Submission
No 105

INQUIRY INTO RURAL WIND FARMS

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Submission to the NSW Legislative Council Inquiry into Rural Wind Farms

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This submission paper responds to the following three terms of reference:

2. Locating rural wind farms to optimize wind resource use and minimise residential and environmental impacts;

3. The impact of rural wind farms on property values; and

4. Mechanisms for encouraging local ownership and control of wind technology.

Locating rural wind farms to optimize wind resource use and minimise residential and environmental impacts

The location of wind farms is based on environmental, economic, social and political factors. Relevant issues include distance to houses, landscape and visual impact, noise, nature conservation, recreation, and property values (Khan 2003). Several studies analyse the alternate locations to site turbines so that they 'blend in' to the surrounding landscape and landscape factors (e.g. topography, scale, degree of industrialization, presence of cultural and natural landmarks), the vicinity to built-up areas, people's perceptions of the landscape and the size of the project (Khan 2003).

(a) Visual Impact

At an approximate height of 100 metres, wind turbines can be potentially visually dominant in rural areas (2006; Hudson Associates Landscape Architects 2008). Visual impacts are the result of contrasting colour of the turbines against the rural landscape and the rotating and reflective blades which create shadow and glint/glare (Meridian and others v WCC and WRO 2007). Generally, literature indicates visual impacts of wind farms are intrinsic perceptions of scenic values and characteristics of rural landscapes (Hoen 2006; Khan 2003). The majority of research studies and court decisions regarding wind farms have articulated visual impact of a wind farm over a large expanse cannot be fully mitigated, but a well-planned siting can reduce the effects on the landscape.

Khan's (2003) research is highly relevant to managing stakeholder interest regarding wind power projects in the light of Preston CJ's decision in *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd.* The judgment determined the public benefits of the wind farm project outweighed local detriment to the Taralga community or individual landowners, and permitted the full original scope of the project, citing intergenerational equity as a key consideration (Rose 2008). Khan supports siting of turbines in ordered and coherent groups. Concentrating wind turbines in a few geographical areas that are clearly separated from each other will leave the majority of the landscape free from turbines in comparison to single turbines which have a substantial visual impact without producing much electricity and that groups of turbines sited too close to each other are often perceived by people as belonging to the same facility. In conjunction with this analysis of visual impact, strategic placement of wind turbines can reduce the variability of energy output from wind farms by means of locating wind turbines in multiple locations with varying wind conditions. Strategic siting of wind farms should balance a reduction in overall variability of a wind farm i.e. reducing intermittency of wind energy output with clustering of wind farms to preserve significant elements of rural character (Macintosh and Downie 2006).

The location of wind farms should consider the visual impact of ancillary infrastructure. Examples of ancillary infrastructure are access roads, electrical substations and transmission lines (Royal Institution of Chartered Surveyors 2007). In some rural areas, installation of wind turbines and ancillary infrastructure may require road upgrades, creation of subdivisions, easements and/or rights to access public utility infrastructure. It is suggested access roads, substations and transmission lines may negatively impact on the rural landscape, a contentious issues among local communities. However, it is anticipated road upgrades will increase access to existing rural properties and future rural residential subdivision. Thus, improved and increased vehicular access to rural properties may lead to an increase in property values and amenity in close proximity to wind turbines and ancillary infrastructure.

It is recommended that electricity generated from wind turbines is harnessed in local substations and distributed to rural areas, despite the lack of evidence to support this proposal. The recommendation has economic, political and environmental benefits such as empowerment of local communities to engage in wind farm technology, reduce the length and scale of electricity transmission lines across rural landscapes, improve the quality of local electricity and increasing sense of community towards sustainable futures.

(b) Rural Character

Rural character can be expressed in scenic, heritage and recreational values (Macintosh and Downie 2006). The majority of local communities have opposed wind farms due to the widespread perception visual impacts have a negative causal effect on rural character. Whilst it is recognized that the concept of rural character appeal is subjective (Pasqueletti, Gipe and Righter 2002), visual impact can be mitigated in some instances by appropriate siting and landscaping controls. This is salient in the *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd* judgment which consisted of granting development consent to a wind farm (subject to landscaping and noise attenuation measures).

General consensus amongst developers and energy associations in Australia and abroad concede no objective grounds exist to measure visual impact of wind farms on rural character and landscape. The level of impact to a high degree depends on personal preferences. The strength of public opposition to wind farms in Australia and overseas demonstrates the complexity of decision making and highlights the importance of involving communities. Inherently, qualitative research of local communities and property values with respect to visual impacts on the landscape purportedly 'subside with time' (Macintosh and Downie 2006) support the notion concerns for scenic values are short-term concerns and can be effectively managed during operation and operation of wind farms. This finding highlights the importance of the Inquiry's fourth term of reference with respect to encouraging local ownership and control of wind technology.

(c) Aviation Safety

It is noted the height of wind turbines and reflectivity of rotor blades may pose serious hazards to the flight path of aircraft such as helicopters and airplanes. CASA strongly discourages siting of wind turbines near aerodromes and provides advice with respect to the illumination of wind turbines to reduce hazards (CASA 2007). The CASA Advisory Circular and Institute of Lighting Engineers Guidance Notes for Reduction of Light Pollution (2005) provide relevant information to maximize aviation safety and minimise visual impact of wind farms in rural areas. It is suggested the height of wind turbines is a concern will have a negative effect on low-flying aircraft such as crop-dusters on agricultural land. This is an important consideration due to possible reductions in the productivity of agricultural land in rural areas.

(d) Setbacks and Easements

Wind turbines require access to unobstructed air flow to function effectively. Development under or within close proximity of wind turbines is limited. Furthermore, ancillary infrastructure and turbines require additional site area away from bushland and existing built structures. Creation of setback requirements, easements and other forms of legal property rights may affect location of wind farms and property values arising from restrictions on use of land.

The impact of rural wind farms on property values

Factors influencing land values include changes in income-earning potential of property, aesthetic appearance - impact on scenic views, changes in on site access roads, changes in natural vegetation and ecology, noise, and general trends in property prices in the area independent of wind farming. The vast majority of evidence indicates wind farms have no material effect on property values.

(a) Agriculture remains the highest land use value

A valuation of the wind farm in Crookwell, New South Wales (NGHEN Environmental 2006) and Wellington City Council, New Zealand (Hudson Associates Landscape Architects 2008) claimed existing wind farms had little or no effect on land values in the localities. The methodology used to conduct the valuation was based on the assumption wind farms do not have any noticeable effect on livestock or cropping (Country Side Energy Incorporation). Thus, the highest value of rural land, agriculture is maintained (Royal Institution of Chartered Surveyors 2007). Furthermore, a review of property sales history in Crookwell, New South Wales suggested comparable values of properties with and without view-sheds of a wind farm. Thus, the valuations concluded the siting of wind farms had a negligible influence on property values.

(b) Property value trends during planning, construction and operation of wind farms

The Royal Institution of Chartered Surveyors (2007) quantitatively verified the impact of wind farms on the value of residential property and agricultural land. The outcomes of the survey were that a negative impact on property prices starts when a planning application is made. Plausible reasons for the negative impact at this stage of the planning process are the associated uncertainty of the location and size of wind farms. The survey concluded a negative impact is evident in the instance wind farms are within view-sheds of residential development. During the planning process, only a minority of the sample claimed no negative impact. Interestingly, the survey is consistent with several other studies which reported the negative impact on property values reduces over time approximately two years after completion of wind farms.

(c) Comparative analysis of properties with and without view-sheds to wind farms

According to a study by the Renewable Energy Policy Project (2003) the presence of commercial-scale wind turbines does not appear to harm view-shed property values (American Wind Energy Association 2003). The study systematically analysed 25,000 property values across 9 sites and found that "for the great majority of projects the property values actually rose more quickly in the view shed than they did in the comparable community. Moreover, values increased faster in the view shed after the projects came on-line than they did before."

An informal investigation of property values in Salmon Beach, Esperance Western Australia concluded 14 out of 15 properties within 200m of the wind farm did not experience a negative impact on property values (Australian Wind Energy Association xxxx). Similar findings were reported by the British Wind Energy Association in the United Kingdom and Institute of Local Government Studies in Denmark. In fact, a study cited gains in property values following construction of wind farms (Australian Wind Energy Association xxxx).

(d) Effect of wind farms of future development of rural property

Land valuation of the proposed wind farm in Crookwell identified the potential effect of wind farms on future subdivision patterns (NGHEN Environmental 2006). It is critical that the location of wind farms does not preclude or restrict future development in rural areas. It is also stressed that wind farms should maintain rural, scenic values where identified for tourism and local economic purposes.

There is little evidence to suggest that wind farms negatively impact upon the land values of neighbouring properties because of ideological values. In terms of valuation principles, the greatest actual impact will be if a revenue stream is derived from the wind farm. The impacts of additional services such as grid interconnection and roadwork should also be taken into account when considering changes in land values. Wind farms do produce some noise during operation. However, noise should not be a concern when the wind farm has been designed using latest technology. Likewise, possible negative impacts arising from shadow and flicker concerns can be alleviated in the planning phase through appropriate planning, in order to ensure such factors will not negatively affect property values.

In the United States of America, research by ECONorthWest (2002) and Renewable Energy Policy Project (2003) found there was "no evidence supporting the claim that views of wind farms decrease property values". Interestingly, the Renewable Energy Policy Project suggested property values increased at a greater rate within the view-shed of the wind farm than in comparable locations away from wind farms. Similarly, reports by the Institute of Local Government Studies, Denmark and British Wind Energy Association, United Kingdom found that "the economic expenses in connection with noise and visual effects from wind mills are minimal" and found no evidence that wind farms caused house prices to decrease.

However the location of transmission lines, substations and massing of wind turbines may reduce property values due to easements and restrictions on types of permissible development directly under transmission lines. There is limited evidence which documents the relationship between location of wind farms and future subdivision patterns in rural areas. In the author's opinion, location of wind turbines should not prohibit or constrain future land releases or fragment large rural landholdings. It is also recommended wind turbines be located on small fragmented/residual rural land of low agricultural value.

Mechanisms for encouraging local ownership and control of wind technology

A dilemma in local planning exists between the promotion of wind power, effective regulation of wind turbine location and public consultation (Khan 2003). At the local level, however, an important driving force can be the economic benefits of wind power for the community, while the (local) environmental effects are often seen as a threat. Khan (2003) and Australian Wind Energy Association and Australian Council of National Trusts (2007) recognise the public-private dimension is the interests of private land owners who want to build turbines on their own land against the public interest to protect the landscape and thus concentrate siting to a few locations.

Analysis of the Swedish planning system illustrates a high degree of autonomy of local governments, which increases the decision-making influence of local governments in deciding the appropriate siting of wind turbines (Khan 2003). From Khan's perspective, local autonomy combined with an ambiguous government policy towards wind power has made the local government a key actor in the development of land based wind power. This notion is reflected in Macintosh and Downie (2006), research founded aesthetic and other landscape values associated with wind farms should be approached on a case-by-case basis having regard to

both the views of residents and the broader community. In contrast, the current policy context in New South Wales is the classification of wind farms as designated development and State Significant Infrastructure under the State Environmental Planning Policy (Infrastructure). It is inferred from Khan's (2003) research in Sweden, increased government involvement at national and regional levels in Australia shall lead to larger wind farms built and operated by large, powerful stakeholders. Hence, it is concluded the SEPP and other non-local policies will discourage local ownership by rural landowners and shape the scale of wind farm developments.

Anxiety among anti-wind farm groups is also influenced by limited scientific evidence available to support claims about the energy and environmental benefits of wind energy (Macintosh and Downie 2006). It is argued local ownership and control of wind technology is deemed a high-risk investment decision which is regarded as expensive, inefficient and unreliable.

Examples of how economic involvement is fostered at local level are detailed below:
'In Germany, the most common forms of local economic development are wind parks jointly owned by local farmers and schemes organized by commercial developers who sell shares to local people (Toke & Elliott, 2000). In both countries, local economic ownership has been actively supported by national authorities and municipal councils by various means.' (Khan 2003 pp573)

'In Sweden, local economic involvement has been fairly common in the form of co-operatives, ownership by farmers and local shares in municipal wind energy projects. (Khan 2003 p574)'

In Laholm, Sweden the local government did not actively encourage farmers to build wind farm developments. Wind farm technology was promoted by a wind power developer coupled with networking among the farmers based on personal and professional contacts. Khan (2003) purports the aforementioned network between farmers and developers were facilitated by a purposeful political strategy to streamline the process of building turbines where wind conditions were optimal. Features of the strategy were no requirements to adhere to detailed Development Control Plans and local government facilitation of small-scale ownership of wind turbines. Critically, these political and economic circumstances were not conducive to reducing public opposition to wind farms.

Conclusion

Suitable location of wind farms depends on multiple, interrelated factors. The literature reviewed in this submission revealed specific topography, perceived visual impact, climate and proximity to infrastructure are the most significant. Success of wind farms in Australia and overseas demonstrates wind farms can be compatible with rural landscapes, on the proviso that adverse visual impacts are identified and addressed during the planning phase and managed throughout construction and operation.

Research has unanimously dispelled the notion wind farms have an adverse influence on property values. Multiple sources indicated direct positive correlations between property values and surrounding the nature and extent of wind farms, rather than visual impact. However, the causal relationship between rural wind farms and agricultural property values is not comprehensively addressed. Also, further investigation into the efficiency and effectiveness of wind technology is required to promote local ownership and control. It is noted assumptions regarding light pollution, visual impact on rural character, noise pollution and property law issues have limited local community acceptance of wind farms.

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