

8 February 2011



Department of the Senate  
PO Box 6100  
Parliament House  
Canberra ACT 2600  
Australia

By email: [community.affairs.sen@aph.gov.au](mailto:community.affairs.sen@aph.gov.au)

Dear Sir/Madam,

RE: SENATE INQUIRY: SOCIAL AND ECONOMIC IMPACT OF RURAL WIND FARMS IN AUSTRALIA

This submission by Wind Prospect Pty Ltd is made in response to the Senate Inquiry into the Social and Economic Impact of Rural Wind Farms in Australia, being undertaken by the Senate Community Affairs Committee.

Wind Prospect Pty Ltd, a subsidiary of the Wind Prospect Group, has been operating in Australia since 2000 and is currently developing a number of wind farm projects in South Australia, Western Australia, Victoria and New South Wales. The Wind Prospect Group and its subsidiaries have gained a wealth of wind farm development, construction and operation experience, which includes:

- Over 17 years of wind farm development, construction, operations and services experience, with activities in the United Kingdom, Ireland, France, Australia, New Zealand, China, South Africa, and Canada;
- Within Australia, obtained development approval for 12 wind farms in South Australia and New South Wales since 2000, totalling more than 1000MW of which 565MW have so far been constructed.

The experience and technical skill gained by Wind Prospect gives us a very sound understanding of the investigation, development, construction and operation processes for wind farms, and is the basis for our comments to this inquiry.

#### About Wind Prospect

Wind Prospect operates globally in wind farm and other renewable energy development, construction, operation and advisory services. Wind Prospect has developed and engineered wind-energy projects around the world since building the UK's second wind farm in 1992. Consents have been obtained for over 53 wind farms world-wide totalling over 2,300 MW of wind farm projects. The Wind Prospect Group now employs over 200 staff globally.

Wind Prospect Pty Ltd was formed in Australia in 2000 as a subsidiary company of the Wind Prospect Group, owned by its Directors and employees. WPPL (and its subsidiaries) has grown from modest

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beginnings to currently employing 32 staff housed in offices in Melbourne, Adelaide and Newcastle, as a direct result of the establishment of the Renewable Energy Target and the emergence of the wind energy industry in Australia.

### Our understanding of wind farms

Wind Prospect has had substantial experience in wind farm development in many jurisdictions around the world, including over 10 years experience within Australia. The focus of our developments have been around community and stakeholder engagement and selecting and developing high yielding, low impact wind farm sites. The technical expertise we hold in-house and the expert team we source through consultants ensures we hold a high level of understanding with regards to technical, planning and environmental constraints. All these factors combined have lead to the development success that we have experienced around the world.

## 1. TERMS OF REFERENCE DISCUSSION

### 1.1 Context

#### Why Wind Farms?

Renewable energy is now a necessary part of Australia's energy generation mix, particularly to meet required reductions in CO<sub>2</sub> emissions in relation to Climate Change action, and to meet the Federal Governments renewable energy target of 20% (or 45,000GWh) renewable energy generation by 2020. In South Australia, wind energy alone now makes up more than 17% of installed generation capacity in the State. The 2010 national renewable energy generation figure stands at around 8.67% (20% of this from wind energy).

Wind energy is currently one of the most economically viable sources of renewable energy and is well suited to some areas of rural Australia where there is good wind resource, grid connection opportunities, separation from residences and low potential for environmental effects. Wind energy is also a 'low resource' means of generating electricity, with no ore mining required, no water use during operation and no emissions. Wind energy infrastructure can also be removed at the end of its generation life, with negligible residual impact.

Modern onshore wind turbines currently have the capacity to generate electricity in the range of 1.5 - 3.3 MW per turbine. One 2MW machine operating at a (typical) capacity factor of 30% would produce, annually, more than 5,000 MWh of electricity. This is enough to meet the needs of around 800 average households (subject to household electricity use). This level of electrical generation can provide a major contribution towards achieving the 20% Renewable Energy Target.

With regards to emissions savings, due to the nature of wind energy it is normally bid into the National Electricity Market at very low cost, which means it gets fully dispatched ahead of other forms of generation, including fossil fuel generation. As wind energy displaces generation which would otherwise have been generated from fossil fuel sources, it results in direct CO<sub>2</sub> emissions savings. Full dispatch of wind also has the effect of reducing electricity pool prices.

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## Wind farm support

In Wind Prospect's experience we have found majority support for wind energy projects in rural areas. Through public opinion surveys offered at public exhibitions for our wind farm developments we have found around 80-95% of respondents are in favour of our wind farm projects. We believe this majority is maintained throughout wind farm construction and operation.

This is also reflected by results of an AMR Interactive survey commissioned by the NSW government in mid 2010 on community attitudes to wind farms, which found wind farms were regarded as an acceptable form of power generation by 81% of the population.

Opposition to wind farms can also be found in some rural communities where wind farms are proposed, which is expected of all types of development in a region. We have found that whilst some may oppose a wind farm development in their area, they do not usually oppose the concept of wind energy or renewable generation altogether; the concerns of those opposing wind farms usually relate to visual amenity and potential noise effects. However, we believe that a significant majority of community members in a region support wind farm development.

### 1.2 Any adverse health effects for people living in close proximity to wind farms

Over the last few years there have been increasing reports in the media and other publications regarding the apparent health effects of wind farms on nearby residents, attributed to infrasound or low frequency noise emitted by wind turbines.

Noise crosses a very broad range of frequencies. Infrasound is generally considered to be noise in the frequencies from 20 Hertz (Hz) down to 0.001 Hz. Low frequency is considered to be noise in the range of around 10 to 200 Hz, whilst audible frequencies for humans range from around 20 Hertz (Hz) to 20,000 Hz. Modern wind turbines generate noise across the noise frequency range, with the aerodynamic noise from wind turbines *not* dominant within the low frequency range (Sonus, 2010).

Infrasound is often described as inaudible, however, sound below 20 Hz remains audible provided the sound level (ie dB) is sufficiently high (O'Neal et al., 2009 in Sonus, 2010). The thresholds of hearing for infrasound have been determined in a range of studies (Leventhall, 2003 in Sonus, 2010), with an internationally recognised audibility threshold of 85 dB(G) at 20 Hz, with the threshold rising as the Hertz decreases. In a study by Australian acoustic specialists, Sonus, (2010 – see attached) on two Australian wind farms, it was found that the infrasound emissions measured for the wind farms was well below the internationally recognised audibility threshold, and further, on par with the level measured at an Australian beach. Significantly, the National Health and Medical Research Council (NHMRC) has identified numerous studies which conclude that sub-audible, low frequency sounds and infrasound from wind turbines do not present a risk to human health and that noise emissions in general will not cause direct health problems (NHMRC, 2010).

Further, whilst non-audible perception of infrasound through felt vibrations in various parts of the body is possible, it is found to only occur at levels well above the audible threshold (Moeller and Pedersen, 2004 in Sonus, 2010).

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An informed literature review commissioned by the American and Canadian wind energy associations, conducted by a panel of medical professors and acoustic specialists from the US, Canada, Denmark and the UK (Colby, *et al*, 2009 – see attached), concluded:

“Following review, analysis, and discussion of current knowledge, the panel reached consensus on the following conclusions:

- There is no evidence that the audible or sub-audible sounds emitted by wind turbines have any direct adverse physiological effects.
- The ground-borne vibrations from wind turbines are too weak to be detected by, or to affect, humans.
- The sounds emitted by wind turbines are not unique. There is no reason to believe, based on the levels and frequencies of the sounds and the panel’s experience with sound exposures in occupational settings, that the sounds from wind turbines could plausibly have direct adverse health consequences.” (pp ES-1)

Audible noise from wind farms can cause annoyance for some people, despite the rigorous noise emission guidelines that States apply to wind farm developments, which aim to protect nearby residents from noise nuisance (such emission guidelines are more stringent than the World Health Organisation’s recommended emission guidelines). Such annoyance can lead to stress and other health impacts, which can in-turn be exacerbated by rhetoric, fears and negative publicity. The NHMRC (2010) has recognized this potential effect in their review, which states:

“It has been suggested that if people are worried about their health they may become anxious, causing stress related illnesses. These are genuine health effects arising from their worry, which arises from the wind turbine, even though the turbine may not objectively be a risk to health (Chapman, 2010).” pp 4.

Colby *et al* (2009) also discuss this phenomenon, suggesting that factors culminating in annoyance include the nocebo effect defined as “*an adverse outcome, or worsening of mental or physical health based on fear or belief in adverse effects*”. The negative media coverage related to the effects of wind turbines we are seeing in Australia only serve to create anticipatory fear in some people that they will experience adverse effects from wind turbines.

There have been proposals in various States (particularly in NSW and Victoria) to apply a fixed setback distance between turbines and neighbouring residents. Wind Prospect does not support this approach, as the setback distance is arbitrary and not based on any scientific merit. In the decision issued by the Land and Environmental Court in NSW for the Gullen Range wind farm, the Court refused to apply the Council’s blanket 2km setback, noting that it was an ‘unsubstantiated empirical standard’ and not founded on any proper basis. The Court said assessment of impacts on properties should be done on an individual basis (see <http://www.austlii.edu.au/au/cases/nsw/NSWLEC/2010/1102.html>). We would concur with this approach as it is the only transparent way to present site design decisions to the local community, regulators and other stakeholders.

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### 1.3 Concerns over the excessive noise and vibrations emitted by wind farms, which are in close proximity to people's homes

#### Noise Amenity

Wind farm noise guidelines are in use by all States in Australia. Each State has nominated the relevant noise guideline for use, which include:

- South Australian EPA, Wind Farms: Environmental Noise Guidelines 2003
- South Australian EPA, Wind Farms: Environmental Noise Guidelines 2009
- New Zealand Standard, NZS6808:1998 Acoustics: The Assessment and Measurement of Sound from Wind Turbine Generators

The noise emission criteria within these guidelines range from 35dB(A) to 40dB(A) (compared to the World Health Organisation criteria of 45dB(A)), which are designed to protect the noise amenity of nearby residences and avoid noise nuisance.

All wind farm developments must comply with the relevant guidelines in order to meet the planning requirements of each State. Prediction modeling is carried out by acoustic experts to present a likely noise emission case and then compliance monitoring is undertaken during the operation of the wind farm to ensure noise levels are compliant with required criteria. If they are not, remedial action would normally be required by the relevant regulatory body.

If residents are experiencing noise nuisance there is provision for them to report the nuisance to the relevant regulatory authority for investigation. It needs to be acknowledged, however, that the advent of noise nuisance is subjective, and some residents may consider any noise they may hear from a wind farm (regardless of noise level or compliance) as a nuisance. In our experience, we have believe that most residents do not consider noise that they may hear from a wind farm as noise nuisance.

There have been proposals in various States (particularly in NSW and Victoria) to apply a fixed setback distance between turbines and neighbouring residents. Wind Prospect does not support this approach, as the setback distance is arbitrary and not based on scientific merit. Noise studies must be undertaken to ensure predicted levels are within required criteria. Empirical data measured against required criteria is the most rigorous way to ensure protection of noise amenity for the majority of residents. It is also the only way to present a transparent case for the selected separation distance between turbines and residents. It is possible that some residents, under certain circumstances will hear the wind farm from two or more kilometers away from a wind farm. In this case, if no studies have been done regarding the noise emissions, there is no way to demonstrate to the resident that the noise they are hearing is or isn't within compliance criteria, and the separation distance remains arbitrary.

#### Vibrations

Wind Prospect is not aware of any complaints offered by residents regarding vibrations from a wind farm. Literature found on vibrations from wind farms includes Colby *et al* (2009) where it was concluded that any ground-borne vibrations that may come from wind farms are too weak to be detected by (or affect) people.

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## 1.4 The impact of rural wind farms on property values, employment opportunities and farm income

### Economic Benefits

#### *Landowners*

Wind farms are a unique form of farm diversification that provides valuable, sustainable rental income for participating landowners for the life of the wind farm. This diversification helps to increase the viability of the farming unit, particularly in marginal agricultural regions of Australia. This also has flow-on effects to the local economy, as local landowners will in-turn invest in local and regional goods and services. Apart from the small amount of land occupied by access tracks, hardstand areas, turbine towers and ancillary equipment, the land would continue to be available for agricultural use.

#### *Local Economy*

In our experience we have found that it is valuable to the local community, and both preferable and effective for the wind farm construction contractor to employ local contractors, construction and operation personnel, where the skills and services are available. For example, the input to the local and regional economy in the Mid-North of South Australia has been reported in detail by SKM (2010) in a study commissioned by AGL titled "*The Economic Impact Assessment of the Hallett Wind Farms*" (attached). The study found that at the completion of building four of the Hallett projects (~350MW; c\$897million), expenditure in the region from development and construction activities would amount to around \$111 million. Direct employment averaged at around 90 annual, full-time-equivalent positions. The study also found that for every job created directly by the wind farms, at least three further jobs are created indirectly.

Local or regional contractors that can benefit from wind farm construction projects include turbine tower manufacturers (such as RPG Australia and Keppel Prince Engineering), civils contractors and plant operators, small engineering firms, hospitality businesses and other agricultural services.

#### *Community Fund*

As part of all of Wind Prospect's wind farm developments we commit to the establishment of a Community Fund for access by the local community. The purpose of the Community Fund is to provide an opportunity for the local community to share in the commercial benefits of the wind farm by providing support for the development, maintenance, and enhancement of facilities, amenities, projects and activities in the region. The Community Fund is usually administered by local community representatives with assistance from the local council. The fund is generally established around the time that the wind farm begins producing electricity, and runs for the life of the wind farm.

Community Funds have been successfully established in areas where Wind Prospect's developed wind farms have been built. An example is in the Mid-North of South Australia, where Community Funds have been used to support local sporting groups, school facilities, hall facilities and the purchase of community farm machinery.

We find the Funds a very positive, equitable and effective means of the local community sharing in the economic benefits of the wind farm.

### Property Values

As with any property and land holding there are many factors which can influence the perceived value of a property including prevailing and permitted land uses, economic conditions, access/proximity to

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markets/workplaces and lifestyle considerations. In most agricultural areas the main determinant on property and land values is the productivity of the land.

It is commonly believed that wind farms can affect property and land values, and as such there have been a number of studies conducted to determine the relationship, including a study carried out by the NSW Valuer General (PRP, 2009) on 45 property sales located within a 10 kilometre radius of 8 wind farms sites. However, these studies have predominantly concluded it is not possible to isolate the sole effect of wind farms on property and land values due to the myriad of factors (as outlined above) influencing value (also see Hoen *et al*, 2009). By comparing the positive and negative impacts of the construction and operational stages of a wind farm to existing knowledge on what causes changes in property values, it is possible to predict the relationship between wind farms and property values.

Henderson and Horning Property Consultants (HHPC, 2006) conducted a study covering a 15 year period into the relationship between wind farms and property/land values by assessing local property values around the operating Crookwell 1 Wind Farm. The study also reviewed other overseas wind farms to compare with the Australian market. The United Kingdom perceptual study concluded that the main negative impacts were from visual impact, fear of 'blight' and proximity of a property to a wind farm. Key conclusions from HHPC (2006) are:

- That agricultural productive capacity of the land subject to the wind farm and the surrounding property is not in any measured way affected by the wind farm;
- The associated property has additional revenue and benefits from the lease agreement, improved roads, erosion control and passive wind protection for stock from the substation and turbine towers;
- The future development of the land under existing planning controls would continue as zoned 1(a) Rural Zone;
- The wind farm development has the potential to slow down the shift of productive agricultural land to rural residential use in the short to medium term;
- There was no measurable reduction in values of properties that have a line of sight to the Crookwell 1 wind farm.; and
- Soils, improvements and access to services are more important drivers of property values than visual impacts

In Nuridin (2009), the Real Estate Institute of Australia and several other real estate agents operating in locations with wind farms in Australia, including Gippsland and Albany, were interviewed to see if wind farms did influence property/land values. All interviewed agents replied that "there is no indication of any depreciation in the value of properties hosting wind farms, or those adjacent to, or in sight of turbines". In fact according to some agents, in Albany the wind farm is used as a marketing tool and in Ararat the wind farm has caused the town to prosper (Nuridin, 2009).

## 1.5 The interface between Commonwealth, state and local planning laws as they pertain to wind farms

State planning systems are in place to provide the overarching framework under which wind farm applications are assessed. Planning processes vary slightly between the States, however all require the provision of detailed environmental assessments of wind farm proposals, require a public consultation process to be undertaken and contain provision for public submissions on the development applications. Further, some local governments have included provisions in their development plans in relation to

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wind farms or renewable energy development proposals. A myriad of State based regulations are also applied to wind farm projects. Wind Prospect has found the State and local processes in SA, WA, VIC and NSW to be effective and mostly efficient (see below) in dealing with wind farm applications.

At present, the Commonwealth legislation relevant to wind farm projects include the:

- Environment Protection and Biodiversity Conservation Act, 1999
- Radiocommunications Act, 1992
- Native Title Act, 1993
- Aboriginal and Torres Strait Islander Heritage Protection Act, 2005

Wind Prospect has found that the following actions are key to successful and appropriate wind farm development:

- Technical knowledge to select and develop a viable, high yielding and environmentally acceptable wind farm site;
- Early engagement with relevant stakeholders to ensure concerns are raised and addressed as soon as practicable;
- Rigorous and complete assessment of potential environmental effects, informing the final infrastructure layout.

On the whole, we have found that these factors can be undertaken within the Federal, State and local planning frameworks currently available within the States that we operate.

The one area where there is a high potential for uncertainty lies around guidelines for noise assessment. At present each State has nominated its preferred guidelines to which wind farm developments must comply. However, recently there has been the release of the Australian Standard AS 4959: Acoustics: Measurement, Prediction and Assessment of noise from Wind Turbine Generators. This standard does not contain emission criteria (for which it refers to State guidelines), but contains guidelines that are potentially at variance with other guideline documents nominated by State governments (see section 2.3) in relation to measurement, prediction and assessment. We have also seen some development assessment panels, particularly in Victoria, require the assessment of projects against guidelines that have not yet been endorsed by the Victorian State Government (ie the new NZS6808:2010). Further, the Environment Protection and Heritage Council (EPHC) has released another set of wind farm guidelines to be applied nationally (Draft National Wind Farm Development Guidelines) which provides yet further guidance on noise assessment which again can be at variance with State nominated guidelines. This is a particular area of uncertainty for both developers and stakeholders that would do well to be resolved. The State nominated guidelines have been applied successfully to date and Wind Prospect supports the continuation of the reference to these guidelines.

The EPHC's Draft National Wind Farm Development Guidelines, in general, are a major disappointment and concern for the wind industry. Whilst Wind Prospect had supported a national approach to wind farm guidelines to deal with some minor inconsistencies applied by the different States, the EPHC draft guidelines unfortunately only serve to add further confusion and uncertainty to the development process. Wind Prospect's comments on the EPHC's second draft of the guidelines are currently being prepared.

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The wind industry as part of the larger renewable energy industry remains a vital part of Australia's energy future. Wind energy results in direct greenhouse gas emissions savings and is one of the few 'low resource' means of generating electricity (no ore, no water use, no emissions). Further, infrastructure can be removed at the end of its generation life with negligible residual impact. In our necessary move to a low emission and renewable energy future, wind energy generation cannot not be underestimated nor undermined by un-founded claims and mis-information – it's too important.

If you have any questions at all regarding this submission, please don't hesitate to contact me on 08 8384 7755, or at [doreen.marchesan@windprospect.com.au](mailto:doreen.marchesan@windprospect.com.au).

Yours sincerely,

<original signed>

Doreen Marchesan  
General Manager, Development

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