

Getting the Wind Up

Exploring the concern about adverse health effects of wind power in Australia and Europe

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About the writer:

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Abstract

Claims about health problems caused directly by wind turbines are threatening to severely limit the further development of the Australian wind industry, especially in the south east of the country. Although at least 17 reviews have found there is no scientific evidence for the claims, they continue to be made wherever a new development is proposed. This paper first looks at the situation in Australia and notes that the perception of noise from turbines is associated with three factors: whether they are in line of sight, whether money is being earned by hosting them and whether the authorities have treated people fairly and respectfully.

The study of the situation in Denmark and Germany provides evidence of a different kind: despite the presence of almost 30,000 wind turbines in these two countries, adverse health effects are not a significant issue in either country. In fact, they are rarely mentioned. There are several reasons for the difference between Australia, Denmark and Germany, one of which is the absence of a strong fossil fuel lobby in the latter countries.

Introduction

The claim that large wind turbines cause adverse health effects in the surrounding population has been made in the last decade. Several studies, none of which have been peer reviewed, have been conducted by medical doctors. The first to achieve prominence was that by Dr Amanda Harry in the UK in 2003. This was followed by a small survey and subsequent report by a GP, Dr David Iser, in Gippsland Victoria in 2005 and by a paediatrician Dr Nina Pierpoint who self-published the book *Wind Turbine Syndrome* in 2009.ⁱ Pierpoint's book and her related articles and submissions to inquiries seem to have ignited opposition around the world, particularly in North America and Australia. According to her, the health effects making up the alleged syndrome (hereafter called WTS) include:

- Sleep disturbance
- Headache
- Visceral vibratory vestibular [the system contributing to balance] disturbance
- Dizziness, vertigo, unsteadiness
- Tinnitus
- Ear pressure or pain
- External auditory canal sensation
- Memory and concentration deficits
- Irritability, anger

Prior to this, the wind opposition movement had focused largely on the issues of landscape, impacts on wildlife, annoyance created by noise and claims that wind power didn't make sense in either financial or energy terms. Whilst these arguments were sometimes effective in delaying wind development or reducing the number of turbines, the claim of adverse health effects is already having a more serious impact.

In the last 12 months, it has arguably been the main factor causing the Victorian state government to honour an election promise and legislate to give homeowners the right to veto within a two-kilometre exclusion zone and to completely ban wind power in some regions of the State. It is also believed to have been critical in the proposal of the NSW government to introduce a similar policy. In South Australia, the opposition party has recently gone down the same path. As a result, the industry's development, in one of the best countries of the world for wind power, is slowing markedly.

Reviews, Studies and Inquiries

In response to growing concern, academics, professional groups and governments around the world have conducted as many as 17 reviews of the available evidence. Their reports have concluded that – whilst there is certainly evidence of annoyance from noise - there is no evidence that WTS exists. It's also significant that world medical authorities have not placed WTS on the international list of recognised diseases.

The latest and possibly most impressive report to deny the existence of WTS was the Massachusetts *Wind Turbine Health Impact Study: Report of Independent Expert Panel* which was released in January 2012. The panel consisted of seven individuals with backgrounds in public health, epidemiology, toxicology, neurology and sleep medicine, neuroscience and mechanical engineering. In conducting their evaluation, panel members conducted an extensive review of the scientific literature as well as other reports, popular media and public comments received by the Massachusetts Department of Environmental Protection. One of its conclusions was that:

“There is no evidence for a set of health effects from exposure to wind turbines that could be characterized as a “Wind Turbine Syndrome”ⁱⁱ.

In Australia, the chorus of complaint by Landscape Guardian groups led first to a rapid review of the scientific literature by the National Health and Medical Research Council in 2010. The NH&MRC concluded that:

While a range of effects such as annoyance, anxiety, hearing loss, and interference with sleep, speech and learning have been reported anecdotally, there is no published scientific evidence to support adverse effects of wind turbines on health. Therefore it is recommended that relevant authorities take a precautionary approach and continue to monitor research outcomes.ⁱⁱⁱ

When wind power opponents weren't happy with this outcome (particularly because their claim that there should be a moratorium on further development wasn't agreed to), they found a friend in Senator Steve Fielding who used his balance of power status to bring about a Senate Committee of Inquiry into the Social and Economic Impact of Rural Wind Farms. The Inquiry conducted hearings around the country and took evidence from experts and ordinary citizens. Some of these were people living near wind farms who claimed their health was badly affected, sometimes to the point that they had been forced to move off their land. One was a farmer from Waubra in Victoria, Carl Stepnell :

Mr Stepnell, whose home was 900 metres from wind turbines at Waubra, informed the Committee that after about six months the turbines began to affect his health:

‘It started with the headaches and the tingling in the head and then eventually the sleep problems—waking up at two to three in the morning and not being able to go back to sleep. It was just every night, maybe until five or six nights of absolute fatigue set in and then you would sleep. It took that long to do it and then away you go again. Then eventually I had heart palpitations, which were a massive concern’.

Mr Stepnell and his wife consulted a medical practitioner who offered to prescribe anti-depressants, but as they were unwilling to turn to medication to live in their home, they bought a house in Ballarat, which was a huge financial cost.^{iv}

One of the experts to give evidence to the Inquiry was Dr Geoff Leventhall, a highly respected British acoustician and a long-time critic of Nina Pierpont's work and WTS. According to Leventhall:

Pierpont has failed to substantiate her hypotheses. These hypotheses lack credibility and do not appear to have any scientific basis. Pierpont has clearly misunderstood much of the acoustic material which she refers to. The so-called "wind turbine syndrome" cannot be distinguished from the stress effects from a persistent and unwanted sound. These are experienced by a small proportion of the population and have been well known for some time. The final conclusion must be that Pierpont has misled both herself and her followers, but she can have the last word, as used by her (p170) in criticism of others: *Let me be emphatic. You can't start with an implausible hypothesis or a flawed data set and get a result that means anything.*^v

The Senate Inquiry's report contained the following key comments:

Adverse health effects may be caused by wind turbines but they may be caused by factors other than noise and vibration, such as stress related to sleeplessness or perceptions of harm. There is insufficient rigorous research to know the answer.

In view of the reported cases of illness and the possible consequences that any adverse health effects may have on communities' acceptance of wind farms the Committee considers that soundly-based studies of these matters should be undertaken as a matter of priority^{vi}.

The Inquiry's recommendation that governments fund further studies will provide state and local governments with reasons to be conservative when deciding on windfarm planning applications and will be a further factor limiting the industry's development over the next few years.

Some Questions Arising

There is no doubt that noise from turbines annoys some people whilst most people are not bothered. According to a recent Swedish review of the literature:

Among the residents with exposures in the range of 35–40 dB [40dB being the max noise allowable at the façade of dwellings in Sweden], the percentage annoyed by noise was about 10% in the Swedish studies and approximately 20% in the Dutch study. The percentage 'very annoyed' by noise was around 6% in all three studies at 35–40 dB exposure.^{vii}

The Massachusetts study also noted that it is a small minority of people who are affected

The percentage of those in the highest noise category (>40dBA) reporting annoyance (~15%) appeared to be higher than among people in the lower noise categories (<5%).^{viii}

The degree of annoyance depends on how people perceive the sound. Factors such as whether they can see the turbines, whether they are receiving money for hosting turbines, whether they expected problems prior to the start-up of the windfarm, and whether the authorities (including the wind company) have treated them respectfully, all play a part.

1. Out of Sight, out of Mind

Two of the four peer-reviewed studies examined by the Massachusetts study found that people were much less annoyed when the turbine was out of sight. According to the report:

The only two papers to consider the influence of seeing a wind turbine...both found a strong association between seeing a turbine and annoyance".^{ix}

2. The Dollar Factor

The Massachusetts report referred to the one peer-reviewed study which examined the impact of money on health effects. It found that very few people hosting turbines on their land, in return for rent, complained at all, even though they generally experienced higher noise levels:

One of the more dramatic findings of this [Dutch] study was that among people who benefited economically from the turbines —who were much more commonly in the higher noise categories—there was virtually no annoyance (3%) despite the same pattern of noticing the noise as those who did not benefit economically.^x

The Australian Senate inquiry noted, after receiving hundreds of submissions from wind opponents, that:

The Committee did not receive any evidence from people who are living near the turbines and who are receiving recompense for the use of their land. The reasons for this are unclear. Several witnesses claimed that the host landholders are subject to 'gag' orders under the terms of their contracts with the developers. This was denied by the industry, although the industry stated that some commercial confidentiality clauses are included in contracts during the planning stages. Mr Geiger, Managing Director, WestWind Energy, stated that: ... our landholders are not subject to any gag orders with regard to health or any other impacts^{xi}.

Simon Chapman, Professor of Public Health at Sydney University, has argued that the 'gag clause' argument doesn't stand up to scrutiny:

Anti-wind farm groups argue that there are many angry turbine hosts who have signed gag clauses preventing them from speaking out. I've collected blank contract forms from Australian companies and none that I've seen contains such clauses. No contract would indemnify any person being harmed from a claim of negligence, so the silence is telling.^{xii}

Lawrence and Kerry Gallagher, who have 19 turbines at Waubra and live

within 600m of them, told ABC 4 Corners in July 2011 that neither they nor their turbine-hosting neighbours had any problems:

Lawrence Gallagher: ...our farming neighbours [are] genuine people and we've lived beside them all our lives and we take them at their word and believe what they say. It's just, we haven't been affected by the noise issues; and all the people, as far as we know, with wind towers haven't been affected, and we live in noisier areas.

Kerryn Gallagher: ... you've got to take their word for itthey genuinely believe that they are sick. And you know I find it really sad to think that it's come to this, ... I just know that it's just not affecting us at all.”^{xiii}

In Australia, I have only been able to find one case of a hosting landowner complaining in any way and that was in a submission to the Senate Inquiry by Mairianne Mackenzie, the co-instigator of the Challicum Hills wind project on her family's land near Ararat in Victoria. Mackenzie, who doesn't actually benefit financially herself, lives around three kilometres from the turbines. Though she remains a supporter of wind power under certain conditions, she complained to the Inquiry about the extent of the earthworks, which took her by surprise, and particularly about what she later described to me as the 'low humming' noise^{xiv}:

Whether or not a sound is stressful depends on what it represents to the hearer. So people who want wind farms will probably enjoy or accept the sound, especially if it is part of what they expected from a wind farm. Those who unwillingly hear noise from towers are more likely to be irritated by the same noise. I was told that there would be no noise at my house. I felt tricked when I discovered that this was not so. The noise of the turbines represented developers' dismissal of noise as a serious issue, or disdain towards wind farm residents.^{xv}

3. The Nocebo Effect

Another factor influencing attitudes to noise is the so-called Nocebo effect. According to the Harvard Medical School:

About 20% of patients taking a sugar pill in controlled clinical trials of a drug spontaneously report uncomfortable side effects — an even higher percentage if they are asked. These effects are one kind of nocebo — a word that means in Latin “I will harm,” as placebo means “I will please.” A placebo makes patients feel better for reasons unrelated to the specific healing properties of the treatment. A nocebo makes patients feel worse (or does other harm) in the same way.^{xvi}

This effect is now a major problem for the wind industry and its neighbours. Because of the fear fostered by anti-wind groups (and in some cases, unintentionally, by the actions of insensitive wind companies and

government bodies), many more people now have negative expectations about wind power. People can then worry themselves into anxiety and sleeping problems. Estimates of the significance of this factor vary enormously with anti-wind groups denying its existence and pro-wind groups arguing that it's a major cause of the claims of WTS.

A related point made by a UK acoustics expert, Dick Bowdler, to the Senate inquiry, is that the confusion in the minds of ordinary people in the UK has been provoked by the careless and arrogant actions of government bodies and wind power corporations. Noise, he says, is a real issue and its ability to cause annoyance is related, as we've seen, to people's perceptions of it. This perception is strongly affected by the way authorities behave, whether they are fair, honest and open with information or not. Bad behavior by authorities leads people, with the help of the Internet, to join with others, to become opposed to wind power and to believe they are suffering from WTS.^{xvii}

Finally, it's worth mentioning that in late 2011, Britain's Institute of Acoustics published what is now the 10th independent review of the evidence on wind farms and health effects. According to Simon Chapman,

And for the 10th time it has emphasized that annoyance has far more to do with social and psychological factors in those complaining than any direct effect from sound or inaudible infrasound emanating from wind turbines... Two factors repeatedly stand out. The first is being able to see wind turbines, which increases annoyance particularly in those who dislike or fear them. The second factor is whether people derive income from hosting turbines, which miraculously appears to be a highly effective antidote to feelings of annoyance and symptoms.^{xviii}

The difference between Australia and Europe

First some background. Germany, one of the world's leading industrial powers, now obtains over 20% of its electricity from renewables (including 7.5% from wind power) whilst Denmark obtains around 33% (including 20% from wind) and Australia, 9% (including 2% from wind). This is despite the fact that Australia's solar and wind resources are much better than Europe's, to the extent that wind capacity factors in south east Australia are commonly nearly double those in Germany and solar irradiance is around 50% higher.

As we've seen, people obviously perceive wind turbines in different ways and this causes a wide range of claims about health effects, ranging from zero to life threatening. Interestingly it appears that perceptions also vary greatly between countries, particularly between Australia, Canada and the USA on the one hand and European countries on the other. The evidence for this is derived from three sources:

1. Statements by politicians and academics

In Australia it is relatively easy to find statements on the web or in the mainstream media by prominent people and organizations on the significance

of adverse health effects from wind farms. In Germany and Denmark, such statements are much more difficult, if not impossible, to find. Nor do inquiries like those carried out by the NH&MRC or the Australian Senate have their counterparts in these countries, despite the much greater intensity of wind power development

Accordingly I contacted politicians, academics and others by telephone and email to obtain statements on the issue. Emails were sent to 40 members of the German Bundestag, including 20 to the members of the conservative governing coalition, the CDU/CSU; 15 to members of the Green Party; and the remainder to members of the centre left SPD and other leftist parties. A selection of the statements is included here, whilst all the statements received can be seen in the Appendix.

The statements, which these leaders of German society made, are both interesting and consistent with other evidence on the lack of a debate over health effects in Germany. In many cases ordinary MPs forwarded my email on to their party's energy spokesperson or to members of the parliamentary or party committees on energy matters. In the end, leading members of the German parliament (the Bundestag) from all four major parties responded.

Michael Kauch is the spokesman on energy and Chairman of the working Group on Infrastructure and Environment of the Free Democratic Party, a centre right party similar to the Liberal Party in Australia. The party has 93 of the 621 seats in the Bundestag.

In Germany we don't have a debate on health issues caused by wind turbines. There are only complaints about noise and shadow flicker caused by the turbines. These problems are handled [by having] minimum distance regulations between the wind parks and residential areas^{xix}.

Volker Beck is the Chief Whip for the Alliance 90/Greens Party which has 68 seats in the Bundestag. According to him:

Health effects are currently no issue in the debate about wind power in Germany. Some years ago, there was a minor discussion about health effects. There were questions about possible effects from infrasound however, wind power plants cannot be built close to houses, therefore the discussion calmed down considerably. Combined with further regulation in regard to infrasonic and distance regulations, the health discussion has ended here^{xx}.

Hans Josef Fell, the energy spokesman for the Greens party wrote:

The health effects argument was a topic 5-10 years ago in northern Germany, where most wind power generators are located. After the policy change of 2011 most southern German states are trying to build up more wind capacity too. Now the same arguments we often faced in the north are brought up again [in the south]. The difference between Germany and Australia may be that here neither the political parties nor the media are making a big topic out of it. In 2007 the newsmagazine *Der Spiegel* had a cover story about "Der Windmühlen Wahn" (The Wind Turbine Delusion) but

discussions of the health effects were only side aspects in the article and right now it is not a debate in society.

The claims of the Waubra Foundation about health effects in a distance up to 10 kilometers are of course totally ridiculous. We have millions of people in Germany living within a distance of 10 kilometers to the next turbine. And tens of thousands who have lived near turbines for up to 25 years without health problems which anybody links to wind power. Much more important are the health effects of nuclear and fossil power plants. Wind power relieves us from bad health effects caused by nuclear and coal^{xxi}.

Dirk Becker is the energy spokesman for the socialist party, the SPD, which has 146 seats. (It was the alliance of the SPD and the Greens which passed important renewable energy legislation in the 1990s).

There is no similar debate about adverse health effects of wind turbines in Germany as there is in Australia. Certainly, there are citizens' initiatives against wind turbines in their vicinity. However, their main motivation is to protect the landscape. This is especially in the south of Germany where people are very concerned with their natural environment. Although many Germans live within a kilometre or so of wind turbines, claims about health effects are quite rare.^{xxii}

Thomas Bareiss is a member of Angela Merkel's CDU/CSU governing coalition which, with 238 members in the Bundestag, has overseen a huge expansion in wind power capacity. According to Bareiss' political adviser:

... based on meetings of the [Christian Democratic Union Party's] Environment and Economic Committee, there is hardly/no debate concerning adverse health effects caused by wind turbines^{xxiii}.

Professor Hans Kleinsteuber teaches politics and journalism at the University of Hamburg:

After Fukushima, our conservative government ... decided to start closing all nuclear plants within ten years. There is virtually a consensus in the country that we expand renewable energy as fast as we can. I can assure you that in the densely populated Germany we have much experience with wind turbines. This is a small country where many people live close to turbines, sometimes only a few hundred metres away. There have been complaints relating to noise at certain times and to the shadow of the blades, but public support is very strong and we haven't heard lately about any health hazards^{xxiv}.

Steen Gade, is the Chairman of Denmark's Parliamentary Standing Committee on Energy, Climate and Housing. He wrote:

The opponents to wind power in Denmark try to raise the issue of adverse health effects but with little success. It is just not an issue which has achieved much traction in this country. Wind power has strong public acceptance and a majority in parliament support the expansion of wind power capacity, both onshore and offshore. For the opponents, issues like the impact on landscape values and on

nature as well as the risk of annoyance due to noise problems are much more important than alleged health effects. The government is dealing with the problems people raised; for example, we have recently adopted binding limits for low frequency noise.^{xxv}

Dr Poul Ostergaard is an expert in energy planning in Denmark:

I am not sure which health effects you are referring to - so I guess you can take that as an indication of a lack of debate here... There is a small debate on infra sound - but it is not a very active debate. A brief visit to the website of the Danish anti-wind power organisation "Neighbours to wind turbines" ("Naboer til Vindmøller") didn't reveal health effects being promoted as a cause of concern. The present Danish coalition government which came into office this autumn ... is quite pro-wind I may add.^{xxvi}

Paul Gipe, the US-based author of *Wind Power: Renewable Energy for Home, Farm and Business* and five other books on wind power, wrote creatively of his own 'illness':

Yes, anti-wind hysteria has made me sick. I got queasy in my stomach when I thought of the 150,000 wind turbines operating worldwide and still no epidemic of death and disease had yet broken out despite the sickening anti-wind hype in the English-speaking world. I worried myself sick that a new Black Death would strike Germany and Spain who together have one-third of the world's wind turbines. I fretted even more that Europe would collapse in panic and mayhem from its 100,000 wind turbines, many now operating for decades.

Why then are Germans, Danes, and Spaniards not falling by the thousands to dementia and disease? Are they made of sterner stuff? Or is it simply that they don't speak English and can't read all the propaganda fostered by the anti-renewables lobby. It is the anti-renewables lobby—it's not just anti-wind anymore, they're after solar too—that makes me sick.^{xxvii}

Finally, though not in response to my survey, the British Wind Energy Association, made its views on the European situation known to UK-based digital publisher, BusinessGreen:

The BWEA also pointed out that there was no evidence of the existence of Wind Turbine Syndrome from those countries with the highest density of wind turbines, such as Germany and Denmark. In Germany, they have deployed 15,000 turbines in the past 20 years, and yet there has been no detectable increase in any of these health symptoms identified as being caused by turbines," said the spokesman for the trade group.^{xxviii}

2. The Policies of Political Parties

Major political parties in Denmark and Germany, including conservative parties at local and national levels, strongly support the development of renewables, especially wind, solar and biomass, and appear to steer clear of wind opponents, whether or not they are claiming

adverse health effects. Consistent with this, wind opposition websites contain no mention of groups or individuals having access to the senior levels of political parties.

This is not surprising. Chancellor Angela Merkel who leads the Christian Democratic Union, the largest conservative party in Germany, is one of the strongest supporters of renewables, of which wind power is by far the most important:

"It's over," she told one of her advisers immediately after watching on TV as the roof of a Fukushima reactor blew off. "Fukushima has forever changed the way we define risk in Germany.... We want to end the use of nuclear energy and reach the age of renewable energy as fast as possible."^{xxix}

As a result of this wide support, wind opposition groups in Germany have to struggle hard for support and exposure. In what I expect is a fairly typical situation, one local German group writes on its website:

We have only 4 of 50 seats in the district council. So do not expect any miracles from us. We can only be the thorn in the flesh of the mighty. We are facing the overwhelming majority of the major factions of the CDU, SPD and the Left. ^{xxx}

In Denmark also, there is cross-party support for wind power development. This was illustrated in a parliamentary vote, as recently as March 2012, for a more radical energy policy which will see wind power accounting for 50% of the nation's electricity supply by 2020.

The center-left ruling coalition led by Prime Minister Helle Thorning-Schmidt's Social Democrats as well as the Liberal Party, the Danish People's Party, the Danish Red-Green Alliance and the Conservative Party united Friday to approve what the government called "the world's most ambitious energy policy."

The vote in the Folketing to back Thorning-Schmidt's call for carbon dioxide emissions in 2020 being 34 percent lower than they were in 1990 was "a decisive step toward a society free of coal, oil and natural gas," said Danish Minister for Climate, Energy and Building, Martin Lidegaard...In addition to the CO2 reduction targets, under the Danish plan, energy consumption would decrease more than 12 percent in 2020 compared to 2006; more than 35 percent of the country's energy would be derived from renewable energy sources; and 50 percent of its electricity consumption would stem from wind power.

"It is the broadest, the greenest and the most long-term energy agreement that has ever been reached in Denmark," Lidegaard said. "Therefore, this is a historic day for Danish energy policy." He praised the broad-based nature of the energy package's support, in which parties controlling 170 of the Folketing's 179 seats signed on to the far-reaching agenda.^{xxxi}

3. The Priorities of the Opposition Movement

In April 2011, Germany's leading newspaper, Der Spiegel, ran an article headed *Resistance Mounts to Germany's Ambitious Renewable Energy Plans*.

The 1500 word article made no mention of health effects at all; the only concerns noted were those related to landscape and other environmental effects:

Many are now asking themselves if the transition to renewable energies will ruin the nation's countryside. The German Wind Energy Association (BWE) states that 21,607 high-tech wind turbines are already in place in Germany. Some fear that the zeal to install wind turbines mirrors the drive to build motorways into West German towns in the 1960s. That was regarded as ultra-modern at the time, but it created massive, irreversible eyesores. Germany's Federal Agency for Nature Conservation is already warning that in the rush to expand renewable energies, nature and wildlife conservation is being put on the back burner. The need to get out of nuclear power seems to be overriding all other concerns. ^{xxxii}

The same article briefly mentioned the local wind power protest groups:

Germany's opposition to wind power is well organized. The website windkraftgegner.de lists more than 70 protest campaigns. They seem every bit as dogged as Merkel's government. ^{xxxiii}

Windkraftgegner.de describes itself as 'an independent portal for community groups ... in Germany who speak out against wind power in general or specific wind power projects'. There are 78 groups listed on the site and it was the only one I came across which listed opposition groups across the country.

Table 1 shows that, contrary to Der Spiegel's suggestion of a well-organized national network, almost half the websites had lapsed or allowed their domain names to be taken over by unrelated private companies. Of the remaining sites, all mentioned landscape, nature protection or poor economic feasibility as reasons for opposing the turbines, whilst only 13 devoted more than two lines to adverse health effects and 15 made no mention of health effects at all. Of the 13 with two or more lines, only three could be said to be taking health effects seriously by devoting more than a paragraph to the subject.

Table 1 Windkraftgegner – Reasons for Opposition

Total no. of opposition groups listed	Lapsed, domain name sold or not relevant	Mentions landscape, nature or economics	Mentions health effects: 1-2 lines	Mentions health effects: 2+ lines*	No mention of health effects
78	34	44	17	13	14

*Includes sites where links to health-related sites were given. Source: www.Windkraftgegner.de

Perhaps most significant is the fact that of the 44 active websites, only one mentioned a particular person having suffered any health effects or having

sold up and moved elsewhere. Nor could any references be found to media stories of individual cases.

Though a similar analysis was not carried out, it appears certain that the situation in Denmark is much the same, with one major difference. The nationally organised opposition group Neighbours to Wind farms, which is mainly concerned about landscape and nature protection, is not actually against wind farms as such.

The company Jysk Wind is a victim of the misconception that the National Association of Neighbours of Wind Turbines is a 'windmill opponent'. It's not the case. We are keen that Denmark should be a leader in renewable energy and wind power, like everyone else. We only advocate that legislation should be designed such that the establishment of wind turbines must be done in a decent manner, taking into account those people who must live near the turbines and also nature and the economy generally... Without us opposing them, the wind industry would get a free hand to destroy the parts of our nature not yet spoiled by the huge power plants already existing.

From England, Germany and especially Spain, we get reports of killings of large, rare and protected birds. In a Spanish study it was claimed that the wind industry distorts the truth and actively tries to hide the carnage from the authorities and the public". ^{xxxiv}

Interestingly this relatively weak opposition in these two countries, compared to that in Australia, exists despite the much greater population pressure and the much more obvious presence of turbines in the landscape. As can be seen in Table 2, Denmark and Germany have 7 and 4 times respectively more Kw of wind power per person and around 45 times more Kw of wind power per square kilometer than Victoria. (which is broadly representative of the populated parts of Australia).

Table 2. Wind power in relation to population and area

Country/ State	MW (‘000Kw) wind onshore	Population	Area k2	Kw wind power/person	Spatial intensity Kw/k2
Australia	2176	22,100,000	7,692,024	0.1	0.2
Victoria	428	5,500,000	227,600	0.1	1.8
Denmark	3622	5,500,000	43,100	0.7	84.0
Germany	28968	81,200,000	357,000	0.4	81.1

Source: Wikipedia, March 2012

Note: Because turbines differ so greatly in size, from 100KW to 6MW, it would be misleading to use #turbines/ person or /K2 of area.

As might be expected, in Europe setback limits (or the minimum distances between turbines and houses) are generally much smaller than the two kilometre minimums now in force or proposed in Victoria and NSW respectively. Although there are differences between the two countries and within Germany itself, the minimum setback is generally between 300m and 1000m. In Denmark it is four times the tip height of the turbine, so long as a maximum sound level of 20dBA for low frequency sound is not exceeded; in Germany, as can be seen in Table 3, it is the ambient noise in the area. The higher the ambient noise, the lower the minimum setback.

Table 3. Germany – minimum setbacks

<u>Nature of area</u>	<u>Ambient noise level</u>	<u>Setback distance</u>
Quiet regions	35 dB(A)	1,000-1,500 m
Middle regions	40 dB(A)	600-1,000 m
Standard regions	45 dB(A)	300-600 m

Source: www.wind-watch.org/documents/european-setbacks-minimum

Explaining the Difference in the Relative Strengths of the Opposition Movements

1. The Fossil Fuel Lobby

One factor is the political and financial power of the fossil fuel industries in Australia, often called the Greenhouse Mafia.

As Sandi Keane recently wrote in the on-line publication *Independent Australia*:

It's no secret the wind industry in Australia has powerful political and corporate enemies. That was evidenced in September 2004 when the leaked memo from the Lower Emissions Technology Advisory Group's (LETAG) – comprising Prime Minister Howard's handpicked group of 12 high level fossil fuel users and generators – signalled the Howard government's intention to follow LETAG's advice and kill off the wind industry.^{xxxv}

Keane has also found that there are close associations between the fossil fuel industry and some closely connected anti-wind groups: Landscape Guardians, the Institute of Public Affairs, the Australian Environment Foundation and the Waubra Foundation.

The Institute of Public Affairs [IPA] has been spinning the facts on climate change for decades now on behalf of Billiton, Western Mining, Caltex, Esso Australia (a subsidiary of Exxon), Shell and Woodside Petroleum. It also receives funding from the Murdoch press.

The head of the Waubra Foundation, Peter Mitchell, certainly has interests in the fossil fuel industry. These include founding Chairman of the Moonie Oil Company Ltd and Chairman or a Director of related companies including Clyde Petroleum plc, Avalon Energy Inc, North Flinders Mines Ltd, Paringa Mining & Exploration plc (most now delisted on the ASX). According to Lowell Resources Funds Management Pty Ltd, Mitchell's experience is derived from over 25 years' involvement in companies that explored for, developed and financed gold and base metal mines, oil and gas fields and pipeline systems in Australia and overseas.^{xxxvi}

It's interesting to note that an offshoot of the IPA, the mischievously named and US-funded *Australian Environment Foundation*, organised a very angry protest at the official opening of the 4MW Hepburn community-owned windfarm in 2010^{xxxvii}.

2. Public awareness of energy security and safety issues

As we've seen, major European political parties actively support wind power and solar and major media stories against it are rather rare. And because of lack of public pressure, major government inquiries of the sort which the Australian Senate conducted in 2011 are unheard of.

In the general population surveys regularly indicate a support level of 70%-80% for more wind power. For example, a 2007 European Commission survey (the latest available):

... showed that 71% of EU citizens are "very positive" about the use of wind energy in their country. Only solar power reaches a slightly higher acceptance level (80%), whereas gas is supported by 42%, coal by 26% and nuclear power by just 20%.^{xxxviii}

Since the Chernobyl disaster, Europeans have had a strong fear of nuclear power. This was greatly intensified by the meltdowns at Fukushima in 2011. As a result of this fear, any technology which lessens the threat of nuclear accident, and reduces CO2 emissions, is likely to be popular; at the same time, annoyance from noise is more likely to be a minor issue for most people.

3. Government action

In Denmark, since the early days of the wind industry, governments at all levels have made a concerted effort to gain public support. The Massachusetts Inquiry conducted a brief review of the situation in several European countries and particularly liked the Danish model which requires strong community engagement by local councils and developers. The main features of the model are:

- Municipalities are responsible for developing energy plans that meet renewable energy targets
- Community maps indicate suitable areas for wind turbine placement, thereby providing an up-front process between regulators and residents before developers are involved.
- Community members receive a number of direct benefits from the wind turbines including [via the grid] the electricity itself; opportunities to purchase shares of nearby wind projects; compensation for loss of property value if their homes are close by; and resources to support community-owned wind power associations.

xxxix

Regarding Germany, the authors commented that:

Over the last 20 years, Germany has enacted a number of coordinated policies that have served to greatly accelerate the use of renewable energy sources, such as wind. These policies include ... incentives such as tariff structures for renewable energy, community mapping designating areas for wind turbines up front, and comprehensive noise and siting regulations. Additionally, public engagement in Germany has been prominent, including widespread education about renewable energy, research involving the country's educational and other institutions, and incentives for community and other ownership (such as by farmers) of wind turbines.^{xi}

Around three quarters of renewable power investments in Germany have been made by communities, farmers, other individuals and small to medium-sized enterprises, *not* by the big four utilities. The incentives for communities, individuals and small organizations to become involved could be the key factor in limiting opposition and avoiding the sort of problems encountered in Australia.^{xii}

4. Language differences

Fossil fuel lobbies, public awareness of climate change, fear of nuclear power

and government action may not be sufficient to explain the extreme difference between continental Europe on the one hand and North America and Australia on the other. Is it possible, as writer Paul Gipe has suggested, that WTS is an English language phenomenon, that it only exists at present in countries where English is the main language? Nina Pierpoint's book was of course first published in English. It could be argued that due largely to the Nocebo Effect, the ideas expressed in the book quickly spread throughout those parts of the English-speaking world where wind power could be seen as a threat of some sort, eventually running up against the language barrier.

Given that the book has recently been translated into the main European languages, we might see an upsurge in complaints of WTS-like symptoms in Germany, Denmark and other European countries. If so, the complainants will have to explain why it has taken so long for the symptoms to appear.

Concluding Remarks

Until further detailed peer-reviewed studies are carried out, it seems certain that the debate over health effects and WTS in Australia will continue unabated. Already, conservative governments are introducing or proposing restrictive legislation on setbacks and wind power development is stalling as a result. In stark contrast, in Germany and Denmark, despite the much greater population and turbine density, the health effects argument hasn't gained traction and development in those countries is proceeding apace with bipartisan political support.

There *is* opposition to wind power in both Denmark and Germany. But, compared to the Australian movement based around the Landscape Guardians, it is weak, locally organized, ineffective at national and state political levels, and has as its main concerns protection of landscape and flora and fauna.

Moreover, political parties in Germany and Denmark, both conservative and socialist, support the industry; the population at large is worried about the safety of nuclear power, climate change and energy security and therefore strongly supports renewables development; there is no equivalent of the Waubra Foundation or indeed of national or state leaders of the prominence of Sarah Laurie or Peter Mitchell; there is no significant fossil fuel lobby or Greenhouse Mafia; and reportage of the issue of health effects in national media appears to be quite rare. Furthermore, when opposition websites mention health effects, it often seems like an after-thought, as it is usually well down on the list of the 15 or so 'problems' said to be caused by wind power.

The politicians, academics and others who responded to my inquiries were unanimous that there was little debate over health effects in either country.

In future, local opposition groups in Denmark and Germany may grow in

importance but it will almost certainly be due to landscape, not health issues. Good, windy sites are becoming harder to find with the result that wind farms are being built in areas with lower wind speeds; this results in pressure for progressively taller, more intrusive, turbines.

In both Australia and Europe the public strongly supports renewables development but there the similarities stop: there is no political consensus in Australia and that is at least partly because of the power of the fossil fuel lobby and its friends in parliament and partly because our largest media organization, News Limited, opposes wind power: as this company controls 70% of the newspaper market, it has a very powerful influence on opinion. In addition, successive state and federal governments have failed to introduce effective renewables policies, thereby causing debilitating 'boom and bust' cycles which have helped to cause companies and talented individuals to head overseas.

This study has thrown even more doubt on the validity of claims that wind turbines are causing adverse health effects or WTS, apart, that is, from the stress effects caused by annoyance to a small minority of residents. At the same time, it has thrown up a critical question: if major problems haven't surfaced in those European countries most intensively farmed for their wind power, why would they arise so stridently in Australia, Canada and the US which have large land areas with relatively few turbines? Unless of course it was due in part to the existence of a common language and, perhaps most importantly, to the activities of very powerful fossil fuel lobbies in each country, supported and encouraged by a host of influential, conservative organizations to fan the flames of discontent.

Endnotes

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- iii *Wind Turbines and Health: A Rapid Review of the Evidence*, NH & MRC, 2009, published in 2010.
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- v *ibid*, Paper no. 465
- vi *ibid*, Final Report, paras 2.99 and 2.100
- vii Karl Bolin, Gösta Bluhm, Gabriella Eriksson and Mats E Nilsson, *Infrasound and Low Frequency Noise From wind Turbines: Exposure and Health Effects*, Environmental Research Letters 6, IOP Publishing, 2011
- viii Massachusetts Study, *Op cit*, p18
- ix *ibid*, p27
- x *ibid* p20
- xi Senate Report para 2.16
- xii Simon Chapman, Much Angst over Wind Turbines is just Hot Air, SMH 21/12/11
- xiii Transcript, *Against the Wind*, 4 Corners ABCTV, broadcast 25/7/11
- xiv Personal communication 22/3/12
- xv Senate Inquiry, Submission No. 892
- xvi http://www.health.harvard.edu/newsweek/The_nocebo_response.htm
- xvii *Senate Report, Submission No.218, pages unnumbered*).
- xviii Simon Chapman, *op cit* (Note: the latest 2-3 editions of the Institute's Acoustics Bulletin are not yet on the Institute's website – hence the reliance on a newspaper report)
- xix *Personal communication 13/4/12*
- xx Personal communication 29/2/12
- xxi Hans-Josef Fell, MP, co-author of the renewable energy legislation in Germany Spokesman on Energy for German Alliance90/Green Party, personal communication, 6/3/12
- xxii Personal communication 11/4/12
- xxiii Dr Swantje Renfordt, political adviser to Thomas Bareiss MP. Personal communication 22/3/12
- xxiv Personal communication 30/1/12
- xxv Personal communication 22/2/12

xxvi Personal communication 20/12/11. (Poul Østergaard is Associate Professor, Energy Planning, Department of Development and Planning, Aalborg University, Aalborg, Denmark).

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xxxi *Denmark OKs Ambitious Green Energy Deal*, UPI, 25/3/12

xxxii *Resistance Mounts to Germany's Ambitious Renewable Energy Plans*, Der Spiegel, op cit

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xxxviii <http://www.wind-energy-the-facts.org/fr/environment/chapter-6-social-acceptance-of-wind-energy-and-wind-farms/>

xxxix Mills, Dora Anne and Manwell, James F, *A Brief Review of Wind Power in Denmark, Germany, Sweden, Vermont, and Maine: Possible Lessons for Massachusetts*. January 11, 2012, www.mass.gov/dep/energy/wind/briefreview.pdf

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xli Morris, Craig, *Myths and Facts: the German Switch from Nuclear to Renewables*, Heinrich Boll Stiftung, 2012 (<http://boell.org/web/139-Craig-Morris-Myths-Facts-Germany.html>) See also Gordon Walker, Patrick Devine-Wright, Sue Hunter, Helen High, Bob Evans, *Trust and Community: Exploring the Meanings, Contexts and Dynamics of Community Renewable Energy*, in *Energy Policy*, 2009

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Appendix

Statements by politicians and academics

Note: all these statements were sent by email to the writer on the dates listed.

1. Denmark

I am not sure which health effects you are referring to - so I guess you can take that as an indication of a lack of debate here. In addition to what you mention yourself, there is a small debate on infra sound – but it is not a very active debate. A brief visit to the website of the Danish anti-wind power organisation “Neighbours to wind turbines” (“Naboer til Vindmøller”) didn’t reveal health effects being promoted as a cause of concern. The present Danish coalition government which came into office this autumn ... is quite pro-wind I may add.

- Poul Østergaard,

Associate Professor, Energy Planning, Department of Development and Planning,
Aalborg University, Aalborg, Denmark.

20/12/2011

We have no such discussion in Denmark.

- Prof. Henrik Lund

Sustainable Energy Planning & Management, Aalborg University

19/12/2011

The opponents to wind power in Denmark try to raise the issue of adverse health effects but with little success. It is just not an issue which has achieved much traction in this country. Wind power has strong public acceptance and a majority in parliament support the expansion of wind power capacity, both onshore and offshore. For the opponents, issues like the impact on landscape values and on nature as well as the risk of annoyance due to noise problems are much more important than alleged health effects. The government is dealing with the problems people raised; for example, we have recently adopted binding limits for low frequency noise.

- Steen Gade,

Chairman, Parliamentary Standing Committee on Energy, Climate and Housing, The Folketing (Parliament of Denmark)

22/2/2012

In Denmark, there is a focus on noise issues, especially low frequency noise, as well as landscape. Whilst health issues are part of the public debate, the opponents have not succeeded in convincing public opinion that there is a relationship between windmills and health.

- Henrik Vinther

Sekretariatsleder, VidenOmVind

(Head of Secretariat, Knowledge About Wind website)

5/3/2012

2. Germany

... based on meetings of the [Christian Democratic Union Party's] Environment and Economic Committee, there is hardly/no debate [sic] concerning adverse health effects caused by wind turbines.

- Dr Swantje Renfordt, political adviser to Thomas Bareiss MP, CDU
2/3/12

I heard about the rumors about health and wind energy. In Germany there is no problem about that. But in the United States they have the same discussion. Trust me, there is no reason. In Germany we discuss about landscape, sound and radar issues (especially in north-west Germany round about 1.5bln Euro investment are blocked).

In Germany the big issue is acceptance! Community wind power for example is one key: everybody who is living close to the wind turbine/farm could participate during the planning process or financially. And if you earn money with wind or the community gets taxes for financing (for example a kindergarten), most people support the wind farm.

- Heiko Jessen, Part owner, Galmsbull windfarm, Schleswig Holstein, 23/1/12

Health effects are currently no issue in the debate about wind power in Germany. Some years ago, there was a minor discussion about health effects. There were questions about possible effects from infrasonic and "Schattenwurf" (i.e. moving shadows of the wind power blades that disrupt the lightning conditions in houses or gardens). However, wind power plants cannot be built close to houses, therefore the discussion calmed down considerably. .. Combined with further regulation in regard to infrasonic and distance regulations, the health discussion has ended here. .. Wind power in Europe is understood to be a price efficient and reliable source for renewable electricity.

-Volker Beck, Chief Whip of the Parliamentary Group of Alliance 90/The Greens, German Bundestag,
29/2/12

The health effects argument was a topic 5-10 years ago in northern Germany, where most wind power generators are located. After the policy change of 2011 most southern German states are trying to build up more wind capacity too. Now the same arguments we often faced in the north are brought up again.

The difference between Germany and Australia may be that here neither the political parties nor the media are making a big topic out of it. In 2004 the newsmagazine "DER SPIEGEL" had a cover story about "Der Windmühlen Wahn" ("The Wind Turbine Delusion") but discussions of the health effects were only side aspects in the article and right now it is not a debate in society.

The claims of the Waubra Foundation about health effects in a distance up to 10

kilometers are of course totally ridiculous. We have millions of people in Germany living within a distance of 10 Kilometers to the next turbine. And tens of thousands who have lived near turbines for up to 25 years without health problems which anybody links to wind power. Much more important are the health effects of nuclear and fossil power plants. Wind power relieves us from bad health effects caused by nuclear and coal.

- Hans-Josef Fell, MP
Co-author of renewable energy legislation in Germany
Spokesman on energy for German Green Party,
6/3/12

In Germany we don't have a debate on health issues caused by wind turbines. There are only complaints about noise and shadow flicker caused by the turbines. These problems are handled [by having] minimum distance regulations between the wind parks and residential areas.

- Michael Kauch, spokesman on energy and Chairman of the working Group on Infrastructure and Environment of the Free Democratic Party, 13/4/12

There is no similar debate about adverse health effects of wind turbines in Germany as there is in Australia. Certainly, there are citizens' initiatives against wind turbines in their vicinity. However, their main motivation is to protect the landscape. This is especially in the south of Germany where people are very concerned with their natural environment. Although many Germans live within a kilometre or so of wind turbines, claims about health effects are quite rare.

- Dirk Becker, energy spokesman for the socialist party, the SDP

After Fukushima, our conservative government ... decided to start closing all nuclear plants within ten years. There is virtually a consensus in the country that we expand renewable energy as fast as we can. I can assure you that in the densely populated Germany we have much experience with wind turbines. This is a small country where many people live close to turbines, sometimes only a few hundred metres away. There have been complaints relating to noise at certain times and to the shadow of the blades, but public support is very strong and we haven't heard lately about any health hazards.

- Prof. Hans J. Kleinsteuber, Dept of Political Science, University of Hamburg
31/1/12

We had all these claims and arguments at several wind projects in Germany, too, mainly 8, 10 or 12 years earlier and books were written in favour and against these claims. But in Dardesheim we didn't get such claims. My impression is, as soon as people feel honestly being involved in the preparation of those wind farms and if they have real and fair chances to participate, most of the headaches disappear and they get aware, that more men and animals die with their cars than their wind turbines. If Thomas Radach [the first person to install a turbine in the area] is asked by journalists, if he suffers on the noise and the infrasound of his fast running real noisy

old, but profitable, wind turbine fifty meters nearby of his new house he always smiles and answers: It's exactly the opposite: I can not sleep, if don't hear the noise ...

And now in Germany as more than 100.000 new jobs in the wind industry were developed the small but sometimes noisy opposition against wind turbine can be seen on the level of the opposition against the railways 100 years before ...

- Heinrich Bartelt, owner, Dardesheim wind farm, east Germany 15/11/2010

Europe -general

Yes, anti-wind hysteria has made me sick. I got queasy in my stomach when I think of the 150,000 wind turbines operating worldwide and still no epidemic of death and disease had yet broken out despite the sickening anti-wind hype in the English-speaking world. I worried myself sick that a new Black Death would strike Germany and Spain who together have one-third of the world's wind turbines. I fretted even more that Europe would collapse in panic and mayhem from its 100,000 wind turbines, many now operating for decades.

Why then are Germans, Danes, and Spaniards not falling by the thousands to dementia and disease? Are they made of sterner stuff? Or is it simply that they don't speak English and can't read all the propaganda fostered by the anti-renewables lobby.

It is the anti-renewables lobby—it's not just anti-wind anymore, they're after solar too—that makes me sick.

- Paul Gipe

Author, renewable energy analyst and director of Wind-works.org
8/2/12

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