Submission
No 67

# INQUIRY INTO RURAL WIND FARMS

**Organisation:** Wind Prospect CWP Pty Ltd

**Name:** Mr Edward Mounsey

**Position:** Development Director

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Mr Ian Cohen MLC, Chair
General Purpose Standing Committee No 5
Parliament House
Macquarie Street
Sydney NSW 2000

Dear Mr Cohen

**Submission by Wind Prospect CWP Pty Ltd to the Rural Wind Farm Inquiry**

## 1. Introduction

This submission by Wind Prospect CWP is made in response to the inquiry into the NSW Rural Wind Farm Industry being undertaken by the Legislative Assembly of the NSW Government. The inquiry is being conducted by Standing Committee 5, chaired by Ian Cohen MLC.

Wind Prospect CWP, a subsidiary of the Wind Prospect Group, is currently developing a number of wind farm projects across NSW. Wind Prospect CWP is a joint venture between Wind Prospect and Continental Wind Partners, both of which bring a substantial amount of experience in wind farm development to the region. Wind Prospect CWP has the benefit of having:

- over 17 years of wind farm development, construction and operations experience in the United Kingdom, Ireland, France, Australia, New Zealand, China and Canada;
- managed major wind farm development and operation on the European mainland;
- obtained development approval for nine wind farms in South Australia; and
- several wind farm projects under development within NSW.

This experience and technical skill provides substantial understanding of the investigation, development, construction and operations of wind farms, and is the basis for our comments to this inquiry.

### 1.1 About Wind Prospect CWP

Wind Prospect CWP was formed in 2007 as a joint venture between two private companies, Wind Prospect Pty Ltd and Continental Wind Partners LLC to leverage the substantial experience and understanding of wind farm projects to its operations in NSW.

Wind Prospect operates globally in wind farm and other renewable energy development, construction, operation and advisory services. Wind Prospect 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 43 wind farm projects world-wide totalling over 1,250 MW of wind farm projects. In South Australia, Wind Prospect have received development consent for nine wind farms totalling 680 MW, and has projects under investigation in most Australian states.

CWP was established in 2007 to finance the development of wind farms in Romania and Poland. Since then it has expanded into other European countries, as well as Australia and New Zealand. Investors

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comprise both institutions and high net worth individuals, including Good Energies Investments who are a major renewable energy investment fund.

Wind Prospect CWP has eight permanent staff employed in our Newcastle office. The office includes project managers, engineering and planning specialists. NSW projects have administration support located in Newcastle and Adelaide, together with the support of various specialist internal staff located in our other Australian and international offices. As the portfolio of projects in NSW expands, the workforce will increase to include electrical and construction engineers and operations managers as appropriate.

### 1.2 Our understanding of NSW wind farms

Wind Prospect CWP has substantial involvement with landholders, government and industry in relation to NSW wind farm development, including two NSW projects which are close to submission to the NSW Department of Planning for Development Approval. We also have a number of other project areas under investigation which have yet to be made public.

The projects which are near to final planning submission are the Boco Rock Wind Farm (www.bocorockwindfarm.com.au) and Sapphire Wind Farm (www.sapphirewindfarm.com.au). Boco Rock Wind Farm is located near Nimmitabel in southern NSW and is proposed to have a generating capacity of approximately 270 MW. Sapphire Wind Farm is located in northern NSW between Glen Innes and Inverell and is proposed to have a generating capacity of approximately 485 MW. Preliminary Environmental Assessments for these projects have been submitted to the Department of Planning (and are available on their web site).

### 1.3 Outline of this submission to the Wind Farm Inquiry

As we have first hand experience in the investigation and development of wind farms, we have sought to clearly describe that process in our submission. In **Section 2**, we describe the process which Wind Prospect CWP follows for the development of a wind farm (reproduced from the Boco Rock Wind Farm Environmental Assessment).

In **Section 3**, we respond to the terms of reference for the Inquiry. We have also highlighted aspects of the discussion that we see as relevant to the inquiry, and have provided references to technical material.

We have also appended copies of the two submissions that we made to Mr Jonathon Carle of the Department of Planning in regard to the establishment of NSW Wind Precincts (Attachments A and B). The submissions provide feedback on the proposed Precinct concept, presenting a number of suggestions and concerns with the NSW planning processes generally, as Wind Prospect CWP see it.

## 2. Our Wind Farm Investigation Process

Wind Prospect have a refined selection and site development process which has been established through 17 years of experience in over 78 development applications for wind farm projects in several countries. The investigation and development process has been customised for NSW based on our current experience and is summarised below from the draft Boco Rock Wind Farm Environmental Assessment.

### 2.1 Site Selection

A range of factors are considered during the 'site selection' phase, which affects the suitability of an area for a wind farm, and which can potentially constrain development. These considerations include the following:

- suitable wind resource;
- capacity within and ease of connection to the electricity transmission network;
- access and general ground conditions;
- proximity to residential properties and the nature of surrounding land uses;
- availability of turbine sites; and
- presence (or absence) of nationally and locally significant areas with regard to environment, landscape, nature conservation, archaeology and cultural heritage.

Numerous investigations into the wind resource potential at several locations across NSW have revealed some general principles which can be applied to assess the merit of an individual site's wind resource. Wind speeds are likely to be adequate in the following areas:

- Exposed areas, being those near to large flat terrain (such as water or open grassland without intervening obstructions) receive a very smooth airflow with a high-energy content.
- Significantly elevated ridges with smooth and gently rising landscape promote wind speed-up for an overall increase in wind speed.

Capacity within and ease of connection to the grid can be difficult to assess, given the commercially confidential nature of certain information concerning the electricity distribution and transmission networks, coupled with the complexity and variety of connection options that may be available. However, on a broad scale, areas remote from high voltage overhead transmission lines or from existing population centres are unlikely to offer many feasible opportunities for grid connection. Together with grid connection factors, actual grid capacity, or the ability for the electricity grid as a whole to absorb wind generated electricity, seem to be the principal limiting factor for wind farm development in NSW.

When searching for suitable wind farm sites, it is important that areas with suitable wind resources and grid connection opportunities are coupled with actual land availability for wind turbines. There are many such areas in NSW, with the Boco Rock Wind Farm being amongst them. Appropriate landscape structure and compatible land use activities are other important criteria to be met for successful wind farm development.

The presence of National Parks and other significant protected or conservation areas are also considered during site selection. The vicinity of conservation areas to a proposed wind farm site and the potential impacts to the values of those conservation areas is undertaken. Siting of wind farms should be carried out to avoid significant impacts on conservation areas and their values.

Through this site selection process, the Boco Rock Wind Farm site was identified as meeting all required criteria. A project site boundary was then defined following negotiations with landowners, and wide-ranging surveys of existing environmental conditions and grid capacity issues were carried out, in order to establish a base-line against which the wind farm could be designed in detail and its impacts assessed.

## 2.2 Site Assessment

After selecting the project area as being fundamentally suitable for a wind farm development, a wind farm feasibility study addressing specific design criteria was undertaken. This study included site assessment of a number of environmental, social and commercial factors such as ecology, cultural heritage, visual amenity and communications.

## 2.3 Detailed Site Design

Assessment of the results of the wind farm feasibility studies are used to develop the 'final layout' (turbines and other infrastructure placement) for the wind farm.

### *2.3.1 Technical and Practicality Factors*

A number of technical and practicality factors influence final turbine layout. These include:

- **The distance between turbines:** Distances should be equivalent to at least three times the diameter of the turbine rotor proposed for use, in order to ensure that each turbine operates in relatively undisturbed wind. This 'rule of thumb' will vary from turbine to turbine depending on the characteristics of the turbine itself, the wind resource on the site and the topography.

- **Internal access tracks:** These must interlink turbines, and be constructed up to 6 metres (m) in width (up to 12 m during construction), and at a gradient suitable for use by heavy vehicles. They are typically constructed of compacted rubble / aggregate, the nature and colour of which should be appropriate to the land use and landscape of the site. Turning circle radii should be adequate for manoeuvring long loads within the site.

- **Substation and buildings location:** The substation and buildings should be located on level ground at a convenient location adjacent to the point of export of the electricity from the site into the high voltage electrical transmission system (owned by Country Energy or TransGrid etc).

- **Site access:** Site access should utilise existing access where possible. The access point will be up to 12 m wide during construction with an appropriate splay in order to accommodate turbine deliveries and site construction vehicles. A gradient criterion must be adhered to.

### *2.3.2 Environmental Requirements*

In addition to the technical and practicality factors of wind farm site design, the following environmental requirements, which bear directly on site design, are considered:

- **Turbine micro-site location:** Turbines should be located near existing tracks or field boundaries where possible, to minimise disruption to the primary agricultural use of the land and to

minimise any vegetation clearance or disturbance. They should not be located on identified areas of high conservation value, and if they are proposed in proximity to identified sensitive environments, effective environmental management actions are required.

- **Separation from dwellings:** The turbines should be located so that no neighbouring residential dwelling experiences noise exceeding the EPA noise criteria within their *Environmental Noise Guidelines* for wind farms, or 'shadow flicker' effects. It is likely that such effects will be felt at a distance of less than 500 m for noise and 800 m (or 10 blade diameters) for shadow flicker. A full analysis of potential noise impacts is undertaken for each project. Discussions on shadow flicker effects are also undertaken for each project.

- **Visual amenity**: Visual effects of a wind farm are highly variable depending on the perceptions of the viewer. Visual amenity from nearby residences, main roads and points of interest are considered and assessed for each project. Photomontages (which overlay the appearance of the proposed wind turbines on photographic panoramas of the project area from various points of interest) are often produced to assess visual amenity impacts.

- **Ecology**: Site selection and detailed site design should be such that any ecological impact is avoided or reduced to acceptable levels. Any residual effects should then be appropriately managed to ensure no significant environmental impacts occur. Ecological assessment of the wind farm site allows significant environmental features to be identified (if any) and allows planning for appropriate management. Discussions on ecological issues are presented for each project.

- **Cultural Heritage:** Site layout should not interfere with or disturb any known sites of Aboriginal or non-Aboriginal heritage. Treatment of such sites is required to be in accordance with relevant legislation and includes negotiation with affected parties. Discussions on cultural heritage issues are also undertaken for each project, and on-site cultural heritage surveys are undertaken as appropriate with Aboriginal groups, archaeologists and anthropologists.

- **Colour**: An appropriate colour for the turbine towers and blades should be identified in light of the main views and backgrounds likely to be experienced. The finish should also be matt to reduce glare effects and 'glinting'.

- **Other**: Other environmental considerations include the impact on local farming operations and public facilities such as telecommunications links, and on aircraft operations in the area.

### *2.3.3 Safety Requirements*

All commercial wind turbines are designed to engineering standards to ensure their safe operation in all conditions. The designs are independently audited by internationally recognised classification societies, such as *Germanische Lloyd*, and receive type certification.

Wind turbines are safe for use in public access areas. For instance, in Swaffham in the UK, a 1.5 megawatt (MW) turbine with a 65 m tower, and 35 m blades, was approved for installation, and has been installed less than 400 metres from a supermarket and housing, and makes up part of an Ecotech Discovery Centre display. The turbine has a public viewing platform built into it, positioned approximately 60 m up the tower directly under the nacelle (Ecotricity 2007). The local townsfolk have embraced this wind turbine, and have encouraged the wind energy developer to install a second, similar

machine, at the site. The 1.3 MW turbines located at the Codrington Wind Farm in Victoria are also on display for the public, with guided tours leading up to the base of one of the turbines.

Fire prevention and control will be of paramount importance during the construction and operation of the wind farm site. Detailed fire management measures are developed for each project.

All related high voltage electrical works would be installed and operated to relevant national and international standards and regulations ensuring the highest level of safety.

Permanent wind monitoring masts will be designed to prevent unauthorised persons from climbing them.

All on-site and public safety issues will be addressed by the approved project safety plan and Emergency Response Plan to be developed and implemented by the appropriate contractor(s).

## 3. Terms of Reference

The following responses to the Terms of Reference for the Rural Wind Farm Inquiry are provided by Wind Prospect CWP to enable the committee to see from a developer perspective the role of wind farms in the future energy mix of Australia.

### *3.1* Term of Reference 1: *The role of utility scale wind generation in (a) reducing greenhouse emissions generated by electricity production (b) producing off peak and base load power*

*Response to ToR 1 (a)*

Modern onshore wind turbines have a capacity to generate electrical energy in the range of 1.5 - 3.3 MW per turbine and annually produce more than 5,000 MWh of electricity each (for a 2 MW turbine with a capacity factor of 30%). This level of electrical generation can provide a major contribution towards achieving the 20% Renewable Energy Target (RET) in the planning timeframes set out by the Australian Federal Government. With the RET in place, this electrical energy is cost competitive with existing generation and can replace fossil fuel based electricity generation; the net result being a reduction in greenhouse emissions generated by electricity production.

*Response to ToR 1 (b)*

All electrical power generating plant (including coal-based generators) are brought on and off-line periodically and so it is the forecasting of demand and management of the supply side which is important for electricity supply. Wind energy production is predictable over suitable timeframes to make an important contribution to overall electrical energy production. Notably, approximately 17% of electrical generation in South Australia is from wind farms in that state.

### 3.2 Term of Reference 2: *Locating rural wind farms to optimise wind resource use and minimise residential and environmental impacts*

*Response to ToR 2*

Wind farm investigations are driven by scientific processes including atmospheric modelling, wind resource monitoring, site specific information and various feedback processes, which are all relatively newly applied in the NSW context. **Section 2** of this submission summarises the process Wind Prospect CWP use in determining suitable wind farm locations.

In our response to the Department of Planning on the Wind Precincts proposed by the NSW State Government, Wind Prospect CWP provided two submissions (included as Attachments A and B) which, in summary, set out the flaws we saw in the NSW Wind Precinct proposal. Wind Precincts would predefine suitable and unsuitable areas and would therefore limit opportunities to explore the resource potential across all parts of NSW. Precincts would also create an unnecessary 'line in the sand' which would create difficulties for suitable projects which were proposed outside of the precinct areas.

There is a current trend for Local Councils to implement Development Control Plans (DCPs) restricting the placement of wind turbines within 1.5 - 2 km of residential buildings (for example, see Upper Lachlan, Oberon, Glen Innes and Inverell DCPs). Wind Prospect CWP determines the appropriate separation distance from each property based on the calculated effects of the wind farm. Assessment of noise, shadow flicker, blade glint, TV interference and visual impact are all considered. Experience has shown that turbines can be placed well within 2 km of residences and have no adverse impact. The unique characteristics of each site need to be considered when preparing and submitting an Environmental Assessment, which is the standard approach for Wind Prospect CWP. If such pre-defined limits were implemented at the State/Federal level then they would severely impede wind farm development in NSW.

Wind farms have to be located close to electrical transmission infrastructure (to avoid significant connection costs) which places them within populated (albeit sparsely) areas. Typically, where there are no people, there are unfortunately no powerlines for projects to connect into. Wind Prospect CWP has to finely balance the development of a wind farm against the impact on residential communities. The methodology applied in the Environmental Assessment has evolved out of wind farm development in Europe and elsewhere over the past twenty years. The current approach is valid and demonstratable, requiring the developer to justify that the wind farm will not have an adverse impact on residential amenity. Notably, Wind Prospect has used this approach with great success in South Australia.

Similarly with environmental issues, our approach is one of assessment and consultation with the appropriate authorities (Department of Environment and Climate Change, Department of the Environment, Water, Heritage and the Arts etc) to determine which of avoid, mitigate and offset is necessary to suitably manage potential impacts. The implementation of BioBanking in NSW has created a mechanism whereby developers can readily determine their required offsets for anticipated impacts. It is not in Wind Prospect CWP's interest to try and develop a project in an area which has significant environmental issues, as this leads to lengthy delays and significant costs (and ultimately the potential for a project to fail to achieve Development Approval).

### *3.3* Term of Reference 3: *The impacts of rural wind farms on property values*

*Response to ToR 3*

The following section on property values and wind farms is an extract from the draft Boco Rock Wind Farm Environmental Assessment. References are given at the end of this section.

> "As with any property and land holding there are many factors which can influence the perceived value including prevailing and permitted land uses, economic conditions, access/proximity to 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. 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 in the first paragraph) influencing value. 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 (H&HPC) 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 (see below) and proximity of a property to a wind farm. The conclusions from H&HPC relevant to this project 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
>
> A recent publication in the Cooma-Monaro Express also reflected the findings of the above study. 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" (Nuridin 2009). 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).

The value of land suitable for subdivision could also be affected; however this is not considered a concern in relation to the Boco Rock Wind Farm. In summary there have been no applications or approved subdivisions in either Council within the immediate area surrounding the site, moreover Council planning controls are set to limit the properties which can subdivide in the future. Conversely, due to the additional revenue to associated landowners, subdivision is less likely to occur in the short to medium term and the land will continue to be used for sheep and cattle grazing.

Some surrounding landowners have raised the concern that construction and operation of the wind farm will decrease the number of potential buyers within the market, which in turn could diminish property values. As already discussed, there are many factors that influence individuals' decision when purchasing a property and the presence of a wind farm may or may not have an influence on this decision. For example, a potential buyer may seek a life-style with a green energy aesthetic.

However, it should be noted that the project cannot be developed without some risk of property value impacts during construction and operational phases, but the risk is sufficiently outweighed due to the additional benefits of the project. There are no suggested mitigation methods for property values, however as the Community Wellbeing and Local Economy (specific sections of the EA) are affected by the project, their mitigation methods can potentially apply.

**The concept of "Blight"**

Compensation for "blight", relating to the loss of future property value or from loss of amenity, was scrutinised in the Land and Environment Court in the case of Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd, 2007. The Taralga Landscape Guardians Inc sought compensation in accordance with the Land Acquisition (Just Terms Compensation) Act 1991 NSW. However the proposition presented a number of insurmountable hurdles according to Chief Judge, Justice Preston.

The Taralga Wind Farm was proposed by a private developer on land where the development was permitted. The Chief Judge summarised that if the concept of blight and compensation were to be applied to the Taralga project, then any otherwise compliant private project which had some impact in lowering the amenity of another property would be exposed to a claim. The Chief Judge went further in saying that:

> *"Creating such a right to compensation would not merely strike at the basis of the conventional framework of land use planning, but would also be contrary to the relevant objective of the Act, in s 5(a)(ii), for 'the promotion and co-ordination of the orderly and economic use and development of land'".*

The resulting decision from the Taralga judgement is relevant to the Boco Rock Wind Farm, as the Proponent has leased the land for a permitted land use. "

List of cited references on property value and wind farms:


- Henderson and Horning Property Consultants (2006). *Land Value Impact of Wind Farm Development, Crookwell New South Wales. A Report to Taurus Energy Pty Ltd* in EA for Grabben Gullen Wind Farm, Section 3.7. Henderson & Horning Pty Ltd, Sydney.
- NSW Land and Environment Court (2007) *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd*, NSWLEC 59.
- Nuridin, Rashida. (2009) *Windfarm, an asset* in Letters to the Editor. *Cooma-Monaro Express*, p6. 9 May 2009.
- Royal Institute of Chartered Surveyors (RICS) (2004) *Impact of wind farms on the value of residential property and agricultural land, An RICS survey*. United Kingdom.


### *3.4* Term of Reference 4: *Mechanisms for encouraging local ownership and control of wind technology*

*Response to ToR 4*

It is our experience that due to the level of risk in successfully developing a wind farm, technical expertise and risk management is required at every stage of the project and, therefore, commercially developed projects are more likely to be successful. Additionally, local ownership may make it difficult to obtain funding in a timely and suitable amount (refer to Hepburn Wind Farm, www.hepburnwind.com.au), and can lead to protracted management decision making.

Some general points are:

- Wind farms are long term projects with lengthy development and operational timeframes;
- Opponents will object in a vocal and often confrontational manner which local owners are unlikely to be prepared to manage and attempt to resolve;
- It is difficult and costly to obtain development consent and financial close, with sometimes significant risk of project failure (and debt);
- Small scale projects do not necessarily benefit from cost efficiency and risk spread; and
- The local community is unlikely to have established knowledge and relationship with industry, or the long term view of the project, and so has additional risks in each stage of decision making.

A perfect example of the perceived issues is shown by recent press articles relating to Kiama Municipal Council, where the Council rejected any involvement with community-owned wind farms (see Local News at www.illawarramercury.com.au). Although there have been examples of locally controlled wind farm schemes elsewhere in the world, our understanding of the situation is similar to that presented above.

### *3.5* Term of Reference 5: *The potential role of energy generated by rural wind farms in relation to the Australian Government's proposed Renewable Energy Target*

Refer to comments made regarding ToR1(a) and ToR1(b) above.

### *3.6* Term of Reference 6: *Any other relevant matter*

Refer to comments on the Wind Precinct proposal, in **Attachments A and B.**

## 4. Conclusion

Wind Prospect CWP Pty Ltd has provided these comments based on our understanding of the NSW, and broader, wind farm industry. We hope that they are of help to the Committee in its deliberations in regard to rural wind farms in NSW. We look forward to seeing the results of the inquiry and would be willing to provide further input into the process as necessary.

If you have any questions about our submission, please do not hesitate to contact me.

Kind Regards

Ed Mounsey
**Development Director**
**Wind Prospect CWP**

Enc: Attachment A: Letter regarding Formal Response to Wind Precinct Workshop.
Attachment B: Letter regarding Additional Consultation on Wind Precincts.

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