# Geoff Putland & Christine Thompson

**MEMBER OF THE GLEN INNES LANDSCAPING GUARDIANS INC**

10th February 2011

Senate Community Affairs Committee
Department of the Senate
PO Box 6100
Parliament House
CANBERRA ACT 2600
AUSTRALIA

Email: community.affairs.sen@aph.gov.au

Dear Sir/Madam

**Re: Senate Inquiry into the Social and Economic Impact of Rural Wind Farms in Australia**

We attach our submission in relation to the above inquiry into the Social and Economic Impact of Rural Wind Farms in Australia, and in particular:

(a) Any adverse health effects for people living in close proximity to wind farms;
(b) Concerns over the excessive noise and vibrations emitted by wind farms, which are in close proximity to people's homes'
(c) The impact of rural wind farms on property values, employment opportunities and farm income;
(d) The interface between Commonwealth, state and local planning laws as they pertain to wind farms; and
(e) Any other relevant matters.

We are beef producers, residents of the Furracabad Valley, and land owners in both the Furracabad and Matheson Valleys west of Glen Innes on the northern tablelands of New South Wales. These properties are situated at the foothills of the Waterloo Range, 14 to 20 kilometres west of Glen Innes where two wind farms are proposed. The Glen Innes Wind Farm (25 turbines) has been

approved and is in the Furracabad Valley. The other proposed wind farm (viz: Whiterock Wind Farm) is on the Southern and Western boundary of our property (in the Matheson Valley) which will include over 100 wind turbines. Further, on our South Eastern boundary, another wind monitor has recently been erected, which is a precursor to another wind farm development on the edge of our properties.

Our submission is written from our perspective as substantial landowners and beef producers in the Glen Innes area and relates to our experiences with the Glen Innes Wind Farm and discussions with other residents and consultants to the Wind Farm industry.

We thank you for the opportunity to submit comments to this Senate Inquiry and strongly believe that the relevant authorities should immediately suspend all wind farm development applications and approvals, pending the outcome of this very important Inquiry.

Firstly, we want to state unequivocally that we support the Federal Government's target of producing a significant amount of the country's electricity needs from renewable sources by 2020. However, in relation to wind farms, such ideals cannot be pursued without proper consideration of the consequences and effects of the construction of these industrial installations, on the rural communities that are living in very close proximity to these wind turbines. We have serious concerns about the design and execution, to date, of wind farms in Australia.

We do not oppose the principle of Wind Power Electricity Generation but believe that they must proceed appropriately and in suitable areas, in a smooth and timely manner. As this is not happening at present one is brought to the inevitable conclusion that the processes currently being used are clearly not working. This is largely because of the ad-hoc process now adopted in the current endeavour to secure approvals for proposed wind farms in the fastest possible time. Ie. Development fast-tracking.

We believe a good deal more consideration must be given by Governments and Approval Authorities (at all levels – Federal, State and Local) to take into account the severe social issues (which cannot be disputed) that wind farms are causing in populated rural agricultural and lifestyle communities.

There are no formal guidelines in New South Wales (except the Draft Guidelines issued in 2002) OR at the Federal Government level for wind farms. It is our sincere desire that this Inquiry will address this untenable situation.

Interestingly, affected Local Councils are leading the way in terms of wind farm guidelines, by establishing their own Development Control Plans for Wind Energy. However their leadership is largely ignored by Wind Farm developers for obvious reasons, (they don't want to abide by Councils' guidelines). Further,

the New South Wales Department of Planning, (the consent authority for wind farms in NSW) appears to be ignoring Local Councils' DCP guidelines, and this has effectively rendered Local Councils' guidelines impotent in the wind farm debate. How can the fact that there are no concrete guidelines, which include setbacks and compensation for affected local residents, for such major Industrial Developments such as wind farms be acceptable to anyone involved in the wind farm development process, as well as the general population, in the current era of social awareness and accountability?

How can there be no regulations protecting the rights of unrelated land owners (ie. Neighbours to farms hosting turbines) from having turbines in close proximity to their homes and hence their livelihoods. This is cruel and unconscionable. All people are asking for is due consideration, respect and a sense of decency to be applied to them, as would be applied to any other part of the community. Instead, those that speak out to defend their position are treated like pariahs. Communities are being polarized and may never recover.

Two fundamental issues are polarizing rural inhabitants and delaying the establishment of Wind Farm viz:

1. Inadequate community consultation by the Developer, which considers and complies with local community wishes; and

2. How close should wind farm developments be permitted to: houses, schools, hospitals etc; now that it is known that wind farms have severe negative:

    - Social;
    - Noise;
    - Visual;
    - Health, and
    - Financial

    Impacts on people living in close proximity to a wind farm.

If wind power generation is to be successful, and we want it to be, it needs to adhere to "principled guidelines" that create a "win-win" situation for all parties involved. In that way rural communities are not polarized. The developers need to look at tracts of land that don't impact on densely settled areas. These options are vast within Australia and must comply with principled guidelines and legislated setbacks. Like any development in Australia, care must be taken at all levels of government and public administration to ensure that Procedural Fairness and Natural Justice is given to all parties. In the case of Wind Farms this must include affected neighbours, affected local communities and other

interested parties. This is clearly not happening at present in the wind power electricity generation industry.

The positioning of very large wind turbines (currently 130 metres in height) in extremely close proximity to rural residential homes and Government community buildings, eg. Schools, hospitals etc, should not be allowed.

We believe that it is essential for the Federal and State Governments to show leadership in Wind Farm Energy Generation and develop clear and specific Guidelines in relation to the development of rural wind farms. Many Councils throughout Australia, including the Glen Innes Severn Council, have produced Development Control Plans for Wind Farms ("DCP") which include a minimum 2 kilometre setback from rural homes or home sites. In our situation in Glen Innes, this setback is supported by local residents, hundreds of local petitioners to the New South Wales State Parliament (over 600 signatures that were gathered in response to the proposed Glen Innes Wind Farm development) our local member, the Hon. Mr Richard Torbay MP and turbine manufacturers in Europe. In addition, the NSW State Government held an extensive and detailed Inquiry into Rural Wind Farms in NSW in August 2009, which supported, among other things, a 2 klm setback. This Inquiry was called The General Purpose Standing Committee No 5 Inquiry into Rural Wind Farms in New South Wales.

At Appendix 1, follow the link to print and review the findings of The General Purpose Standing Committee No 5's Report into Rural Wind Farms in New South Wales, dated December 2009.

We believe a minimum 2 kilometre setback of turbines from rural residences is essential. Under Common Law, any turbine situated closer than 2 kilometres could be considered a "Nuisance" due to the adverse auditory, visual and financial impact of such turbines situated within close proximity to homes.

Many wind farm developers are employing consultants to produce their required Environmental Assessment Reports in order to seek approval for their wind farm developments. Some reports being produced can, in many areas, only be described as a minimalist review of the local environment, with disregard for the opinions and rights of people living in the nearby community. The former NSW Premier, Mr Rees went on the record and stated that "As long as this fast-tracking (of renewable energy developments) does not trample over community concerns regarding noise and visual pollution, it will (the fast-tracking) help to establish a more environmentally sustainable energy sector in NSW, to create green jobs and attract more investment." (Glen Innes Examiner, 17 March 2009) – this doesn't appear to be happening.

In the past, some Environmental Assessments ("EA") contained numerous inaccuracies and omissions and thereby confirmed their lack of consultative

processes with local communities. At present, EAs are resulting in hostile local communities throughout rural Australia.

From the social perspective, the Glen Innes Wind Farm has torn apart the fabric of our local community. It resulted in bitter arguments published in the local newspaper, accusations of a highly personal and slanderous nature being made against opponents of the positioning of some of the turbines. A family severely impacted by turbines being placed too close to their home suffered terribly as a result of the dispute and has moved out of the area. A member of this family was the Medical Locum in the New England district and a great loss to the Community. We understand that after more than 12 months, a replacement has still not been found.

We liaised with the NSW Department of Planning on the proposed Glen Innes Wind Farm development, however the absence of any guidelines developed and implemented by either the Federal or the New South Wales Government has not assisted all parties, ensuring that this development proceeds in a timely manner. It cannot be underestimated the impact this development will have on local residents who will be negatively and severely impacted by the positioning of certain turbines close to their homes – many residences will be “hugged” by numerous 130 metre high turbines around their homes, some of which are approximately 1.4 kilometres away.

Legislation stating that wind turbines should not be positioned closer than 2 kilometres from people’s homes (or home sites) will protect the innocent and provide guidelines for developers. We believe that, if this occurs, wind farm developments would, largely, proceed with very little opposition from local communities.

It is our sincere desire that this Inquiry will result in the establishment of a strong set of guidelines for wind farm Developers, and provide protection for local residents who are currently being severely and negatively impacted by wind turbines being positioned too close to their homes.

Yours faithfully

Geoffrey W Putland

Christine VA Thompson

Encl: Submission in response to the Senate Community Affairs Committee's Inquiry into The Social and Economic Impacts of Rural Wind Farms in Australia

# SUBMISSION TO THE

# SENATE COMMUNITY AFFAIRS COMMITTEE

# FOR THE INQUIRY INTO

# THE SOCIAL AND ECONOMIC IMPACTS OF RURAL

# WIND FARMS

**From**


**GEOFFREY W PUTLAND AND**
**CHRISTINE VA THOMPSON**

**MEMBERS OF THE**
**GLEN INNES LANDSCAPE GUARDIANS INC**


**10th February 2011**

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## APPENDICES

## INTRODUCTION

With an increasing interest in regional Australia for the location of Wind Farm developments, it is essential that the Federal, State and Local Governments have in place Development Control Regulations for these Proposed Wind Farms in Australia, with which wind farm developers must comply. Such Control Regulations will give local communities and potential developers the necessary guidance for wind farm developments and will allow for better decision making on such proposals.

Wind Farm Development Control Regulations will give local communities and potential developers the guidelines for wind farm developments so as to ensure such developments do not significantly adversely impact on the community and can proceed in a timely manner.

Wind Farm development applicants should be required to comply with Local, State and Federal Government Development Control Regulations for Wind Farms when designing a commercial wind farm in Australia and preparing their Development Applications.

Currently there are no formal guidelines in New South Wales (except the Draft Guidelines issued in 2002) OR the Federal Government for wind farms. Local Councils are leading the way for wind farms. How can this be acceptable to anyone involved in the Wind Farm Development process in the current era of social awareness and accountability?

There must be regulations protecting the rights of unrelated land owners (ie: neighbours to farms hosting wind turbines) from having turbines in close proximity to their homes and hence their livelihoods. The absence of such regulations is cruel and unconscionable, given the vast spaces in Australia that can be utilized.

If wind power generation is to be successful it needs to adhere to “principled guidelines” that create a “win-win” situation for all parties involved. In that way rural communities are not polarized, which is happening at present. The developers need to look at tracts of land that don’t impact on densely settled areas. These options are vast within Australia’s huge continent.

We are not against wind farm development per se and other projects which mitigate CO2 production – we already undertake substantial CO2 reduction processes and strategies on our properties.

Based upon our experience with the Glen Innes Wind Farm, and our discussions with residents living in close proximity to both proposed and operating wind farms throughout Australia, two fundamental issues are polarizing rural inhabitants and delaying the establishment of Wind Farms viz:

1. Inadequate community consultation; and

2. How close should wind farm developments be permitted to: residential houses, schools, hospitals etc; now that it is known that wind farms have severe negative:

   - Social,
   - Noise,
   - Visual,
   - Health, and
   - Financial

   impacts on people living in close proximity to a wind farm.

Our view, which is also supported by several local Councils' Development Control Plans for Wind Farms and the Report of the New South Wales Legislative Council's General Purpose Standing Committee No 5's Inquiry into Rural Wind Farms in New South Wales is that <u>Wind Farms should not be allowed within 2 kilometres of residential houses, residential building sites and public buildings eg: schools, hospitals.</u>

We discuss the importance and reasoning behind our 2 kilometre set-back position as well as other matters which should be addressed in the Development Control Regulations for Wind Farms in Australia, in the following pages.

## OBJECTIVES OF DEVELOPMENT CONTROL REGULATIONS FOR WIND FARMS IN AUSTRALIA ("DCRWFA")

The objectives of the DCRWFA should be:

1. To provide development controls and guidelines that assist in achieving the objectives of the relevant Local Environmental Plan(s) and comply with the relevant local Councils' Development Control Plans for proposed Wind Farms;

2. Provide information to be included and assessed with each development application for commercial wind power generation;

3. To ensure adequate local community consultation occurs;

4. To ensure the local community concerns and rights are adequately considered, addressed and complied with in terms of the comments made by the Former Premier of NSW, Mr Rees (in his capacity as Premier of NSW) in March 2009, that the fast-tracking of Renewable Energy Projects would not undermine community or council requirements.

   Mr Rees said "As long as this fast-tracking does not trample over community concerns regarding noise and visual pollution, it will (the fast-tracking) help to establish a more environmentally sustainable energy sector in NSW, to create green jobs and attract more investment." (Glen Innes Examiner, 17 March 2009).

5. To eliminate local residents and land use conflicts arising from proposed wind farm developments – a major problem area at the moment;

6. Ensure road and access issues are identified as significant aspects of gaining consent for a wind farm; and

7. To ensure that adequate provisions are made to restore developed land at the end of a project's useful life.

## THE MATTERS WHICH SHOULD BE INCLUDED IN THE DEVELOPMENT CONTROL REGULATIONS FOR WIND FARMS IN AUSTRALIA AND THEIR DETAILED ANALYSIS

The DCRWFA should ensure that all Wind Farm Development Environmental Assessment Applications address the following matters:

1. Fully comply with the relevant Local Council's Development Control Plan for Proposed Wind Farm Developments.

2. Adequate and regular local Community consultation must occur at the earliest possible time (viz: before any wind monitoring equipment is installed), including the local communities' concerns about the visual and noise issues of wind turbines.

3. Minimum Set–Back of Wind Turbines from Residential Properties and Government Buildings.

4. Health Issues of people living in close proximity to Wind Turbines.

5. Effect on Property Values.

6. Effect on Livestock and Pastoral Businesses.

7. Noise Amenity Impacts.

*8.* Visual Amenity Impacts*.*

9. An evaluation of flora and fauna impacts.

10. The heritage significance of the site and surrounds. .

11. An evaluation of the electromagnetic radiation and/or interference from the wind turbines and/or transmission lines. .

12. The location of the proposed wind farm, boundary dimensions and site area.

13. The site plan or plans.

14. A description of the wind turbine/s to be used.

15. A land-use description of the adjoining land and/or affected lands.

16. A construction program environmental management plan.
17. A decommissioning and site restoration plan and programme.
18. Demonstration that relevant Agencies issues have been addressed.
19. An Operation Monitoring Program.
20. Conflict of Interest issues including political donations.

**FOLLOWING IS A DETAILED ANALYSIS ADDRESSING THE ABOVE POINTS.**

1. **Fully comply with the relevant Local Council's Development Control Plan for Proposed Wind Farm Developments.**

   The guidelines developed by the relevant local council for Proposed Wind Farm Developments provide the best indication of the wishes/desires of residents of the local community for such development.

   Mr Rees (in his capacity as the Premier of New South Wales, in March 2009) confirmed the importance of local community wishes/desires in his statement: "As long as this fast-tracking does not trample over community concerns regarding noise and visual pollution, it will (the fast-tracking) help to establish a more environmentally sustainable energy sector in NSW, to create green jobs and attract more investment." (Glen Innes Examiner, 17 March 2009).

2. **Adequate and regular local Community consultation must occur at the earliest possible time (viz: before any wind monitoring equipment is installed), including the local communities' concerns about the visual and noise issues of wind turbines.**

   Developers must be required to consult with the local community, particularly non-related property owners who may be impacted by the proximity of wind turbines. A detailed Community and Stakeholder Communication and Consultation Plan must be prepared at the feasibility stage. The Community and Stakeholder Communications and Consultation Plan needs to demonstrate how the community and affected stakeholders will be informed throughout the development of the project. It should also include opportunities for them to participate in a dialogue at relevant phases of the project.

   Consultation with Stakeholders should be one of the most important activities in ensuring a successful outcome to a wind farm development. Developers should:

   a) Identify stakeholder groups;

   b) Provide stakeholders with information that explains the nature of the development, its potential impacts and contact details.

c) Seek the input of the local community, particularly their expectations and perceptions of the proposed development.

d) Consider issues raised during the consultation and where practicable incorporate measures within the management of its operations to address the community issues as they arise.

With the Glen Innes Wind Farm experience, there was very little evidence of input sought from the local community. We, as a group and as individuals, certainly had expectations and perceptions of the proposed development and attempts on our part to discuss this with the proponents or their consultants was not forthcoming. A very unsatisfactory outcome for everyone, for local residents, the developer and generation of green power.

In our experience with the Glen Innes Wind Farm, there was inadequate Consultation or engagement with the local community until court action was imminent from the local residents.

3. **Minimum Set–Back of Wind Turbines from Residential Properties and Government Buildings.**

Where visible, how close should wind farm developments be permitted to: residential houses, schools, hospitals etc; now that it is known that wind farms have severe negative:

- Social,
- Noise,
- Visual,
- Health, and
- Financial

impacts on people living in close proximity to a wind farm.

Our view, which is also supported by several local Councils' Development Control Plans for Wind Farms and the Report of the New South Wales Legislative Council's General Purpose Standing Committee No. 5 – Inquiry into Rural Wind Farms in New South Wales (Refer Appendix 1), <u>is that Wind turbines of up to 150 metres in height (current models) should not be allowed within 2 kilometres of residential houses, residential building sites and public buildings eg: schools, hospitals etc.</u>

If a 2 klm setback is adhered to then noise issues, visual issues, common law issues of nuisance, including nuisance in terms of loss of value on properties and potential health issues raised in this submission, would, in

the main, diminish, if not disappear entirely. It would seem impossible for approval authorities to ignore all the evidence to support this distance of setback from homes and people's lives.

In July 2010, the United Kingdom's House of Lords put up a Private Members Bill – The Wind Turbines (Minimum Distances from Residential Premises) Bill, to make provision for minimum distances between wind turbines and residential premises according to size/height of the wind turbine. The Bill states that:

"…
(4) If the height of the wind turbine generator is -

(a) greater than 25m, but does not exceed 50 m, the minimum distance requirement is 1,000m;
(b) greater than 50m, but does not exceed 100m, the minimum distance requirement is 1,500m;
(c) greater than 100m, but does not exceed 150m, the minimum distance requirement is 2000m;
(d) greater than 150m, the minimum distance requirement is 3000m. …."

The House of Lords Private Members Bill – The Wind Turbines (Minimum Distances from Residential Premises) Bill, is attached at Appendix 2.

This is acknowledgement that the UK, a major user of wind energy, recognizes there are real issues with turbines being placed too close to residential properties.

EuropeanTurbine manufacturer Retoxo-RISP GmbH recommended a minimum 2km setback to residences in their brochure "Important factors when planning a wind farm". *"Buildings, particularly housing should not be nearer than 2km to the wind farm".*

There is ample evidence to indicate that such setback would ameliorate much, if not all, of the impact and opposition to many wind farm proposals.

We recommend a 2 km setback (for turbines less than 150m in height – currently the Australian experience), as documented in the Glen Innes Severn Council and other Councils' Development Control Plans as well as concluded in the findings of the General Purposes Standing Committee No 5 in their Inquiry into Rural Wind Farms in NSW. These Development Control Plans and Government Report cannot simply be dismissed as irrelevant.

Where turbines are proposed to be significantly higher than 150 metres or where the turbines will dominate the immediate view from the dwelling or dwelling lot, increasing these separation distances is recommended to at least 3 klm.

Turbine locations should not surround a property. Where a property has turbines adjacent to more than one axis of the property, there should be sufficient setbacks/distances to the development to minimize the visual impact on that property.

4. **Health Issues of People living in close proximity to Wind Turbines.**

The environmental Assessment must fully assess the affect of the proposal on people for a distance of at least 10 kilometres from the turbines taking into consideration the affect/impact of noise, visual and blade glint and flicker.

Wind Farm Developers generally push that **"There are no health issues likely to arise from a wind farm development".** We do not believe this is the case if turbines are too close to a property.

Wind Turbines close to homes can seriously impact on the health of the occupants residing close by.

A recent item on Channel 9's "A Current Affair" Friday 14th August 2009, portrayed, quite effectively, the plight of residents living too close to wind turbines.

We are not medical experts, however there are numerous articles and professionals today taking a serious interest in the health affects when living too close to wind turbines. Therefore, as part of our submission, we have attached a series of articles by Dr Nina Pierpont MD, a physician-scientist from USA who has undertaken extensive research on this topic. Dr Pierpont MD has also published a book titled "Wind Turbine Syndrome" (Reference: ISBH: 978 - 0 - 9841827 - 0 -1) which is available from her website.

The following is her website relating to her research on the health effects of wind turbines being positioned too close to homes and for your information, we include her Curriculum Vitae.

Website link: www.windturbinesyndrome.com

Enclosed as Appendix 3 are the following articles by Dr Nina Pierpont MD:

Attachment – Health Concerns 1. ***Health, Hazard, and Quality of Life near Wind Power Installations: How Close Is too Close? (3-2-05)***

Attachment – Health Concerns 2. ***Noisy Wind and Hot Air (5-7-05)***

Attachment – Health Concerns 3. ***Health Effects of Wind Turbine Noise (3-2-06)***

Attachment – Health Concerns 4. ***Wind Turbine Syndrome: Testimony before the New York State Legislature Energy Committee***

***(3-7-06)***

We refer to her book and submit her research and articles as well as her website to support our position of a 2 kilometre setback of wind turbines from non-related homes and home sites.

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***Curriculum Vitae***

Posted August 11th, 2008.

**Nina Pierpont, MD PhD**

Fellow of the American Academy of Pediatrics

January 15, 2008

Education

1991 M.D. The Johns Hopkins University School of Medicine
1985 Ph.D. Princeton University (Behavioral Ecology)
1981 M.A. Princeton University (Behavioral Ecology)
1977 B.A. Yale University (Biology), National Merit Scholar (cum laude)

Post-Doctoral Training

1992 to 94 Pediatrics Dartmouth-Hitchcock Medical Center, Lebanon, NH
1991 to 92 Pediatrics Children's National Medical Center, Washington, DC
1985 to 86 Ornithology American Museum of Natural History, New York, NY

Licensure and Certification

1997 Licensed Physician, New York
1997 Licensed Physician, New Hampshire (expired)
1995 Pediatric Advanced Life Support Instructor and Affiliate Faculty
1994 Diplomate, American Board of Pediatrics (recertified 2000, expires 2008)
1994 Licensed Physician, Alaska (expired)

Hospital or Affiliated Institution Appointments

10/00 to 12/03 Senior Attending in Pediatrics Bassett Healthcare, Cooperstown, NY
1997 to 00 Attending Pediatrician Alice Hyde Hospital, Malone, NY
1995 to 96 Chief of Pediatrics Yukon-Kuskokwim (Yup'ik Eskimo) Delta Regional Hospital, Bethel, AK
1994 to 95 Staff Pediatrician Yukon-Kuskokwim (Yup'ik Eskimo) Delta Regional Hospital, Bethel, AK

Other Professional Positions

2004 to … Private Practice (Solo) Pediatrics (emphasizing Behavioral Peds) Malone, NY
1998 to 00 Private Practice (Solo) Pediatrics Malone, NY
1997 to 00 Staff Pediatrician St. Regis Mohawk (Iroquois) Health Services, Hogansburg, NY
1997 to 98 Staff Pediatrician North Country Children's Clinic (clinic for needy children), Malone, NY

Academic Appointments

2000 to 03 Assistant Clinical Professor of Pediatrics, Columbia University, College of Physicians and Surgeons

5. **Effect on Property Values**.

The Environmental Assessment must fully assess the negative affect of the proposal on all property values for a distance of at least 10 kilometres from the turbines taking into consideration the affect/impact of noise, visual, health and blade glint and flicker.

Whilst wind farm developers dismiss the impact of Wind Turbines close to homes as not having an impact on land values, this conclusion is not supported by the facts. There is evidence to support a significant impact on land values for properties in close proximity to wind turbines.

Sales of properties in the local Furracabad/Matheson valley areas have already "fallen through" due to the specter of Wind Farm developments in the region – a 100% reduction in the land value.

Ballarat-based valuer, Alan Hives has stated that there has now been enough sales of property featuring or near wind farms to draw some conclusions of their impact on property values.

In a recent report he stated that "the more intrusive the wind turbines in "lifestyle" terms, the bigger the price impact" on property owners (National Wind Watch, posted 14 November 2008). "In some coastal areas of Gippsland with high lifestyle value, property values had fallen by as much as a third", he states.

A valuer from Yarram Victoria, John J. Jess, AAPI, Certified Practising Valuer and member of the Australian Property Institute, has completed extensive research and appeared as an expert witness at the proposed Bald Hills Wind Farm development. For evidenciary purposes, we can discuss one such valuation. Mr Jess completed a valuation in 2006 on a property in Devon North, positioned in close proximity of a Wind Farm. The valuation was based on 2 criteria: 1. Market value of the property on the basis of ignoring any detrimental effect due to proposed wind farm on adjacent land, and 2. Market value assuming the proposed wind farm to be constructed on adjacent land.

The value of the property under criteria 1. was $350,000. The value of the property under criteria 2. was $255,000. A decrease in market value of $95,000 or a 27% decline in market value for this property. (Data based on Valuation dated 22 March 2006 of a property in Bolgers Road, Devon North.

Neighbours to a proposed Wind Farm will have permanent capital losses on their properties. Such losses significantly impact key areas such as a person's capacity to borrow, the cost of borrowing and their capacity to provide adequately for themselves in retirement.

Values for rural land can be split into two broad components:

a) Agricultural value – the value which is paid for the current and potential agricultural earning capacity of the land, plus its rural amenity (being able to enjoy living in a rural area), and

b) Locational value unrelated to its agricultural value – this relates to its value from being located in an area of high visual or other amenity, and its proximity to local towns, schools, universities and medical care etc. People wish to "get away from it all" (built up areas, including industrial areas), and enjoy unspoiled natural rural beauty, both during their active family life and in retirement years.

Factors such as these are very important in setting the locational value that buyers are prepared to pay over and above the agricultural value.

The Broken Hill area (where a substantial wind farm is proposed) is located in extensive (as opposed to intensive) farming country in Western New South Wales where land has limited agricultural use but little or no locational value. The extensive nature of the farming involves larger sized properties so that population and housing density is low and it is possible to site a wind farm power station away from houses, stock handling facilities and the general vicinity of neighbours. The comparative barren terrain is ideal for such a development. Because agricultural productivity and the rural amenity of neighbours are not greatly altered, the wind farm has little impact on land values.

Ideal conditions … a computer-generated image of the proposed wind farm site outside Broken Hill.

We have attached this article dated 8 October 2007 supporting this development at Appendix 4.).

The Broken Hill development may be contrasted with the Glen Innes Wind Farm where land has considerable agricultural and locational value by reason of its location in a beautiful rural setting, within 2 ½ hours of the coast, 4 hours from Brisbane and 6 hours from Sydney, with airline access being an hour from Sydney to either Armidale or Inverell. Property sizes are of course smaller in the Glen Innes region and range from less than 100 acres to properties of several thousand acres and population density is higher. Grazing productivity is also commensurately higher.

An interesting comment by one of our Councillors previously said that really, we should be grateful for the wind farm as our rates would decrease. Clearly this would be a result of a reduction in the rateable value of our land! Therefore, he acknowledged the fact that our land would reduce in value. We understand this has also been the case in the South Gippsland Shire where the Council reduced the rateable value of some properties by as much as 40% as a result of their proximity to, and the effect from, the wind farms.

If one was in doubt about the reduction in neighbouring property values, just ask yourself, if you had a choice of purchasing a property with, or without, a neighbouring wind farm, which would you prefer. If you would prefer a property without the neighbouring wind farm, what would entice

you to buy it with a wind farm next door. There can only be one incentive – money – a reduction in price!

To further support our position, we have included some further comments:

- **Blot on the landscape** – Danny Buttley, Victoria (Australia) Herald Sun, 21 Feb 04: "Bruce Richards, Managing Director of PBE Real Estate in South Gippsland, said Victoria's property boom was going backwards in the shadow of the giant turbines. He said selling homes within 2km of Toora's 12 wind turbines was becoming increasingly hard. 'Anywhere close to the towers is very, very difficult to sell,' he said.

  South Gippsland Shire mayor David Lewis said rate valuations had decreased on some properties near turbines, but could not confirm if it was just due to wind farms. But there was no doubt they had depressed the immediate property market. 'My personal belief is that it does destroy property values,' he said."

- **Turbines Cast Shadow Over Land Values**: Paul Sellars, Weekly Times, 16 APR 2003... "Three prominent agents have told The Weekly Times that existing wind turbines -- and the prospect of more to come -- have turned potential buyers off properties. PBE Real Estate co-founding director John Evans said in 35 years working in South Gippsland, he had never seen a bigger threat to property values than wind farms... Wesfarmers Landmark Leongatha agent Glen Wright said wind farms were "definitely" having an impact on values. If they are near the property, buyers are staying away," Mr Wright said. "If I had to put a figure on it, I would say (a reduction of) 25 to 30 per cent on the going value."

  Pat Rice Hawkins Pty Ltd sales manager Bruce Falk said potential buyers were turned off by the prospect of wind turbines... 'I would have shown 50 or 60 people through that property and I would say half of those wouldn't even look at the place once they realized it's in the vicinity of wind turbines,' Mr Falk said...The agents' claims were rejected by the Australian Wind Energy Association." This is no surprise!

Further, would you purchase this property?

Photo courtesy of Ed Sliwinski

**Fenner, NY. How much would YOU pay for this home?**

There is a strong argument to say that no one would ever consider buying this property.

The value of properties within close proximity of wind turbines ARE impacted.

There is also the matter of Common Law, that if an owner's land value diminishes as a result of an action by a neighbour, litigation may result.

In summary, our main point in terms of Land Valuations is that Governments and Approval Authorities must give due consideration to the appropriate location of wind farms, preferably away from populated areas. But where developments are proposed in areas like Glen Innes on the top of the Waterloo Range, then specific setbacks from affected homes must be adhered to. We are proposing a minimum setback of 2 kilometers from affected homes.

6. **Effect on Livestock and Pastoral Businesses**

The environmental Assessment must fully assess the affect of the proposal on livestock for a distance of at least 10 kilometres from the turbines taking into consideration the affect/impact of noise, visual and blade glint and flicker.

The development should be sited and carried out to minimize impacts on, or restrictions to normal grazing, farming, forestry practices;

The development should be carried out in a way that minimizes any adverse effects on adjoining land and the development site, particularly in the way of:

a. Land degradation;
b. Alteration to drainage patterns;
c. Pollution of ground water;
d. Spread of noxious plants and animals;
e. Bushfire hazard; and
f. Amenity of adjoining/adjacent/affected landowners.

7. **Noise Amenity Impacts**

The Environmental Assessment must include a comprehensive assessment of the predicted noise impacts resulting from the construction and operation of the proposed wind farm. The assessment must include consideration of noise impacts of the project, with a particular focus on the particular/local and meteorological conditions characteristic of the specific locality which may exacerbate impacts (such as the van den Berg effect for wind turbines). The probability of such occurrences must be quantified. Sufficient information must be provided to enable a clear understanding of which criteria have been used.

As a minimum, the noise assessment should consider the following guidelines:

- *Wind Turbines* – The South Australian Environment Protection Authority's *Wind Farms – Environmental Noise Guidelines, 2003;*

- *Remaining Structures* – in accordance with the NSW EPA *Industrial Noise Policy, January 2000*;

- *Construction Noise* – undertaken in accordance with Chapter 171 of the Environmental Noise Control Manual (EPA, 2004) for noise impacts associated with the proposal, particularly along the main access routes to the site.

At present, we understand the criterion for Noise evaluation is the South Australian guidelines – Federal Guidelines must be developed.

Noise perception is in many circumstances entirely separate to the meeting of specific regulatory criterion.

The fact that a sound can be discerned and identified by a sensitive receiver within the general background noise, can be sufficient aggravation and cause undue stress and other negative impacts on the receiver. The human ear is particularly adept at discriminating and identifying noise sources within a total environmental noise.

The fact is the turbines will be heard within a noise environment even if they are simultaneously meeting regulatory noise guidelines. Also there are effects due to changes in wind direction and harmonic effects as turbines take up new directions (similar to the harmonics experienced when the engines of a twin-engine aircraft are out of synchronization, a sound experienced by many passengers).

The very effect of noise “nuisance” is a major concern.

The Environmental Assessment must clearly outline the noise mitigation, monitoring and management measures the proponent intends to apply to the project. This must include an assessment of the feasibility, effectiveness, and reliability of proposed measures and any residual impacts after these measures have been implemented.

Where noise levels are found to exceed EPA guidelines, remediation work such as cessation or decommissioning of the turbines to reduce the noise impacts on sensitive receptors such as residential dwellings should be carried out.

**Noise from turbines will be minimized if a 2 kilometre setback is applied.**

## *8.* Visual Amenity Impacts

The Environmental Assessment must fully describe all project components, locations and dimensions. A photographic assessment clearly demonstrating the potential visual amenity impacts must be provided along with a clear description of visual amenity mitigation and management measures that the Proponent intends to apply to the project. An assessment of the feasibility, effectiveness and reliability of the proposed mitigation measures and any residual impacts after these measures have been implemented must be included.

The Environmental Assessment must also assess the visual impact of the proposal of the particular landscape (including existing and approved dwellings) for a distance of at least 10 kilometres from the turbines, taking into consideration the impact of shadow "flicker" and "blade glint". The visual impact assessment should be prepared with regard to the Australian Wind Energy Association and Australian Council of National Trust's *Wind Farms and Landscape Values: Stage 1 Report – Identifying Issues, March 2005, Appendix B; Wind Farms and Landscape Values: Final Issues Paper, or other updated guidelines.*

The developer must assess the visual impact of the project including an assessment of scenic value. The developer must consult with the local Council and the community on appropriate visual impact and their mitigation measures.

The developer must assess the cumulative impact of the development in regard to existing wind farms or identified sites or proposed wind farms. Large expanse of ridgelines cannot be covered with wind farms and turbines.

Turbine locations shall be located sensitive to residential dwellings surrounding the development. Existing and proposed screenings could be used to minimize visual impacts to residential properties – Note that due to the height of turbines, screening is not the preferred choice of dealing with visual impact. The developer's priority should be endeavouring to position the turbines in locations with low visual impact to nearby properties, especially existing dwellings and lots provided for dwellings.

Broadly, three criterion are used to evaluate the issue of Visual Impact.

a) Distance of the nearest turbine,
b) Spacial visibility of the turbine;
c) Number of turbines visible.

Given the size of today's turbines (130 metres to 150 metres in height), their scale in any landscape can be very significant for the closest residences.

In relation to the proposed Glen Innes Wind Farm, a non-related property affected not only has one turbine that impacts on it, it will be "hugged" by several turbines. The impact of these turbines on this one property, when it proceeds, will be overwhelming and may be considered unacceptable and a Nuisance at Common Law, due to visual and auditory impacts.

Other properties in the Furracabad Valley at Glen Innes are also severely impacted, thus giving rise to Nuisance at Common Law.

**Guidelines must be implemented to protect all parties from this situation.**

Developers admit that the impact on residences close to wind turbines is high. However, Wind Farm Proponents are still refusing to reconfigure wind farms to improve the position of severely impacted homes.

The value of properties will be severely impacted by the specter of wind turbines closer than 2 km from homes. We believe that there may be a Common Law case of Nuisance, due to Visual and Auditory Impacts at homes closer than 2 kilometres to wind turbines.

Developers with experience in wind farm developments, are fully aware of neighbours concerns – it is one of the major issues raised. No one issue can be looked at in isolation - it is the cumulative impact of all issues.

**Visual Absorption Capability.** The scale and form of wind turbines contrast with rural scenes and as such there is low visual absorption capability for wind farms in a rural environment. Developers know this, and that is why they must select sites that are more suitable.

There is no possibility of rural landscapes absorbing 130 to 150 metre high wind turbines positioned on top of hills. These turbines are not consistent with a rural landscape as developers often suggest.

In Glen Innes, the developer has downplayed the rural amenity of the Valley. It has ignored the fact that the Valley would be changed from a pastoral landscape to a rural industrial landscape, as well as the associated loss of amenity and the valley's sensitivity to that loss.

Tree screening is generally provided as the only mitigation option for adverse Visual Impact. This is not true – the removal or relocation of

turbines away from non-related homes is the obvious solution. Developers have stated that to remove turbines could make a wind farm unviable. Unviability should not, and cannot be a reason. Individual landowners' rights MUST take precedence.

Developers state that "tree planting" is the best mitigation option.

The suggestion of planting tall trees of **"… 10 to 20 metres height within 30 to 50 metres of a residence to provide screening…"** is of no practical use for the following reasons:

1. Trees will take over 20 to 30 years to grow. By then, new technology will be available and the wind farm will be obsolete.

2. Rural areas rely heavily on northern aspects to warm homes in the winter and minimize energy use, trees on northern aspects are generally not an option.

3. The lack of winter sun by a northerly barrier destroys the possibility of solar panels as an alternative energy source.

4. In rural areas, an important aspect is the landscape view itself; the trees will block it out.

In terms of overseas trends, there is a strong push to ensure that neighbouring residents are not too close to wind turbines. There is enormous data on numerous websites railing against turbines in close proximity to homes.

In fact, a builder of wind turbines also recommend a 2 kilometre setback of turbines from buildings, especially homes, viz:

"RetexoGruppe - RISP GmbH" is a major builder of Wind Turbines for Europe. They also assist developers in the planning of their wind farms from assisting with the site location; measurement of the wind intensity to ensure it is satisfactory; the amount of area required to construct a wind farm; Grid connection and liaising with local Electricity suppliers.

**TetexoGruppe – RISP unequivocally state that "Buildings, particularly housing, should not be nearer than 2 km to the windfarm".**

As stated previously, the House of Lords in the UK has submitted a Bill (Refer to Appendix 2) outlining the following setbacks:

"…
(4) If the height of the wind turbine generator is -

(a) greater than 25m, but does not exceed 50 m, the minimum distance requirement is 1,000m;
(b) greater than 50m, but does not exceed 100m, the minimum distance requirement is 1,500m;
(c) greater than 100m, but does not exceed 150m, the minimum distance requirement is 2000m;
(d) greater than 150m, the minimum distance requirement is 3000m. …."

It is so evident that there are serious problems with turbines being placed too close to homes. What is stopping authorities from protecting individuals from Developers who will not demonstrate any concern for the non-related residents in the vicinity of their wind farm developments. This is something only Government Regulations can control.

Today in overseas locations, the new and successful wind farms are located in remoter areas, offshore or developed with adequate distance from residential homes. They are not near private homes therefore they are not fighting opposition to their developments because they are locating turbines too close to homes. Overseas developers now realize that sensitivity to people and people's lives and wellbeing is critical to keep the public supportive. There does not need to be a "sacrificial lamb" if developments are thought out properly.

In conclusion, there is only one real option to mitigate the visual impact of wind farms – position turbines that are less than 150 m in height, 2 kilometres or more away from non-related homes and home sites.

9. **An evaluation of flora and fauna impacts**

With specific mention of migratory species potentially impacted by the development. Where the development is in close proximity to known habitats of rare or endangered species, early consultation with the Department of Environment and Climate Change is highly recommended.

10. **The heritage significance of the site and surrounds**.

Reference shall include the local Councils' guidelines, the Heritage Council, the National Trust of Australia and the Australian Heritage Council.

11. **An evaluation of the electromagnetic radiation and/or interference from the wind turbines and/or transmission lines**.

    This should include impacts on human and animal health and local television and radio reception and other local communications.

    A communications study should identify the existing status of communications and detail the proposed method of dealing with potential communication interference. The development should not detract from the reception of radio, TV, mobile phone, two-way reception or other communication methods. Where necessary, it may be required to install additional services (boosters/communication towers/re-transmission towers etc) to maintain such services in the vicinity of the development. Where this is determined to be necessary, the work and equipment shall be at the developer's cost.

12. **The location of the proposed wind farm, boundary dimensions and site area.**

    This should include a map of 1:25,000 scale showing the location of the proposed development, the route of transmission lines to the electricity grid (and include access road, pylon, gradient and erosion control assessments), the service roads on and to the site, and the proximity to significant features such as dwellings, environmentally sensitive land, prime crop and pasture land, forests, national parks, heritage items and aircraft facilities.

    The development shall not be located within two times the height of the turbine (including the tip of the blade) from a formed public road.

    The development shall not be located within two times the height of the turbine (including the tip of the blade) from a non-related property boundary or public land.

13. **The site plan or plans**

    Showing positions of the proposed wind turbines, site boundaries, native vegetation, the proposed vehicular access points, the location of existing and proposed vegetation and trees on the land, the location and uses of all existing and proposed buildings, power lines, sub-station and fences on the land.

A Bushfire Threat Assessment is to be prepared by a suitably qualified Bushfire Consultant, addressing, but not limited to, the risk of bushfire originating from the development site and the potential for harm/damage should a bushfire encroach on the site.

14. **A description of the wind turbine/s to be used.**

Including all relevant details such as number, make, model, dimensions, generation capacity materials and colour.

15. **A land-use description of the adjoining land and/or affected lands**

A land-use description of the adjoining land and/or affected lands and landscape including assessment of the likely future impact.

16. **A construction program environmental management plan**

Incorporating the proposed staging of the project, erosion and sedimentation controls, heavy vehicle movements, site access including all service roads, transmission towers, substation, underground wiring, construction phase impacts including facilities, waste disposal, staff/contractor numbers etc, weed control, farm impacts and all other works.

The construction phase of the wind farm shall occur only on identified roads/routes. Construction vehicles, including concrete trucks, carriers of turbines components, and related heavy vehicles (including relevant contractors) shall only travel the approval road. This route shall be identified in the development application for each of the construction components and/or contractors.

Local townships will require road works to cope with the over size and over weight traffic movements related to the construction of a wind farm. Bonds will also be required for any potential damage to roads during the construction phase. This should be held by the respective Local Councils.

All infrastructure related to the wind farm should be included in the development application. Management of temporary facilities, waste, numbers of contractors/employees, etc., should be part of the Development Application information. All infrastructure should be located in low visual impact locations and interconnection cables/wiring and the like should be underground.

In New South Wales, developers must consider and refer to the Planning NSW Environmental Impact Assessment Guidelines for wind farms, the NSW Wind Energy Handbook, Best Practice Guidelines for implementation of Wind Energy projects in Australia (AusWEA), S.A. EPA Wind Farm Noise Assessment Guidelines and all other relevant policies and legislation applicable to the proposed development. Reference to relevant Council policies and documents should also be made. Particular reference must be made to "Wind Farms and Landscape Values Foundation Report" and any subsequent documents arising from this report or produced by the Department of Environment and Heritage relative to wind farm developments.

17. **A decommissioning and site restoration plan and programme**.

Within six (6) months of the wind turbine generators becoming redundant, any rights of carriageways that were constructed to enable maintenance to be conducted on the wind turbine generators are to be extinguished by the developer.

Within six (6) months of the Wind Turbine Generators becoming redundant, they are to be fully dismantled and removed from the site by the developer or current operator of the development at the time.

18. **Demonstration that relevant Agencies issues have been addressed** CASA for aviation safety, SCA for water quality issues etc.

19. **An Operating Monitoring Program**

An operating monitoring program detailing, but not limited to, health issues, property values, livestock and pastoral businesses, noise measurements (locations, times and dates), shadow flicker assessments (locations, times and dates), fauna impact surveys, traffic movements, maintenance schedules. The Program will identify those issues to be addressed in a Report which is to be lodged with the respective Council on an annual basis and made available for public viewing. Any inconsistencies arising from the operation of the wind farm and any consent issued are to be addressed in the report. The requirements of the Monitoring Program identified as a result of the community consultation and development assessment process.

This program must also detail what actions will be taken by the wind farm operators if the proposed operating conditions are not complied with eg. Decommissioning of the wind farm, dismantling of the wind farm etc.

## 20. Conflict of Interest Issues including Political Donations

No local council should receive a fee/contribution for allowing a wind farm to be developed in their area of responsibility – this eliminates any conflict of interest.

Donations to political parties by Wind Farm Developers and their consultants should be banned, or if made, openly disclosed to the public/local community, in the Environmental Assessment and to the Planning Approval Department.

However, if a Community Enhancement Plan is approved, funds should be spent in the affected community, viz: within 10 kilometres of the wind farm development, with projects for expenditure agreed between the affected community, local council and the Developer.

## OTHER ISSUES

It cannot be disputed at the moment that the insensitive siting of Wind Farms in Australia and throughout the rest of the world, and the inability of Wind Farms to provide base load electricity, is causing a ground swell of opposition to Wind Farms.

There is a strong case that the lack of appropriate guidelines and set backs for Wind Farms is giving a right to affected parties to have an action at Common Law for Nuisance against the relevant parties – refer to Appendix 5 for a summary of a legal position in this regard. We believe that a minimum of 2 kilometres set-back of turbines (less than 150m in height) from residential houses will significantly reduce, if not eliminate, the many ill effects from turbines too close to homes and will result in the significant reduction in "Nuisance" cases at Common Law.

We also enclose as Appendix 6 a newspaper article by Terry McCrann which outlines argument against the use of Wind Farms as a viable means of power generation.

At Appendix 1 we have included the Report of the New South Wales Legislative Council, General Purpose Standing Committee No 5's Inquiry into Rural Wind Farms in New South Wales.

At Appendix 2, we have included the latest Bill in the UK House of Lords posted on 29th July 2010, making provision for minimum distances between wind turbines and residential premises according to the size of the wind turbines.

## CONCLUSION

- We are not against sustainable energy solutions and support the Federal and State Governments' target of producing a portion of the country's electricity needs from renewable sources by 2020.

- This will not be achievable if sustainable energy project proponents and authorizing bodies do not have regulations which properly protect, consider and effectively consult affected local residents and work together to find constructive "win-win" solutions for all parties.

- More care is needed in the siting and design of wind farms to avoid the proximity to neighbouring residences, and the adoption of minimum setbacks would provide certainty for developers, authorizing bodies and residents alike.

- Although we would have preferred a 3 km setback from Wind Turbines, we have embraced the COMPROMISE 2 KM SETBACK of the Glen Severn Council's DCP for turbines up to 150 m in height. In the Glen Innes area, this setback is also supported by valley residents, the hundreds of local petitioners to State Parliament, and our local member, the Hon. Mr Richard Torbay MP.

- If inappropriately sited, Wind Turbines would, under Common Law, be considered a "Nuisance" due to their adverse auditory, visual and financial impact.

- **Most, if not all, objections to Wind Farms can be resolved if a 2 kilometre setback for turbines up to a height of 150 metres (current models) is adopted across Australia.**

# APPENDICES

**APPENDIX 1.**

Below is the link to the NSW Legislative Council's General Purpose Standing Committee No 5's Report from their 2009 Inquiry into Rural Wind Farms in New South Wales.

http://www.wind-watch.org/documents/wp-content/uploads/091216-Report-Rural-wind-farms.pdf

We have also forwarded, under separate email, an attachment also containing the above report, for this Senate Inquiry to print and peruse.

**APPENDIX 2.**

*posted:* July 29, 2010 • England, Regulations, Siting, Wales

# Wind Turbines (Minimum Distances from Residential Premises) Bill

*Author:* House of Lords

A Bill To Make provision for a minimum distance between wind turbines and residential premises according to the size of the wind turbine; and for connected purposes.

Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present

Parliament assembled, and by the authority of the same, as follows:—

1**. Planning permission**

(1) No relevant authority may grant planning permission for the construction of a wind turbine generator unless it meets the minimum distance requirement under section 2, subject to the exception in section 3.

(2) "Relevant authority" means the local authority or government department with the power to grant planning permission for a wind turbine generator.

2**. Requirements for minimum distance**

(1) The "minimum distance requirement" means the necessary minimum distance between the wind turbine generator and residential premises as set out in subsection (4).

(2) "Residential premises" means any premises the main purpose of which is to provide residential accommodation, including farmhouses.

(3) If a number of wind turbine generators are being built as part of the same project the minimum distance requirement applies to each wind turbine generator individually.

(4) If the height of the wind turbine generator is—

(a) greater than 25m, but does not exceed 50m, the minimum distance requirement is 1000m;

(b) greater than 50m, but does not exceed 100m, the minimum distance requirement is 1500m;

(c) greater than 100m, but does not exceed 150m, the minimum distance requirement is 2000m;

(d) greater than 150m, the minimum distance requirement is 3000m.

(5) The height of the wind turbine generator is measured from the ground to the end of the blade tip at its highest point.

(6) There is no minimum distance requirement if the height of the wind turbine generator does not exceed 25m.

(7) If planning permission is granted on the condition that the proposed wind turbine generator meets the minimum distance requirement under subsection (5) the actual height of the wind turbine generator must not exceed the maximum height in relation to that minimum distance.

3**. Exception**

(1) The local authority may grant planning permission for the construction of a wind turbine generator which does not meet the minimum distance requirement under section 2(4) if the condition under subsection (2) is met.

(2) The condition is that the owners of all residential premises which fall within the minimum distance requirement for the proposed wind turbine generator must agree in writing to the construction of the wind turbine generator.

(3) It is the duty of a relevant authority to ensure that no written agreement is elicited by unlawful means and that all necessary written agreements have been received before planning permission is granted.

4**. Short title and extent**

(1) This Act shall be known as the Wind Turbines (Minimum Distances from Residential Premises) Act 2010.

(2) This Act extends to England and Wales.

H*ouse of Lords, Session 2010 – 11*
*Sponsor: Lord Reay*
*1st reading: House of Lords 26 July, 2010*
*Web site: s*[*ervices.parliament.uk/bills/2010-11/windturbinesminimumdistancesfromresidentialpremiseshl.html*](services.parliament.uk/bills/2010-11/windturbinesminimumdistancesfromresidentialpremiseshl.html)
[N*ote:* 1000 metres = 3281 feet = 0.62 mile; 50 metres = 164 feet]
R*esource Library Home*

## APPENDIX 3.

**HEALTH CONCERNS**

**ARTICLES BY DR NINE PIERPONT.**

**Attachment – Health Concerns 1.**

***Health, Hazard, and Quality of Life near Wind Power Installations: How Close Is too Close? (3-2-05)***

Posted July 26th, 2008 in Articles by Nina Pierpont.

Falling over

A nacelle (generator and gearbox) weighing up to 60 tons atop a 265 ft. metal tower, equipped with 135 ft. blades, is a significant hazard to people, livestock, buildings, and traffic within a radius equal to the height of the structure (400 ft) and beyond. In Germany in 2003, in high storm winds, the brakes on a wind turbine failed and the blades spun out of control. A blade struck the tower and the entire nacelle flew off the tower. The blades and other parts landed as far as 1650 ft (0.31 mile) from the base of the tower.[1] (Note that all turbines discussed in this article are "upwind," three-bladed, industrial-sized turbines. "Downwind" turbines have not been built since the 1980's.) Given the date, this turbine was probably smaller than the ones proposed for current construction, and thus could not throw pieces as far. This distance is nearly identical to calculations of ice throw from turbines with 100 ft blades rotating 20 times per minute (1680 ft).[2]

Fires

Most fires in wind turbines are started by lightning and fueled by up to 200 gallons of hydraulic oil in the nacelle. Fire-fighting at 265 ft (26 stories) may not be possible with the equipment of a rural town. A fire may leave wind turbine controls malfunctioning until the equipment in the nacelle is repaired or replaced, making it more susceptible to the kind of accident described above.

Lightning and power surges

Wind turbines themselves cause irregularities in the power supply as wind speed changes. Within the power grid, supply and demand must always be balanced; there is no storage of electricity on this scale. When the wind dies, there is less power (brown-out) until a coal- or gas-powered plant at some distance from the

wind installation fires up to increase production. When the wind gusts, there are power surges. Residents living near a new wind turbine installation in Meyersdale, PA, which came on-line in December 2003, have had to replace stove elements and small appliances due to power surges which started at that time. Residents of Lincoln Township, WI, near a wind installation noticed an increase in lightning strikes in their area after the turbines went on-line in June 1999. Two computers protected by surge protectors and a TV set, all in different houses, were simultaneously "fried" one evening when lightning struck a nearby wind turbine tower.[3]

Flicker

When turning with the sun behind them, turbine blades cast moving shadows across the landscape and houses, described as a strobe effect within houses, which can be difficult to block out. Some people lose their balance or become nauseated from seeing the movement. As with car or sea sickness, this is because the three organs of position perception (the inner ear, eyes, and stretch receptors in muscles and joints) are not agreeing with each other: the eyes say there is movement, while the ears and stretch receptors do not. People with a personal or family history of migraine, or migraine-associated phenomena such as car sickness or vertigo, are more susceptible to these effects. The strobe effect can also provoke seizures in people with epilepsy.

In Lincoln Township, WI, two years after installation, 33% of residents 800 ft to ¼ mile from the turbines found shadows from the blades to be a problem, 40% ¼ to ½ mile away, 18% ½ to 1 mile away, and 3% 1 to 2 miles away (230 people sampled).

Noise

In the same survey in Lincoln Township in 2001, 44% of residents 800 ft to ¼ mile from the turbines found noise to be a problem in their households, 52% ¼ to ½ mile away, 32% ½ to 1 mile away, and 4% 1 to 2 miles away (229 people sampled). Under certain conditions the turbines could be heard up to 2 miles away. These numbers correspond well to measurements made by a sound engineer near a more recent 30 MW, 17 turbine installation on the Dutch-German border, where residents living 500 m (1640 ft, or 0.31 mile) and more from the turbines were reacting strongly to the noise, and residents up to 1900 m (1.2 miles) away expressed annoyance. The engineer found that measured sound levels were higher than predicted by standard models because of differences in daytime and nighttime wind patterns, and that annoyance was increased by the impulsive nature or rhythmic thumping of the sound, a pattern found at a distance from the turbines (documented at 1500 m, or 0.9 mile) but not immediately under or among the turbines.[4] This was described as a "low pitched thumping sound."

Noise levels sufficient to prevent or interrupt sleep, even with windows closed, are reported in dwellings close to wind power installations in all surveys. Low frequency sound, defined as 10-200 Hz, travels farther and comes through walls and around obstacles because of its long wavelength; sounds in the range of 25-150 Hz have wavelengths similar to room dimensions, and can reverberate in rooms. Low frequency sound is especially bothersome, according to the World Health Organization:[5]

“Low frequency noise, for example from ventilation systems, can disturb rest and sleep even at low sound levels.”

“For noise with a large proportion of low frequency sounds a still lower [measurement] guideline (than 30dBA) is recommended.” [This means 30 dB total sound pressure using an "A" filter.]

“When prominent low frequency components are present, noise measures based on A-weighting are inappropriate.” [An "A" filter, which filters out low-frequency sounds, is standard in loudness measurement.]

“Since A-weighting underestimates the sound pressure level of noise with low frequency components, a better assessment of health effects would be to use C-weighting.” [A "C" filter filters out less of the low-frequency sound.]

“It should be noted that a large proportion of low frequency components in a noise may increase considerably the adverse effects on health.”

In other words, the World Health Organization recommends that threshold standards for noise in communities be set lower than 30dB (as measured with the standard “A” filter) whenever the noise has a substantial low-pitched component—as it does from wind turbines. Again, this is because low-pitched noise is more disturbing and has a greater impact on health at low levels than higher-pitched noise. When measuring such noise, a “C” filter will give a more accurate reading of loudness by including more of the low-frequency sounds.

Dr. Amanda Harry, a British physician, found (near a 16-turbine installation in 2003) that 13 out of 14 people surveyed reported an increase in headaches, and 10 reported sleep problems and anxiety. Other symptoms included migraine, nausea, dizziness, palpitations, stress, and depression.[6]

Noise itself can induce dizziness and loss of balance in people with a previous history of noise-induced hearing loss, since, when people damage their hearing through too much exposure to loud (e.g., machine) noise, the balance organs in the inner ear may also be damaged. This is known as the Tullio phenomenon.

Dizziness (specifically, vertigo) and anxiety are neurologically linked phenomena.[7] Hence the anxiety and depression seen in association with other

symptoms near wind installations are not a neurotic response to symptoms, but rather a neurologically linked response to the balance disturbances people experience from shadow flicker or low-frequency noise. Sleep deprivation, by the way, also causes anxiety and depression.

Older people, who often sleep less soundly, are more likely to have their sleep disturbed by turbine noise. They may also suffer more disturbances in equilibrium near turbines because of age-related problems with the function of the inner ear (e.g., dizziness and tinnitus: ringing in the ears) or from the nerves or parts of the brain receiving signals from the inner ear. It is noteworthy that among healthy people age 57 to 91, 5% have chronic dizziness, and 24% tinnitus.[8]

Setback

Based on these health effects and hazards, turbines should not be placed within 1700 feet of any road or dwelling. Those living within ½ mile (2640 ft) should be apprised that they are likely to experience very bothersome levels of noise and flicker, which continue (though to a lesser degree) to a mile or more from the turbines. At 2 miles, noise is sometimes heard, but few people are bothered. In Lincoln Township, WI, after two years with the turbines, 73% of people said they would not consider buying or building a house within a mile of the turbines, and 23% wished to be at least 2 miles away (212 people sampled).

It is significant that each of these setbacks (the first for hazard of falling objects, the second for noise) is supported by two unrelated pieces of data yielding the same result. For noise, the data from two wind installations of different ages in different countries, one by resident survey and the other an engineer's measurements, yield the same distance at which noise stops being bothersome: at something greater than 1-1.2 miles. Thus the age or specific type of equipment is not relevant to the noise issue, and specific measurements, properly done, support what neighbors of wind installations are saying.

In conclusion, based on these data, wind turbines should not be built within 1.5 miles of people's homes. Let it be understood, however, that there will still be health and life quality problems caused by wind turbines beyond this radius. People living 1.5 to 3 miles from a proposed turbine site should be notified of potential health and life quality effects, and for this they should be appropriately compensated.

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[1] See photos at http://www.pbase.com/wp/wind_turbine_photos

[2] Personal communication, Prof. Terry Matilsky, Dept. of Physics and Astronomy, Rutgers Univ., Piscataway, NJ. See http://xray.rutgers.edu/~matilsky/windmills/throw.html

[3] Bittner-Mackin, E. Excerpts from the Final Report of the Township of Lincoln [Wisconsin] Wind Turbine Moratorium Committee, 12/4/03.

[4] van den Berg, GP, 2004. Effects of the wind profile at night on wind turbine sound. Journal of Sound and Vibration 277:955-970. Contact g.p.van.den.berg@phys.rug.nl**.** For a pre-publication copy of this article, go to http://www.nowap.co.uk/docs/windnoise.pdf

[5] Berglund, B, et al, 2000. Guidelines for Community Noise, World Health Organization. Quoted in Leventhall, G, 2003, A Review of Published Research on Low Frequency Noise and its Effects; see http://www.defra.gov.uk

[6] Milner, C. 2004. Wind farms "make people sick who live up to a mile away." Telegraph.co.uk, 1/25/04; see www.telegraph.co.uk

[7] Balaban, CD, and Thayer, JF. 2001. Neurological bases for balance-anxiety links. Journal of Anxiety Disorders 15:53-79.

[8] Sataloff, J, et al. 1987. Tinnitus and vertigo in healthy senior citizens without a history of noise exposure. American Journal of Otolaryngology 8:87-89.

**Attachment – Health Concerns 2.**

***Noisy Wind and Hot Air (5-7-05)***

Posted July 26th, 2008 in Articles by Nina Pierpont.

As well as being about wind turbine noise, this discussion is also about credibility, and the validity of information and the validity of sources. I'm going to address both of these—the noise issue, and how to decide what and who to believe.With regard to technical studies, *hired consultants are always less credible than university scientists who are free of industry ties*. Take a look at the pharmaceutical industry in this country: because the research on ill effects is done by companies selling the products, ill effects are concealed, and we end up with debacles like the recent one with Vioxx. Noble Environmental quotes in public what their paid consultant, Dr. Leventhall, says about my thoughts on wind turbine sound (or perhaps they just wrote it themselves, since some of the physics, "Synchronization effects can be reduced by running the turbines unsynchronized," is not worthy of a high school student). Dr. van den Berg, a university researcher, replied the following to Noble when they asked him about my March 2 *Malone Telegram* piece:

"Indeed in the statement the term 'low pitched thumping sound,' a description of the sound character, seems to be equated to 'low frequency noise,' a technical term relating to a specific frequency range. The results of my investigations have not led to the conclusion that low frequency sound as such (implying sound of frequencies between 1 and approximately 200 Hz) are the likely cause of annoyance from modern wind turbines for most people. However, noise from (tall) wind turbines has not been addressed properly by wind turbine (farm) managers and consultants, and I can understand that residents who have become aware of that feel they have to further their arguments, but get confused by the technical jargon used in acoustics.

"You may use this statement publicly, but only in its entirety." [As I have done here.][1]

Now let us read the summary of Dr. van den Berg's paper, "Do wind turbines produce significant low frequency sound levels?" presented in August 2004 at the 11th International Meeting on Low Frequency Noise and Vibration and its Control, in which his answer is yes, they do, and this sound is significant, though its effect is indirect:

"Wind turbines produce low frequency sounds, but it has not been shown this is a major factor contributing to annoyance. Sound from wind turbines involves several sound production mechanisms related to different interactions between

the turbine blades and the air. Low frequency sound is predominantly the result of the displacement of air by a blade and of turbulence at the blade surface.

"An important contribution to the low frequency part of the sound spectrum may be the result of the sudden variation in air flow the blade encounters when it passes the tower: the angle of attack of the incoming air suddenly deviates from the angle that is optimized for the mean flow.

"This effect probably has not been considered important as the blade-passing frequency is of the order of one hertz [one beat per second] where human hearing is very insensitive. This argument, however, obscures a very relevant effect: the low blade passing-frequency modulates well-audible [easily heard] higher frequency sounds and thus creates periodic sound. This effect is stronger at night because in a stable atmosphere there is a greater difference between rotor-averaged and near-tower wind speed. Measurements have shown that more turbines can interact to further amplify this effect.

"The effect is confirmed by residents near wind turbines who mention the same common observation: often late in the afternoon or in the evening the turbine sound changes to a more 'clapping' or 'beating' sound, the rhythm in agreement with the blade-passing frequency. It is clear from the observations that this is associated to [with] a change to a higher atmospheric stability. The increased annoyance has not been investigated as such, although there are indications from [the] literature [that] this effect is relevant. *It is of increasing relevance as the effect is stronger for modern (that is: tall) wind turbines*."[2]

The university researcher, unlike Noble's paid consultant, states that the true noise issues are *not* being adequately addressed by wind farm developers or their consultants, and that wind turbines, contrary to what Noble is stating in its current public relations blitz, do produce low frequency sound. Van den Berg is investigating the complex way in which the low frequency vibrations of the blades passing the tower modify higher frequency sounds to produce the clapping or thumping noise that people even at some distance from wind turbines actually hear. In choosing what to investigate, he keeps his eye on what people are really experiencing.

What is significant about this research, too, is its discovery that taller turbines are louder than smaller ones, and its explanation of why wind turbines in general are so much noisier, at greater distances, than predicted by older sound propagation models. The answer is in the wind flow patterns higher above the ground, especially at night.[3] Van den Berg studies turbines with 328 ft hub height. Even according to Noble's consultant, Leventhall, the older predictions for how sound will carry apply only up to about 180 ft hub height, while the turbines proposed for Malone will be 265 (and possibly 390) ft. Thus the constant refrain of the Noble salesmen, "The new technology won't have this problem…this study does not apply…that study does not apply…" is contradicted by research.

Given all this argument, and the slowness with which research catches up to people's experience, how do we keep neighbors' needs for peace and quiet from being swept under the carpet?

One way is *not* by trusting the pre-construction "study" of sound commissioned by Noble. This will not actually be a study (since the turbines will not be up). At worst it could be a generalized piece of writing with no mention of local conditions or terrain at all, like the report prepared by the same consultant for a wind power developer in New Zealand last year.[4] At best it could be an exercise in *modeling* sound transmission over complex terrain in variable weather conditions, in a field of study in which the models themselves are in flux, changing as new information becomes available from existing wind farms. How will you and I, in Malone, be able to judge whether the models and variables are accurate and yield good results? We won't, of course, but we can be quite confident that a paid consultant will never reach the conclusion, for his client, that they can't go ahead with the project.

As an example of Noble's approach to the issue of pre-construction studies, let's turn to bird populations. This is my area of expertise, in which I have a PhD and scientific papers published in this country and abroad. The Noble representatives tell us that full and appropriate studies of bird and bat populations will be done before any turbines are erected. If this were truly Noble's intention, researchers would be in the field now, and Noble would not be talking about any turbine construction before 2007.[5] Since there are no researchers in the field on the south end of Malone, and the main season for bird studies is well under way, we are really talking about 2008 at the earliest, because two years of study through the whole seasonal cycle—summer plus the spring and fall migrations (which extend from mid-March to December)—are a minimum requirement. Of course, the less you study something, the less chance you have of actually finding out something which might slow down the project.

Since this is the nature of Noble's approach to bird studies, I suspect their approach in other areas, such as noise, aesthetics, hydrology, soil, economic impact, etc. will be similar.

How can we prevent this, and have recourse if the turbines are actually built? Both problems require a tough, well-written town ordinance, specifying how studies are to be conducted and their results reviewed before permits are issued, and for later recourse, an escrow fund or cash bond to be put up by the developers, also before permits are issued. The escrow fund should be managed by a community committee, and set up to provide as many forms of economic safety for the community as are allowed by law. In it there needs to be a decommissioning fund for each turbine, to take it down, remove the concrete footer, and restore the land to its original state at the end of the turbine's useful life. There need to be funds to cover damages to the health, property values, and quality of life of nearby residents, should these occur. It would be good, too,

if we could protect the town against future unfavorable changes in state tax law which might allow wind turbines to escape local taxation altogether, as they did in the State of Kansas.[6] Wind energy companies have influence over tax law in both Washington and Albany, and there is already a New York State law on the books saying wind turbines are not subject to local taxes unless overridden by a specific local ordinance. Obviously, this override needs to be in our ordinance.

A powerful town ordinance has already been written for us by a group of lawyers. My husband circulated a preliminary version to the Planning Board and Town Board over a month ago, but it has now been refined and given a strong legal basis, anchored in the existing Malone Town Code. I urge townspeople to support a 6-month moratorium during which these issues are reviewed with the help of experienced outside counsel, followed by adoption of a strong regulatory ordinance that keeps our town and natural beauty from becoming another of civilization's waste heaps.

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[1] GP van den Berg, personal communication, May 2, 2005.

[2] GP van den Berg, "Do wind turbines produce significant low frequency sound levels?" *Eleventh International Meeting on Low Frequency Noise and Vibration and its Control*, Maastricht, The Netherlands, 30 August to 1 September 2004, p. 1.

[3] GP van den Berg, GP, 2004. Effects of the wind profile at night on wind turbine sound. *Journal of Sound and Vibration* 277:955-970.

[4] Geoff Leventhall, "Notes on low frequency noise from wind turbines with special reference to the Genesis Power Ltd. proposal, near Waiuku, NZ," prepared for Genesis Power/Hegley Acoustic Consultants by Dr. Geoff Leventhall, June 4, 2004. Available from Dr. Leventhall at geoff@activenoise.co.uk.

[5] See Charles Hinckley, "Comments of Noble Environmental Power, LLC, in response to the initial facility certification and procurement notice (SAPA) No. 03-E-0188SA3, State Register, November 10, 2004," in which Noble Environmental informed the NY State Public Service Commission that "Noble is seeking to bring on line one or more wind generation facilities before the end of 2005." It appears from Noble's comments, in its petition to the PSC, that it is seeking an "expedited or fast-track" process, so as to "capture" the federal Production Tax Credit due to expire December 31, 2005.

[6] Glenn R. Schleede, "Misplaced State Government Faith in 'Wind Energy'-This Time by the Kansas Energy Council." Round Hill, VA, 3/1/05.

**Attachment – Health Concerns 3.**

***Health Effects of Wind Turbine Noise (3-2-06)***

Posted July 26th, 2008 in Articles by Nina Pierpont.

Industrial wind turbines produce significant amounts of audible and low-frequency noise. Dr. Oguz A. Soysal, Professor and Chairman of the Dept. of Physics and Engineering at Frostburg State University in Maryland, measured sound levels over half a mile away from the Meyersdale, PA, 20-turbine wind farm. Typical audible (A-weighted) dB (decibel) levels were in the 50-60 range, and audible plus low-frequency (C-weighted) dB were in the 65-70 range.[1] 65-70 dB is the loudness of a washing machine, vacuum cleaner, or hair dryer.[2] A difference of 10 dB between A and C weighting represents a significant amount of low-frequency sound by World Health Organization standards.[3]

The noise produced by wind turbines has a thumping, pulsing character, especially at night, when it is more audible. The noise is louder at night because of the contrast between the still, cool air at ground level and the steady stream of wind at the level of the turbine hubs.[4] This nighttime noise travels a long distance. It has been documented to be disturbing to residents 1.2 miles away from wind turbines in regular rolling terrain,[5] and 1.5 miles away in Appalachian valleys.[6]

At night, the WHO recommends, the level of continuous noise at the outside a dwelling should be 45 dB or less, and inside, 30 dB or less. These thresholds should be even lower if there is a significant low-frequency component to the sound, they add—as there is for wind turbines. Higher levels of noise disturb sleep and produce a host of effects on health, well-being, and productivity.[7]

The decibel is logarithmic. Increasing the dB level by 10 multiplies the sound pressure level by 10. Increasing the dB level by 20 multiplies the sound pressure level by 100 (and 30 dB multiplies by 1000, etc.). Thus the 65 dB measured day and night half a mile from the Meyersdale wind farm has a measured intensity 100 times greater than the loudest continuous outdoor nighttime noise (45 dB) recommended by the WHO.

Typical ordinances proposed or passed for NY State communities considering industrial wind turbines allow A-weighted noise levels of 50 dB and construction of turbines only 1000 ft. from dwellings. These ordinances meet neither WHO nor NYS Dept. of Environmental Conservation (DEC) standards, especially compared to the very low ambient noise levels (with dB levels typically in the 20's) in rural NY.[8]

The health effects of excessive community noise are carefully documented in the WHO report with reference to scientific and medical literature. Effects relevant to wind turbines, in terms of dB levels and noise type, are paraphrased and summarized from this report:

- For people to understand each other easily when talking, environmental noise levels should be 35 dB or less. For vulnerable groups (hearing impaired, elderly, children in the process of reading and language acquisition, and foreign language speakers) even lower background levels are needed. When noise interferes with speech comprehension, problems with concentration, fatigue, uncertainty and lack of self-confidence, irritation, misunderstandings, decreased work capacity, problems in human relations, and a number of stress reactions arise.[9]
- Wind turbine noise, as described above and experienced by many turbine neighbors, is easily within the decibel levels to disturb sleep. Effects of noise-induced sleep disturbance include fatigue, depressed mood or well-being, decreased performance, and increased use of sedatives or sleeping pills. Measured physiologic effects of noise during sleep are increased blood pressure and heart rate, changes in breathing pattern, and cardiac arrhythmias.[10] Certain types of nighttime noise are especially bothersome, the authors note, including those which combine noise with vibration, those with low-frequency components, and sources in environments with low background noise.[11] All three of these special considerations apply to industrial wind turbines in rural NY State. Children, the elderly, and people with preexisting illnesses, especially depression, are especially vulnerable to sleep disturbance.
- Noise has an adverse effect on performance over and above its effects on speech comprehension. The most strongly affected cognitive areas are reading, attention, problem solving, and memory. Children in school are adversely affected by noise, and it is the uncontrollability of noise, rather than its intensity, which is most critical. The effort to tune out the noise

comes at the price of increased levels of stress hormones and elevation of resting blood pressure. The adverse effects are larger in children with lower school achievement.[12]

- What is commonly referred to as noise "annoyance" is in fact a range of negative emotions, documented in people exposed to community noise, including anger, disappointment, dissatisfaction, withdrawal, helplessness, depression, anxiety, distraction, agitation, and exhaustion.[13] Numerous reports from neighbors of new industrial wind turbine installations document these symptoms. The percentage of highly annoyed people in a population starts to increase at 42 dB, and the percentage of moderately annoyed at 37 dB.[14]

Low-frequency sound is also sensed as pressure in the ears. It modulates the loudness of regular audible frequencies, and is sensed as a feeling or vibration in the chest and throat.[15] Neighbors of industrial wind turbines describe the distressing sensation of having to breathe in sync with the rhythmic thumps of the turbine blades, especially at night when trying to sleep.

The participants in noise studies are selected from the general population and are usually adults. Vulnerable groups of people are underrepresented. Vulnerable groups include people with decreased personal abilities (old, ill, or depressed people), people with particular diseases or medical problems, people (children) dealing with complex cognitive tasks such as reading acquisition, people who are blind or hearing impaired, fetuses, babies and young children, and the elderly. These people may be less able to cope with the impacts of noise exposure and at greater risk for harmful effects than is documented in studies. Attention needs to be paid to them when developing regulations and setback requirements for industrial wind turbines and other sources of annoying and debilitating noise.

Wind turbines also create moving visual disturbances, especially early and late in the day when the long shadows of moving blades sweep rhythmically over the landscape. That portion of the population which is susceptible to vertigo, unsteadiness, or motion sickness (including many children and a large proportion of the elderly) will be vulnerable to unsteadiness and nausea when subjected to this visual disturbance. People with seizure disorders are susceptible to triggering of seizures by the strobe effect of seeing the sun through the moving blades.

To protect the public health, it is critical that industrial wind turbines not be placed within a minimum of 1.5 miles of human dwellings (homes, hospitals, residential schools, nursing homes, prisons, etc.) or schools. In mountainous terrain the setback should be greater, especially in topography with long parallel ridges and valleys as in the Appalachians.

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[1] Soysal, OA. 2005. Acoustic Noise Generated by Wind Turbines. Presented to the Lycoming County, PA Zoning Board 12/14/05. osoysal@frostburg.edu

[2] www.lhh.org/noise/decibel.htm

[3] World Health Organization, 1999. *Guidelines for Community Noise*. Ed. by Berglund B et al. Available at www.who.int/docstore/peh/noise/guidelines2.html

[4] van den Berg, FGP, 2005. "The beat is getting stronger: The effect of atmospheric stability on low frequency modulated sound of wind turbines." *Journal of Low Frequency Noise, Vibration, and Active Control*, 24(1):1-24.

[5] van den Berg, FGP, 2003. "Effects of the wind profile at night on wind turbine sound." *Journal of Sound and Vibration* 277:955-970.

[6] Linda Cooper, Citizens for Responsible Windpower, "Activist Shares Wind Power Concerns," *The Pendleton Times*, March 3, 2005, p. 4.

[7] WHO, 1999. *Guidelines for Community Noise.*

[8] NYS DEC, 2001. *Assessing and Mitigating Noise Impacts*.

[9] WHO, 1999. *Guidelines for Community Noise*, pp. 42-44.

[10] Ibid, p. 44.

[11] Ibid. p. 46

[12] Ibid. pp. 49-50

[13] Ibid. p. 50

[14] Ibid. p. 51

[15] Moller, H. and CS Pedersen. 2004. Hearing at low and infrasonic frequencies. *Noise & Health* 6 (23):37-57.

**Attachment – Health Concerns 4.**

***Wind Turbine Syndrome: Testimony before the New York State Legislature Energy Committee (3-7-06)***

Posted July 26th, 2008 in Articles by Nina Pierpont.

I am here to talk to you today as a physician-scientist about a clinical phenomenon called Wind Turbine Syndrome. This is relevant to today's hearing because it critically affects implementation of the RPS (Renewable Portfolio Standard) in terms of the siting of industrial wind turbines. Current siting practices (which are solely industry-driven) disregard public health. The supervision of the legislature—of this committee—is needed to create siting standards to protect the citizenry, all the citizenry, including citizens who are rural, old, ill, impaired, and very young.

Federal agencies are trying to put the brakes on willy-nilly wind turbine construction, citing, for instance, wildlife issues. The GAO (Government Accountability Office) last fall told US Fish and Wildlife to get involved. The National Academy of Sciences in April 2005 initiated a 20-month study on environmental impacts whose final report is due in December this year. There also needs to be a focus on human health, and the state needs to step up to the plate in terms of regulation.

I live in Franklin County, the poorest in NY State. Two years ago, after passage of the RPS, wind energy companies showed up there in force, as they have in all the poor, rural parts of the state. They showed up with no controls whatsoever, unregulated by either the legislature or NYSERDA (New York State Energy Research & Development Authority). Our town boards, made up of farmers, teachers, corrections officers, etc., were told, "You guys handle this," by our state representatives. I got involved as a responsible citizen and physician. Over the last 1½ years I have done a lot of reading, research, and interviews. I have spoken at town board meetings and before the St. Lawrence County Legislature, and published alone or with my husband (a retired university professor) numerous editorials and letters to the editor in local newspapers. My focus has been health issues and to some degree wildlife, in which I also have credentials in my PhD.

I get a lot of slander and abuse from the wind salesmen. Their favorites are saying that my abundantly referenced and footnoted articles, like the one before you (note: a separate handout), have "no evidence," or that I think wind turbines cause mad cow disease. The latter smear came from a town meeting in Ellenburg, NY, in October 2004, when I presented information culled from the

medical literature on possible effects of low frequency noise. This included a paper out of the UK linking low frequency sound to prion diseases by a complex and highly speculative mechanism. I was very clear how speculative it was, but apparently the concept of something being speculative was over their heads, including over the heads of wind salesmen in the room.

I am not for or against the RPS. I'm an intelligent person and I support renewable energy. I am not here to shoot down wind energy, which probably has its place, though that place is not near people's homes or near schools, hospitals, or other locations where people have to sleep or learn.

I would like to stress that these are not "farms." One doesn't "farm" wind any more than one "farms" water in a hydroelectric dam or "farms" neutrons in an atomic plant. These are large, industrial installations. They make large-scale, industrial noise. "Jet engines" is the most common description I hear in surveying people—a jet engine that doesn't go away and which you can't get used to.

A syndrome in medicine is a constellation of symptoms and findings which is consistent from person to person. Defining a syndrome is the first step in investigating any new disease. The symptom cluster has to make sense in terms of pathophysiology—there has to be a plausible mechanism in terms of how the body and brain work. Defining a syndrome, and making that knowledge available to the medical community, lets other doctors go from scratching their heads over weird presentations of illness which are coming through their offices, to being able to validate and name what is going on and start to do something about it. It also opens the door to epidemiologic studies to define prevalence and risk factors, which will guide prevention and treatment.

Describing and documenting symptoms is the province of physicians. So is research on the causes of diseases. Deciding whether people have significant symptoms is not within the expertise of engineers or specialists in acoustics, even when the symptoms appear to be caused by noise. We physicians appreciate the noise data which engineers provide, but this data has nothing to do with whether people have symptoms or not. One British acoustics expert, Dr. Geoff Leventhall, is especially troubling in this regard, insisting that people *can't* have symptoms because turbines *don't*, he says, produce low frequency noise. His fallback, for which he is well paid by the industry, is that people make up their complaints. But he's not trained to distinguish whether people are making up their complaints, or to know about the range of physical, psychiatric, and neurological symptoms people might have. A related point: the hallmark of a good doctor is one who takes symptoms seriously and pursues them until they are understood (and ameliorated). This includes symptoms related to the brain, our most complex organ—symptoms which may be neurologic, psychiatric, or physical.

Three doctors that I know of are studying the Wind Turbine Syndrome: myself, one in England, and one in Australia. We note the same sets of symptoms. The symptoms start when local turbines go into operation and resolve when the turbines are off or when the person is out of the area. The symptoms include:

1) Sleep problems: noise or physical sensations of pulsation or pressure make it hard to go to sleep and cause frequent awakening.
2) Headaches which are increased in frequency or severity.
3) Dizziness, unsteadiness, and nausea.
4) Exhaustion, anxiety, anger, irritability, and depression.
5) Problems with concentration and learning.
6) Tinnitus (ringing in the ears).

Not everyone near turbines has these symptoms. This does not mean people are making them up; it means there are differences among people in susceptibility. These differences are known as risk factors. Defining risk factors and the proportion of people who get symptoms is the role of epidemiologic studies. These studies are under way.

Chronic sleep disturbance is the most common symptom. Exhaustion, mood problems, and problems with concentration and learning are natural outcomes of poor sleep.

Sensitivity to low frequency vibration is a risk factor. Contrary to assertions of the wind industry, some people feel disturbing amounts of vibration or pulsation from wind turbines, and can count in their bodies, especially their chests, the beats of the blades passing the towers, even when they can't hear or see them. Sensitivity to low frequency vibration in the body or ears is highly variable in people, and hence poorly understood and the subject of much debate.

Another risk factor is a preexisting migraine disorder. Migraine is not just a bad headache; it's a complex neurologic phenomenon which affects the visual, hearing, and balance systems, and can even affect motor control and consciousness itself. Many people with migraine disorder have increased sensitivity to noise and to motion—they get carsick as youngsters, and seasick, and very sick on carnival rides. Migraine-associated vertigo (which is the spinning type of dizziness, often with nausea) is a described medical entity. Migraine occurs in 12% of Americans. It is a common, familial, inherited condition.

To keep our balance and feel steady in space, we use three types of input: from our eyes (seeing where we are in space), from stretch receptors in joints and muscles, and from balance organs in the inner ear. At least two of these systems have to be working, and agreeing, to maintain balance. If the systems don't agree, as in seasickness or vertigo, one feels both ill and unsteady. Wind

turbines impinge on this system in two ways: by the visual disturbance of the moving blades and shadows, and by noise or vibration impacting the inner ear.

Other candidate risk factors for susceptibility to Wind Turbine Syndrome are age-related changes in the inner ear. Five percent (5%) of otherwise healthy people from age 57 to 91 experience dizziness, and 24% experience tinnitus or ringing. Damage to the ears or hearing from other causes, such as noise exposure, is also a potential risk factor.

Inner ear organs are closely linked, by proven neurological connections, to the brain systems which control mood, anxiety, and one's sense of well-being. Disturbing the inner ear disturbs mood, not because a person is a whiner or doesn't like turbines, but because of neurology.

Data from a number of studies and individual cases document that in rolling terrain, disturbing symptoms of the Wind Turbine Syndrome occur up to 1.2 miles from the closest turbine. In long Appalachian valleys, with turbines on ridge-tops, disturbing symptoms occur up to 1.5 miles away. In New Zealand, which is more mountainous, disturbing symptoms occur up to 1.9 miles away.

In New York State, with its mixed terrain, I recommend a setback of 1.5 miles (8000 ft.) between all industrial wind turbines and people's homes or schools, hospitals, or similar institutions. This setback should be imposed immediately for turbines not yet built.

The legislature might want to set up a panel of clinicians to review the data and medical information I refer to here, but until this happens, and as research continues, a moratorium on all wind turbine construction within 1.5 miles of homes would be appropriate.

To recapitulate, there is in fact a consistent cluster of symptoms, the Wind Turbine Syndrome, which occurs in a significant number of people in the vicinity of industrial wind turbines. There are specific risks factors for this syndrome, and people with these risk factors include a substantial portion of the population. A setback of 1.5 miles from homes, schools, hospitals, and similar institutions will probably be adequate, in most NY State terrain, to protect people from the adverse health effects of industrial wind turbines.

**APPENDIX 4.**

smh.com.au
The Sydney Morning Herald

## Huge wind farm plan announced

Ideal conditions … a computer-generated image of the proposed wind farm site outside Broken Hill.

October 8, 2007 - 1:19PM

A western NSW wind farm dubbed the largest in Australia could be up and running by the end of 2009, the company behind it says.

Renewable energy group Epuron announced its proposal today to install about 500 wind turbines north-west of Broken Hill, in far western NSW, saying they could generate enough electricity for 400,000 homes.

Epuron executive director Andrew Durran said if the NSW Government approved the wind farm near Silverton, the project could be operational in stages by late 2009.

The company will submit a development application for the farm in March next year, with approval expected by the end of the year.

Construction would begin early in 2009.

The $2 billion project could produce up to 4.5 per cent of NSW annual energy needs, and reduce greenhouse gas emissions by 3 million tonnes of carbon dioxide a year, the company said.

"Silverton Wind Farm will be one of the largest in the world once it's operating, with the potential for almost 1000 megawatts of renewable energy capacity," Mr Durran said.

"NSW is an excellent state for wind farms. It has an excellent wind resource, it has a very strong transmission system, and it has got the largest energy load, so from our perspective NSW has a great potential for wind technology."

Mr Durran said he had also spoken to the communities of Silverton and Broken Hill, with most people showing support for the project.

The operation and maintenance of the facility would create 100 permanent jobs in the area, he said.

Meanwhile, four landholders had already agreed to host the wind turbines.

"The townspeople in the area recognise the jobs and economic benefits from this project," he said.

"They also recognise that to date their towns have relied on mining as a income source. This provides a new income source for the region."

However, Mr Durran said the differences between the federal and NSW clean energy targets were a concern, as they created confusion and delays for renewable energy providers.

Under the Federal Government's national Clean Energy Target, announced last month, 30,000 gigawatt hours each year would come from low emissions sources by 2020 - about 15 per cent of Australia's energy consumption.

Prime Minister John Howard said the Government would consult with states and industry in designing and implementing the scheme, which he said would take effect no later than January 2010.

The federal plan would replace state-based schemes, he said.

NSW has set a renewable energy target of 10 per cent by 2010, beginning in 2008, and 15 per cent target by 2020.

"The chief concern there is that the State Government's renewable energy scheme is intended to start from the first of January in 2008, [while] the federal scheme could be two or three years after that," Mr Durran said.

"The industry can't afford to wait two or three years for this to occur.

"We'd like the [federal] announcement to be strengthened to start from 2008."

The Clean Energy Council's Dominique La Fontaine said the confusion would lead to a stalling of investment in renewable energy.

"If the states put those plans on hold in the expectation of the federal measure, then that will cause a stalling in investment," she said.

"So we must proceed immediately with the NSW renewable energy targets to enable the right investment framework, and the climate for the wind farms."

The plan shows there's no need for new coal-fired power stations, Greenpeace says.

Greenpeace energy campaigner Ben Pearson said the proposal showed coal-fired power stations, which fuelled climate change, were not needed.

He said Greenpeace was calling for a 25 per cent renewable energy target by 2020.

"A strong, ambitious renewable energy target would see this wind project and many more go ahead, delivering clean electricity and helping reduce Australia's greenhouse gas emissions," he said.

"Australia does have the renewable energy resources it needs to move away from coal.

"All that is lacking is political support."

**AAP**

*This story was found at:*
***http://www.smh.com.au/articles/2007/10/08/1191695793755.html***

**APPENDIX 5.**

## NUISANCE AT COMMON LAW

Landowners own their land in “Fee Simple” (or Freehold). This is land that the Crown has once managed, has sold, for an exchange of money, into private ownership and has no more right to govern, interfere with, or remove from the owner without compensating the owner. Under the Australian Constitution, a Grant in Fee Simple Title is a legal document on par with all government laws. It is protected by the Common Law of Australia and is the highest form or land ownership in the country.

What does a Grant in Fee Simple Title give us?

There are 4 elements of ownership that are carried in a Fee Simple Title Deed.

1. *Tenements* - The purchase of any structures or buildings that are on the land.

2. *Messuages* - The right to build any structures of any kind on the land.

3. *Corporeal Hereditaments* - The right of ownership of all natural elements on the land, to an extent above the land, and to the very centre of the earth.

4. *Incorporeal Hereditaments* - The right to use the land in any manner including to waste the land. (Waste being a legal term meaning to take back to bare rock or destroy).

As an element of our Fee Simple ownership landowners also have the following responsibilities and rights.

* At common law, landowners are not entitled to use their land in ways detrimental to their neighbours and their neighbours’ use of their own land.

* An owner of land may be able to sue for nuisance against someone who does something that adversely affects the landowner’s land.

* A landowner has a right to quiet enjoyment of their land.

* Landowners, or anyone else entitled to the possession of land, have a legal right to exclude trespassers.

Therefore, we believe that a Grant in Fee Simple gives the grantee a right of action in Nuisance against any person whose behaviour causes visual, olfactory or auditory damage to the owner of the land. In other words, the owner of a parcel of land owned in Fee Simple, could bring an action at Common Law against any person whose action imposed on his land, injurious effect.

Wind Farmers' Land Verses Non-Related Dwellings

Turbines located upon leased land where any adverse impacts, whether visual or auditory, are confined to the leases of the land upon which they will be constructed. The owners of these leases are all wind farmers who have freely entered into an agreement with an applicant for the use of their land in this way. The compensation of such owners for any adverse effect suffered by them is to be found in the payments, and which the Wind Farm will make in the future to such owners. These agreements were freely made, and the payments must be treated as agreed compensation, freely negotiated and accepted by the land owners.

But totally different considerations apply to turbines impacting on non-related dwellings (residential houses, residential house building sites and community and government buildings eg. Schools, hospitals etc. that are not Wind Farmers.).

A non-related dwelling, in close proximity to Wind Turbines (less than 2 km away) will suffer injury both visual and auditory. The injury is permanent. Only when the wind is not blowing will the noise cease; only in the pitch black of a moonless night will there be no visual impact. Although some turbines may have lights fitted to them for aircraft safety at night.

Therefore, any person whose action causes the landowners' estate to be injuriously affected in a visual, auditory or olfactory way can be successfully sued at Common Law. We believe that this action is a right of landowners who hold land in fee, but only after any turbines are erected, not before.

The land owners rights under Fee Simple ownership

We believe that an action in Nuisance against any person or company whose behaviour has caused nuisance, will be a more common result of the positioning of industrial wind turbines too close to non-related dwellings.

This is because of the valuable rights given to a land owner who owns an estate in fee simple – the right to action in Nuisance. This is a right currently possessed by all land owners. It is not a right possessed by the Wind Power Companies as they are leasing land.

Pursuant to that right, we understand that a land owner holding an estate in fee simple can sue in the Common Law Courts.

Further, we believe that Part 3A of the Local Government Act does not abolish this right. Indeed there is a presumption, in statutory interpretation, that the statute does not appear to fulfill this criteria.

The Minister and a Just Decision

Under the current regime, the Minister for the Department of Planning makes the final decision as to whether a Wind Farm will proceed, and on what basis.

The powers given to the Minister in a decision making process must be exercised doing justice to all affected parties; these include the Wind Farm Developer and all affected residents and/or landowners.

The Minister, in making decisions on the development of Wind Farm projects, is under a duty of law to exercise her/his power in any application, justly. She/he must ensure that justice is done to landowners who will be adversely affected by a wind farm, under the current ad hoc regime. She has a Duty of Care to consider the impact of "Nuisance" for non-related parties.

However, the empirical evidence in New South Wales (and in other States) suggests that the current process is too subjective and relies on the opinions of just a few in the Department of Planning. There are many injured parties in the Wind Farm forum.

The result of the current ad hoc wind farm approval process is, and will continue to be if changes do not occur, loud and vigorous litigation through the courts. This will be expensive for all parties, and a situation that must be addressed.

We believe that a minimum of 2 kilometre setback of turbines from residences will significantly reduce the many ill effects from turbines too close to homes and will result in the significant reduction in "Nuisance" cases at Common Law.

**APPENDIX 6.**

# Sanity still blowing in the wind

Article from: Herald Sun

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Terry McCrann

August 04, 2009 12:00am

**THE Rudd Government's 'green power' strategy has been utterly shredded by detailed analysis which shows the total uselessness of the one form of power on which it is almost entirely based - wind.**

Further, this independent analysis is a damning indictment of not only the federal government and all state governments for their betrayal of their most fundamental duty to the public interest. But it also exposes the disgrace of the so-called 'public service' bureaucracies.

Where is the official analysis of what wind power generation does in practice - at either federal or state level? Which, if it had been done, would have embarrassingly exposed its uselessness. Why has it had to be done by 'privateers'?

The answer is of course that the public service at both state and federal level has abandoned not just its broad general duty to the public, but even its narrower duty to tell political government the truth by providing policy advice and analysis.

Simply and damningly: If you don't ask the question, if you don't do the analysis, you won't come up with the 'wrong' answer.

If you do, you find that not only does wind fail as a power source. Not that that's a surprise to anyone who's prepared to 'look'. When the wind don't blow, the power don't flow. Even more devastatingly, as this analysis shows, the wind not only don't blow an awful lot of the time. It tends to not blow 'everywhere' at the same time.

This utterly shreds the claim that if we build enough of the so-called 'wind farms' across southern Australia, the wind will always be blowing somewhere.

No it won't. But you'll look in vain for 'official' advice saying that.

What makes the analysis even more damning is that wind fails even in the main reason for its costly and ineffective existence - to reduce greenhouse gas emissions. Precisely because of that pesky little problem.

An unreliable 484MW wind farm would not only cost more than two times a gas-fired 550MW power station. But it would allow perhaps only 25MW of coal-fired generation to be shut down - whereas the gas plant could close its full 550MW.

The analysis comes in a series of papers. The first, from weather analyst Andrew Miskelly and physicist Tom Quirk, tracks the performance of the wind farms across Victoria, South Australia, New South Wales and Tasmania for the entire month of June in five-minute intervals.

They used the data from the Australian Energy Market Operator - the national energy body. Their damning evidence is shown in the graph which measures two things. One the actual performance of all the farms in the four states through every minute of June. The second, assuming equal installed capacity in all four states - to further test the "wind will be blowing somewhere" claim.

Two huge and unmistakable messages leap out of the graph. Wind farms spend most of their time not generating power, or not generating very much. They can move quickly from producing a lot or quite a lot of power to zero.

Second, even though spread right across southern Australia, they tend to produce or not produce at much the same time. That makes impossible any practical ability to ask nature to 'turn on', say, Victorian wind farms when nature has turned off SA ones. Or even 'distant' Tasmanian ones.

The correlation of failure between Victoria and SA is especially strong. It's not quite as strong between SA and NSW and Tasmania, but still strong enough to make even those scattered wind farms useless as a combined generating force.

And when you put all the wind farms in the four states together you get a devastating image of practical uselessness - that would require you to keep almost the equivalent capacity of coal-fired stations on and operating pretty much at full power all the time.

A second analysis, from engineer and power industry authority Peter Lang, shows three equally devastating and simple conclusions.

Wind power does not avoid significant amounts of greenhouse gas emissions. It is a very, very high-cost way to avoid such emissions - costing between $830 and $1149 to avoid one tonne of CO2 emitted per MWh as against just $22 with nuclear power. And wind power, even with high capacity penetration, could never make a significant contribution to reducing those emissions.

A third analysis, from Peter Mitchell - not an expert on anything, 'just' a victim of a proposed wind farm in south-western Victoria - uses Lang's analysis to help compare the proposed Stockyard Hill wind farm with the Mortlake gas power station.

The comparison is devastating, yet again. If you want to have power and reduce emissions, gas wins in a hand canter. And saves quite literally billions.

Every wind turbine that goes up anywhere in Australia is not just a statement of some primitive theology but testament to government and public service betrayal.

I have a dream: to be at the first dismantling of the first turbine. We'll keep some as a reminder of a time when politicians and supposed intellectual elites lost all touch with reality.