

1. Introduction

1.1 Background

This Environmental Assessment has been prepared by Connell Wagner PPI on behalf of Renewable Power Ventures for the proposed development of a wind farm (generating works using wind energy) with ancillary infrastructure. The project site is located on the Great Dividing Range about 40 kilometres north-east of Canberra and 10 kilometres to the south-west of Tarago, NSW (Figures 1.1 & 1.2).

Under NSW planning legislation, the Capital Wind Farm is regarded as a Major Project and an Environmental Assessment is required to support a Major Projects Application for this project.

Specific requirements for the scope and content of an Environmental Assessment were prescribed by the Director-General of the Department of Planning (DoP) in September 2004 (Appendix A). The Director-General's requirements (DGRs) also include reference to relevant Environmental Impact Assessment (EIA) guidelines.

This Environmental Assessment addresses the Director-General's requirements and provides a description of the proposed project and the existing environment, an assessment of the potential environmental impacts, the measures proposed to mitigate those impacts, justification of the project and consultation undertaken or proposed for the project.

1.2 Overview of Proposed Development

A wind farm is an arrangement of turbines at a location that harnesses the natural energy provided by the wind to drive electric generators. The electricity generated by the wind farm is supplied to the electricity supply grid for use by network customers.

The wind farm will be able to produce about 132 megawatts (million watts) of electrical power from the combined output of 63 wind turbines each with a generation capacity of approximately 2.1 megawatts. The three bladed horizontal axis turbine will be mounted on towers of about 80 metres in height and have the general form shown in Figure 1.3. The turbines are large structures and the top of the blade sweep for each turbine will have a height of about 124 metres. The turbines will have automatic controls that enable them to face into the wind.

The wind turbines will be located in three groups as shown in Figure 1.4. The turbines will be located at or near ridge tops to maximise generation, while being spaced to minimise interference between neighbouring turbines. The design of the wind farm will also address a range of environmental considerations as described in the Environmental Assessment.

The individual turbines within each group will be connected by 33,000 volt underground cables. The respective groups will be linked by underground cables or by an overhead transmission line to a substation where the voltage will be increased from 33,000 volts to 330,000 volts for connection to the grid. The substation will be located adjacent to an existing 330,000 volt transmission line operated by TransGrid. Control cables will also link the turbines to a facilities building located at the substation site. The wind farm will be designed to be operated automatically and remotely but will have staff in attendance during daytime hours.

Construction works at the wind farm site will include the installation of turbines, wind monitoring towers, access tracks, minor drainage works, electricity reticulation, construction of a facilities building and substation and installation of temporary site office facilities, two concrete batch plants and a small quarry. The sites of the temporary facilities will be restored following the construction phase.

A detailed description of the proposed development is provided in Chapter 3. The design of the wind farm used for the assessment presented in this document including the site layout and equipment specifications, is the result of a number of refinements to the original wind farm design. The refinements have incorporated responses to matters arising out of community consultation, tender analysis and contractor selection stages. It is considered that the resultant project description provides a lower impact on the environment and surrounding communities than would have occurred with the initial project description.

Some of the environmental impact studies were undertaken at an earlier stage of planning and reflect the typical layout and equipment that was being considered and the conceptual layout at that stage. Nevertheless, the assessments made and conclusions drawn from the earlier studies remain applicable to the final wind farm proposal, the associated impacts and proposed mitigation measures as described in this document.

1.3 Project Location

The proposed development is located approximately 10 kilometres south-west of Tarago and about 10 kilometres north of Bungendore in the Southern Tablelands of New South Wales, as shown in Figure 1.2. It is wholly within the local government area of Palerang Shire. Physically, the wind farm is located on ridges of the Great Dividing Range to the east of Lake George.

The land on which the proposed wind farm will be located and to which the Development Application applies comprises privately owned properties, which are predominantly cleared pastoral land used for grazing by sheep and other livestock.

The proposed wind farm involves three main groups of turbines (Table 1.1) situated over seven properties as indicated in Table 1.2 and shown in Figure 1.5.

Table 1.1 - Turbine Groups

Turbine Group	Number of Properties	Number of Turbines	General Location
Groses Hill	2	17	North-West Group adjacent to Lake George
Ellenden	3	17	South-Western Group adjacent to Lake George
Hammonds Hill	5	29	South-East Group between Ellenden Group & Tarago Road
Total	7	63	

1.4 Properties involved in the Development

Table 1.2 provides property details of the lands on which this proposal is located and to which the Development Application applies. These properties are also shown in Figure 1.5 together with adjacent properties. An aerial photograph of the site showing the proposed turbine sites and access tracks is provided in Figure 1.6.

Renewable Power Ventures, as the proponent of the project, has entered into options with the landowners of the properties where the development is located to lease the land including agreements to undertake planning studies for the wind farm. Renewable Power Ventures has the consent of the landowners to lodge the Major Projects Application. Provided the necessary approvals are obtained, the option agreements also provide landowner agreement for Renewable Power Ventures to lease the land, construct and operate and decommission the wind farm.

Table 1.2 - Property Details for Land on which the Wind Farm is Located

Turbine Group	Land Title Details			Turbine Numbers	No. of turbines
Property or Landowner	Lot	DP	Title		
Groses Hill					17
Raasey Pty Limited	Lot 76	DP 754919	76 / 754919	6-10	5
	Lot 78	DP 754919	78 / 754919	12	1
	Lot 79	DP 754919	79 / 754919	1-5	5
M and J Limon	Lot 2	DP 720169	Perpetual Lease	11, 13-17	6
M Osborne	Lot 45	DP 754877	45 / 754877	Easement for overhead transmission line to substation	
Ellenden					17
Ellendon Limited	PT3	DP 754877	Deed No. 56 Book 1886		Nil, incl. overhead line
	Lot 7	DP 227420	Deed No. 414 Book 2073	18-25	8
	B	DP 70961	V 6429 / F 101	33-34	2
B Osborne	Lot 16	DP 535180	16 / 535180	26-28	3
Currandooley Pty Ltd	Lot 17	DP 535180	V 11497 / F 9	29-32	4
	Lot 10	DP 237079	V 11490 / F 151	Access only	
Lakelands Pty Ltd	Lot 1	DP 658449	V 14344 / F 129	Easement for possible access	
Hammonds Hill					29
Ellendon Limited	B	DP 370961	V 6429 / F 101	38, 42-45	5
B Osborne	Lot 18	DP 535179	18 / 535179	46-55, 57	11
Currandooley Pty Ltd	Lot 11	DP 237079	11 / 237079	56, 60, 61, 63	4
M Osborne	Lot 5	DP 837873	5 / 837873	58, 59, 62	3 & Substation
I & R Willson	Lot 48	DP 754877	V 15402 / F 64	35-37, 39-41	6
Dept. of Lands	Osborne Trig Reserve and Crown Road Reserves			Nil. A Licence is required for track and cable routes	
Total number of turbines					63

1.4.1 Crown Land - Trig Station Reserves and Road Reserves

Several Trigonometrical (Trig) Stations, two involving small areas of Crown Land that are designated Trig Station Reserves, are present within the vicinity of the wind farm. Those Trig Stations that are close to turbine sites are listed in Table 1.3.

Table 1.3 - Trig Stations relevant to the Wind Farm Project

Trig Station	Trig Reserve	Relationship of turbines to Trig Station	Ownership of Property surrounding Trig Station or Reserve
Groses Hill	No	Nearest turbine is 500 metres south of Trig Station	Raasey Pty Limited
Red Hill	No	Four turbines within 500 metres of the Trig Station	Ellendon Limited
Osborne (Big Hill)	Yes	Turbines immediately north and south of Trig Reserve	Currandooley & M Osborne

The Osborne Trig Reserve is shown on Figure 1.5. No turbines will be located on the Osborne Trig Reserve, however a licence will be sought from the Department of Lands for the purpose of laying underground cables and access through this reserve.

The Department of Lands has been consulted regarding the proposed development and potential impacts on survey activities, predominantly related to turbines in proximity to Red Hill and Osborne Trig Station. These aspects are discussed in Section 5.7 of the Environmental Assessment.

Where the wind turbines, access tracks or cable routes are located close to a Trig Station and its reference marks, the Trig Station and reference marks will be fenced off during construction works to avoid disturbance or inadvertent damage.

Renewable Power Ventures has discussed the project's access to and use of Crown Road Reserves (Figure 1.5) with the Lands Department which has proposed that access be granted by way of a licence.

1.4.2 Woodlawn Wind Farm

Another wind farm has been proposed on the former Woodlawn Mine Site located some 5 kilometres to the north and east of the Capital Wind Farm site (Figure 1.2). The proponent, Woodlawn Wind Energy Pty Ltd, has received development consent from the Department of Planning, for a wind farm comprising 25 turbines and having a total generation capacity of 50 megawatts. In addition, as part of the rehabilitation of the former mine site, waste is being deposited in the mine void by the landowner, Collex. This operation will use methane generated from the waste to produce electricity and is referred to as the Woodlawn Bioreactor.

1.5 Local Government Areas

The Capital Wind Farm and the substation are wholly within the Palerang local government area. The boundary between the Palerang and the adjoining Goulburn-Mulwaree Shire is shown in Figure 1.7. The two shires were formed in 2004 through a process whereby the NSW Government redefined shire boundaries and amalgamated a number of former Local Government Areas. The process of amalgamations retained the former local government zoning provisions and as a consequence the new shire boundary has a different location to that for the Local Environment Plans (LEPs) applicable to the former shires.

While the project is entirely within Palerang Shire, it is within two former Local Government Areas and within the bounds of the corresponding LEPs, which still apply as described below:

- Mulwaree LEP (Applicable for the wind farm and part of the substation)
- Yarrawlumla LEP (Applicable for the substation and associated access)

As can be seen in Figure 1.7 the location of the substation is mainly south of the boundary between the Mulwaree and Yarrawlumla LEPs but crosses the boundary and falls within the two LEPs. Provisions of the LEPs that are relevant to the proposed development are described in Chapter 4.

1.6 Project Participants

The project proponent and eventual operator of the wind farm is Renewable Power Ventures. The owners of the lands on which the wind farm is to be located will lease their land for the purpose of construction and operation of the wind farm.

The energy produced by the Capital Wind Farm will be sold within the National Electricity Market.

A summary of the key project participants who are directly involved with the project is provided below:

- Renewable Power Ventures is a developer of renewable power projects
- Landowners of properties will lease their land required for the wind farm to Renewable Power Ventures
- TransGrid is the owner and operator of the main electricity transmission network in New South Wales and is the owner and operator of the existing 330,000 volt transmission line that passes through the site
- Department of Planning (DoP) will be the Consent Authority for the project
- Department of Lands is the custodian of the Trig Stations and road reserves
- A project contractor will be appointed to supply the wind farm equipment and undertake the construction works.

Connell Wagner PPI has been engaged by Renewable Power Ventures to coordinate the environmental impact assessment and prepare the Environmental Assessment and the associated Major Projects Application required to obtain planning approval for the project.

1.6.1 Renewable Power Ventures

Renewable Power Ventures is the project proponent and is a renewable power generation development company formed as a joint venture company between Babcock & Brown, National Power Partners (USA) and Carbon Solutions.

Renewable Power Ventures' principal function is to develop and operate commercially viable renewable energy projects. In carrying out this function, Renewable Power Ventures plans its projects to ensure that they:

- (a) operate efficiently and safely
- (b) comply with statutory environmental requirements
- (c) sensitively consider the concerns of the local and indigenous community.

Renewable Power Ventures developed and is currently managing the 89.1 megawatt Alinta Wind Farm in Western Australia which comprises 54 turbines.

The installed Capital and Alinta Wind Farm projects will have a combined generation capacity in excess of 220 megawatts and can provide significant greenhouse gas emission savings to the Australian electricity supply industry.

1.6.2 Project Contractor

Renewable Power Ventures will engage a contractor to supply the required equipment and to construct the Capital Wind Farm. There are a range of contractors that can potentially undertake the construction of the wind farm.

Renewable Power Ventures will ensure that the contract specification addresses the Statement of Commitments to ensure that the project construction and operation is consistent with the Consent and associated approvals. Renewable Power Ventures will work with the contractor to finalise design elements, complete planning and, subject to obtaining the necessary approvals, to progress the implementation of the wind farm.

Most of the wind farm equipment suppliers are familiar with the construction issues and generally have well developed environmental management systems. In selecting the project contractor, Renewable Power Ventures will review the contractor's prior performance and ensure that the contractor has an effective environmental management system that will ensure that the project's environmental commitments are achieved.

1.6.3 TransGrid

TransGrid, as the owner and operator of the existing 330,000 volt transmission line to which the wind farm will be connected, will have a key role in specifying its requirements for the grid connection. Renewable Power Ventures, the project contractor and Transgrid will work together to reach a suitable design that facilitates the wind farm operation while maintaining security of the existing line. The grid connection is described in Section 3.

1.7 Greenhouse Gas Emissions

The majority of scientific opinion is that human activities are changing the composition of the atmosphere and that these changes are altering global weather patterns and climate through an enhanced "greenhouse effect". To reduce greenhouse gas emissions state and federal governments have introduced a range of initiatives including encouraging people to buy energy generated from renewable sources and introduced schemes such as the Federal Government's Mandated Renewable Energy Target Scheme and the NSW State Government's Greenhouse Gas Abatement Scheme.

Renewable Power Ventures has responded to these initiatives by planning and developing renewable energy projects.

The Capital Wind Farm's estimated potential net greenhouse gas emissions savings are described in Chapter 13. In summary, the project has potential to provide savings of 390,000 tonnes of greenhouse gas emissions each year it operates and up to 9.75 million tonnes over 25 years, compared to electricity produced by the NSW 'pool' of generators comprising mostly fossil fuels.

1.8 National Electricity Market

The output of the wind farm will be sold in the National Electricity Market (NEM) and will have the potential to create Renewable Energy Certificates (RECs) under the MRET Scheme which can be sold to liable parties under the Scheme. The Electricity Grid connects New South Wales, Queensland, Victoria and South Australia. Tasmania will also be connected via Basslink to the Grid in early 2006.

1.9 Outline of Planning Requirements and Purpose of this Document

Wind farms of the scale of the Capital project are classified as State Significant Development and, before such a development can proceed, it is necessary to obtain development consent from the NSW Minister for Planning, through the Department of Planning.

The Capital Wind Farm is an electricity generation facility that has a capital investment value of more than \$30 million. Under the State Environmental Planning Policy (Major Projects) 2005 it is classed as

a project to which Part 3A of the EP&A Act applies. Where the Minister directs the project assessment to be undertaken under Part 3A, an Environmental Assessment is required in respect of key project impacts as set out in requirements specified by the Director-General, Planning. The DoP has advised that requirements previously issued in September 2004 have been adopted for the project. Further advice from DoP on requirements for the assessment were issued in January 2006.

The purpose of this document is to satisfy the requirements of the Environmental Planning and Assessment Act, 1979 in respect of the proposed wind farm development, in accordance with the Director-General's requirements for the project. It examines the potential environmental impacts associated with the proposed development and describes measures to mitigate those impacts.

Further details on the Planning Context for the project are provided in Chapter 4 of the Environmental Assessment.

1.10 Stages of the Development Process

The following stages of the development process have been either initiated and are in progress or have been completed:

- initial planning (wind monitoring and wind energy assessment);
- site selection and feasibility study based on conceptual design;
- negotiation of landowner lease agreements to enable Renewable Power Ventures to proceed with project planning;
- site specific planning and environmental studies
- community consultation;
- government agency consultation;
- tender process to identify wind farm layout, equipment to be used and to confirm project viability; and
- preparation of the Environmental Assessment and submission of the Major Projects Application.

The key stages in the overall Planning and Approvals process are outlined in Figure 1.8.

1.10.1 Project Application and Environmental Assessment Exhibition

The lodging of the Major Projects Application on 16 December 2005 with the Preliminary Environmental Assessment (PEA) initiated a process whereby the Department of Planning (DoP) in conjunction with relevant government agencies reviewed the PEA for adequacy prior to formal acceptance. Comments on the PEA were issued by DoP on 30 January 2006 and the PEA has been revised to address DoP comments and re-issued in February 2006.

Once DoP is satisfied with the material provided, the Application is registered and the Environmental Assessment can be placed on exhibition. The relevant government agencies will provide advice to DoP and comment on any recommendations for potential conditions of consent.

1.11 Contributors to the Environmental Assessment Process

The organisations involved in the project scoping, assessment of impacts and the preparation of the Environmental Assessment are shown in Table 1.4.

Table 1.4 - The Environmental Assessment Preparation

Project Component / Role	Organisation
Project Management & initial Project Engineering	Renewable Power Ventures
Detailed Design	Potential Project Contractor
Environmental Assessment Preparation and selected Environmental Impact Studies other than those listed below	Connell Wagner PPI
Flora & Fauna Assessment	Kevin Mills & Associates
Bat Assessment	Greg Richards & Associates
Aboriginal Heritage	Austral Archaeology
Aboriginal Cultural Heritage	Pejar Local Aboriginal Land Council, Gundungurra Tribal Council Aboriginal Corporation Buru Ngunawal Aboriginal Corporation
Noise Assessment	Vipac Engineers and Scientists
Telecommunications Interference	Lawrence Derrick & Associates
Trig Station Review	Department of Lands
Planning Focus Meeting involvement and advice regarding assessment requirements	Renewable Power Ventures Department of Planning (DoP) and Department of Natural Resources (DNR) Shire Councils Department of Environment and Conservation (DEC) Department of Energy, Utilities and Sustainability (DEUS) Roads and Traffic Authority (RTA)
Community Consultation	Renewable Power Ventures & Connell Wagner PPI
Transmission Connection	Renewable Power Ventures, TransGrid, Project Contractor and Connell Wagner PPI.

1.12 Structure and Content of this Environmental Assessment

The content of this Environmental Assessment is largely determined by:

- Specific assessment requirements of the Director-General, Department of Planning which includes reference to relevant guidelines and agency requirements (Appendix A)
- In the formulation of the Director-General's Requirements, the key regulatory bodies that have, or are likely to have, involvement in the proposed development have been consulted.
- DoP Wind Energy and Transmission Environmental Impact Assessment Guidelines.

To satisfy the assessment requirements, specialist practitioners have investigated the various technical issues relating to the proposal. The reports of these practitioners form Appendices to the Environmental Assessment. The main body of the Environmental Assessment provides an abbreviated form of the specialist assessments, with the aim of clearly stating the potential impacts and any recommendations for their mitigation. The purpose of this presentation is to produce an Environmental Assessment that concisely describes the proposed development and which can be clearly understood by the general public while providing supporting studies for those that require more detail.

The structure of the Environmental Assessment is intended to assist the reader to gauge the potential impacts of the proposal. Specific key environmental issues are addressed in the following format:

- Introduction to the issues in relation to a wind energy proposal
- Description of assessment methodology
- Existing character of the environment
- Potential impacts relative to the issue
- Measures proposed to mitigate the impacts
- Conclusion.

Chapter 2: outlines Renewable Power Ventures' business objectives, its reasons for selection of the Capital Wind Farm project and alternatives considered during the formulation of the project.

Chapter 3: provides a detailed description of the project activities and stages and an outline of the proposed management of those activities

Chapter 4: outlines the planning context of the development

Chapters 5 to 14: provide a review of relevant environmental issues, setting out the existing environment, potential environmental impacts and proposed mitigation measures

Chapter 15: provides a Statement of Commitments

Chapter 16 describes the justification of the project

Chapter 17: lists references

Volume 2: provides the Appendices

Figures in the EA are generally provided at the end of the relevant chapter except where inserted in the text (as shown in contents listing).

1.13 Contact Details for Further Information

Renewable Power Ventures can be contacted on Phone: 9238 2028 or, Facsimile: 9235 3535.

Persons with enquiries regarding the Development Application process or wishing to make a submission regarding the project should contact Department of Planning (DoP) as follows:

Mr Paul Weiner: *Phone:* (02) 9228 6339 / *Facsimile:* (02) 9228 6355
Address: GPO Box 39, SYDNEY 2001