UNION FENOSA WIND AUSTRALIA

Crookwell 3 Wind Farm

Chapter 6

PROJECT JUSTIFICATION

6 Project Justification

This chapter provides justification for the wind farm project and discusses its environmental, economic and social benefits. It also discusses the alternatives to the project in relation to its type, location, and scale.

6.1 Climate Change

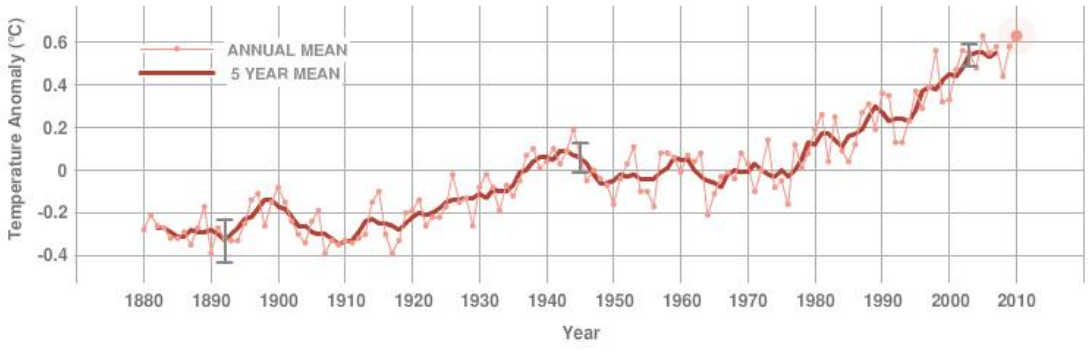
6.1.1 International and Australian Impacts

Climate change is an increase in global average surface temperature resulting from an increase in the amount of greenhouse gases, such as carbon dioxide (CO_2), methane, and certain other trace gases in the atmosphere (DCCEE 2010). Greenhouse gases contribute to a warming of the Earth's surface and lower atmosphere. Despite natural changes to the earth's climate that have occurred for millions of years, since the industrial revolution the earth has warmed at an unprecedented speed. The amount of greenhouse gases entering the atmosphere has caused an advanced level of climate change and global warming that has resulted in sea level rise, biodiversity depletion and extreme weather patterns.

It is widely acknowledged by the majority of scientists and all major scientific associations that human-induced global warming and its subsequent harmful consequences are real, and must be mitigated. The United Nation's Intergovernmental Panel on Climate Change projects that average temperatures around the world will increase by up to 5.8°C over the coming century (GWEC 2012). This is predicted to result in dramatic climate shifts, including increased global average air and ocean temperature, melting ice caps, flooding of low-lying land, storms, droughts and dramatic changes in weather patterns. The majority of the world's population will experience these effects by 2050 (Garnaut 2008, UN 2009).

In 2010, global average temperature was 0.53°C (0.95°F) above the 1961-90 mean, and the year ranked as the warmest year on record (WMO 2011). The World Meteorological Organisation (WMO) emphasises that *"over the ten years from 2001 to 2010, global temperatures have averaged 0.46°C (0.83°F) above the 1961-1990 average, and are the highest ever recorded for a 10-year period since the beginning of instrumental climate records"*. This data confirms the Earth's significant long-term warming trend (refer to **Figure 17**).

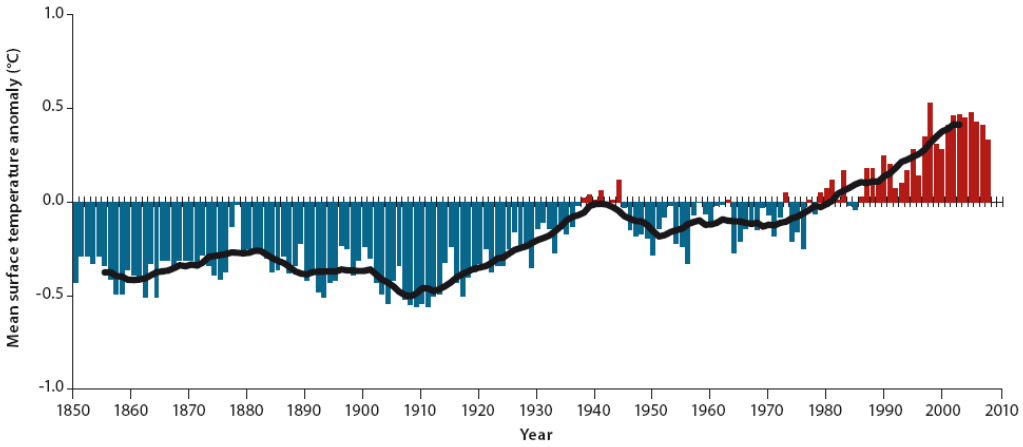
Figure 17 – Global temperature rise (1880-2010)



Source: www.climate.nasa.gov

Since the mid-20th century, Australian temperatures have, on average, risen by about 1°C (BOM, 2010) (refer to **Figure 18**). An increase in the frequency of heatwaves and a decrease in the numbers of frosts and cold days have also been observed in Australia over that time (BOM, 2010). Rainfall patterns have also changed, as the northern areas have seen an increase in rainfall over the last 50 years while much of Southern Australia has experienced a decline (BOM, 2010).

Figure 18: Mean surface temperature change (1910-2007) for Australia



Source: BOM, 2011

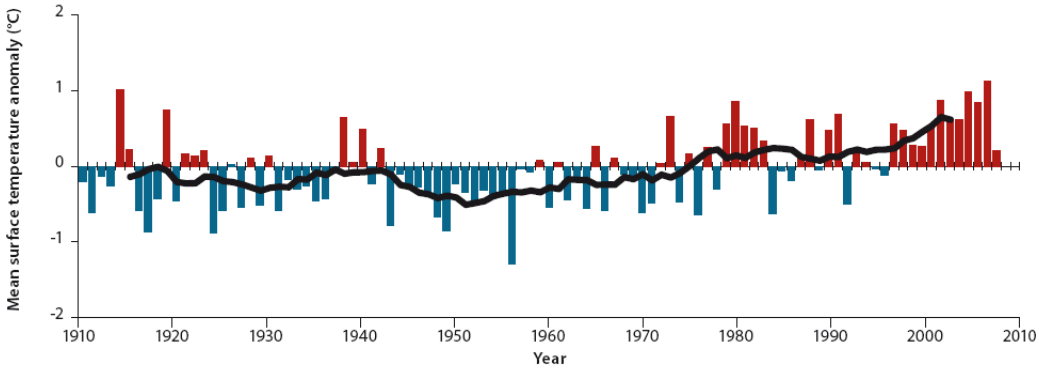
The *Garnaut Review Final Report* (2008) found that *"Australia's level of exposure and sensitivity to the impacts of climate change is high"* and that the major impacts of climate change are likely to include considerable drying in southern Australia, with risk of much greater drying, stressed urban water supply and the effects of changes in temperature and water availability on agriculture. This is expected to have a severe and costly impact on agriculture, infrastructure, biodiversity and ecosystems in Australia, as well as flow on effects on neighbouring nations (Garnaut 2008).

The update to the Garnaut Climate Change Review (2011) advocates that Australia should *"calibrate its emissions reductions proportionately to the global mitigation effort which aims to limit global warming to below 2 degrees above pre-industrial global average temperatures"*, and that a target to reduce Australia's carbon pollution to 25 per cent below 2000 levels by 2020 is appropriate (Garnaut, 2011).

6.1.2 NSW and Local Impacts

Current climate trends identified by the Bureau of Meteorology (BOM) indicate an accelerating increase in average annual temperature in NSW (see **Figure 19** below). During the 1950s to 1980s, the annual average temperature rise was around 0.1°C per decade; since 1990 it has been about 0.5°C per decade (BOM 2010). All years from 1997 to 2008 were warmer than average, which represented *"an unprecedented sequence in the historical records"* (BOM 2010).

Figure 19: Mean surface temperature change (1910-2007) for NSW



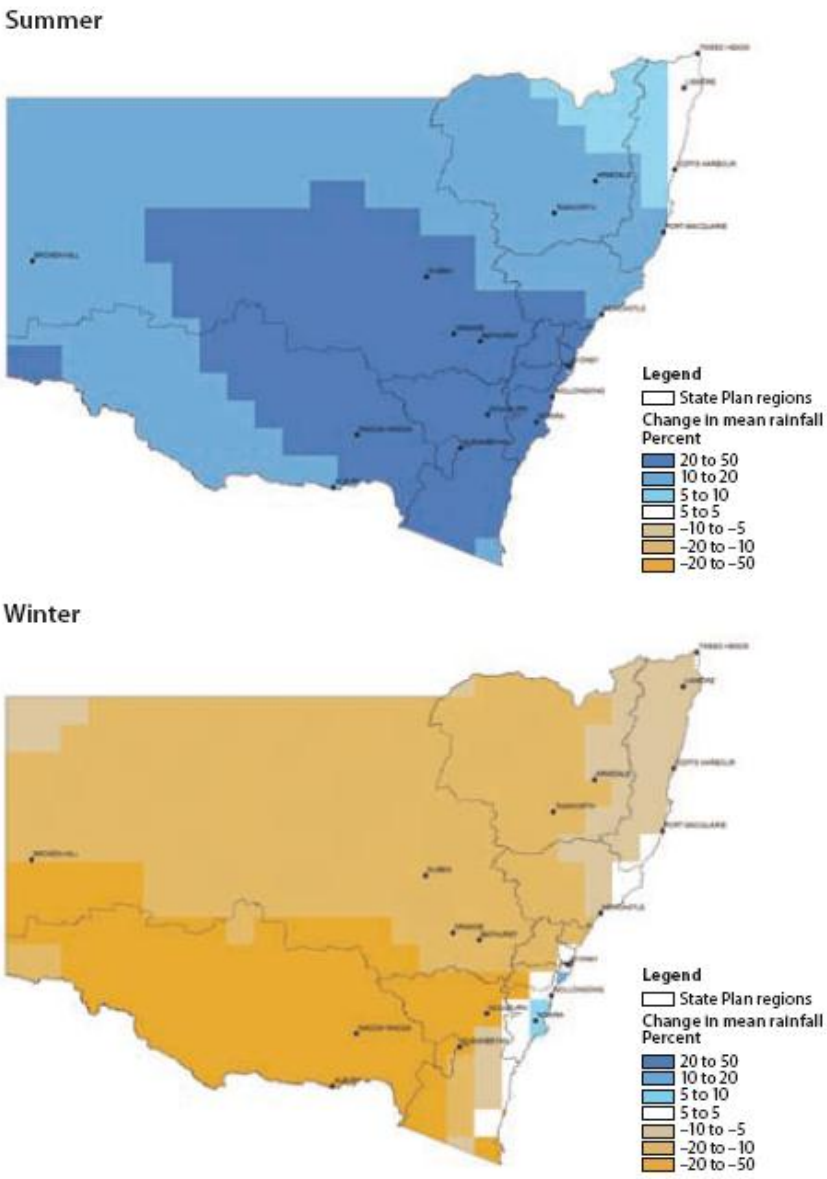
Source: BOM, 2010

According to the NSW Government, CSIRO and Bureau of Meteorology projections, the NSW community needs to prepare for higher temperatures, rising sea levels, less rainfall, more frequent and more severe droughts and more extreme storms. These changes *"are likely to have significant impacts on agriculture, water supply, settlements and infrastructure, natural resources, biodiversity and human health"* (DECCW 2010).

The NSW Climate Impacts Profile (2010) predicts greater maximum and minimum temperatures to be experienced across the state in all seasons. Winter and spring maximum temperatures are expected to rise by around 2–3°C across much of northern NSW by 2050 (DECCW 2010).

In addition, many parts of the state are forecasted to experience a shift from winter-dominated to summer-dominated rainfall, which may have implications for the length and severity of drought in these areas (refer to **Figure 20** below).

Figure 20 – Projected changes in summer and winter rainfall by 2050 for NSW



Source: NSW Climate Impact Profile, DECCW, 2010

The NSW Climate Impact Profile is the first integrated assessment of the biophysical changes projected for the state as a result of climate change. It outlines some of the risks NSW faces, and provides regional projections for eight different areas of the state. The climate impact projections for the South-East region by 2050, in which Crookwell is located, are;

- *"The climate is virtually certain to be hotter, with a likely rainfall increase in summer and decrease in winter. Snowfall is likely to decrease.*
- *Run-off and stream flow are likely to decrease in spring and winter, particularly in the west, and increase during summer.*
- *Sea level is virtually certain to keep rising.*
- *The rate of erosion is likely to increase on some soils. Coastal agricultural soils are likely to be inundated and acidification is likely to increase.*
- *Sea level rise coupled with increased flooding is virtually certain to pose an increased risk to property and infrastructure in coastal areas. Developments near coastal lakes and estuary entrances and on coastal floodplains are vulnerable.*
- *Widespread changes to some natural ecosystems are very likely. Those most at risk are alpine ecosystems, low-lying coastal ecosystems and those sensitive to fire".* (DECCW 2010)

6.2 Renewable Energy

6.2.1 Energy Generation

The international community is heavily dependent on the supply of fossil fuels for electricity production, which emit large levels of CO_2. Further, per capita consumption rates and energy demands are expected to rise, driven by an estimated global population of approximately 9.2 billion people by 2050, and the increasing industrialisation of the large Chinese, Indian, and other economies (Garnaut 2008, United Nations 2006). It is projected that world consumption of energy from all fuel sources will increase by 49 per cent from 2007 to 2035 (EIA 2010). The known impacts of fossil fuels combined with increasing energy demand highlight the need renewable energy technologies that emit less greenhouse gases.

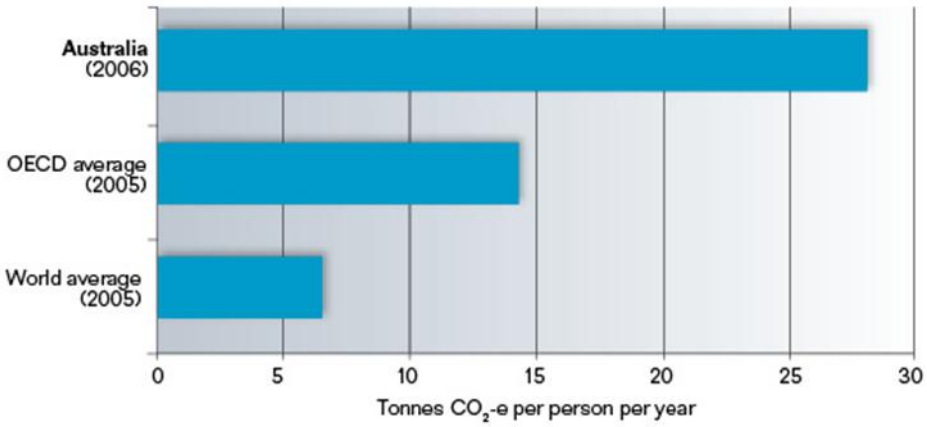
This is evident in Australia, which has the highest per capita emissions in the OECD and is among the highest emitters in the world (Garnaut 2008, OECD 2009). Garnaut's (2008) Climate Change Review identifies that Australia's per capita emissions are nearly twice the OECD average and more than four times the world average (refer to **Figure 21 – Per capita greenhouse gas emissions, Australia, OECD & the world, 2005**).

The Review also highlights findings from the Department of Climate Change (2008) and the International Energy Agency (2007) that *"the high emissions intensity of energy use in Australia is mainly the result of our reliance on coal for electricity"* (refer to **Figure 22 – Per capita emissions due to electricity, Australia, OECD & the world, 2005**).

Australia's long-term energy projections show total energy production nearly doubling due to strong export demand, primary energy consumption rising by 35 per cent, and electricity demand increasing by nearly 50 per cent by 2030 (ABARE 2010).

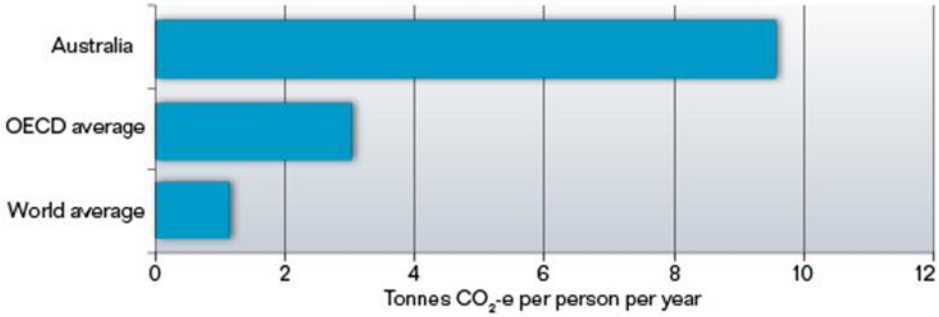
At current rates of production, the Australian Coal Association estimates 500 years supply of brown coal, 100 years of black coal and 60 years for conventional gas (ABARE 2009). Fossil fuels already dominates Australian energy sources **(refer to Figure 23 - Composition of Australian energy supply)**.

Figure 21: Per capita greenhouse gas emissions, Australia, OECD average and the World average, 2005 **(emissions including and excluding emissions from land-use change and forestry, c. 2004)**



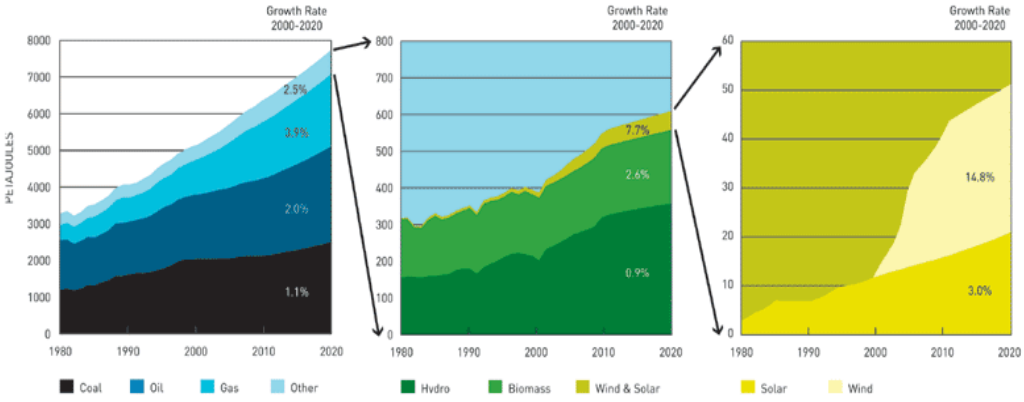
Source: DCC (2008c); IEA (2007a) cited in Garnaut 2008, http://www.garnautreview.org.au/chp7.htm

Figure 22 – Per capita emissions due to electricity, 2005



Source: DCC (2008b); IEA (2007a) cited in Garnaut 2008, http://www.garnautreview.org.au/chp7.htm

Figure 23 – Composition of Australian energy supply



Source: http://www.energymatters.com.au/faqs/renewable-energy-faq.php

6.2.2 The role of renewable energy

As the negative impacts of climate change and global warming are becoming increasingly apparent, society is looking at the role of innovation and technology to address these concerns. A key example is renewable energy. Renewable energy harnesses the replaceable natural energies of the Earth and can be defined as *"energy that is drawn from sources that cannot be depleted or can be replaced"* (House of Representatives Standing Committee on Industry and Resources, 2007).

As energy demands continue to rise and non-renewable energy supplies are depleted, new sources of energy are increasingly required. The adoption of renewable energy is acknowledged as a primary method to address energy security, reduce greenhouse gas emissions, and cater for future energy needs.

One of the greatest benefits of renewable energy is its potential to provide clean sources of electricity. Renewable energy sources produce less greenhouse gas emissions than fossil fuel or non-renewable energy sources. Additionally, renewable energy produces little or no waste products such as chemical pollutants, and therefore has a smaller direct impact on the surrounding environment. Renewable energy technologies have been sought and developed *"not only to increase the diversity of energy supplies but to potentially displace fossil fuels and consequently reduce greenhouse gas emissions generated by electricity production"* (IEA 2009 in NSW Legislative Council 2009).

Renewable energy can also provide opportunities for rural economic development and establish vibrant new industries in local communities where the economy is dependent on agriculture.

Australia is a nation endowed with significant renewable energy potential, including: *"high levels of solar rays to be used for solar projects; some of the best dry hot rock sites in the world in South Australia, Tasmania, New South Wales and Victoria for geothermal energy production; a vast coastline bordering the southern ocean available for wave energy; and significant wind resources"* (DEWHA 2009, Sustainability Victoria 2010).

Currently, renewable energy accounts for approximately 8.67 per cent of all electricity generated in Australia (CEC, 2011).

6.2.3 The role of wind energy

There are many benefits of wind energy technology. Firstly, and most obviously, is its ability to produce clean and renewable energy. Unlike conventional energy sources, wind energy can produce electricity locally, thus reducing transference distances and loss of energy in the process (Diesendorf 2007b). Wind energy also does not involve any harmful side-effects which may result from other energy sources such as the risk of gas explosions, nuclear meltdowns or the production of radioactive by-products requiring future storage for thousands of years (Diesendorf 2007b).

Wind energy is currently the most commercially viable and proven renewable technology, and since the 1970s has been viewed as a key part of a new generation energy mix. Wind energy can play a key role in reducing greenhouse gas emissions, providing energy security, decreasing transmission losses, and reducing water consumption. The Australian Energy Regulator (AER), in its State of the Energy Market 2008 report, found that *"renewable energy sources, such as hydroelectric, wind and solar, produced some of the lowest greenhouse gas emissions"* (AER 2008 in NSW Legislative Council, 2009). Within three to six months of operation, a wind turbine has offset all carbon emissions resulting from its construction, enabling it to operate 'carbon free' for the remainder of its operational life (GWEC, 2010).

Wind energy avoids the negative environmental impacts which are associated with coal-fired electricity generation, such as direct emissions of oxides of nitrogen and sulphur, which cause acid rain and other atmospheric pollution (SEDA NSW 2001).

Other types of electricity generation, such as coal power, also require a considerable amount of water during operation. In the case of a coal-fired plant, water is required for the cooling towers, to replace water lost from the boilers, and to stabilise the mine. By contrast, wind power uses no water during operation and miniscule amounts during construction.

Wind energy also has benefits for land owners involved in the projects by diversifying the revenue stream from the land without compromising the core business of agricultural production due to the small development footprint of a wind farm. Wind farms also provide significant local investment and direct and indirect employment. Please refer to **Chapter 8 – Economic and Social Impacts** for more information.

One of the present challenges of wind power is the intermittent nature of its power production. Varying wind speeds affect the energy produced from wind turbines. It is recognised that with current technology, a single wind farm cannot produce sufficient electricity to meet base load power requirements. However, wind farms can meet a significant portion of electrical demand where the transmission network is well linked and wind farms are geographically diverse. This is because, whilst the wind may not be blowing at peak generation speeds in NSW, a modern transmission network is able to utilise wind power generated from Victoria or SA where the wind may be blowing at a more favourable rate, and vice versa.

Considerable research is underway within the energy industry to improve the management of different types of energy generators as part of the overall modern power generation network. For example, improvements in wind forecasting can increase the ability of grid operators to schedule and accommodate generation from wind, whilst reducing the generation from polluting sources of base load generation. Furthermore, wind generation can be combined with other renewable sources such as hydroelectricity to improve its ability to supply base load power. Additionally, advances in energy battery technologies also offer the potential for short term storage of energy to be utilised when the wind speeds are down. Wind power is seen as a key component of a modern energy network that also includes solar, hydro and gas.

As technology advances, the role of wind power in Australia's energy mix is increasing. The University of Melbourne Energy Research Institute team has established an organisation, Beyond Zero Emissions, a non-profit, independent climate change solutions research and advocacy group that is currently developing the Zero Carbon Australia 2020 Project. The Zero Carbon Australia 2020 Project is a *"costed, detailed blueprint for a transition of Australia to a Zero Emissions Economy by 2020 using proven, commercialised technology"* (University of Melbourne, 2010).

The Zero Carbon Australia 2020 Project only uses proven and costed technologies that are commercially available. Importantly, wind power is one of only two primary technologies utilised (the other being concentrating solar thermal (CST)), providing a significant proportion of (approximately 40%) of the proposed energy mix (University of Melbourne, 2010). Wind power and CST are backed up by a 2% annual contribution from crop waste biomass and hydroelectricity (University of Melbourne, 2010).

The Zero Carbon Australia 2020 Project mid-term goals are to have 15,000 MW of wind and 5,000 MW of CST operational by 2015. Australia, however, currently has less than 2,000 MW of wind turbine capacity installed (University of Melbourne, 2010). Wind power was selected as a key source for Australia's future energy requirement on the basis that;

- it is generally the cheapest renewable energy source to deploy;
- it is technologically mature;
- 40% wind power can be readily integrated with the CST-based electricity supply grid; and
- at least 15% of the installed wind capacity would always be producing power, with the same reliability as conventional 'baseload' power

Wind power, therefore, can play a crucial role in Australia's future energy needs.

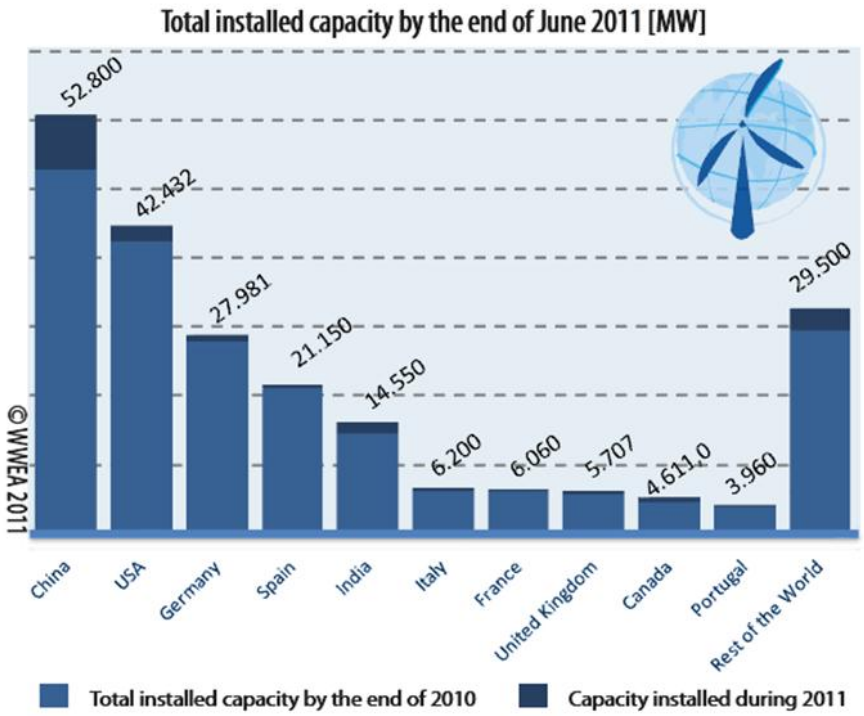
6.3 Wind Power Context

6.3.1 International Context

Wind power is one of the fastest growing energy technologies in the world (Diesendorf 2009). According to the World Wind Energy Association, at the end of 2009 over 159,213 MW of wind energy capacity was installed globally (WWEA, 2009), over which 38,312 MW were added in 2009. Wind power showed a growth rate of 31.7 % in 2009, the highest rate since 2001 (WWEA, 2009). This confirms wind energy as the second largest renewable energy technology being utilised, behind hydro-power which is currently the largest.

The international wind energy industry also witnessed growth worth over AUS $100 billion in 2008 (WWEA, 2009). As seen in **Figure 24**, a total global wind capacity of 200,000 MW would be exceeded by the year 2010, and a global capacity of 1,900,000 MW is predicted as possible by the year 2020 (WWEA, 2009).

Figure 24 – World Total Installed Capacity (MW) from 2001 to 2010 (predicted)



Source: World Wind Energy Association, 2011

The international wind industry is responsible for significant employment. The World Wind Energy Association estimated that the wind sector employed 670,000 persons worldwide by 2010 (WWEA 2011).

Whilst wind energy is most commonly utilised in Europe, it is being increasingly embraced by nations outside that continent. In 2010, China became number one in total installed capacity, and added 18.9 GW within one year, accounting for more than 50 per cent of the world market for new wind turbines (WWEA 2011). In the first 6 months of 2011, China added 8 GW, accounting for 43 per cent of the world market for new wind turbines (WWEA, 2011).

While the wind energy industry has grown by over 30 per cent over the past decade, wind energy currently supplies less than three precent of global electricity generation

(WWEA 2011). It is considered, however, that wind energy has the potential to supply *"10-12% of global electricity demand by 2020, reducing greenhouse gas emissions by 1.5 billion tonnes per year"* (NSW Legislative Council, 2009).

6.3.2 Australian Context

Wind energy in Australia has shown rapid growth over the last 30 years, and is increasingly recognised as a key source to supply our increasing energy needs. The Australian wind industry is generally concentrated in the Southern states of Western Australia, South Australia, Victoria, Tasmania and NSW.

The Renewable Energy Target (RET) scheme outlines the Australian Government's commitment to reducing greenhouse gas emissions and expanding the use of renewable sources from 2020 and beyond. On 20 August 2009, the Renewable Energy (Electricity) Amendment Bill 2009 was passed in the Commonwealth Parliament, which expanded the MRET (Mandatory Renewable Energy Target) scheme into a single national scheme, called the RET. This scheme places a legal liability on wholesale purchasers of electricity to proportionately contribute towards the generation of renewable energy (Sustainability Victoria, 2010). The RET scheme includes a target requiring 45,000 GWh of electricity to be produced by renewable energy sources by 2020. In June 2010, the Government passed an enhanced RET scheme, which created new categories for renewable energy to encourage commercial scale energy development.

The RET places an obligation on electricity retailers and large users of electricity to purchase 20 per cent of their electricity from renewable energy sources by 2020 (Minister for Climate Change, Energy Efficiency and Water, June 2010).

On 1 January 2011 the RET split into two separate schemes, and the 'Large-scale Renewable Energy Target' (LRET) and the 'Small-scale Renewable Energy Scheme' (SRES) became effective. The LRET encourages large scale energy generation to be produced using technologies such as hydro, biomass, solar, tidal and wind power. The LRET will drive investment in renewable energy projects like wind farms, commercial solar and geothermal, which will deliver the majority of the 2020 target. The annual targets for the LRET increase each year up to 41,000 GWh by 2020 (DCCEE, 2010).

To achieve this target, Australia will require significant investment in renewable generation. As wind power is currently one of the most economic and mature renewable energy technologies available, it is likely to contribute a large share of this target.

A report commissioned by the Commonwealth Department of Climate Change stated that *"wind energy is projected to contribute over 17,000 GWh per year to the RET"* (McLennan Magasanik Associates 2009 cited in NSW Legislative Council 2009).

Beyond the environmental benefits, the profile of wind power has grown due to its status as a market ready technology, at an increasingly affordable price. Moreover, Australia is described by the Global Wind Energy Council as having some of the world's best wind resources (DEWHA 2009, CEC 2010) (refer to **Figure 25 – Renewable Energy Atlas of Australia**), making it a prime location for wind farm development.

Wind power generation in Australia has increased by approximately 30 per cent each year over the previous decade (CEC 2012). Since 2000, *"more than 1400 direct jobs and $3.3 billion of investment have been generated through the development of wind energy in Australia"* (GL Garrad Hassan cited in CEC 2011).

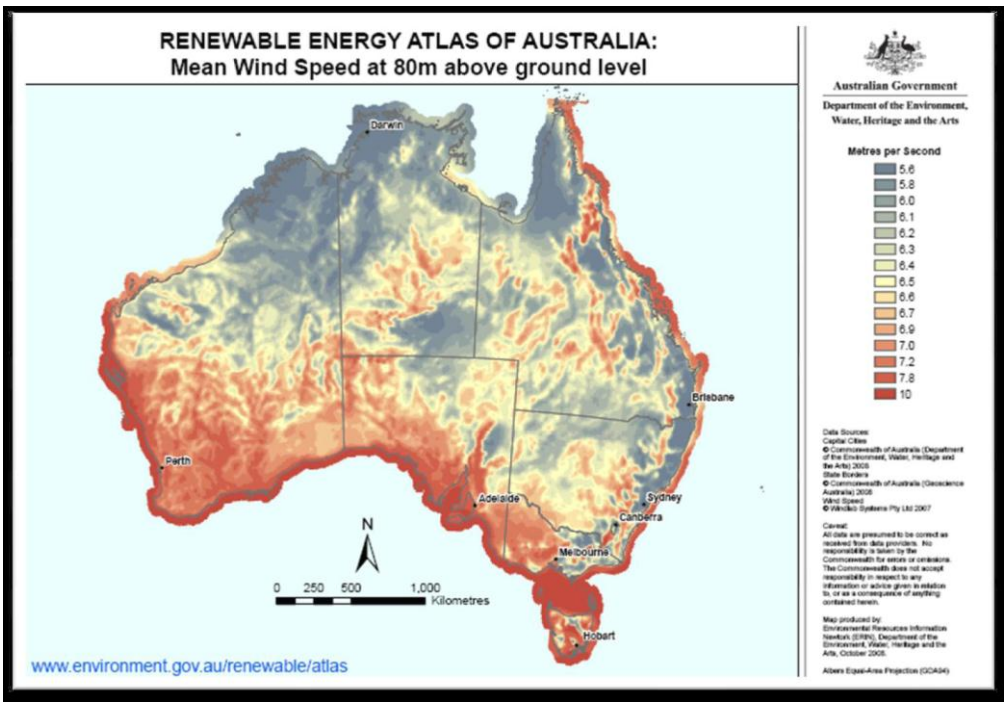
However, total installed wind generation capacity in Australia is considerably lower in comparison to many other developed and developing nations (WWEA, 2010).

In September 2011, the Commonwealth Government moved towards implementing its carbon reduction initiatives by introducing the Carbon Bill package to the Australian Parliament. This package includes 18 bills to implement the policy set out in '*Securing*

a Clean Energy Future: The Australian Government's Climate Change Plan'. The intended outcome is to reduce Australia's carbon output. This will be achieved in part by assisting the Australian energy sector to transition from high carbon polluting electricity generation methods to low or zero carbon emission methods.

The introduction of a carbon tax for high polluting users will promote low and zero emission energy sources as well as provide funding for the development and transition to low emission methods; including wind farms.

Figure 25 – Renewable energy atlas of Australia



Source: The Department of the Environment, Water, Heritage and the Arts 2009.

By mid-2011, Australia was home to 54 operating wind farms (CEC, 2011) (refer to **Table 6** below). This wind energy investment by July 2011 has created:

- 2124 MW total installed wind capacity
- 1153 operating wind turbines
- 891,003 equivalent homes powered
- $5.609 billion of total capital investment
- $3.365 billion of investment in Australia
- 1487 direct jobs
- 4460 indirect jobs
- 6,326,122 tonnes of carbon dioxide displaced

Source: Clean Energy Council, Wind Energy in Australia: National Snapshot, 2011

Table 6 – Jurisdictional breakdown of wind farms in Australia (July 2011)

Jurisdiction	Wind farms Installed (proposed)	Turbines Installed (proposed)	Capacity Installed (proposed)
New South Wales	7 (29)	116 (2554)	187 MW (5646MW)
Queensland	2 (3)	22 (270)	12 MW (622 MW)
South Australia	15 (14)	535 (648)	1151 MW (1354 MW)
Tasmania	6 (2)	68 (148)	142 MW (329MW)
Victoria	9 (33)	267 (1766)	428MW (4111MW)
Western Australia	15 (9)	145 (505)	204MW (1037MW)
Northern Territory	Nil		
Australian Capital Territory	Nil		
Australia	54 (90)	1153 (5891)	2124 MW (13099MW)

Source: Clean Energy Council 2011

South Australia and Western Australia contain the highest number of wind farms, and South Australia is reported to have the highest level of total electricity coming from wind energy production.

6.3.3 NSW Context

In NSW, more than 90 per cent of electricity is generated from coal, and one third of NSW's total greenhouse gas emissions are due to the generation of electricity (NSW Government 2010b). Most of NSW's electricity is sourced from black coal fired power stations in the Hunter Valley, such as the Bayswater Power Station. In NSW, each kW of electricity produced from coal generation results in 1.07kg of carbon pollution (NSW Government 2010a), whilst electricity produced from wind farms produces no direct carbon pollution. The greenhouse gases generated by the manufacture of the turbines and the construction of the wind farm are miniscule and offset within three to six months of wind farm operation.

There is increasing community concern in regional NSW regarding air and water pollution caused by both coal fired power stations and coal mines. The Sydney Morning Herald has publicised community concerns over health impacts thought to be associated with the coal mining industry in the Hunter Valley (SMH, 2010).

Energy demands in NSW are predicted to rise as a result of increased population and consumption rates. Governments have recognised that renewable energy sources should be encouraged in order to reduce the greenhouse gas emissions resulting from increased generation. In lieu of the RET legislation, the NSW government introduced the draft NSW Renewable Energy Target (NRET) in 2007. This scheme required 10% of NSW's electricity to be sourced from renewable energy by 2010, and 15% by 2020 (NSW Government 2006). The target applied to all electricity retailers and required that they purchase the proportion of their electricity supply from accredited renewable generation sources (NSW Government 2006). Due to the introduction of the RET scheme by the Federal Government, the draft NRET scheme was not legislated.

While dependence on fossil-fuelled energy remains high, the wind energy sector in NSW is currently experiencing rapid growth. As of 1 July 2011, there were 7 operating

wind farms and 187 MW of installed wind power in NSW, accounting for 556,961 tonnes of carbon pollution avoided (CEC, 2011). Approximately 30 new wind farms are proposed for the state, which would allow for an equivalent of 2,368,457 homes to be powered.

The key reasons for the emergence of the wind energy industry in NSW include:

– the status of wind energy technology as 'market ready';

– its role in reducing greenhouse gas emissions;

– the potential for considerable investment and economic activity driven by the Commonwealth Renewable Energy Target (RET);

– the significant wind resources available in NSW; and,

– the price competitiveness of electricity generated by wind energy.

NSW has an excellent wind resource (refer to **Figure 26 – NSW Wind Atlas**). Background wind speeds in NSW are comparable to northern Europe, where a large portion of international wind generation is currently installed (NSW Government 2010a). NSW has an estimated potential for over 5,000 MW of wind energy (NSW Government 2010c).

Many of the ideal sites in NSW are *"the hills and ridges of the Great Dividing Range and calmer background winds that blow from west to east across the vast NSW inland"* (NSW Government 2010c). The extensive NSW transmission network is linked to the national grid, offering easy access for wind farms (SEDA NSW 2001). Furthermore, NSW has one of the biggest wind monitoring networks in Australia.

At the end of 2010, the NSW Government conducted a survey of approximately 2,000 people and 300 businesses in rural NSW in order to assess public attitudes to wind farms. The results showed that around 80 per cent of respondents said they would strongly support wind farms in their region (SMH, 2011).

6.4 Community Attitudes

In the 2008 local government elections, Upper Lachlan Shire residents were asked about their support for the development and construction of wind farm turbines in the area. The results of the poll showed that 70.04% were 'for' and 29.96% 'against', with every polling booth registering a 'for' vote majority including those in the area of the then approved Crookwell 2 Wind Farm. This positive community attitude provides further support for a new wind farm in the region.

More recently, the CSIRO conducted an investigation, *Exploring Community Acceptance to Rural Wind Farms in Australia: a snapshot*, published in 2012 that sought to improve understandings of community resistance and acceptance of rural wind farms.

The study involved interviews and media analysis across nine wind farms of different sizes and operational status across New South Wales, Victoria and South Australia.

The study produced four high level findings:

1. There is strong community support for the development of wind farms, including support from rural residents who do not seek media attention or political engagement to express their views. This finding contrasts with the level of opposition that may be assumed from the typically 'conflict-oriented' portrayal of wind farm proposals in the popular media.
2. The actual and perceived local costs and benefits of wind farms are strongly influenced by the design, implementation, and community engagement processes.
3. Existing regulatory approaches provide an appropriate framework for negotiating wind farm developments, but there is scope for improving outcomes.

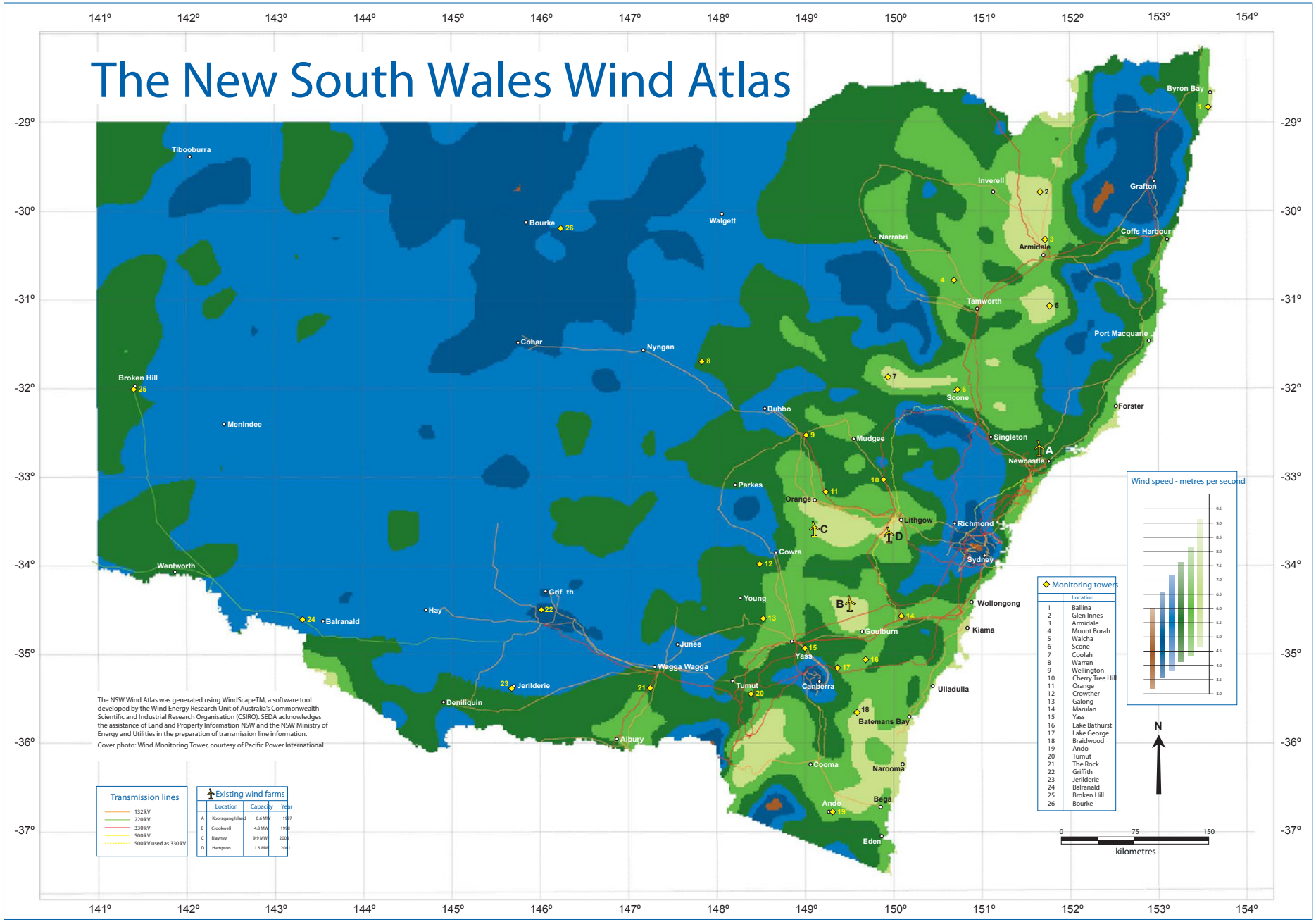


FIGURE 26 NSW Wind Atlas

Source: NSW State Goverment

4. The emerging notion of a 'Social Licence to Operate' provides a useful framework for wind farm developers to engage local communities in ways that could enhance transparency and local support, and complement formal regulatory processes. This approach could provide a structured and cooperative framework for exploring strategies for reducing potential adverse impacts, sharing financial benefits equitably, and building local trust and understanding through a clear communication process.

Overall, the study found that *"community acceptance of wind farms could be increased by developers intentionally adopting frameworks for transparent and well-structured community engagement"* (CSIRO, 2012).

The proponent seeks to minimise or eliminate where possible any potential adverse impact from the construction, operation and decommission of the proposed Crookwell 3 Wind Farm upon the community and the environment, and capitalise on the strengths of the project, such as maximising renewable energy output.

6.5 Project Benefits

6.5.1 Environmental benefits

Wind energy plays a key role in reducing greenhouse gas emissions and mitigating climate change. The NSW State Government promotes the development of renewable energy as part of an approach to ensuring sustainable development in the New South Wales energy sector and reducing the state's greenhouse gas emissions.

The Crookwell 3 Wind Farm would contain up to 30 turbines, generating between 54 MW to 102 MW of wind energy (in addition to the 92 MW of capacity from the approved Crookwell 2 Wind Farm). If approved, the Crookwell 3 Wind Farm would save between 145,715 and 208,654 tonnes of CO_2 annually (when compared to generating the same amount of electricity from black coal fired power stations). This is the equivalent of taking up to 48,188 cars off the road, or planting up to 311,425 trees. The electricity generated by the wind farm could supply up to 33,225 households with energy, or a population of 86,385 people.

The environmental benefits of wind energy projects such as Crookwell 3 Wind Farm are clear: wind farms do not generate any greenhouse gas emissions during electricity production (NSW Legislative Council, 2009), and minimal quantities during the manufacture of its equipment and construction phase. By contrast, fossil fuels such as coal, gas and oil are major emitters of carbon dioxide.

Wind power generation also mitigates other adverse environmental impacts such as landscape degradation from fossil fuel exploration and mining, the pollution caused by accidental oil spills, and waste from fuel (GWEC, 2010). Furthermore, wind energy does not require large water resources or make large tracts of land unusable, as the turbines and associated infrastructure use, on average, approximately 1% of land upon a site (GWEC, 2010). This footprint is slightly larger during the temporary construction period.

Another key environmental benefit of wind power generation is energy security. An energy future based on conventional fuel sources is uncertain as oil, coal and gas are non-renewable and by definition will one day run out. It is estimated that by 2030 world energy needs will be between 30 and 60 per cent higher than current levels (GWEC 2010). However, the main fossil fuels used in power generation, which nations are heavily reliant upon, are becoming more expensive and more difficult to extract (GWEC 2010). There is uncertainty over supply and cost associated with the importation of fossil fuels. In contrast, wind energy is a renewable energy source which is eternally obtainable in almost every country in the world.

Pollution

The generation of wind power at Crookwell 3 Wind Farm would also have a positive effect on regional air quality as it would displace pollutants generated from coal power stations. The combustion of coal to produce electricity produces sulphur dioxide and

nitrogen oxide, which are the main components of the 'acid rain' effect, which negatively impact upon forests, water courses and human health (GWEC 2010). Based on 2008/09 NSW Electricity Generation figures (NPI, 2010) approximately 240 million kg of acid rain producing sulphur dioxide are produced by NSW electricity generators per year as well as 170 million kg of oxides of nitrogen. The majority of this pollution is emitted by coal power stations. For example, NSW's largest electricity generator, the Bayswater Power Station in Muswellbrook, emitted 37 million kg of Oxides of Nitrogen and 70 million Kg of Sulphur Dioxide in 2008/2009 (NPI, 2010). By contrast, the Crookwell 3 Wind Farm would produce no oxides of nitrogen, sulphur dioxide, or any other direct pollutants.

Other pollutants emitted by coal power stations include (NPI, 2010):

- Ammonia
- Arsenic & compounds
- Beryllium & compounds
- Boron & compounds
- Cadmium & compounds
- Carbon monoxide
- Chromium (III) compounds
- Chromium (VI) compounds
- Cobalt & compounds
- Copper & compounds
- Cumene (1-methylethylbenzene)
- Fluoride compounds
- Hydrochloric acid
- Lead & compounds
- Manganese & compounds
- Mercury & compounds
- Nickel & compounds
- Particulate Matter
- Polychlorinated dioxins and furans
- Polycyclic aromatic hydrocarbons
- Selenium & compounds
- Sulfuric acid
- Zinc and compounds

As wind farms do not produce any direct pollution, every MW of energy produced by wind farms displaces the emission of the above pollutants.

Greenhouse gas reductions

A key determinant in calculating the emission reductions of the Crookwell 3 Wind Farm is the type of energy that is displaced by the wind energy. Whilst in Victoria wind energy displaces brown coal fuelled energy at a rate of 1.31 tonnes per MWh of energy, in NSW it is less as black coal converts to energy at a higher efficiency. A co-efficient of 0.973 tonne per MWh of energy has been used to support the calculations below. This pool co-efficient is derived from GGAS (2010). **Table 7** outlines the savings that would be made as an outcome of the proposal.

Table 7 – Greenhouse Gas Savings

	Minimum	Maximum	Source
Number turbines	30	30	CDPL
Turbine MW	1.8	3.4	Turbine manufacturer
Total MW	54	102	Calculated
Capacity factor	0.34	0.24	Estimated
Output (MWh)	160,833	214,444	Calculated
Greenhouse gas displaced (tonnes)	145,715	208,654	Based on NSW GGAS 2010
Number of households supplied electricity	23,203	33,225	Based on AGO, 1999
Population supplied electricity	60,327	86,385	Based on Vic Sustainable Energy Authority 2003
Equivalent cars off road	33,652	48,188	Based on Vic Sustainable Energy Authority 2003
Equivalent number trees planted	217,485	311,425	Based on Vic Sustainable Energy Authority 2003

As outlined in the table above, the greenhouse gas savings attributable to the proposed Crookwell 3 Wind Farm equates to the electricity use of a population up to 86,385 or 33,225 average households. This is approximately 1/4 of Canberra's population or more than double the population of Goulburn.

Water Savings

In addition to electricity savings, due to the amount of water required to fuel black coal energy production, significant amounts of water would be saved by the production of energy through the Crookwell 3 Wind Farm.

The five coal power stations currently in operation in NSW use approximately 85,000 ML per year or 15% of Sydney's annual water consumption (NGH Environmental 2009). As coal fired electricity production continues to rely on potable rather than recycled water, this represents a major environmental impact in addition to the pollution and greenhouse gases produced by coal fired power stations.

Based on the annual water consumption and energy production rates for coal fired power stations in NSW, approximately 1316 litres is used per MWh produced (NGH Environmental 2009 p.69). On this basis, the Crookwell 3 Wind Farm is likely to reduce the amount of potable water consumption attributable to energy generation in NSW by more than 282 million litres per year or 282 megalitres per year.

6.5.2 Economic benefits

The Global Wind Energy Council emphasises the significant economic benefits of utilising wind power, as follows:

- **No fuel price risk**: Wind energy is a large indigenous power source which is permanently available in virtually every country in the world.
- **Investment and jobs**: According to the GWEC scenario, the annual value of global investment in wind energy would reach €149.4 billion by 2020 and account for over 2.2 million jobs.
- **Regional economic development**: The wind power industry is revitalising regional economies, providing quality jobs and expanding tax bases in rural regions.
- **No geo-political risk**: There are no fuel costs, no geo-political risk and no supply dependence on imported fuels from politically unstable regions.
- **Speed of development**: Wind power also has the advantage that it can be deployed faster than other energy supply technologies.

– **Emissions**: Wind energy emits neither climate change inducing carbon dioxide nor the other air pollutants, and as a result, has none of the high external costs related with conventional energy sources.

Futureye have calculated the specific economic impacts of the Crookwell 3 Wind Farm, as follows:

– A total capital investment of approximately $90 - 110 million.

– Stimulation of the economy in the Upper Lachlan Shire as a result of greater income generation and subsequent expenditure in the region.

– Provision of flow on economic benefits in terms of employment and commercial opportunities from the economic investment.

– Up-skilling of the local workforce within a growing energy market.

– Creation of up to 40 full time jobs during the construction phase.

– Creation of 6 full time jobs during the operational phase of the wind farm.

– Creation of up to 10 additional contractors on the site once every 10 to 15 years as part of scheduled major site overhauls.

– Use of a significant portion of locally sourced materials and employment.

– Increases in the local tourism industry, and in turn, increased expenditure on local services such as accommodation and retail.

These economic benefits are in addition to CDPL's commitment to contribute an annual monetary contribution of amount of $1,666 (adjusted annually to changes in the CPI) per operating turbine to the local community, as part of Upper Lachlan's Community Enhancement Fund. This equates to an annual contribution of up to $49,980 to directly benefit projects in the local area.

Furthermore, the Clean Energy Council of Australia (CEC) released a publication, *Wind Farm Investment, Employment and Carbon Abatement in Australia*, in June 2012. The study provides a snapshot of wind farm investment, jobs and carbon abatement in Australia and each of the states. The key findings of the study are as follows:

– Total local capital investment in Australian wind farms is $4.25 billion (of a total $7 billion) and potential further local investment in proposed wind farms is $17.8 billion (of a total $29.6 billion).

– Construction of a 50 MW wind farm would provide a gross value added of some $50 million to a state and contribute between 0.012% and 0.21% to gross state product (GSP) depending on the size of the state economy.

– Based on four indicative regions, construction of a 50 MW wind farm could contribute 0.1% to 2.6% to regional gross regional product, depending on the size of the regional economy.

– Construction of a wind farm could lead to potential local personal expenditure of $25,000 per person per annum on accommodation, food and other services in the region.

– A typical 50 megawatt (MW) wind farm:

  - Has an estimated average construction workforce of 48 people with each worker spending $25,000 per year in the local area. This equates to some $1.2 million per year flowing into hotels, shops, restaurants, and other local service providers.

  - Employs around five staff for operations and maintenance, equating to an ongoing local annual influx of $125,000.

  - Creates 795 one-year, full-time equivalent construction jobs per 50MW wind farm in Australia, including 504 jobs in the State and 160 in the region.

- Creates 44 one-year, full-time equivalent operation jobs per 50MW wind farm in Australia, including 19 jobs in the State and 12 in the region.

– The national average of emissions abatement achieved by wind farms across Australia is 246,200 tons per annum which is equivalent to 57,300 cars removed from the road.

The study concluded that the development of wind farms contribute significantly to investment, employment and emissions abatement at regional, state and national levels.

6.5.3 Social benefits

Chapter 8 details the social impacts of the proposed wind farm. Specifically, the social benefits of the Crookwell 3 Wind Farm are as follows:

– beneficial social outcomes through supporting national and international efforts to reduce the potential impacts of global warming and climate change;

– greater employment opportunities and up-skilling of the local workforce;

– establishment of a collaborative approach to implementing local business assistance programs;

– the development a formal approach to community investment programs and partnerships which provide sustainable benefits to the community of Crookwell and surrounding districts; and

– direct social benefits arising from the annual contribution to Upper Lachlan's Community Enhancement Fund.

– beneficial social outcomes arising from landowner payments flowing through the local economy.

6.6 Consideration of Alternatives

6.6.1 Do Nothing

An alternative to the construction of the proposed Crookwell 3 Wind Farm is to not proceed with the project. Such an option has a number of significant consequences, primarily the continued reliance on fossil fuels for electricity generation and the consequential emission of greenhouse gases. The continued emission of greenhouse gases will contribute to anthropogenic climate change and its impacts such as sea level rise and extreme weather.

Not proceeding with the project will also not realise the project benefits outlined in **Chapter 6.5**. These include the reduction of pollutants otherwise emitted by fossil fuels and water savings. The economic benefits would also not flow to the Crookwell region and wider NSW, such as investment of $90-110 million and the creation of 40 jobs during construction and 6 ongoing jobs during operation. For the local community, if the project were not to proceed, the Community Enhancement Fund payments of $49,980 for local projects per year would not be paid.

6.6.2 Alternative energy sources

The key alternative energy source to wind power is the continued use of fossil fuels, such as coal and natural gas. However, the combustion of these fuels results in the release of CO_2 that contributes to the warming of the Earth and results in the dangerous impacts of climate change. State and National legislation has been passed to address climate change by reducing greenhouse gas emissions. Ambitious targets have been put into place at all levels of government to substantially reduce emissions over coming decades.

Further, it is considered unlikely that power generation companies would invest in higher emitting fossil fuel sources, especially coal, given the worldwide movement away from such forms of energy and the recent introduction of a market mechanism for carbon in Australia.

Since the 1970s, alternative renewable technologies have been researched, promoted and developed, to varying extents in many nations. Other forms of renewable energy include:

- solar energy, including solar thermal energy;
- hydro energy;
- ocean energy, including tidal; wave energy;
- geothermal energy; and,
- bioenergy.

The likely degree of adoption and commercial viability of these forms of renewable energy is difficult to ascertain, as most depend on technological advances and overcoming major barriers. With the exception of solar energy, all are in the early stages of development and are not 'market ready'. None have benefited from several decades of operation like wind power.

Hydroelectricity, the conversion of strong water flows to electricity using a water turbine, has been utilised since the early 20th Century on a large-scale. It is known to have environmental impacts, such as the direct loss of flora and fauna from the flooding of the dam site, aquatic temperature impacts, the creation of aquatic fauna barriers, the reversal of seasonal flows, and the reduction in flooding events. In recent years, doubts have been raised over the ability for hydroelectricity to generate sufficient energy given the low dam levels associated with reduced rainfall patterns.

Whilst alternative forms of renewable energy are promising and are likely to form a component of Australia's future energy mix, they are currently unable to compete with wind energy on a cost-effectiveness basis. Wind is the only proven energy source used internationally for decades.

Furthermore, each of these alternatives has their own environmental and social impacts, and many are simply incompatible with the climate and topography of the Crookwell region. Wind speeds, population density, land use, vegetation and transmission lines combine to make the Crookwell region ideally suited to wind energy. On balance, it is considered that wind energy is the most commercially viable renewable energy, and is the best technology for the site.

6.6.3 Wind Farm location

As outlined in **Chapter 4 – Design Response**, the location of a wind farm is dependent on a number of location criteria, including the following factors;

- distance from coastline;
- population density and buffers to residential settlements;
- willingness of land owners;
- size of land holdings;
- proximity to existing electricity grid;
- strength of wind resource;
- access to existing infrastructure (ports, good quality roads etc); and
- general environmental constraints.

The Great Dividing Range in NSW presents a consistent wind resource that meets many of the above criteria. This is evidenced by the number of wind farms planned, proposed or built within the Southern Tablelands.

Whilst it may appear that countless sites exist across NSW, finding a suitable location for a wind farm is a difficult exercise. More remote areas of the State where population densities are lower, such as Western NSW, do not possess the transmission infrastructure necessary to ensure a project's viability. Most energy generators,

including wind, are unviable if it is necessary to construct hundreds of kilometres of transmission lines to connect the farm to the electricity grid.

In some cases, where existing transmission lines are available in more remote areas, wind speeds are insufficient to power the turbines. In other areas, where transmission lines combine with high wind speeds, the land is publically owned or has significant flora and fauna constraints.

Other constraints not evident at Crookwell include significant landscape and visual constraints, close proximity to urban areas, high population density, geotechnical constraints, and lack of supporting infrastructure.

CDPL and its related entity (Gas Natural Fenosa) have been active in the region and currently have two additional proposals in various stages of planning and development (the approved Crookwell 2 Wind Farm which is still under development and the proposed Paling Yards Wind Farm). CDPL's involvement in the area is based on a long history of wind monitoring and existing relationships with local land holders.

The location of the Crookwell 3 Wind Farm has partly been driven by its proximity to the approved Crookwell 2 Wind Farm. The viability of Crookwell 3 is increased by the sharing of infrastructure with Crookwell 2, such as the approved substation on the Crookwell 2 site.

The subject site is also favoured by the presence of the existing 330kV high voltage power line, which runs through both components of the site. As a result, long distance overhead power line connections are not required.

Further, the majority of residents support the ongoing development of wind farms in Upper Lachlan Shire, including within the Crookwell area surrounding the subject site. Refer to **Chapter 6.4** for a discussion on community attitudes to wind farms in Australia and the Crookwell region.

6.6.4 Wind Farm Scale

In addition to the location criteria outlined above, the scale of the proposed wind farm has been determined by several factors. This includes;

- the number of willing land owners and their proximity to each other;
- environmental constraints;
- proximity to nearby dwellings;
- landscape and visual impacts; and
- the amount of turbines required to create a viable project.

The majority of wind farms proposed in NSW are greater than 25 turbines, and in recent times, greater than 50. At up to 30 turbines, the proposed wind farm is of a scale comparable or smaller to most modern wind farms in Australia.

The scale of any wind farm is typically dependent on the above criteria, and is also a result of the approval process. In this case, as the proposed wind farm is able to share infrastructure with the approved Crookwell 2 Wind Farm, the project is viable despite incorporating only a relatively small number of turbines.

Whilst the subject site has an area of 1,500 ha, only approximately 1% of the land is directly used for the turbines, access tracks and supporting infrastructure during the operation phase. It is not possible to reduce the area of the subject site as turbines must be placed at minimum distances apart in order to maintain operational efficiency. It is noted that because modern turbines are taller and wider and are generally spaced further apart than older, smaller turbines, the total number of turbines per hectare is lower.

The sharing of infrastructure with approved Crookwell 2 Wind Farm also reduces the scale of the project by avoiding the duplication of substations and control buildings.

Therefore, the scale of the project has been optimised in consideration of the given characteristics of the site and locality, and cannot reasonable be reduced.

For more information on the scale of wind farms in the area, please refer to **Chapter 22 – Cumulative Impacts**.

6.6.5 Turbine size

The general size of turbines for the project is influenced by the following criteria;

- The type and characteristics of the of wind resource;
- Visual impacts from neighbouring receptor points;
- The topography of the land;
- The cost and availability of turbines from various turbine manufacturers; and,
- The 'capacity factors' of different turbine sizes (the larger the turbine the smaller the capacity factor).

Advances in technology and construction techniques have seen turbines steadily increase in size since the 1970's. This is evident in the Crookwell region by comparing the size of the turbines for Crookwell I Wind Farm, established in the late 1990s, with the larger turbines at Cullerin Wind Farm and Capital Wind Farm, which were developed in recent years. Taller turbines are more efficient, as they are able to capture higher winds that are less affected by surface roughness caused by obstacles such as trees.

The project would utilise turbines between 125 and 152 metres tall at the top of the blade tip. This is reflected in the output which would be between 1.8MW and 3.4MW depending on the final turbine selection. These are considered to be in the medium range in terms of height and output given international trends.

Internationally, in northern Europe, for example, wind turbines with up to 5MW capacity and 170 metres tall are now in operation. This turbine size is not currently appropriate in the NSW Tablelands due to the nature of the wind resource and cost effectiveness of the turbines.

The wind turbines chosen for this project are commonly available and frequently used in projects around Australia. Smaller turbines are now difficult to source and do not represent an efficient use of capital.

A reduction in turbine height or width would also result in less energy produced from the farm and a consequential reduction in the greenhouse emissions displaced. A wind farm with a reduced total energy output would make a smaller contribution to meeting the Federal Government's Renewable Energy Target of 20% of renewable energy by 2020.

The noise generated by a wind turbine is not necessarily related to its size, as larger modern turbines can produce less sound than older, smaller turbines. The various turbines chosen for this project have differing noise characteristics and have been assessed based on these differences.

It is important to note that whilst the modern turbines are taller and have a greater zone of visual influence, they are more efficient and are spaced further apart. Therefore, by increasing the height of the proposed turbine, the number of turbines per hectare decreases, thus reducing the overall scale of the project.

6.6.6 Electricity Connection

It is proposed that Crookwell 3 Wind Farm would share the substation and grid connection infrastructure approved under the Crookwell 2 Wind Farm. Therefore, this infrastructure is not included as part of this EA.

As part of the project, several options for linking Crookwell 3 South and Crookwell 3 East to the substation are proposed. Please refer to **Chapter 5** and **Figures 13** and **14 – Indicative Access & Infrastructure Plans** for more information.

These options have been developed in response to several criteria as outlined below:

- length of route;
- minimising vegetation loss; and
- whether easement agreements can be agreed with land owners.

The routes chosen represent a reasonable balance between the avoidance of native vegetation loss and the economic viability of the route.

Subject to agreement with Upper Lachlan Shire Council, options may include the use of the road reserve for electricity connection to the substation.

The decision to provide an overground or underground electricity connection would impact on the amount of vegetation loss. Whilst an overground connection may increase the visual impact of the proposal, it may be the preferred option in order to reduce impacts on native vegetation, as disturbance can be generally restricted to the base of electricity poles and some clipping of tree canopies, in contrast to the underground cabling which would disturb vegetation along its path.

UNION FENOSA WIND AUSTRALIA

Crookwell 3 Wind Farm

Chapter 7

STATUTORY PROVISIONS

7 Statutory Provisions

7.1 Introduction

This chapter of the EA addresses the relevant statutory provisions relating to the proposed Crookwell 3 Wind Farm.

The development of the project requires project approval under Part 3A of the Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act).

As EARs were issued for the Project within two years before Part 3A of the EP&A Act was repealed on 1 October 2011, the project is a *transitional Part 3A project* under Clause 2(1)(c) of Schedule 6A of the Act. Accordingly, the Project will continue to be assessed and determined under Part 3A under to Clause 3(1) of Schedule 6A of the EP&A Act.

This chapter discusses and assesses compliance of the project under the relevant Federal, State and Local Government legislation, policies and guidelines.

7.2 Commonwealth Instruments

7.2.1 Environment Protection and Biodiversity Conservation Act 1999

The objectives of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) are to:

- provide for the protection of the environment, especially matters of national environmental significance
- conserve Australian biodiversity
- provide a streamlined national environmental assessment and approvals process
- enhance the protection and management of important natural and cultural places
- control the international movement of plants and animals (wildlife), wildlife specimens and products made or derived from wildlife
- promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources

The EPBC Act is administered by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC). The EPBC Act is aimed at environment and heritage protection and biodiversity conservation.

The EPBC Act requires referral to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities of any "action" that has, will have, or is likely to have a significant impact on:

- a matter of national environmental significance;
- the environment of Commonwealth land (even if the action is taken outside Commonwealth land);
- the environment of a Commonwealth Heritage Place outside the Australian jurisdiction; and
- the environment anywhere in the world (if the action is undertaken by the Commonwealth).

Once a referral is made, the Commonwealth Minister for the Sustainability, Environment, Water, Population and Communities determines whether the action requires assessment and approval under the EPBC Act.

An action includes a project, development, undertaking, activity, or series of activities.

The eight matters of "national environmental significance" protected under the EPBC Act are:

- world heritage properties

– national heritage places
– wetlands of international importance (listed under the Ramsar Convention)
– listed threatened species and ecological communities
– migratory species protected under international agreements
– Commonwealth marine areas
– the Great Barrier Reef Marine Park
– nuclear actions (including uranium mines)

The Significant Impact Guidelines 1.1: Matters of National Environmental Significance have been prepared under the EPBC Act to provide overarching guidance on determining whether an action is likely to have a significant impact on a matter of national environmental significance protected by the EPBC Act. These guidelines define significant impact as:

> *"… an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts".*

EPBC Act Policy Statement 2.3 – Wind Farm Industry provides further guidance to assist operators in the wind farm industry to decide whether or not proposed actions require referral under the EPBC Act.

The project will not:

– be carried out on or in the vicinity of Commonwealth land and so will not have a significant impact on Commonwealth land; or
– be undertaken by the Commonwealth.

Accordingly, the project will only require referral if it will have, or is likely to have a significant impact on a "matter of national environmental significance" protected by the EPBC Act. In this regard there is no:

– world heritage area or national heritage places (please refer to **Chapter 19 – Heritage** for more information);
– wetlands of international importance (listed under the Ramsar Convention); or
– Commonwealth marine areas,

in the vicinity of the site. Nor will the Project involve any nuclear actions or affect the Great Barrier Reef Marine Park.

Accordingly, the project will only require referral under the EPBC Act if it will have, or is likely to have a significant impact on listed threatened species and ecological communities or migratory species protected under international agreements.

As part of this EA, a flora and fauna assessment was undertaken by Anderson Environmental. This report assessed the significant impact criteria for listed threatened species, endangered ecological communities and migratory species listed under the EPBC Act. This report concluded that:

> *The results of the field surveys detected no Endangered Ecological Communities or threatened species listed under either the EPBC Act … within the site. Whilst no threatened species listed under either the EPBC Act … were detected within the site by the surveys undertaken, each threatened species which was considered likely to have the potential to occur with the site and to be impacted by the project was further assessed in accordance with …* ***the criteria contained in the EPBC Act in the case of species listed under the EPBC Act …***

The results of this ecological impact assessment concluded that:

- ***The project is not likely to result in a significant impact on any endangered ecological community or flora species listed under the EPBC Act. Accordingly, the project is not considered, fo****r this reason, to be a controlled action which requires approval under the EPBC Act.*

The report recommended that further targeted surveys be undertaken for particular threatened species listed under the EPBC Act to confirm the preliminary findings of the report that none of these species were present at the site. The recommended surveys were undertaken by Anderson Environmental and reported on in a Targeted Threatened Species Assessment. This confirmed that the surveys detected no threatened species listed under the EPBC Act within the site.

Further information on the flora and fauna assessment, including the impact criteria, is contained at **Chapter 14 – Flora and Fauna**.

Accordingly, the Crookwell 3 Wind Farm does not require referral to the Commonwealth Minister for the Sustainability, Environment, Water, Population and Communities under the EPBC Act.

7.2.2 Renewable Energy (Electricity) Act 2000

The Commonwealth Government's *Renewable Energy (Electricity) Act* 2000 (the REE Act), sets up the statutory framework for mandatory renewable energy targets (MRET) and energy trading scheme. The Act initially established an MRET of 2% (or 9500 GWh) to be reached by 2010, which means that 2% of total energy produced must be from renewable energy sources. The REE Act identifies wind as an eligible renewable energy sources

In August 2009, the Government implemented the Renewable Energy Target (RET) Scheme, designed to legislate the Government's commitment of 20 per cent of Australia's electricity supply coming from renewable sources by 2020.

On 26 February 2010, the Government announced changes to be made to the RET scheme to provide greater certainty for households, large-scale renewable energy projects and installers of small-scale renewable energy systems like solar panels and solar water heaters. The enhanced RET legislation was passed by the Commonwealth Parliament on Thursday 24 June 2010. As of 1 January 2011, the enhanced RET was split into two parts, the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES).

The LRET creates a financial incentive for large-scale renewable power stations such as wind, solar and hydro-electric by providing a mechanism for the creation of large-scale generation certificates (LGCs) by these power stations according to how much renewable energy electricity they produce.

The LRET also places a legal liability on liable entities (typically electricity retailers) to purchase an amount of large-scale generation certificates (LGCs) from these power stations to meet an annual target. The annual targets for the LRET increase each year from 16,763GWh in 2012 up to 41,850 GWh by 2020 (DCCEE 2010) or 18% of total energy.

The proposed wind farm directly and specifically supports the REE Act by supplying up to 214,444 MWh (or 209GWh) of renewable energy per year and therefore contributing to the LRET target.

7.2.3 Civil Aviation Safety Regulations 1998

The *Civil Aviation Safety Regulations* 1998 (made under the *Civil Aviation Act* 1988) require that CASA must be informed of proposals to build a structure greater than 110 metres above Australian Datum. This is required to allow assessment of whether the structure may represent a hazard to aircraft, and to provide any associated requirements including any requirements for markings or lighting.

A circular regarding hazard lighting of wind farm (AC139-18(0) has been released by CASA that is of relevance to this project. The circular advises that proponents of wind farms where the turbines exceeds 110m above ground level should expect that CASA would require appropriate obstruction lighting and marking to reduce the hazard to aviation unless the circumstances at a particular wind farm are very unusual. This circular has been withdrawn by CASA pending a review of the guideline material. Despite this, CASA has advised that the circular remains of relance to proponents wishing to assess aeronautical impacts. It is understood that the review of this circular is continuing.

An assessment of aviation matters was undertaken by Aviation Projects Pty Ltd to inform this EA. The report found that *"the proposed development does not impose any significant risk to normal flying operations provided aircraft are operated in compliance with applicable regulatory and operational control requirements and with the application of good airmanship"*. **Chapter 15 – Aviation** provides further information on the potential for hazard to aircraft and details the proposed hazard lighting.

7.2.4 Clean Energy Act 2011

The Clean Energy Act 2011 commenced on 2 April 2012 as part of the Clean Energy Legislative Package. The Clean Energy Legislative Package introduced a carbon pricing mechanism commencing on 1 July 2012 as follows:

- Liable entities (generally entities which control the operation of facilities that emit greater than 25,000 tonnes per annum of greenhouse gas emissions) will be required to purchase and surrender carbon units for each tonne of carbon pollution they emit.
- The carbon price commenced on 1 July 2012 at $23 per tonne of carbon dioxide equivalent, increasing to $24.15 on 1 July 2013 and $25.40 on 1 July 2014.
- From 1 July 2015, the emissions unit price will be set by the market under an emissions trading scheme (ETS). Under the ETS a cap will be placed on Australia's total emissions to reflect the emissions reduction target and the carbon price will be determined by the market (subject to a price floor ($15, rising by 4% each year in real terms) and price ceiling ($20 above the expected international price, rising up 5% each year in real terms) which will apply for the first three years of the ETS).

The Clean Energy Legislative Package is expected to increase demand for renewable energy from projects such as from the Crookwell 3 Wind Farm.

7.3 NSW State Instruments

7.3.1 Environmental Planning and Assessment Act 1979

The EP&A Act is the primary piece of legislation governing development within NSW. The *Environmental Planning and Assessment Regulation* 2000, made under the EP&A Act also operates to regulate development within NSW.

The Minister for Planning declared the Crookwell 3 Wind Farm as a major project under Part 3A of the EP&A Act.

In addition, in accordance with a declaration published in the NSW Government gazette on 27 November 2009 all renewable energy projects with a peak generating capacity of 30 megawatts (MW) or more were declared to be critical infrastructure projects under Part 3A. As the project has a peak generating capacity of between 54 to 102 MW, the project is a critical infrastructure project.

The critical infrastructure provisions:

- *ensure the timely and efficient delivery of essential infrastructure projects*
- *allow the Government and the planning system to rapidly and readily respond to the changing needs of the State*

– *provide certainty in the delivery of these projects*

– *provide for rigorous scrutiny to ensure environmental outcomes are appropriate*

– *focus on delivering outcomes essential to the NSW community.*

As EARs were issued for the Project within two years before Part 3A of the EP&A Act was repealed on 1 October 2011, the project is a *transitional Part 3A project* under Clause 2(1)(c) of Schedule 6A of the Act. Accordingly, the Project will continue to be assessed and determined under Part 3A under to Clause 3(1) of Schedule 6A of the EP&A Act.

A range of State, Regional and Local environmental planning instruments (EPIs) apply to the Site, including State Environmental Planning Polices (SEPPs), which include Regional Environmental Plans (REPs), and Local Environmental Plans (LEPs). These are considered at **Chapter 7.3** and **7.4 below**.

The Minister for Planning and Infrastructure (or the Planning and Assessment Commission as his delegate) must take into account applicable SEPPs and REPs in determining and may (but is not required to) take into account the provisions of other applicable EPIs in determining whether to approve the project. As the project is a critical infrastructure project, the project may be approved by the Minister under Part 3A of the EP&A Act even if it is prohibited by the applicable EPIs.

Once a project has been assessed and approved under Part 3A of the EP&A Act it has the benefit of provisions in the EP&A Act which:

– remove the requirement to obtain a range of additional approvals including:
  > an Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974 (NSW)*;
  > an authorisation referred to in section 12 of the *Native Vegetation Act 2003 (NSW)* to clear native vegetation; and
  > a water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91 of the *Water Management Act 2000* (NSW); and

– provide that certain other approvals may not be refused and must be granted on terms consistent with the Part 3A approval including a consent under section 138 of the *Roads Act 1993* (NSW).

The EARs require that the objectives of the EP&A Act be taken into account by the proposed wind farm, as detailed in **Table 8**.

Table 8 – Objectives of EP&A Act

Objective	Comment
To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,	The project will develop the natural wind resource of the Crookwell region and conserve other resources such as soil, water and air. It will lead to a better environment by displacing greenhouse emissions and reducing the impacts of climate change and global warming. **Chapter 8** concludes that the project will have social and economic benefits.
To encourage the promotion and co-ordination of the orderly and economic use and development of land,	The project will promote the orderly and economic use of the land by adding a new use and development to the site that can coexist with the current agricultural use, in an orderly and managed manner.

Objective	Comment
To encourage the protection, provision and co-ordination of communication and utility services,	The project is a form of electricity generation and so will, as a supplier, facilitate the supply of electricity utility services. The telecommunication assessment results shown in Chapter 17, highlight that the proposed turbines are not expected to cause interference to the identified point-to-point links. None of the point-to-multi-point stations identified have indicated that there would be interference with their services. The proposed turbines could cause some impact to services from the wireless internet service if they are located between the communications tower and the customers, a number of mitigation measures have been recommended in the report.
To encourage the provision of land for public purposes,	The project does not involve any change to the status of public land.
To encourage the provision and co-ordination of community services and facilities, and	The project will contribute to a Community Enhancement Fund to fund local projects in the vicinity of the site, as detailed in **Chapter 8.**
To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and	**Chapter 14** details the assessment of the impact of the project on flora and fauna, which has concluded that the impact will not be significant.
To encourage ecologically sustainable development, and	A wind farm is inherently an ecologically sustainable development (ESD) as it contributes to a reduction of greenhouse emissions and addresses climate change. In consideration of the ESD principles, 'Sustainable Use' of the infrastructure, 'Integration of Economic Development and Environmental Protection', the project design and management has been guided by the 'Precautionary Approach' to avoid serious or irreversible damage to the environment where possible, and in any case minimise the local environmental impact.
To encourage the provision and maintenance of affordable housing, and	Not applicable.
To promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and	Both State and Local statutory instruments have been considered in the wind farm design and in the preparation of this EA.
To provide increased opportunity for public involvement and participation in environmental planning and assessment.	A community consultation strategy, as detailed in **Chapter 23**, has been implemented and will continue to be

Objective	Comment
	implemented as the project moves towards construction. This EA will be placed on public exhibition and comments will be considered by the Minister for Planning in decision making.

7.3.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act* 1997 (POEO Act) is the primary piece of legislation regulating pollution control and waste disposal in NSW. The POEO Act is administered by the NSW Environment Protection Authority (EPA), part of the Department of Environment and Climate Change (DECC).

The POEO Act requires an Environment Protection Licence (EPL) to be obtained in relation to certain electricity generation works. However an EPL is not required for wind power generation. Accordingly, an EPL will not be required for the project.

7.3.3 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act* 1974 (NPW Act) governs the establishment, preservation and management of national parks, historic sites and certain other areas. The NPW Act also provides the basis for the legal protection and management of threatened native flora and fauna and Aboriginal sites within NSW.

Major projects subject to Part 3A of the EP&A Act do not require separate Aboriginal heritage impact permits under the NPW Act. The impacts of the project on Aboriginal heritage have been considered and assessed as part of this EA. Refer to **Chapter 19** for details.

7.3.4 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act* 1995 (TSC Act) provides for the conservation of threatened species, populations and ecological communities of animals and plants. It provides a framework for the assessment of any action that may impact on threatened species.

The Assessment of Significance (Seven Part Test) is a statutory mechanism under Section 5A of the EP&A Act, for assessing whether a proposed development activity may have a significant impact on threatened species, populations or ecological communities or their habitats. The Seven Part Test does not apply to projects which are assessed under Part 3A of the EP&A Act. However, the EARs provide that the EA must include *"an assessment of all project components on flora and fauna and their habitat consistent with the Draft Guidelines for Threatened Species Assessment (DEC, 2005), including details on the existing site conditions and quantity and likelihood of disturbance"*.

If the results of the test of significance concludes that there is likely to be a significant impact on a listed species, population or Endangered Ecological Community protected under the TSC Act then the *Draft Guidelines for Threatened Species Assessment* (DEC, 2005) specify that a Species Impact Statement is required.

As part of this EA, a flora and fauna assessment was undertaken by Anderson Environmental. This report assessed the impact of the project on threatened species and endangered ecological communities listed under the EPBC Act. This report concluded that:

> *Whilst no threatened species listed under … the TSC Act were detected within the site by the surveys undertaken, each threatened species which was considered likely to have the potential to occur with the site and to be impacted by the project was further assessed in accordance with … the 7-Part Tests of Significance criteria in the case of species listed under the TSC Act.*

The results of this ecological impact assessment concluded that … the project is not likely to result in a significant impact on any fauna species listed under the TSC Act. Accordingly, there is no requirement for a species impact statement to be prepared.

A full assessment of species and communities under the TSC Act is found at **Appendix 8**.

See **Chapter 14** for further details of the flora and fauna impacts of the project.

7.3.5 Water Management Act 2000

The object of the *Water Management Act* 2000 (WMA) is the sustainable and integrated management of the State's water for the benefit of both present and future generations.

A controlled activity approval under the WMA is required for certain types of developments and activities that are carried out in or near a river, lake or estuary. Under the WMA, a controlled activity means:

- the erection of a building or the carrying out of a work (within the meaning of the Environmental Planning and Assessment Act 1979), or
- the removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise, or
- the deposition of material (whether or not extractive material) on land, whether by way of landfill operations or otherwise, or
- the carrying out of any other activity that affects the quantity or flow of water in a water source.

Major projects approved under Part 3A of the EP&A Act still require to obtain water access licences under the WMA for the project in the event that water from onsite bore, dam or river (e.g. concrete batching plant, etc) is required. The objectives of the WMA will also be considered in the preparation of the Construction and Operation Environmental Management Plan.

7.3.6 Native Vegetation Act 2003

In accordance with the principles of ecologically sustainable development, the *Native Vegetation Conservation Act* 2003 (NV Act) provides for the conservation of native vegetation through the prevention of inappropriate clearing and promotion of rehabilitation practices.

The design of the wind farm sought to minimise the removal of vegetation by the careful placement of the turbines and tracks.

Although the site has been subject to extensive historical vegetation clearing and disturbance, the development would require some clearing of vegetation and trees, both in preparation of the site for turbines, and as part of the installation of the network of tracks.

Major projects approved under Part 3A of the EP&A Act do not require a separate approval under the NV Act for the clearing of native vegetation.

See **Chapter 14** for further details of the flora and fauna impacts of the project.

7.3.7 Heritage Act 1977

The *Heritage Act 1977* aims to protect and preserve items of non-indigenous Heritage significance. The Act provides for the protection of items of local, regional and State heritage significance.

No items listed under the Heritage Act's State Heritage Register are located within the site.

Refer to **Chapter 19** for details of the heritage impacts of the project.

7.3.8 Roads Act 1993

Section 138 of the *Roads Act 1993* prohibits a number of activities, such as conducting work in, on or over a public road, unless consent has been obtained from the appropriate roads authority.

The proposed development would require consent from the appropriate roads authority for the following items:

– installation of electrical cables under or along roads;

– access points from roads into the wind farm site.

Crookwell Road is a State owned public road and therefore consent would be required from the NSW Roads and Traffic Authority, whilst all other roads are under the management of Upper Lachlan Shire Council.

If the project is approved under Part 3A of the EP&A Act then the consents required under section 138 of the *Roads Act 1993* cannot be refused and must be granted on terms substantially consistent with the project approval.

It is noted that the upgrading of roads required for this project is the same as that required for the approved Crookwell 2 Wind Farm, and that as this project is intended to be constructed after Crookwell 2, no road upgrades are sought as part of this project.

7.3.9 Crown Lands Act 1989

Part 4 of the *Crown Lands Act 1989* provides for circumstances where Crown Land may be leased or sold and where licenses over Crown Land may be granted.

There is a network of Crown public roads in the area, and electrical cables may be installed under such roads to connect the turbines to the substation in Crookwell 2. A number of options have been shown in the Access and Infrastructure Plans (**Figures 13** and **14**) for electrical connections, some of which involve crown land public roads.

As outlined above, consents will be applied for under section 138 of the *Roads Act 1993* to authorise the carrying out of any works within the road reserves. In the event that the proponent determines to obtain or the Department of Lands requires that the proponent obtain a formal easement or similar interest in the land will be obtained under the *Crown Lands Act* 1989.

7.3.10 State Environmental Planning Policies (SEPPs)

The SEPPs that apply to the site include:

– *State Environmental Planning Policy (Major Development) 2005* (Major Development SEPP);

– the State Environmental Planning Policy (State and Regional Development) 2011

– *State Environmental Planning Policy No. 44 Koala Habitat Protection* (SEPP 44);

– *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP);

– *State Environmental Planning Policy (Rural Lands) 2008* (Rural Lands SEPP);

– *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011* (Drinking Water SEPP); and

– *Drinking Water Catchments Regional Environmental Plan No. 1 (Drinking Water REP No.1).*

<u>State Environmental Planning Policy (Major Development) 2005</u>

Subject to Clause 2A of the Major Development SEPP, following the repeal of Part 3A of the Act, this policy is subject to Schedule 6A of the Act. Because the Crookwell 3 Wind Farm is a transitional Part 3A project, its declaration under this policy as a project under Part 3A is not affected by the repeal of Clauses 6-6C and Schedules 1, 2 and 5 of the Major Development SEPP.

Clause 6 (repealed) of the Major Development SEPP provides that, development which, in the opinion of the Minister for Planning is development of a kind listed in Schedule 1 to the SEPP is a project to which Part 3A of the EP&A Act applies.

Clause 24 of Schedule 1 (repealed) lists:

"Development for the purpose of a facility for the generation of electricity or heat or their co-generation (using any energy source, including gas, coal, bio-fuel, distillate and waste and hydro, wave, solar or wind power), being development that:

(a) has a capital investment value of more than $30 million…."

On 18 February 2010, the Director, Infrastructure Projects Branch of the Department of Planning and Infrastructure, under delegation from the Minister for Planning, confirmed that the Crookwell 3 Wind Farm is a project to which Part 3A of the EP&A Act applies.

State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011 does not apply to make the project State significant development (SSD) as the project is a transitional Part 3A project under schedule 6A of the EP&A Act.

State Environmental Planning Policy No. 44 – Koala Habitat Protection

SEPP 44 *"aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline"*.

The flora and fauna assessment of the area by Anderson Environmental states that *"there have been no Koalas reported in the local area for over 30 years (NSW DECCW Atlas Data) and this is likely to be due to the high levels of clearing in the landscape and lack of interconnecting vegetation. The site assessment detected no usage of the site by Koalas (utilising the Australian Koala Foundation methodology)"*.

It further concludes that *"the study area is highly degraded and it is considered to represent negligible habitat for Koalas. Core Koala habitat does not exist on the sites and therefore SEPP 44 does not apply to the proposal"*.

Accordingly, the site does not include any core Koala habitat and no plan of management is required for the site under SEPP 44.

State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across the State by:

- *improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and*
- *providing greater flexibility in the location of infrastructure and service facilities, and*
- *allowing for the efficient development, redevelopment or disposal of surplus government owned land, and*
- *identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and*
- *identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and*
- *providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.*

Division 4 of the SEPP is relevant as it applies to 'electricity generating works'. It outlines a range of electricity generating works that are exempt developments, complying development, and permissible with consent.

Clause 34(1) of SEPP Infrastructure provides that 'development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone'. Electricity generating works are defined so as to include wind farms.

State Environmental Planning Policy (Rural Lands) 2008

The aim of this policy is:

- to facilitate the orderly and economic use and development of rural lands for rural and related purposes,
- to identify the Rural Planning Principles and the Rural Subdivision Principles so as to assist in the proper management, development and protection of rural lands for the purpose of promoting the social, economic and environmental welfare of the State,
- to implement measures designed to reduce land use conflicts,
- to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations,
- to amend provisions of other environmental planning instruments relating to concessional lots in rural subdivisions.

The proposed wind farm would not conflict with the continued use of the land for agricultural purposes as only 1% of the site is utilised for the project and agricultural practises, such as grazing, can successfully operate on the balance of the site and in close proximity to the wind turbine.

This policy does not contain any provisions of specific relevance to the proposed Crookwell 3 Wind Farm.

State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011

The Drinking Water SEPP commenced on 1 March 2011 and repealed the Drinking Water Catchments Regional Environmental Plan No. 1.

Clause 13 of the Drinking Water SEPP provides that applications made, but not yet determined, before the commencement of the policy, must be determined as if the policy had not commenced. Accordingly, this policy does not apply to the Crookwell 3 Wind Farm project and the Drinking Water Catchments Regional Environmental Plan No. 1 still applies.

Drinking Water Catchments Regional Environmental Plan No. 1

The site is subject to the Drinking Water Catchments REP No. 1 as it is located within the Warrangamba catchment.

This plan aims to:

- *create healthy water catchments that would deliver high quality water while sustaining diverse and prosperous communities.*
- *provide the statutory components in Sustaining the Catchments that, together with the non-statutory components in Sustaining the Catchments, would achieve the aim set out in paragraph (a), and*
- *to achieve the water quality management goals of:*
  - *improve water quality in degraded areas and critical locations where water quality is not suitable for the relevant environmental values, and*
  - *maintain or improve water quality where it is currently suitable for the relevant environmental values.*

Clause 26 of the REP provides that:

A consent authority must not grant consent to the carrying out of development under Part 4 of the Act on land in the hydrological catchment unless:

(a) it has considered whether the proposed development will have a neutral or beneficial effect on water quality, and

(b) it is satisfied that the carrying out of the proposed development would have a neutral or beneficial effect on water quality.

Clause 28 of the REP provides that:

(1) A person must not carry out development on land in the hydrological catchment except with the concurrence of the Chief Executive (except as provided by subclause (3)).

(3) This clause does not apply if the consent authority is satisfied that the proposed development:

(a) has no identifiable potential impact on water quality, or …

The land affected by construction activities would be only a small percentage of the total site. Most of this land would be rehabilitated back to the current site condition or better following construction. Given the small percentage of the site area affected by permanent structures, no meaningful change to the total site runoff is anticipated. The vast majority of the site would be undisturbed from the wind farm and used and managed in its current state.

The location of the turbines and access tracks have been designed to minimise the degree of cut and fill required. CDPL has committed to preparing a Soil and Water Management Plan as part of the Construction Environmental Management Plan. This environmental management plan will detail a range of best practise techniques designed at avoiding negative impacts on water quality by minimising runoff and avoiding sedimentation. This will include techniques to restrict flow speeds, incorporate sediment controls devices, and maximising natural drainage.

With the implementation of best practice measures, the construction and operation of the wind farm is expected to have a neutral effect on water quality.

7.4 Local Instruments

7.4.1 General

Crookwell 3 South, Crookwell 3 East and the options being considered for locating the electricity connections going back to the approved Crookwell 2 Wind Farm are currently zoned under the Upper Lachlan Local Environment Plan 2010 (Upper Lachlan LEP). The Upper Lachlan LEP commenced on 9 July 2010. The application for project approval for the proposed Crookwell 3 Wind Farm was lodged before this date. Clause 1.8A of the Upper Lachlan LEP states that "*If a development application has been made before the commencement of this Plan in relation to land to which this Plan applies and the application has not been finally determined before that commencement, the application must be determined as if this Plan had not commenced*."

Accordingly, the Upper Lachlan LEP does not apply to the determination of this application and it is necessary to consider the zoning of the Crookwell 3 South, Crookwell 3 East and the options being considered for locating the electricity connections going back to the approved Crookwell 2 Wind Farm under LEPs which applied before the commencement of the Upper Lachlan LEP being Crookwell Local Environmental Plan 1994 (CLEP) (see **Chapter 7.4.3** below) and the Mulwaree Local Environmental Plan 1995 (MLEP) (see **Chapter 7.4.4** below).

However, as the Upper Lachlan LEP was in draft form at the time of the application being made, it may be considered in determining this application as part of the broader consideration of the public interest. For this reason, the provisions of the Upper Lachlan LEP as they apply to the project are set out at **Chapter 7.4.2** below.

7.4.2 Upper Lachlan Local Environmental Plan 2010

The particular aims of the Upper Lachlan LEP are as follows:

(a) to provide planning controls for Upper Lachlan and to update and consolidate into one instrument the various planning controls that currently apply to Upper Lachlan,

(b) to encourage the sustainable management, development and conservation of natural resources,

(c) to promote the use of rural resources for agriculture and primary production including fishing, forestry, mining and related processing, service and value adding industries,

(d) to protect and conserve the environmental and cultural heritage of Upper Lachlan,

(e) to encourage new residents to Upper Lachlan by providing a range of housing opportunities in the main towns and villages,

(f) to allow development only if it occurs in a manner that minimises risks due to environmental hazards, and minimises risks to important elements of the physical environment, including water quality.

Under the Upper Lachlan LEP:

– Crookwell 3 South is zoned *RU2 Rural Landscape*; and

– Crookwell 3 East is zoned part *RU2 Rural Landscape* and part *E3 Environmental Management* (see **Figure 27 – Zone Map**).

The project includes a number of electricity connection options to link with the substation at Crookwell 2 (refer to **Chapter 5**), including a crossing of Crookwell Road from Crookwell 3 South. Where located east of Crookwell Road, the electricity connections are zoned 'RU2 Rural Landscape', and west of Crookwell Road, they are zoned 'E3 Environmental Management'. Crookwell Road itself is zoned 'SP2 Infrastructure'.

The provisions of the LEP outlines the land uses that are prohibited, permissible with consent, and permissible without consent for each zone defined within the LEP.

Under the Upper Lachlan LEP:

– *"electricity generating works"* are defined to mean *"a building or place used for the purpose of making or generating electricity"* and this would include the project;

– *"electricity generating works"* are permitted with development consent on land zoned *RU2 Rural Landscape*; and

– *"electricity generating works"* are prohibited on land zoned *E3 Environmental Management*.

Whilst the Upper Lachlan LEP provides that *"electricity generating works"* are prohibited on land zoned *E3 Environmental Management*, the project is a critical infrastructure project under Part 3A of the EP&A Act. As a critical infrastructure project, the project may be approved under Part 3A even if it is prohibited by the provisions of an LEP (section 75J(3) of the EP&A Act).

The proposed Crookwell 3 Wind Farm generally accords with the objectives of each of the relevant zones, as demonstrated in the **Table 9 – Upper Lachlan LEP – Rural Landscape 2 Zone** and **Table 10 – Upper Lachlan LEP 2010 – Environmental Management Zone** below.

Table 9 – Upper Lachlan LEP 2010 – Rural Landscape 2 Zone

Objective	Comment
To encourage sustainable primary industry production by maintaining and	The area of the site affected by the development of the wind farm (predominantly the turbines and

Upper Lachlan
Local Environmental
Plan 2010

LAND ZONING MAP

LEGEND

ZONING

E2 Environmental Conservation

RU2 Rural Landscape

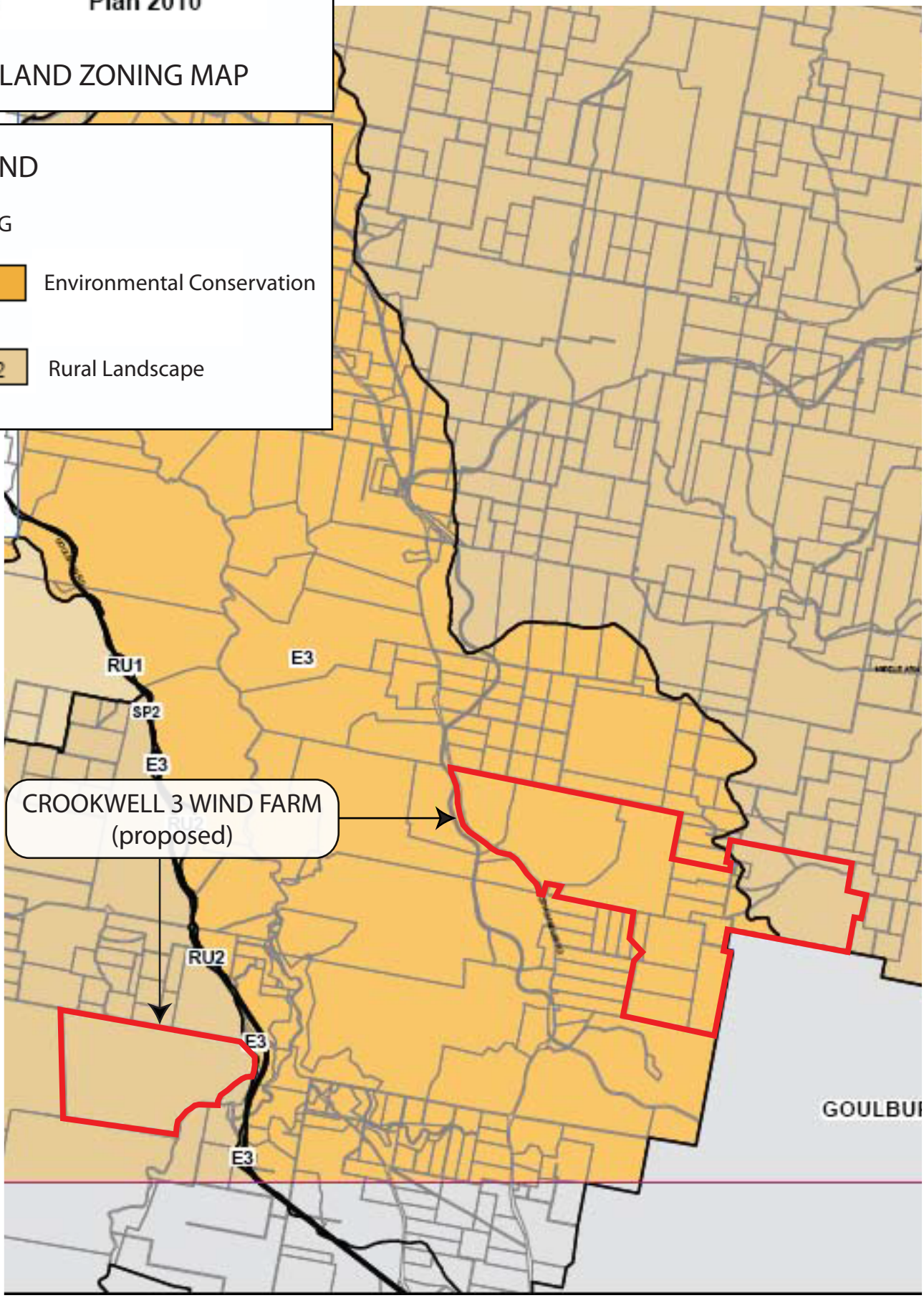


FIGURE 27 - ZONE MAP

A4
SCALE 1:NTS

CROOKWELL 3 WIND FARM PROJ/DRG NO 309447 SA P 01 REV 00 DRWN LL CHKD AT DATE 15.02.2011

Tract

Objective	Comment
enhancing the natural resource base.	tracks) represents only a very small percentage of the overall site. For the vast majority of the site, the agricultural activities that currently exist (predominantly grazing) can continue unaffected. The tracks can assist agriculture by improving access to outer paddocks for farm vehicles and machinery. The economic benefits that flow from the leasing arrangements with the landowners can allow more efficient and effective agricultural production, particularly improving pasture land. At the completion of the wind farm's operating life, the turbines would either be replaced or the land would be rehabilitated to its previous or better condition, and used for farming.
To maintain the rural landscape character of the land.	The proposed wind farm would have positive and negative impacts on the elements that constitute the rural character of the area. The landscape and visual assessment found that the landscape surrounding the subject site has an overall moderate sensitivity and some capacity to accommodate change. It is noted that part of the existing rural character of the area includes human interventions such as agricultural buildings (sheds, fences etc), vegetation clearing, and domesticated animals. The proposed wind farm would have a positive impact on rural and agricultural activities, a primary component of rural character. Only a small fraction of the land area would be removed from agricultural production (approximately 1%), and the new tracks and increased landowner income would allow for more efficient and improved farming practises. Rural character is also characterised by vegetation, either remnant trees or wind rows of introduced species. The majority of vegetation on the site would be unaffected, and the proposed wind farm includes new plantings to assist in screening dwellings. As a result, it is not considered that the proposed wind farm would have an unreasonable impact on the rural character of the area.
To provide for a range of compatible land uses, including extensive agriculture.	The proposed wind farm is entirely compatible with extensive agriculture, and is uses only a very small percentage of the site (less than 1%) and the remainder of the land can be utilised for extensive agriculture.
To preserve environmentally sensitive areas including waterways and prevent inappropriate development likely to result in environmental harm.	The proposed development would protect waterways by located all turbines well away from waterways. Access tracks would cross waterways and drainage lines, and these would be appropriately managed and designed to

Objective	Comment
To protect the Pejar catchment area from inappropriate land uses and activities and minimise risk to water quality.	minimise impacts. Detailed plans of waterway crossings, mostly likely large culverts, would be submitted in accordance with the conditions of any project approval granted for the project. Erosion, a key risk to water quality, is evident in the region and site, but can be managed through careful construction techniques and rehabilitation of disturbed areas. The majority of the site is not disturbed by the proposed wind farm, and as such the risk of further erosion is considered to be low. Where the development has the potential to cause additional erosion hazard, this would be avoided and managed through the preparation of a Soil & Water Management and an Erosion and Sediment Control Plan. These plans would implement necessary management controls and techniques during construction and operation of the wind farm. The proposed wind farm does not contain any buildings or areas where humans will congregate and therefore is unlikely to have impacts on water quality through water contamination. Risks to water quality associated with construction would be controlled through the construction management plan, which would detail the range of techniques used to prevent land and water degradation. The development largely protects the existing trees and vegetation on the site, as only limited clearing would be required due to the relatively small footprint of the project. Replacement planting, in the form of screen planting, would enhance the natural wildlife habitat of the area, and assist in controlling land degradation. Further information on the flora and fauna is found at **Chapter 14**.
To minimise the visual impact of development on the rural landscape. To minimise the impact of development on the existing agricultural landscape character.	The landscape and visual assessment found that the landscape surrounding the subject site has an overall moderate sensitivity and some capacity to accommodate change. It is noted that part of the existing rural landscape of the area includes human interventions such as agricultural buildings (sheds, fences etc), vegetation clearing, and domesticated animals. The rural landscape is also characterised by vegetation, either remnant trees or wind rows of introduced species. The majority of vegetation on the site would be unaffected, and the proposed wind farm includes new plantings to assist in screening dwellings. The turbines have been sited to minimise the

Objective	Comment
	visual impact of the wind farm whilst maintaining a viable wind farm project. Turbines are well setback from key roads such as Woodhouselee and Crookwell Road.

Table 10 – Upper Lachlan LEP 2010 – Environmental Management Zone

To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.	The specialist assessments of the site have found that any special ecological, scientific, cultural or aesthetic values of the site would not be significantly impacted by the proposed wind farm. The clearing required for the project is proposed to be offset by entering into property vegetation plans over other land on site to secure these lands for conservation (see chapter 14.3). Further details on the ecological values of the site are found in **Chapter 14**. Further details on the aesthetic values of the site are found in **Chapter 9**.
To provide for a limited range of development that does not have an adverse effect on those values.	It is considered that a small wind farm, occupying less than 1% of the site, is compatible with the ecological, scientific, cultural and aesthetic values of the site.
To facilitate the management of environmentally sensitive land and areas of high environmental value to the local government area.	The proposed wind farm would be managed to a high standard and supported by a range of management plans, as required by likely approval conditions should the project be approved.

Clause 6.2 of the Upper Lachlan LEP has the objective of maintaining terrestrial and aquatic biodiversity and relevantly provides that:

(3) Before determining a development application for land to which this clause applies, the consent authority must consider any adverse impact from the proposed development on:

(a) a native ecological community, and

(b) the habitat of any threatened species, populations or ecological community, and

(c) a regionally significant species of fauna and flora or habitat, and

(d) a habitat element providing connectivity.

(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:

(a) the development is designed, sited and will be managed to avoid any adverse environmental impact, or

(b) if that impact cannot be avoided—the development is designed, sited and will be managed to minimise that impact, or

(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

Clause 6.2 of the Upper Lachlan LEP (refer to **Table 10**) applies to those parts of the site and the proposed electricity connections which are, as specified on the biodiversity map as being sensitive (refer to **Figure 28 – Biodiversity Map**). The areas specified on the biodiversity map are the eastern half of Crookwell 3 East and the northern half of Crookwell 3 South, and a portion of the electricity connections to Crookwell 2 Wind Farm. The Flora and Fauna assessment found that the project is unlikely to have a significant impact on any communities, populations or threatened species listed under the EPBC Act or the TSC Act.

Further information on the flora and fauna is found at **Chapter 14**.

Clause 6.3 of the Upper Lachlan LEP has the objective of maintaining soil resources and the diversity and stability of landscapes and relevantly provides that:

(3) Before determining a development application for land to which this clause applies, the consent authority must consider any adverse impact from the proposed development in relation to:

(a) the geotechnical stability of the site, and

(b) the probability of increased erosion or other land degradation processes.

(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:

(a) the development is designed, sited and will be managed to avoid any adverse environmental impact, or

(b) if that impact cannot be avoided—the development is designed, sited and will be managed to minimise that impact, or

(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

Clause 6.3 of the Upper Lachlan LEP also applies to part of the site, as specified as being sensitive on the Natural Resources Sensitivity-Land Map (refer to **Figure 29 – Land Map**). Accordingly, clause 6.3 of the Upper Lachlan LEP (refer to **Table 10**) applies to part of the site and the proposed electricity connection to Crookwell 2 Wind Farm, and is shown as being sensitive on the land map (refer to **Figure 29**). This includes Steeves Creek, First Creek and other drainage lines that run through the site. With only 1% of the land area disturbed as part of the project, the risk to soil resources is low. Nonetheless, the soil and water management plan, prepared as part of the environmental management plan, would detail the measures and techniques to preserve soil resources.

Clause 6.4 of the Upper Lachlan LEP applies to First Creek and Wollondilly/Pejar River, as these are defined as sensitive on the Natural Resources Sensitivity-Water Map (refer to **Figure 30 – Water Map**). First Creek runs through Crookwell 3 South and Wollondilly/Pejar River runs along the south east boundary of Crookwell 3 South. The proposed electricity connection required to connect the site to the Crookwell 2 substation also runs across Wollondilly/Pejar River.

The objective of clause 6.4 is to maintain the hydrological functions of riparian land waterways and aquifers, including protecting:

(a) water quality, and

(b) natural water flows, and

(c) the stability of the bed and banks of waterways, and

(d) groundwater systems.

The clause states that 'before determining a development application for land to which this clause applies, the consent authority must consider any adverse impact from the proposed development on:

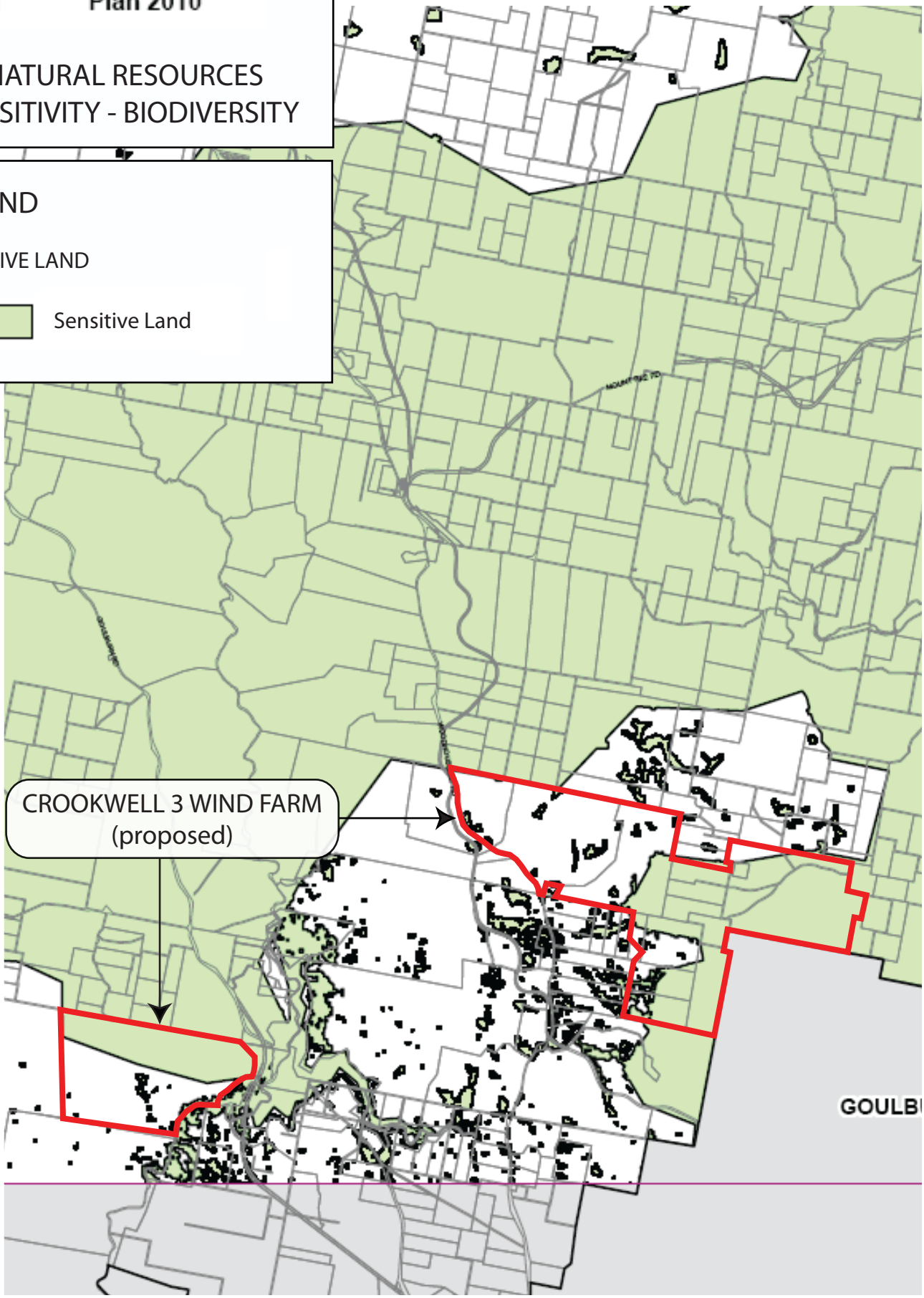
Upper Lachlan
Local Environmental
Plan 2010

NATURAL RESOURCES SENSITIVITY - BIODIVERSITY

LEGEND

SENSITIVE LAND

Sensitive Land



A4
SCALE 1:NTS

FIGURE 28 - BIODIVERSITY MAP

CROOKWELL 3 WIND FARM PROJ/DRG NO 309447 SA P 02 REV 00 DRWN LL CHKD AT DATE 15.02.2011

Tract

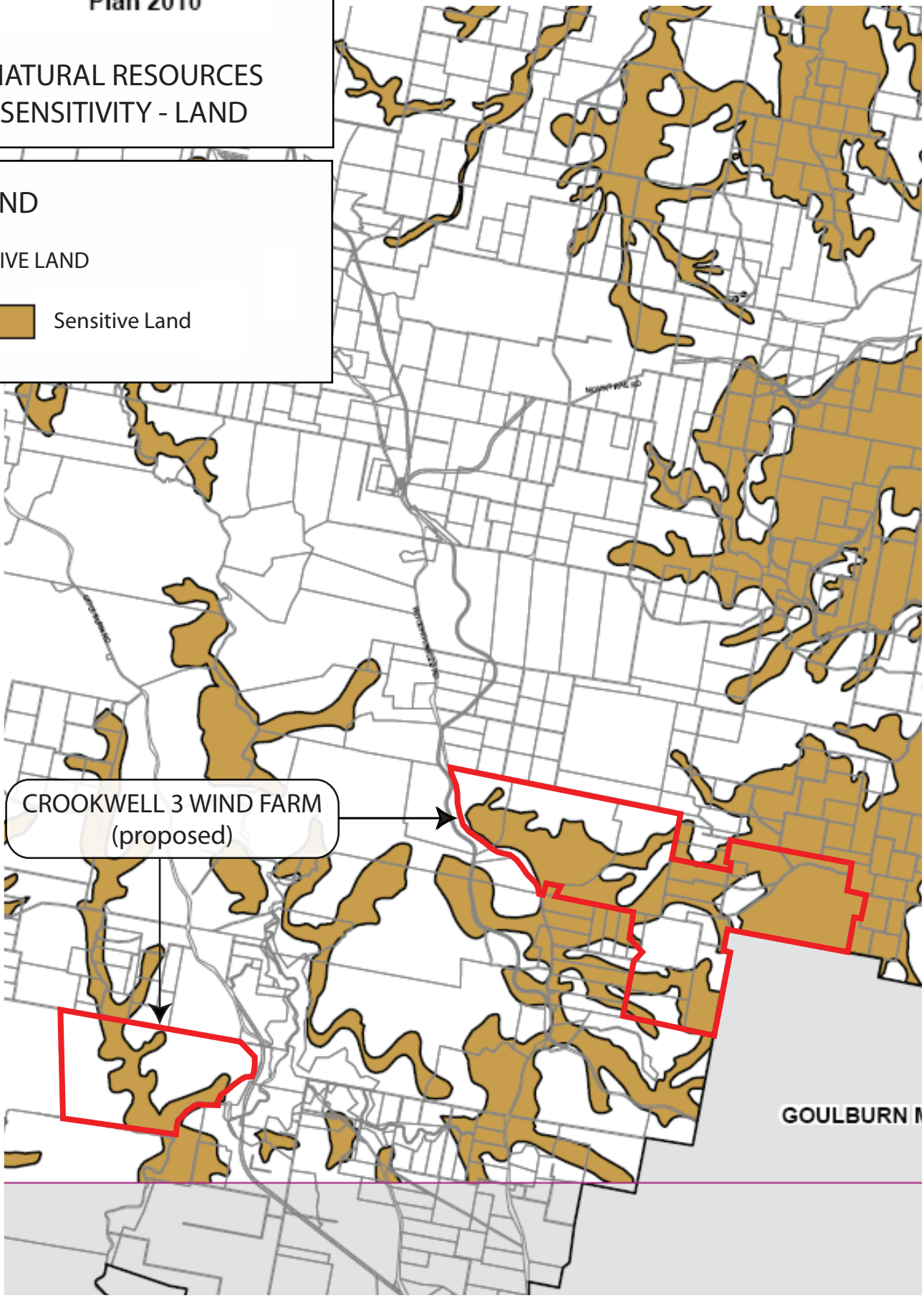
Upper Lachlan
Local Environmental
Plan 2010

NATURAL RESOURCES SENSITIVITY - LAND

LEGEND

SENSITIVE LAND

Sensitive Land



A4
SCALE 1:NTS

FIGURE 29 - LAND MAP

CROOKWELL 3 WIND FARM PROJ/DRG NO 309447 SA P 03 REV 00 DRWN LL CHKD AT DATE 15.02.2011

Tract

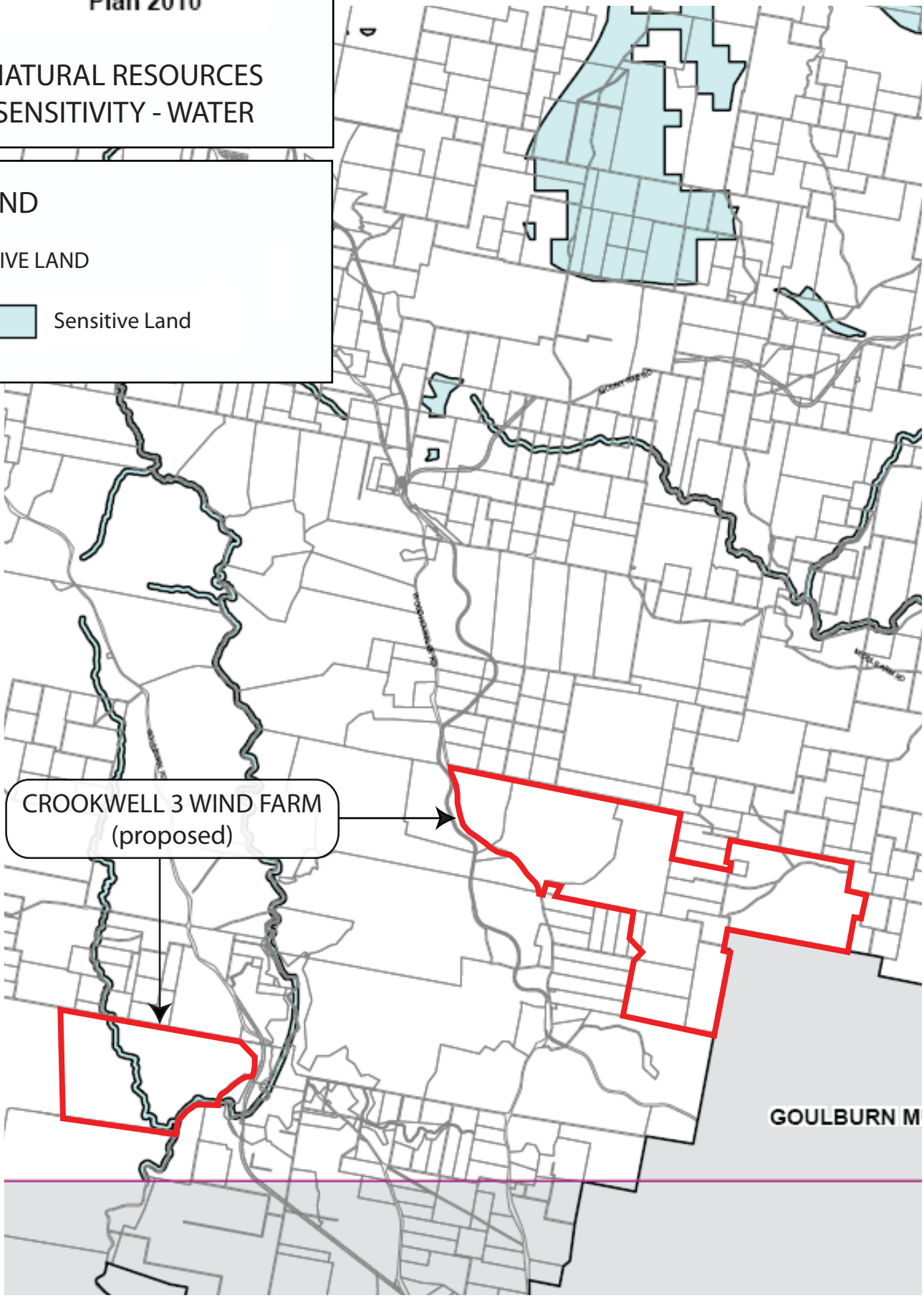
Upper Lachlan
Local Environmental
Plan 2010

NATURAL RESOURCES SENSITIVITY - WATER

LEGEND

SENSITIVE LAND

Sensitive Land



A4
SCALE 1:NTS

FIGURE 30 - WATER MAP

CROOKWELL 3 WIND FARM PROJ/DRG NO 309447 SA P 04 REV 00 DRWN LL CHKD AT DATE 15.02.2011

Tract

(a) the water quality of receiving waters, and

(b) the natural flow regime, and

(c) the natural flow paths of waterways, and

(d) the stability of the bed, shore and banks of waterways, and

(e) the flows, capacity and quality of groundwater systems.

All turbines are proposed to be located away from areas deemed sensitive by this clause 6.4. It is proposed that an access track will cross First Creek, and an electricity connection will cross Wollondilly/Pejar River. The detailed design of these crossings, which will be undertaken post determination, would consider the requirements of this clause and flow pattern of the waterway and ensure that sufficient allowance is made for unaffected flows for most rain events. This would also be managed through the Riparian Vegetation Management Plan and the Soil and Water Management Plan, which will form part of the Construction Environmental Management Plan.

Erosion is evident in the region and site, but can be managed through careful construction techniques and rehabilitation of disturbed areas. The majority of the site is not disturbed by the proposed wind farm, and as such the risk of further erosion is considered to be low. Where the development has the potential to cause additional erosion hazard, this would be avoided and managed through the preparation of a Soil & Water Management and an Erosion and Sediment Control Plan. These plans would implement necessary management controls and techniques during construction and operation of the wind farm.

7.4.3 Crookwell Local Environment Plan 1994

Prior to the commencement of the Upper Lachlan LEP, all of Crookwell 3 South and the north east component of Crookwell 2 East was subject to the Crookwell Local Environmental Plan 1994 (CLEP). As outlined at **Chapter 7.4.1** above, the transitional provisions contained in the Upper Lachlan LEP have the effect that the application for project approval is to be determined under now repealed CLEP.

That part of the site which was subject to the CLEP at the time the application was lodged, including the electricity connection options linking the project with Crookwell 2 Substation, was zoned 1(a) General Rural under the CLEP. The project is permissible subject to obtaining development consent on land zoned 1(a) General Rural under the CLEP.

The relevant objectives of zone 1(a) General Rural as contained in clause 7 of the CLEP are set out in **Table 11 – Crookwell LEP 1994** below.

Table 11 – Crookwell LEP 1994

Objective	Comment
To protect enhance and conserve the area's agricultural land (particularly prime crop and pasture land) to sustain its efficient and effective agricultural production potential,	The area of the site affected by the development of the wind farm (namely the development footprint which includes turbines and tracks) represents only a very small percentage of the overall site. For the vast majority of the site, the agricultural activities that currently exist can continue unhindered. The economic benefits that flow from the leasing arrangements with the landowners would provide an opportunity to adopt more efficient and effective agricultural production, particularly the creation of prime pasture land. At the completion of the wind farm's operating life, the turbines will either be replaced or the land will be rehabilitated to its

Objective	Comment
	previous or better condition.
To protect enhance and conserve the area's trees and other vegetation in environmentally sensitive areas where they are significant to scenic amenity or natural wildlife habitat or are likely to control land degradation,	The development largely protects the trees and vegetation on the site, as only limited clearing will be required due to its relatively small footprint. The proposed offsets will enhance the natural wildlife habitat of the area, and assist in controlling land degradation. Further information on the flora and fauna is found at **Chapter 14**.
To protect enhance and conserve the area's places of significance for nature conservation	No significant areas of nature conservation have been found to be affected by the proposal. Management measures will be implemented through the environmental management plan to minimise potential impacts on the site's values.
To protect enhance and conserve the area's places and buildings of archaeological or heritage significance (including the protection of Aboriginal relics and places).	In relation to non-indigenous heritage the assessment found that there were no significant items which would be disturbed as part of the proposal. All identified non-indigenous heritage items were well outside any proposed development areas. Furthermore, the heritage significance of these identified items was found to be low and they are typical of many of the items on many farms in the Shire. These items are not listed under the Heritage Act 1977 (NSW) or on any other heritage register including the relevant Local Environmental Plan or recent Cultural Heritage Study of the Upper Lachlan Shire. In relation to indigenous heritage, the results of the surveys undertaken detected 10 new locations where artefacts were identified as occur during the field assessments. Anderson Environmental Consultants assessed the heritage significance of these artefact deposits as low to moderate, however a precautionary approach to further investigations is recommended. Further information in relation to heritage matters is found at **Chapter 19**.
To discourage further subdivision and encourage consolidation of existing agricultural landholdings	No plan of subdivision will be registered as a result of the proposal.
To control development that could have an adverse impact on the rural character of the land in the zone	The proposed wind farm would have positive and negative impacts on the elements that constitute the rural character of the area. The landscape and visual assessment found that the landscape surrounding the subject site has an overall moderate sensitivity and some capacity to accommodate change. It is noted that part of the existing rural character of the area includes human interventions such as agricultural buildings (sheds, fences etc), vegetation clearing, and domesticated animals. The proposed wind farm would have a positive impact on rural and agricultural activities, a primary component of rural character. Only a very small fraction of the land area of the site would be removed from agricultural production (approximately

Objective	Comment
	1%), and the new tracks and increased landowner income would allow for more efficient and improved farming practises. Rural character is also characterised by vegetation, either remnant trees or wind rows of introduced species. The majority of vegetation on the site would be unaffected, and the proposed wind farm includes new plantings to assist in screening dwellings. As a result, it is not considered that the proposed wind farm would have an unreasonable impact on the rural character of the area.
To control development that could be subjected to physical limitations such as erosion hazard, bush fire risk and flooding	<u>Erosion</u> Erosion is evident in the region and site, but can be managed through careful construction techniques and rehabilitation of disturbed areas. The majority of the site is not disturbed by the proposed wind farm, and as such the risk of further erosion is considered to be low. Where the development has the potential to cause additional erosion hazard, this would be avoided and managed through the preparation of a Soil & Water Management and an Erosion and Sediment Control Plan. These plans would implement necessary management controls and techniques during construction and operation of the wind farm. <u>Flooding and Drainage Patterns</u> All turbines are located away from drainage lines and areas known to flood. Some access tracks cross drainage lines and therefore have the potential for flow alteration and water pollution, especially where fords or small culverts are required. The design of the crossing would consider the flow pattern of the drainage lines and ensure that sufficient allowance is made for unaffected flows for most rain events. This would be managed through the soil and water management plan. Existing farm tracks that cross drainage lines would be upgraded as part of the development where they are needed for the wind farm. <u>Bushfire</u> The subject site is considered to be bushfire prone land according to Upper Lachlan records. Parts of the site that are cleared pastureland have a lower risk of fire than the forested western portions of Crookwell 3 East. Only one (1) turbine is located in this forested area, and the remainder are located in cleared pasture. The potential risk of fire caused by wind farms is considered lower in comparison to normal power generation sites, as power transmission is located within the turbine towers and distributed underground to the transformers (CFA 2007). Due to

Objective	Comment
	modern manufacturing techniques, the risk of fire at wind farms is 'very low' (CFA 2007, AusWind 2007). As part of the environmental management plan, a bushfire risk management plan would be developed based on the guidelines 'Planning for Bushfire Protection' (RFS, 2001). Further, the proponent commits to consult with the RFS during periods of high fire danger, and generally to ensure the RFS are familiar with the development.
To provide land for future urban development, for rural residential development and for development for other non-agricultural purposes, depending on the need for such development.	The project utilises the relevant parts of the site for non-agricultural purposes, meeting the need for the provision of renewable electricity generation to meet State and Commonwealth policies. As the site is distant from urban settlements it is unlikely to be suitable for further urban or rural residential development.

In addition, clause 22(a) of the CLEP provides that in considering an application for consent to develop land the Council considers to be subject to bush fire hazards the Council must make an assessment of the nature and degree of the hazard and appropriate measures to reduce that hazard. As part of the environmental management plan, a bushfire risk management plan would be developed based on the guidelines 'Planning for Bushfire Protection' (RFS, 2001). Further conditions on the risk of bushfire and mitigation measures are found in **Table 11** above.

7.4.4 Mulwaree Local Environmental Plan 1995

Prior to the commencement of the Upper Lachlan LEP, the Mulwaree Local Environmental Plan 1995 (MLEP) applied to the southern part of Crookwell 3 East and Crookwell 3 South, being that part of the land which was formerly contained within Mulwaree Shire Council. As outlined at **Chapter 7.4.1** above, the transitional provisions contained in the Upper Lachlan LEP have the effect that the application for project approval for the project is to be determined as if the relevant portions of the land were still zoned under the MLEP.

That part of the site which is subject to the MLEP is zoned 1(a) General Rural under the MLEP. The project is permissible subject to obtaining development consent on land zoned 1(a) General Rural under the MLEP.

The relevant objectives of zone 1(a) General Rural as contained in clause 9 of the MLEP are as follows (see **Table 12 – Mulwaree LEP 1995**).

Table 12 – Mulwaree LEP 1995

Objective	Comment
To protect enhance and conserve the area's agricultural land (particularly prime crop and pasture land) to sustain its efficient and effective agricultural production potential,	Please refer to comments on the CLEP (**Chapter 7.4.3**).
To protect enhance and conserve soil stability by	Erosion is evident in the region and site, but can be managed through careful construction techniques and

Objective	Comment
controlling and locating development in accordance with soil capability, as identified by the Department of Conservation and Land Management	rehabilitation of disturbed areas. The majority of the site is not disturbed by the proposed wind farm, and as such the risk of further erosion is considered to be low. Where the development has the potential to cause additional erosion hazard, this would be avoided and managed through the preparation of a Soil & Water Management and an Erosion and Sediment Control Plan. These plans would implement necessary management controls and techniques during construction and operation of the wind farm. The micro-siting of the turbines will consider further geotechnical analysis of the preferred turbine locations, and turbines will only be constructed in locations deemed to have a soil and ground structure that is suitable.
To protect enhance and conserve forests of existing and potential commercial value for timber production	There are no forests on the subject site, and any forests in the area are well beyond the site boundary and subsequently unaffected.
To protect enhance and conserve valuable deposits of minerals, coal, petroleum, and extractive materials by controlling the location of development for other purposes in order to ensure the efficient extraction of those deposits	A northern portion of Crookwell 3 East is covered by a Minerals Title EL7912. Impacts to mining exploration would be minimal and limited to the small area of land required for wind farm infrastructure. The development footprint of a wind farm is small (approximately 1%) which allows mining to continue uninterrupted on the balance of the site.
To protect enhance and conserve the area's trees and other vegetation in environmentally sensitive areas where they are significant to scenic amenity or natural wildlife habitat or are likely to control land degradation	Please refer to comments on the CLEP (**Chapter 7.4.3**).
To protect enhance and conserve water resources and water catchment areas for use in the public interest	All turbines are located away from drainage lines and areas known to flood. Some access tracks cross drainage lines and therefore have the potential for flow alteration and water pollution, especially where fords or small culverts are required. The design of the crossing would consider the flow pattern of the drainage lines and ensure that sufficient allowance is made for unaffected flows for most rain events. This would be managed through the soil and water management plan. Existing farm tracks that cross drainage lines would be upgraded as part of the development where they are needed for the wind farm. The project will use water during construction phase in the manufacture of concrete and in dust suppression activities. These activities are temporary in nature, will be sourced from appropriate locations, and are not expected to have any significant impact on water resources.

Objective	Comment
To protect enhance and conserve the area's places of significance for nature conservation	Please refer to comments on the CLEP (**Chapter 7.4.3**).
To protect enhance and conserve the area's places and buildings of archaeological or heritage significance (including the protection of Aboriginal relics and places).	Please refer to comments on CLEP (**Chapter 7.4.3**).
Minimising the costs to the community of fragmented and isolated development of rural land and providing, extending and maintaining public amenities and services	No plan of subdivision will be registered as a result of the proposal and the proposal does not include any residential use. The additional income generated by the lease payments is likely to reduce the pressure for the subdivision of land for rural lifestyle purposes.
To provide land for future urban development, for rural residential development and for development for other non-agricultural purposes, depending on the need for such development.	Please refer to comments on the CLEP (**Chapter 7.4.3**).

In addition, clause 10 of the MLEP provides that the Council may consent to an application to carry out development on land within zone 1(a) General Rural only if it has taken into account, if relevant, the effect of carrying out the proposed development on a number of specified matters. These specified matters are:

- The present use of the land for the purposes of agriculture and the potential of any land which is prime crop and pasture land for sustained agricultural production.
- Vegetation, timber production, land capability (including soil stability) and water resources (including the quality and stability of watercourses, aquatic wildlife habitat, ground water storage and riparian rights).
- The future recovery of known or prospective areas of valuable deposits of minerals, coal, petroleum, or extractive materials.
- The protection of localities of significance for nature conservation or of high scenic or recreational value, and places and buildings of archaeological or heritage significance, including aboriginal relics and places.
- The cost of providing, extending and maintaining public amenities and services, including electricity, to the development.
- Future expansion of settlement in the locality.
- The quality and availability of water resources within the water catchment area.

Each of these issues are addressed in **Table 12** above.

Further, clause 33 of MLEP provides that:

"The Council shall not consent to the subdivision of land, other than for boundary adjustments, or to the erection of a building on land that is considered by the Council, following an assessment of the land by the Council, to constitute a medium to high bush fire hazard by reason of the vegetation on the land or on any adjacent land unless, in the opinion of the Council:

– *adequate provision is made for access for fire fighting vehicles,*

– *adequate safeguards are adopted in the form of dams, fire breaks, reserves and fire radiation zones,*

– *adequate water supplies are available for fire fighting purposes,*

– *fire protection measures can be undertaken within the boundaries of the subdivision or allotments, and*

– *access tracks, dams and firebreaks are designed so as not to cause erosion or sedimentation of drainage lines or other soils."*

No plan of subdivision is proposed to be registered as part of the project. However, the grant of the leases may give rise to a deemed subdivision. The subject site is considered to be bushfire prone land according to Upper Lachlan records. Parts of the site that are cleared pastureland have a lower risk of fire than the forested western portions of Crookwell 3 East. Only 1 turbine is located in this forested area, and the remainder are located in cleared pasture.

The potential risk of fire caused by wind farms is considered lower in comparison to normal power generation sites, as power transmission is located within the turbine towers and distributed underground to the transformers (CFA 2007). Due to modern manufacturing, the risk of fire at wind farms is 'very low' (CFA 2007, AusWind 2007).

As part of the environmental management plan, a bushfire risk management plan would be developed based on the guidelines 'Planning for Bushfire Protection' (RFS, 2001). Further, the proponent commits to consult with the RFS during periods of high fire danger, and generally to ensure the RFS are familiar with the development.

7.4.5 Relevant Development Control Plans

The proposed wind farm is a project to which Part 3A of the EP&A Act applies. There is no specific statutory provision requiring the Minister to consider the provisions of any development control plan (DCP) in determining an application for project approval under Part 3A. The Minister may, as part of the general discretion to consider matters in the public interest, choose to consider the provisions of a development control plan in determining an application for project approval under Part 3A.

The *Upper Lachlan Shire Council – Development Control Plan 2010* (DCP 2010) was adopted by Upper Lachlan Shire Council (Council) on 18 February 2010 and commenced operation on 9 July 2010 together with the Upper Lachlan LEP.

DCP 2010, supplements the Upper Lachlan LEP by providing general information and detailed guidelines and controls which relate to the decision making process.

DCP 2010 supersedes all Development Control Plans and Guidelines of the former Crookwell, Gunning, Mulwaree and Upper Lachlan Shire Councils, adopted and in force prior to the date of DCP 2010 coming into effect. This includes the *Upper Lachlan Shire Council Development Control Plan – Wind Power Generation 2008* (DCP 2008). The application for project approval for the proposed Crookwell 3 Wind Farm was lodged before 9 July 2010, when DCP 2008 was still in force.

In addition, the provisions relating to wind farms contained in DCP 2010 were amended on 23 June 2011 by Amendment No. 1 to the DCP, and subsequently amended on 22 September 2011 by Amendment No. 2 to the DCP.

There are no transitional provisions in DCP 2010 (including in relation to Amendments No. 1 and No. 2). However, the NSW Land and Environment Court (per Lloyd J in *Architectural Property Services Pty Ltd v Rockdale City Council [1999] NSWLEC 83* at paragraph 16) has held that:

– a DCP made after the date on which an application is made should be taken into consideration, but not be given determinative weight in that a failure to comply will not be fatal to an otherwise satisfactory application; and

– the provisions of the repealed DCP may also be taken into consideration as indicative of the standards and controls which applied when the application was made.

Given this, an assessment against both DCP 2008 and DCP 2010 has been made. The content of both DCPs as they relate to wind farms is similar and so the provisions have been considered in one table (**Table 13**). In addition, the amendments made to DCP 2010 by Amendment No. 1 and Amendment No. 2 have also been considered the table.

In relation to wind farms, both the DCP 2008 and DCP 2010 have the following objectives:

– to provide development controls and guidelines that assist in achieving the objectives of the LEP,

– to ensure sufficient information is included with each development application to enable proper assessment,

– to minimise potential land use conflicts,

– to ensure road and access issues are identified as significant aspects of gaining consent for a wind farm, and

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

DCP 2010 details the Council's controls that *"must be included as part of the design criteria and assessment of any related development application"*.

Table 13 identifies the relevant provisions of DCP 2010 (including those inserted by Amendment No. 1 and Amendment No. 2) and DCP 2008 along with an assessment of the compliance of the proposed wind farm against these.

Table 13 – DCP 2008 and DCP 2010

Guideline	**Comment**
Clause 9.5a of DCP 2010 Clause 8a of DCP 2008 The development should be sited and carried out to minimise impacts on, or restrictions to normal grazing, farming, forestry practices.	The development would have a negligible impact on current agricultural practises with a very small percentage of the site taken out of production by the turbines and access tracks. The tracks would be used by the farmer to access outlying paddocks and would therefore contribute to the agricultural use of the land. The access tracks have been sited in conjunction with the landowner to maximise the benefit of the new tracks to the farming operation. The taller turbines used in this wind farm require less turbines over a given area than shorter turbines, thus reducing further the land taken out of agricultural production.
Clause 9.5b of DCP 2010 Clause 8b of DCP 2008 The development should be carried out in a way that minimises any adverse effects on adjoining land and the development site, particularly in the way of: -Land degradation; -Alteration to drainage patterns; -Pollution of ground water; -Spread of noxious plants and	<u>Land Degradation</u> Erosion is evident in the region and site, but can be managed through careful construction techniques and rehabilitation of disturbed areas. The majority of the site is not disturbed by the proposed wind farm, and as such the risk of further erosion is considered to be low. Where the development has the potential to cause additional erosion hazard, this would be avoided and managed through the preparation of a Soil & Water Management and an Erosion and Sediment Control Plan. These plans would implement necessary management controls and techniques during

Guideline	Comment
animals; and -Bushfire hazard.	construction and operation of the wind farm. Drainage Patterns All turbines are located away from drainage lines. Some access tracks cross drainage lines and therefore have the potential for flow alteration and water pollution, especially where fords or small culverts are required. The design of the crossing would consider the flow pattern of the drainage lines and ensure that sufficient allowance is made for unaffected flows for most rain events. This would be managed through the soil and water management plan. Existing farm tracks that cross drainage lines would be upgraded as part of the development where they are needed for the wind farm. Ground Water Groundwater would not be affected by the proposed wind farm as the footings are too shallow to significantly interrupt groundwater flows and large areas of vegetation would not be removed. There are no known recharge zones on the subject site that would be impacted by the proposed development. Noxious Plants and Animals The movement of machinery, soil, and vehicles across the site have the potential to spread noxious weeds into and across the site. The environmental management plan will detail the mechanisms to prevent the spread of weeds and animals. This may include machinery wash downs, staff training, soil and fill screening and other commonly used techniques. The proposed wind farm would improve the control of noxious plants and animals by introducing coordinated management regimes managed by the wind farm developer. Bushfire The subject site is considered to be bushfire prone land according to Upper Lachlan records. Parts of the site that are cleared pasture land have a lower risk of fire than the forested western portions of Crookwell 3 East. Only one (1) turbine is located in this forested area, and the remainder are located in cleared pasture. The potential risk of fire caused by wind farms is considered lower in comparison to normal power generation sites, as power transmission is located within the turbine towers and distributed underground to the transformers (CFA 2007). Due to modern manufacturing, the risk of fire at wind farms is 'very low' (CFA 2007, AusWind 2007). As part of the environmental management plan, a bushfire risk management plan would be developed based on the guidelines 'Planning for Bushfire Protection' (RFS, 2001). Further, the proponent commits to consult with the RFS during periods of high

Guideline	Comment
	fire danger, and generally to ensure the RFS are familiar with the development.
Clause 9.5c of DCP 2010 Clause 8c of DCP 2008 The developer must assess the visual impact of the project including an assessment of scenic value. The developer must consult with the Council and the community on appropriate visual impact measures.	The visual impact of the proposed wind farm was assessed by Green Bean Design and is found in **Chapter 9**. The Landscape and Visual Impact Assessment (LVIA) concluded that the Crookwell 3 East site would have a potential *High* or *Moderate to High* visual impact on 19 residential view locations within the Crookwell 3 Wind Farm 5km viewshed, and that the South site would have a potential *High* or *Moderate to High* visual impact on 10 residential view locations within the Crookwell 3 wind farm 5km viewshed. The LVIA found that *"The majority of residential view locations between the Crookwell 3 Wind Farm 5km and 10km viewshed would experience a Nil to Low visual impact".*
Clause 9.5d of DCP 2010 Clause 8d of DCP 2008 In addition to point c. above, the developer must assess the cumulative impact of the development in regard to existing wind farms, identified sites of proposed wind farms. Council does not favour large expanse of ridgelines being covered with wind farms and turbines. Amendment No.2 amended clause 9.5d as follows: The developer must assess the cumulative impact of the development having regard to wind farms in existence and those approved but yet to be constructed. Council does not favour large expanses of ridgelines being covered with wind farms and turbines.	**Chapter 22** discusses the potential cumulative impacts of the project in the context of nearby proposed, approved and constructed wind farms. The LVIA assessment found that there are opportunities for 'direct' and 'indirect' views from residential dwellings, and 'sequential' views from some surrounding road corridors between Crookwell 3 wind farm and other wind farms, but that 'there is unlikely to be a significant increase in visual impact arising from cumulative impacts'. The LVIA concluded that; *- Overall, the Crookwell 3 wind farm is not considered to significantly increase the magnitude of visual impact for the majority of residential view locations within the Crookwell 3 wind farm 10km viewshed.* *- The potential for the occurrence of 'direct' and 'indirect' cumulative visual impact is mitigated to a degree by the screening or partial filtering of views toward approved and existing wind farms.* *- Sequential views from local roads would be mitigated to some extent by undulating landform and tree cover alongside road corridors.* In relation to ridgelines, there are significant gaps between surrounding projects that allow views between wind farm projects. Most ridgelines within the Crookwell 2 and 3 Wind Farms have turbines for only a portion of the ridgeline, with the remainder of the ridgeline used solely for grazing and agriculture, creating open breaks.
Clause 9.5e of DCP 2010 (Amendment No 1 inserted the reference to infrasound). Clause 8e of DCP 2008 (no	A full assessment of the noise impacts of the project, including the methodology used and an assessment of infrasound is found at **Chapter 10**.

Guideline	Comment
reference to 2009 SA guidelines or infrasound) Proposed wind turbines shall comply with the South Australian EPA Wind Farms Environmental Noise Guidelines (2009). Note that where noise levels are found to exceed EPA guidelines, Council may require remediation work such as cessation or decommissioning of the turbines to reduce the noise impacts on sensitive receptors such as non related dwellings. The developer shall also furnish all data that has been collected on Infrasound levels that would occur at a representative sample of neighbouring non-host residences. Amendment No.2 amended clause 9.5e as follows: Proposed wind turbines shall comply with the South Australian Environment Protection Authority Wind farms environmental noise guidelines (July 2009) or any replacement guidelines…	
Clause 9.5f of DCP 2010 Clause 8f of DCP 2008 Where visible from a non related dwelling or immediate surrounds, the development shall not be located within 15 times the blade tip height or 2.0 km's (whichever is the greater) of any dwelling not associated with the development or 15 times the blade tip height or 2.0 km's (whichever is the greater) from any lot that has been created for the purpose of a dwelling. Where turbines are proposed to be significantly higher than such properties/dwellings or where the turbines would dominate the immediate view from the dwelling or dwelling lot, increasing these separation distances is recommended. Amendment No 1 to DCP 2010 amended clause 9.5f as follows: Turbines shall not be located within	This guideline is not met by the proposed wind farm as there are numerous non-participating houses within 2.28km (15 times a 152m max tip height). Neither the constructed Crookwell I nor the approved Crookwell 2 Wind Farms meet this guideline. It is considered by the proponent that the numerical controls contained in the DCP are unreasonable and arbitrary. Few other Australian wind farms would comply and to ensure compliance with this distance would significantly reduce a project's yield. The limits are not based on any scientific understanding of buffer distances required by noise and other negative characteristics of the wind farm. Nor do they take into account topography, prevailing wind patterns, landscape type or the characteristics of the turbine itself, all of which vary and should be reflected in buffer distances. A preferable approach is to use the results of the specialist assessments and established standards to determine the most appropriate buffer distance based on the specific project under consideration. The turbines proposed as part of the project have been positioned to minimise negative amenity impacts in consideration of the specialist assessments.

Guideline	Comment
2.0 kilometres of any dwelling not associated with the development or from any lot upon which a dwelling may be constructed. The 2.0 kilometre setback proposes utilising a precautionary principle in addressing perceived visual and health concerns.	
Clause 9.5g of DCP 2010 Clause 8g of DCP 2008 The development shall not be located within two times the height of the turbine (including the tip of the blade) from a formed public road. A greater distance may be required by the road authority. Amendment No.2 amended clause 9.5g as follows: Turbines shall not be located within a distance two times the height of the turbine (including the tip of the blade) from a formed public road. A greater distance may be required by the road authority.	The guideline is met by the proposed wind farm as the turbines are well setback from formed public roads, far greater than the required 304 metres. In particular, turbines are setback a minimum distance of approximately 800 metres from Woodhouselee Road and approximately 1,000 metres from Crookwell Road.
Clause 9.5h of DCP 2010 Clause 8h of DCP 2008 The development shall not be located within two times the height of the turbine (including the tip of the blade) from a non related property boundary. Amendment No.2 amended clause 9.5h as follows: Turbines shall not be located within a distance two times the height of the turbine (including the tip of the blade) from a non-related property boundary.	This guideline is not met by the proposed wind farm. The closest turbine in Crookwell 3 South is 150 metres from the boundary and 130 metres from the boundary in Crookwell 3 East. Please refer to the comments made above in relation to the setback requirements of DCP 2010 which also apply to this clause.
Clause 9.5i of DCP 2010 Clause 8i of DCP 2008 Turbine locations shall be located sensitive to non-related dwellings surrounding the development. Existing and proposed screenings could be used to minimise visual	The proposed turbines have been sited with consideration of non-host dwellings and views from these dwellings. In particular, turbines have been well setback from Woodhouselee Road where a row of houses exists. Houses along Woodhouselee Road sit low in a valley where the valley slope acts to block some views of the turbines, which are situated in higher locations closer to the ridgeline. Most houses in the region are typical of rural dwellings

Guideline	Comment
impacts to non-related properties – Note due to the height of turbines, screening is not the preferred choice of dealing with visual impact. The developer's priority should be endeavouring to position the turbines in locations with low visual impact to nearby properties, especially existing dwellings and lots provided for dwellings. Amendment No 1 to DCP 2010 amended clause 9.5i as follows: Existing and proposed screenings may be used to minimise visual impacts to non-related properties. However, due to the height of turbines, screening is not the preferred method of minimising visual impact. Turbines shall be located in positions so as to have minimal visual impact on nearby properties, especially existing dwellings and lots on which dwellings may be constructed.	that are surrounded by screen planting used as wind breaks by the residents. These act to partially screen views of the turbines. Furthermore, extensive screen planting would occur in consultation with local landowners to mitigate the visual impact where the planting is seen as effective and is desired by the landowner.
Clause 9.5j of DCP 2010 Clause 8j of DCP 2008 Turbine locations are to be sensitive to existing related dwellings on the subject site. Issues of excessive noise, shadow flicker, and general proximity to turbines should be minimised. Amendment No 1 to DCP 2010 amended clause 9.5j as follows: Turbine locations are to be sensitive to existing related dwellings on the subject site. Noise and shadow flicker should be minimised and turbines should not be located in close proximity to existing dwellings.	Participating dwellings have been considered by the specialist assessments, which have found that the dwellings meet the relevant standards. The noise related impacts on related dwellings are found in **Chapter 10**, and the shadow flicker impacts are found in **Chapter 13**. These chapters concluded that the proposed wind farm, with the conditions specified, would not cause any unreasonable impacts on existing related dwellings.
Clause 9.5k of DCP 2010 Clause 8k of DCP 2008 Turbine locations should not surround a non related property. Where a non related property has turbines adjacent to more than one axis of the property, there should be sufficient setbacks/distances to the	There are no dwellings that would be surrounded by turbines, or have proximate views of turbines in all axis. Most dwellings proximate to the proposed wind farm would have views of turbines in only a single axis. In regards to the cumulative impact of the proposed wind farm and other wind farms approved or existing in the area, some houses would have views in most axes to turbines at a variety of distances. Some of these turbines would be more than 4km away, at which distance the visual impact of the turbine is reduced.

Guideline	Comment
development to minimise the visual impact of that property. Amendment No 1 to DCP 2010 amended clause 9.5k as follows: Turbine locations shall not surround a non-related property. Turbines shall be located with the specified setbacks from property boundaries to minimise the visual impact of the development on adjacent and nearby non-related property. Cumulative impacts, having regard to existing turbines and turbines approved but yet to be constructed, should be assessed.	Considering all turbines existing or approved in the region, no houses would be surrounded by turbines in all axis. Further the hilly topography of the region allows for views above some turbines where they are situated low in the landscape. Similarly, the viewlines of many houses are interrupted by hills, blocking views of more distance turbines. Woodhouselee Road illustrates this point, where views from houses to turbines in Crookwell 2 and the proposed Crookwell 3 are blocked by the valley slope.
Clause 9.5i of DCP 2010 Clause 8i of DCP 2008 A communications study should identify the existing status of communications and detail the proposed method of dealing with potential communication interference. Developers are advised that many parts of the Upper Lachlan Shire have very poor radio, TV, mobile phone, two way reception and the like. The development should not detract from the reception of any of these or other communication methods. Where necessary, it may be required to install additional services (boosters/communication towers/ re-transmission towers etc) to maintain such services in the vicinity of the development. Where this is determined to be necessary, the work and equipment shall be at the developers cost.	**Chapter 17** details the investigations carried out to study the impact of the proposed wind farm on communication systems. The chapter makes a number of recommendations to ensure that communications systems are no negatively impacted by the proposed wind farm.
Clause 9.5m of DCP 2010 Clause 8m of DCP 2008 The construction phase of the wind farm shall occur only on identified roads/routes. Construction vehicles, including concrete trucks, carriers of turbine components, and related heavy vehicles (including relevant contractors) shall only travel the approved road. This route shall be	**Chapter 16** details the roads proposed to be utilised to access the site for construction purposes.

Guideline	Comment
identified and approved in accordance with this Plan.	
Clause 9.5n of DCP 2010 Clause 8n of DCP 2008 Council requires substantial investigations into the road chosen for the preferred route. Detailed road condition reports would be required as part of any consent. Council requires the use of the ARRB 'laser car' and 'gypsy camera' for this purpose. Amendment No 2 to DCP 2010 amended clause 9.5n as follows: <u>A report detailing investigations into the impact of construction vehicles on the proposed route shall accompany the development application.</u> Detailed road condition reports will be required as part of any consent. Council requires the use of the ARRB 'laser car' and 'gypsy camera' for this purpose.	**Chapter 16** details the roads proposed to be utilised to access the site for construction purposes. This assessment, by URS Pty Ltd, conducted the necessary investigations required to prepare a traffic impact assessment. It is expected that a condition of any approval would require detailed road condition reports.
Clause 9.5o of DCP 2010 Clause 8o of DCP 2008 Council will usually require road works to cope with the over size and overweight traffic movements related to the construction of a wind farm. Bonds will also be required for any potential damage to roads during the construction phase. The road works and bond amounts will be determined by Council professional staff, but would be determined generally by the length of road and condition of road surface/base bridge, drainage etc relevant to the selected route. Where road works are determined necessary for the development, costs associated with the road works shall be the developer's responsibility.	The traffic assessment, found at **Chapter 16**, considered all traffic movements resulting from the construction and operation of the proposed wind farm. It is expected that conditions of any approval would require compliance with these issues.
Clause 9.5p of DCP 2010 Clause 8p of DCP 2008	**Figures 13** and **14** shows the proposed access tracks serving the wind farm, some of which are existing farm access tracks that would be upgraded. All internal roads would be responsibility of the wind farm

Guideline	Comment
Construction and maintenance of internal roads (roads within the property subject to the development) shall be the responsibility of the developer. Council will require proof that they have been adequately designed and constructed for their purpose. Council (and often other State Government Agencies) shall be provided with adequate information about the environmental aspects of the internal road construction.	developer. It is expected that conditions of any approval would require detailed plans showing road construction. The environmental aspects of the road construction would be detailed in the environmental management plan.
Clause 9.5q of DCP 2010 Clause 8q of DCP 2008 All infrastructure related to the wind farm should be included in the development application. Management of temporary facilities, waste, numbers of contractors/employees, etc, should be part of the Development Application information. All infrastructure should be located in low visual impact locations and interconnection cables/wiring and the like should be underground.	The Access and Infrastructure Plans (see **Figures 13** and **14**) and **Chapter 5** details the necessary infrastructure for the wind farm, noting that the substation, control room and associated buildings would be shared with Crookwell 2.
Clause 9.5r of DCP 2010 Clause 8r of DCP 2008 (no reference to SA 2009 guidelines) Developers shall consider and refer to the Planning NSW Environmental Impact Assessment Guidelines for wind farms, the NSW Wind Energy Handbook, Best Practice Guidelines for implementation of Wind Energy projects in Australia (AusWEA), S.A. EPA Wind Farm Noise Assessment Guidelines and all other relevant polices and legislation applicable to the proposed development. Reference to relevant Council policies and documents should also be made. Amendments No.1 and No.2 to DCP 2010 amended 9.5r by inserting "Department of Planning", as well as "July 2009" following the reference to the South Australian Environment Protection Authority Wind farms	**Chapter 7** includes a detailed investigation and review of all relevant guidelines and policies.

Guideline	Comment
environmental noise guidelines.	
Clause 9.5s of DCP 2010 Clause 8s of DCP 2008 Council prefers to have a viewing area where safe vehicle and pedestrian movements can view the wind farm in a safe manner. The developer should liaise with Council Engineering staff and the RTA. Amendment No 2 to DCP 2010 amended clause 9.5s as follows: If appropriate, the development application should include details of a viewing area where safe vehicle and pedestrian movements can view the wind farm. The developer should liaise with relevant officers of Council's Works and Operation Department and the RTA regarding any proposed viewing area.	As there is a viewing area for Crookwell 1, it is not proposed to build a new viewing area for Crookwell 3.
Clause 9.5t of DCP 2010 Clause 8t of DCP 2008 Within six months of the wind turbine generators become redundant, any rights of carriageways that were constructed to enable maintenance to be conducted on the wind turbine generators are to be extinguished by the developer, unless otherwise agreed with the landowner. Amendment No 2 to DCP 2012 amended clause 9.5t as follows: Within six months of the wind turbine generators ceasing to operate, any rights of carriageways that were created to enable maintenance to be conducted on the wind turbine generators are to be extinguished by the developer and the land made good, unless otherwise agreed with the landowner.	A Decommissioning and Rehabilitation Plan (DRP) was prepared for the project by AECOM Australia Pty Ltd for CDPL. Prior to each lease being executed with the landowners, this DRP was discussed and agreed with all landowners. This DRP outlines the stakeholder and landowner consultation, expected operational life, dismantling, land rehabilitation, funding arrangements, timeframes and responsibility associated with the decommissioning of the proposed Crookwell 3 Wind Farm. The DRP is found at Appendix 4. It is also expected that the conditions of any planning approval granted for the project would detail requirements of the proponent in relation to decommissioning. The lease arrangements to be entered into with the landowners under the agreements for lease include reference to access arrangement to the turbines, and mechanisms for the termination of the agreements.
Clause 9.5u of DCP 2010 Clause 8u of DCP 2008	Refer to the Decommissioning and Rehabilitation Plan found at Appendix 4. It is expected that the conditions of any planning approval granted for the project would detail

Guideline	Comment
Within six months of the Wind Turbine Generators becoming redundant, or not being commissioned, they are to be fully dismantled and removed from the site by the developer. A security guarantee/bond is to be lodged with the consent authority prior to operations commencing in an amount determined by the consent authority to cover the cost of future work. Amendment No 1 to DCP 2010 amended clause 9.5u as follows: Within twelve months of the wind turbine generators ceasing to operate, they are to be fully dismantled and removed from the site. A security guarantee/bond is to be lodged with the consent authority (prior to any work commencing on-site) in an amount determined by the consent authority to cover the cost of dismantling and removal of the turbines.	requirements of the proponent in relation to decommissioning. The lease arrangements entered into with the landowners under the agreements for lease include reference to access arrangement to the turbines, and mechanisms for the termination of the agreements.
Clause 9.5v of DCP 2010 The proponent is to provide details of the proposed connection to the electricity reticulation network as part of the Development Application Environmental Assessment.	Details of the proposed electricity connection are shown in **Figures 13** and **14** and detailed in **Chapter 5**.

It is noted that neither the Crookwell 1 Wind Farm or the approved Crookwell 2 Wind Farm comply with some of the guidelines contained in both DCP 2008 and DCP 2010. It is also noted that:

– the buffer guidelines contained in both DCP 2008 and DCP 2010 go beyond those typically found reasonable by Australian planning courts, tribunals and panels; and

– few wind farms in Australia, either constructed or planned, would comply with these guidelines.

Similar provisions to the numerical controls contained in DCP 2008 and DCP 2010 were contained in the now repealed *Upper Lachlan Shire Council Development Control Plan – Wind Power Generation 2005 (2005 DCP)*. These provisions were considered by the NSW Land and Environment Court in *King & anor v Minister for Planning; Parkesbourne-Mummel Landscape Guardians Inc v Minister for Planning; Gullen Range Wind Farm Pty Limited v Minister for Planning [2010]* NSWLEC 1102 (7 May 2010) (Gullen Range Decision). In the Gullen Range Decision Moore SC and Fakes C held at paragraph 661 that:

> *'We have rejected, for two reasons, giving any weight to the council's DCP and the numerical prescriptions in it. First, there is no statutory requirement for us to do so. Second, although it would be possible to have regard to the document*

as part of the broad public interest, the evidence given concerning the adoption of the numerical limits was exposed as being inaccurate and without foundation. The numerical limits in the DCP could, therefore, only be considered to be arbitrary and certainly could not be considered as being satisfactorily derived in the fashions for either a DCP or a council policy discussed by McClellan CJ in Stockland Development v Manly'.

In addition to the matters outlined in the table above, both DCP 2008 and DCP 2010 outlines Council's guidelines for a 'community enhancement program', based on an annual contribution. Prior to 23 June 2011 when Amendment No 1 to DCP 2010 commenced, both DCP 2008 and DCP 2010 specified a contribution of $850 per MW, indexed to the consumer price index for Sydney commencing at the September 2006 quarter. This requirement was also contained in the now repealed 2005 DCP and was not applied in the Gullen Range Decision as the Court considered it appropriate to instead adopt the per turbine rate derived from the Cullerin Range Wind Farm (of $1,666 per turbine per annum).

Amendment No 1 to DCP 2010 varied the amount of specified contribution to a minimum rate of $2,500 per constructed turbine per annum (indexed to the consumer price index for Sydney (Housing) commencing at the September 2010 quarter). In addition, Amendment No 1 to DCP 2010 also amended section 3.17 of DCP 2010 by inserting *"guidelines in respect to State Significant development regarding the level of monetary contribution and operation of a Community Enhancement Program"*. These guidelines include provisions which recommend that any approval granted to a wind farm project should include a condition requiring the proponent to enter into a planning agreement with the Council on the terms specified in Appendix A to DCP 2010 under which the proponent will be required to make an annual contribution, at a minimum rate of $2,500 per constructed turbine, to the Council's Community Enhancement Program.

Amendment No 2 to DCP 2010 amended Section 3.17 of DCP 2010 by replacing "September 2010 quarter" with "June 2011 quarter".

The EP&A Act contains provisions regulating voluntary planning agreements. Planning agreements are voluntary agreements which are negotiated between a planning authority and a developer. Under the EP&A Act, a condition of an approval under Part 3A can require that a planning agreement be entered into only if it is in the terms of a commitment made by the proponent in a statement of commitments made under Part 3A.

CDPL is in the process of negotiating a voluntary planning agreement with the Council which proposes that:

– CDPL will contribute an annual monetary contribution of amount of $1,666 (adjusted annually to changes in the CPI) per operating turbine forming part of the Crookwell 3 Wind Farm; and

– these annual contributions will be paid into a Community Enhancement Fund which will fund local projects within a radius of 20-25km of the Crookwell 3 Wind Farm.

CDPL proposes that the local projects which will eligible for funding from the Community Enhancement Fund will be projects aimed at:

– enhancing any aspect of the local environment including, but not limited to, ameliorating any impacts from the Crookwell 3 Wind Farm; or

– providing any community service or facility.

7.5 Other Plans and Guidelines

7.5.1 Draft NSW Planning Guidelines: Wind Farms (December 2011)

The *Draft NSW Wind Farm Planning Guidelines* were exhibited from 23 December 2011 to 14 March 2012.

The purpose of the guidelines is to:

- *provide a clear and consistent regulatory framework for the assessment and determination of wind farm proposals across the state*
- *outline clear processes for community consultation for wind farm developments*
- *provide guidance on how to measure and assess potential environmental noise impacts from wind farms*

Whilst the *Draft NSW Wind Farm Planning Guidelines* have not yet been finalised and no supplementary EARs have been issued required this EA to apply the draft guidelines in this EA, this EA addresses the matters for consideration and relevant assessment issues relevant to the Crookwell 3 Wind Farm project, which is a wind farm 'application yet to be exhibited'.

Refer to **Appendix 1** for a discussion on how this EA addresses the guidelines.

7.5.2 Draft National Wind Farm Development Guidelines (EPHC, July 2010)

EPHC has prepared a set of *Draft National Wind Farm Development Guidelines* which aim to outline best practice for industry and planning authorities in areas including, heritage, threatened species and turbine noise.

It is not the intention of these guidelines to be mandatory or change existing jurisdictional statutory processes, but to provide a basis for further consultation and consideration of the role of national guidelines in existing state approval processes.

These guidelines have been considered in the preparation of this EA

7.5.3 Best Practice Guidelines for Implementation of Wind Energy projects in Australia (AusWEA, 2006).

The *Best Practice Guidelines for Implementation of Wind Energy projects in Australia* prepared by AusWEA outline general principles to guide wind farm development, such as consultation, mitigation measures, biodiversity and visual impact. They also highlight the information required to be supplied by proponent in a development application for a wind farm.

These guidelines have been considered in the preparation of this EA.

7.5.4 Hawkesbury-Nepean Catchment Action Plan

The site is located within the Wollondilly Catchment, part of the Warrangamba Catchment. It is therefore located within the area subject to the Hawkesbury-Nepean Catchment Action Plan (CAP), prepared by the Hawkesbury-Nepean Catchment Management Authority.

The CAP aims to:

- improve river health;
- protect biodiversity; and
- identify and encourage best practice soil and land management.

As discussed in **Chapter 21 – Hydrology**, the proposed wind farm would protect river health and biodiversity, and utilise best practise soil and land management.

It is not expected that the proposed wind farm would have any significant adverse impact on the Wollondilly River or on local biodiversity. Appropriate sediment control measures would be implemented to prevent soil erosion from the small areas of the site that are subject to disturbance. As the site coverage of the towers and footings are minimal, the increase in any runoff would be negligible.

It is expected that a condition would be added to the project approval requiring the preparation of a Construction and Operation Environmental Management Plan, and a Soil and Water Management Plan. Together, these plans would further ensure that river

health and biodiversity are not adversely affected by the proposed development, and that soil and land is appropriately managed.

The proposed wind farm is considered to be consistent with the aims and targets for the CAP.

7.6 Conclusions

The chapter has found that the Crookwell 3 Wind Farm is compatible with the existing land uses of the area and substantially complies with the relevant environmental planning instruments applicable to the site and surrounding area.

Some approvals and authorisations from other governmental agencies would be required for the purposes of the project, as detailed above.

UNION FENOSA WIND AUSTRALIA

Crookwell 3 Wind Farm

Chapter 8

ECONOMIC AND SOCIAL IMPACTS

8 Economic and Social Impacts

8.1 Introduction

Futureye were engaged by CDPL to conduct a socio-economic impact assessment of the proposed Crookwell 3 Wind Farm. The potential impacts and benefits are summarised within this chapter. The full report prepared by Futureye is found at **Appendix 5**.

The key objectives of the socio-economic characterisation were to:

- *establish a demographic profile of the Crookwell region using the 2006 Census Data;*
- *compare the Crookwell demographic profile with neighbouring localities and Australia as a whole;*
- *establish an economic profile of the Crookwell region;*
- *describe the scope of local and regional employment and economic opportunities;*
- *describe the potential employment and economic impacts that the proposed development could have on the Crookwell region;*
- *identify relevant social policy objectives of the Crookwell area and how the proposed development complements these policy objectives; and*
- *describe the community concerns identified during the consultation undertaken to date and outline how the CDPL proposes to address these concerns.*

8.2 Economic impacts

Economic impacts as a consequence of the proposed wind farm may arise from three phases during the life cycle of the development:

- Planning and construction related impacts.
- Operational impacts.
- Decommissioning impacts.

The proposed Crookwell 3 Wind Farm would be likely to stimulate the economy in the Upper Lachlan Shire as a result of greater income generation and subsequent expenditure in the region. The proposed wind farm development has the potential to deliver direct and indirect benefits for host communities and the local and regional economies. It is also anticipated that the proposed development would provide flow on economic benefits in terms of employment and commercial opportunities from the economic investment along with the benefits of up-skilling of the local workforce within a growing energy market. Some landowners with lease agreements are expected to benefit directly from additional income.

Futureye anticipate that *"the positive economic contributions of the project would outweigh potential negative economic impacts, such as concerns regarding impact on property prices and potential property developments (e.g. subdivisions)"*.

8.2.2 Direct Impacts

There would be a number of direct economic impacts as a result of the development of Crookwell 3 Wind Farm, arising from the design, development and subsequent construction and commissioning of the wind farm, and expenditure and employment associated with the management, operation and maintenance of the wind farm.

The key direct economic impacts on the local economy are discussed below, covering employment, capital investment and land use and revenue.

Employment

Wind farm developments have the potential to directly create new employment opportunities in rural communities. The socio-economic report notes that, as an

average, *"It has been estimated that in NSW for every megawatt installed 0.5-0.8 jobs are created during construction and 0.05-0.5 in operation phase"*. These jobs tend to be in areas such as manufacturing and transportation.

The report found that the construction phase of the proposed Crookwell 3 Wind Farm *"has the potential to create up to 40 full time jobs for the works within the site boundary as a result of construction activities in the area"*. It is estimated that *"during the operational phase of the Project there is the potential for the creation of 6 permanent jobs"*.

These full time jobs include management staff during normal working hours and on-call services out-of-hours. In addition, up to 10 additional contractors could be working on the site once every 10 to 15 years as part of schedule major site overhauls. These jobs may potentially be sourced locally if the skills exist within the community.

Futureye also notes that there is the potential for further temporary employment arising out of future decommissioning or re-powering of the site.

The report concludes that *"the increased number of employment opportunities has a direct benefit to the NSW and national economy"*.

Capital Investment

The total capital investment for the Crookwell 3 Wind Farm is estimated to be approximately $90 - 110 million. There would be an injection of capital investment spending into the region consisting of:

– construction and operation phase wages; and

– the purchase of local materials and services where available.

Futureye note that local suppliers and contractors would benefit from associated operating expenditure including site vehicles, minor maintenance and equipment/materials over the operating phase of the project. It is also noted that local service suppliers would also benefit during the scheduled major overhauls undertaken at the site approximately every 10 to 15 years.

Futureye note the level of capital investment into the local, regional, state and national economies *"is dependent upon the contracting arrangements agreed for the sourcing of materials and services"*. Although it cannot be accurately calculated, there would be a level of direct economic benefit for Crookwell and the Upper Lachlan Shire as a result of the capital investment made in Crookwell 3. Futureye highlight that *"previous wind farm construction in the area has involved a significant portion of locally sourced materials and employment due to large distances to other larger population centres"*.

In addition, over the life of the project, the financial contribution proposed to be made to the Community Development Fund operated by Upper Lachlan Shire Council as a result of the Crookwell 3 Wind Farm would be significant and would assist the Shire in funding local services and infrastructure.

Land Use and Revenue

Additional income provided to the site's landowners from the leases may slightly raise the average household income in the area by providing a new source of revenue for farmers. The additional income source helps to *"diversify the economic base"* of the local economy of the region and would enable it to *"better withstand agricultural commodity price declines, droughts and other negative shocks to the agricultural sector"*.

Once the wind farm is operational, the additional areas of land that would be temporarily unavailable for farming during the construction phase can be used once again. These areas can be used to grow crops and graze livestock close to the base of the wind turbines during the operational phase.

Concerns have been expressed about the impact on adjoining landowners' ability to subdivide land or build dwellings where this land is in close proximity to turbines. Futureye notes that;

- *The area or landowners who may wish to subdivide for dwellings has not been quantified.*
- *The current rural zoning and the location of the land (being a significant distance from a population centre), may provide significant constraints making further subdivision unlikely.*

8.2.3 Indirect impacts

In addition to the direct benefits, the proposed Crookwell 3 Wind Farm is likely to provide a range of flow-on effects and noticeable boosts to the local economy through various income and expenditure effects. Personnel employed during the construction phase may contribute to the local economy via expending some proportion of their salaries on local goods and services, in turn supporting existing jobs or creating new ones. The extent of this impact and the amount of money invested in the local economy is dependent on where the construction workforce is located. If the labour force resides within the local community, either as locals or those relocated, "*the positive impact on the local economy will be higher than if employees are located in purpose built housing sites"*.

Further indirect economic impacts of the Crookwell 3 Wind Farm are outlined below.

Indirect Employment Opportunities

Futureye found that there would be indirect employment benefits to Crookwell, Upper Lachlan and the broader region, as a result of the Crookwell 3 Wind Farm.

The provision of wages to locally based labour has the potential to increase household spending and demand for goods and services in the local area. In turn, local businesses (for example retailers, accommodation facilities, entertainment) would experience a greater demand as a result of the influx of employees. While the impact would be highest in the construction phase, it would continue during the operational phase.

Tourism impacts

Development of the proposed wind farm has the potential to affect the local tourism industry, and in turn, this has the potential to impact expenditure on local services such as accommodation and retail.

Critics of wind farms have expressed concern that wind farms may discourage tourists from visiting due to the visual impact on the landscape. However, Futureye notes that a large numbers of visitors tour wind farms every year in Australia, *"including 50,000 visitors per year to Codrington wind farm in Victoria, 30,000 visitors in three months to the Windy Hill wind farm in the Atherton Tablelands, and 400-500 people to an open day at the existing Crookwell wind farm"* (Passey 2003 cited in Futureye report).

As one of the larger wind farms in NSW, Futureye emphasise that additional visitors would be attracted to the Crookwell area with associated indirect benefits to the local economy. It is important to note that Crookwell 1 is already advertised by both Upper Lachlan Tourism and NSW Tourism websites as one of the 'top tourist activities' in Crookwell.

Changes to land value

The value of rural land in the Crookwell region is determined by a range of economic factors, including *"commodity prices, interest rates, existing improvements on agricultural land, infrastructure and services and the supply of land and /or availability of similar land for sale"*. The establishment of the proposed wind farm on such rural lands would be only one consideration in determining price.

The value of properties that are hosts to wind turbines should increase provided that the rights to rentals for the turbines are transferable with the sale of the property (The Senate, June 2011). In relation to neighbouring properties and properties with views of the turbines, there is little evidence to suggest that the land values are affected by the wind farm development.

Any impacts to the property market are primarily experienced during construction and commissioning of wind farms, and once a wind farm is established, the prices recover and there appears to be little to no adverse impacts on land prices (Offor Sharp & Associates, 2003).

Futureye refers to the key finding of the *Preliminary Assessment of the Impact of Wind Farms on Surrounding Land Values in Australia* (2009) provided for the NSW Valuer General which was that *"wind farms do not appear to have negatively affected property values in most cases"*. This study noted that "*a property's underlying land use may affect its sensitivity to price impacts"* and found that, of the properties studied, *"no reductions in sale price were evident for rural properties or residential properties located in nearby townships with views of the wind farm"*.

A Community Affairs References Committee was established for the Australian Senate to investigate any adverse health effects for people living in close proximity to wind farms and the economic impact of rural wind farms such as impacts on land values. The report, *The Social and Economic Impacts of Rural Wind Farms* was released in June 2011 (Community Affairs References Committee, 2011).

The Committee understood that that values of some properties that are close to turbines may be adversely affected but in most cases planning processes such as setbacks are designed to avoid such situations.

The Committee's report referred to the findings of the 2009 assessment for the NSW Valuer General that found no reductions in sale prices, as well as a study of 78 property sales around the Crookwell wind farm from 1990 to 2006. The study found that there were *"no measurable reduction in values for those properties that have a sight line to the [wind turbine] development*" and "*factors such as soils, improvements and access to services are more important drivers in determining value then the visual amenity of the wind farm*" (Henderson & Horning 2006 cited in Windlab 2011).

Futureye highlights that *"international reports and surveys show that proximity to wind farms has not had a material effect on property values"*.

An international example, *The Effect of Wind Development on Local Property Values*, is a report prepared for the US Government in 2003 which examined the values of land where wind turbines are visible (up to 8km) associated with every US wind farm installation between 1989 and 2001 (Windlab 2011). Over 25,000 records of property sales were subject to statistical analysis.

The report concluded that:

> *"The statistical evidence does not support a contention that property values within the view shed of wind developments suffer or perform poorer than in a comparable region. For the great majority of projects in all three of the Cases studied, the property values in the view shed actually go up faster than values in the comparable region"* (Beck et al 2003 cited in Windlab 2011).

Community investment

CDPL is committed to supporting local community organisations in the Crookwell area. The activities of CDPL are not limited to planning and development but extend to operating the wind farms with a view to becoming a long-term member of the community. As part of its ongoing commitment to supporting local community organisations CDPL is in the process of negotiating a planning agreement which proposes that:

– CDPL would contribute an annual monetary contribution of amount of $1,666 (adjusted annually to changes in the CPI) per operating turbine forming part of the Crookwell 3 Wind Farm; and

– these annual contributions would be paid into a Community Enhancement Fund which would fund local projects within a radius of 20-30km of the Crookwell 3 Wind Farm, including projects aimed at ameliorating any impacts from Crookwell 3.

This equates to an annual payment of $49,980 to the Community Enhancement Fund if all 30 turbines proposed as part of the project are approved and constructed.

Road Upgrades

The construction of approximately 30 wind turbines on agricultural land would require the mobilisation of heavy vehicles in the region to deliver materials to the development site.

A detailed traffic assessment has been undertaken as part of the EA for the Crookwell 3 Wind Farm proposal. Please refer to **Appendix 10** for the Transport Impact Assessment.

Futureye note that there are parts of the current road network which provide access to the site that would need to be upgraded to be able to accommodate the construction vehicles and equipment that is required to be transported to the site. It is however noted, that *"the majority of required upgrades would be completed as part of the Crookwell 2 wind farm Project"*.

The upgrading of the roads would provide an indirect economic benefit for the region. The road upgrades would increase road safety and reduce vehicle maintenance costs. These positive impacts may not become evident until the operational phase, due to the use of the roads by construction vehicles during the development phase.

8.2.4 Clean Energy Council 2012 publication

The Clean Energy Council engaged Sinclair Knight Merz (SKM) Pty Ltd to produce a snapshot of wind farm investment, jobs and carbon abatement in Australia and each of the states. SKM looked at existing wind farm financial data and interviewed four companies with experience in numerous wind farm projects. In their report, SKM presents a breakdown of investment during the construction and operations phases of a major wind farm, collated from actual data provided by developers, contractors, advisers and consultants.

The report, *Investment, Employment and Carbon Abatement in Australia*, was released in June 2012 and the key findings are as follows:

– Total local capital investment in Australian wind farms is $4.25 billion (of a total $7 billion).

– Potential further local investment in proposed wind farms is $17.8 billion (of a total $29.6 billion).

– Construction of a 50 MW wind farm would provide a gross value added of some $50 million to a state and contribute between 0.012% and 0.21% to gross state product (GSP) depending on the size of the state economy.

– Based on four indicative regions, construction of a 50 MW wind farm could contribute 0.1% to 2.6% to regional gross regional product, depending on the size of the regional economy.

– Construction of a wind farm could lead to potential local personal expenditure of $25,000 per person per annum on accommodation, food and other services in the region.

– Transport, plant hire and materials such as crushed rock, cement, sand and gravel are likely to be provided from local sources.

- A typical 50 megawatt (MW) wind farm:
  - Has an estimated average construction workforce of 48 people with each worker spending $25,000 per year in the local area. This equates to some $1.2 million per year flowing into hotels, shops, restaurants, and other local service providers.
  - Employs around five staff for operations and maintenance, equating to an ongoing local annual influx of $125,000.
  - Provides up to $250,000 annually in payments to farmers, a proportion of which flows into the local community.
  - Provides a community contribution of up to some $80,000 per year for the life of the project.
  - Creates approximately 795 one-year, full-time equivalent construction jobs per 50MW wind farm in Australia, including 504 jobs in the State and 160 in the locality.
  - Creates approximately 44 one-year, full-time equivalent operation jobs per 50MW wind farm in Australia, including 19 jobs in the State and 12 in the locality.
- The national average of emissions abatement achieved by wind farms across Australia is 246,200 tons per annum which is equivalent to 57,300 cars removed from the road.
- In the National Electricity Market, the abatement intensity achieved varies quite a lot from state to state, with the abatement in the NEM highest in Victoria and lowest in Tasmania.

The study therefore shows that the development of wind farms contribute significantly to investment, employment and emissions abatement at regional, State and national levels.

8.3 Social and policy objectives

It is important to have an appreciation for the social and policy context in which the Crookwell 3 Wind Farm is being proposed. Futureye conducted an assessment of the Federal, State and Local policies associated with renewable energy, wind-farms in particular, and community concerns regarding wind-farms. The proposed Crookwell 3 Wind Farm supports and reflects a number of the local and broader social and policy objectives. Of particular relevance are policies focused on employment and economic development, environmental management, tourism and agriculture. A discussion of these can be found in the full report found at **Appendix 5**.

Federal Policy

In August 2009, the Australian Government implemented the Renewable Energy Target (RET) Scheme, "*which is designed to deliver on the Government's commitment to ensure that 20 per cent of Australia's electricity supply will come from renewable sources by 2020"*. On 29 June, 2010, the Australian Government finalised changes to the RET scheme "*to provide greater for certainty large-scale renewable energy projects"*. As a result, the existing RET scheme was separated into two parts: the Small-scale Renewable Energy Scheme (SRES) and the Large-scale Renewable Energy Target (LRET). The LRET would deliver the majority of the 2020 target; *"with annual targets set to reach 41,000 GWh by 2020"*.

It is estimated that the Crookwell Project (Crookwell 1, 2, and 3 combined) would provide 390GWh of energy per year towards the LRET target and beyond.

The report notes that the proponent of the Crookwell 3 wind farm is compliant with both:

– the *Draft National Wind Farm Development Guidelines* (July 2010), prepared by the National Environment Protection Council which outline certain technical and social expectations for proposed wind farms; and

– the 2009 EPBC Act Policy Statement 2.3 – Wind Farm Industry issued pursuant to the Environment Protection and Biodiversity Conservation Act 1999 (Cth).

State Policy

The NSW Government has set targets through its State Plan, "*aimed at ensuring 10 per cent of electricity consumed in NSW is from renewable sources by 2010, rising to 15 per cent by 2020"*.

The Crookwell 3 Wind Farm proposal is compliant with the *Draft NSW Wind Energy Environmental Impact Assessment Guidelines,* which consider the following specific matters:

– factors to be considered in the location of a wind farm

– issues relevant to the environmental assessment of wind farms

– community and stakeholder consultation to provide for an informed and transparent process.

The proponent is highly committed to understanding the full-range of community perspectives in the Crookwell area. Futureye note that CDPL has engaged in two rounds of consultation with the local community, including an in-depth set of interviews with the few highly-opposed community members.

Local Policy

The Crookwell 3 Wind Farm proposal would implement the objectives of the Development Control Plan (DCP), which outlines how and where future wind farm developments are proposed. Refer to **Chapter 7 – Planning Instruments** for further details on the DCP.

The proposal implements the objectives and strategies of the *Upper Lachlan Shire Strategy: 2020 Vision,* which assesses the current context and a growth strategy in the Shire. The community themes in this document provide an opportunity for the Crookwell 3 project to build its development and Community Enhancement Program in line with areas of community interest.

8.3.2 Identification of Potential Social Issues

The Crookwell 3 Wind Farm is being proposed in a complex and challenging public policy context.

The proposed wind farm is aligned with state and federal policy commitments to shift Australia's energy supply to a greater percentage of renewable energy power sources such as wind. Reductions in electricity sources that generate greenhouse gas emissions are anticipated to have beneficial social and economic outcomes through supporting national and international efforts to reduce the potential impacts of global warming and climate change.

The report identifies several potential social issues arising out of the proposed development. The potential issues have been identified through an analysis of the community responses during the consultation program, a literature review of similar renewable energy projects and discussions with project managers and representatives of the Upper Lachlan Shire Council.

CDPL has developed a community consultation and engagement program aimed at providing the community with factual information about the project and gathering feedback from the community and stakeholders about their concerns and interests, which can subsequently be addressed in the approvals process and feedback into the project design where appropriate. Please refer to **Chapter 23 – Consultation** for the overview of the Consultation Strategy.

On 28, 29, and 30 April, 2010, CDPL conducted a door knock community consultation survey of households within a 3 to 5 kilometre radius of the proposed wind farm. The survey found the following:

- Of the respondents who were either supportive or highly supportive, a large number still had high levels of concerns about a range of issues, including electromagnetic interference, land values and noise.
- 100% of the respondents who indicated they were neutral towards the project (representing 26% of all respondents) were concerned or very concerned about a range of issues. Given the level of concerns that existed amongst this cohort, there is significant risk that they may oppose the project if these risks are not adequately addressed.
- A number of respondents concerned about the project met as a group and had their comments recorded collectively. Had the meetings occurred individually, the number of people opposed would have been higher.
- Opponents indicated areas where they would like to see improvements from wind farm developers, namely responsiveness, transparency, compensation, community investment and regional planning and development. This provides an opportunity for CDPL to consider these issues and respond so as to improve CDPL's standing with these stakeholders to become their wind farm developer of choice.

To further inform the strategy for managing community concerns relating to the proposed wind farm, CDPL hired Futureye to interview a select group of 6 highly-concerned community members between 14 June and 8 July, 2010 in order to further understand the issues which underpin their concerns.

Futureye has synthesised these community members' views under nine (9) thematic headings. CDPL has developed responses to address concerns under each thematic heading. The thematic headings and analyses of the following potential social issues have been undertaken;

- **Corporate engagement and information**: some residents raised concerns about CDPL's approach to community engagement.
- **Health/Noise**: issue of noise impacting human health and the rural sounds cape.
- **Wind Farm technology**: scepticism about the environmental benefits of wind farm technology in terms of efficiency and its ability to meet energy requirements.
- **Community development and regional planning**: the cumulative impacts caused by a range of wind turbines being built in close proximity to the town of Crookwell.
- **Flora and fauna**: impacts on flora and fauna, particularly on specific bird species, such as the wedge tail eagle.
- **Property values**: a perception among some residents that the wind farm proposals for Crookwell 2 and 3 have negatively impacted on property values.
- **Community divisions**: beliefs that proposed wind farm developments have created divisions and tensions within the community and that wind farm developers are not helping to address these issues.
- **Buffer zones and proximity issues**: requests for a two kilometre buffer between any wind turbine and a residential property, based on studies by Van Den Berg and Nina Pierpont as a scientific justification.
- **Distribution of benefits:** some community members believed that it was unfair that neighbours who are perceived as being equally impacted received no financial benefit.

These issues are further discussed in the full socio-economic report found at **Appendix 5.**

8.3.3 Recommendations for future activities

Futureye recommend that CDPL undertake a number of future activities in consultation with the NSW Government, Local Council, the community at-large, and highly critical community members. In summary, the recommendations include:

- *continue to implement the current consultation strategy in a manner which ensures the further consultation, addresses the issues (including health impacts associated with noise) raised by the highly-concerned stakeholders;*
- *continue to implement the consultation strategy in a coordinated, whole-of project and transparent manner throughout the planning process, construction, operational and closure phases of the project;*
- *develop a robust governance structure with roles and responsibilities for the Community Enhancement Program;*
- *formalise, maintain and promote a consultation register, grievance mechanism and issue resolution tracking mechanism which is integrated into CDPL day-to-day operations as well as supplier agreements;*
- *establish and publicly promote a local employment and purchasing policy for preferentially sourcing labour, services and products from the local community and region wherever practicable; and*
- *provide employment requirements in the pre-construction compliance report.*