



# Hepburn Community Wind Park

**Application for Planning Permit**

**VOLUME 1 – Main Document**

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## **The Hepburn Renewable Energy Association Inc.**

on behalf of our 370 members is proud to submit this Application for  
Planning Permit for the Hepburn Community Wind Park.

This application is the culmination of over 18 months investigation and consideration.

HREA wishes to thank Future Energy Pty Ltd for its ongoing  
commitment to this worthwhile local community project.

### **Acknowledgements**

Our thanks to the following people and organisations for their assistance:

*Elizabeth Boulton*

*Peter Wallace Engineer Pty Ltd*

*Ballarat University*

*Marshall Day Acoustics Pty Ltd*

*Garrad Hassan Pacific Pty Ltd*

*Hardrock Geotechnical Pty Ltd*

*Terraculture Pty Ltd*

*John Cleary Planning*

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# Glossary

AAV	Aboriginal Affairs Victoria
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations
Co-operative	Hepburn Wind Co-operative
dBA	Decibels (A-weighted)
DNISP	Distribution Network Service Provider
DSE	Department of Sustainability and Environment
EMP	Environmental Management Plan
EPBC Act	Environment Protection and Biodiversity Conservation Act
Future Energy	Future Energy Pty Ltd
Guidelines	Policy and planning guidelines for development of wind energy facilities in Victoria
HREA	Hepburn Renewable Energy Association Inc.
HWC	Hepburn Wind Co-operative
IPCC	Intergovernmental Panel on Climate Change
km	kilometre
kV	kilovolt
mm	millimetre
m	metre
MRET	Mandatory Renewable Energy Target
MW	megawatt
MWh	megawatt hour
nacelle	streamlined enclosure for the wind turbine generator/gearbox assembly
rpm	Revolutions per minute
SV	Sustainability Victoria
VRET	Victorian Renewable Energy Target
Wind Park	Hepburn Community Wind Park
wind turbine	wind powered generator comprising a generator/gearbox assembly, which is enclosed in a nacelle and supported on a steel tower and driven by a 3-bladed variable pitch rotor

# About Hepburn Renewable Energy Association Inc. and Future Energy Pty Ltd

The proponent for the Hepburn Community Wind Park is the Hepburn Renewable Energy Association Inc., assisted by its Project Partner, Future Energy Pty Ltd. The Hepburn Community Wind Park will be owned by the Hepburn Wind Co-operative Ltd, making it Australia's first community owned wind energy facility. Proponent details are:

## Hepburn Renewable Energy Association Inc. (HREA)

**Hepburn Renewable Energy Association Inc. (HREA)** 20 Bridport Street, Daylesford Vic 3460, Tel: 03 5348 1298, [www.hrea.org.au](http://www.hrea.org.au).

HREA was incorporated in November 2005. It is a non government, community organisation operated by volunteers and has a membership which is growing consistently each month. At the date of lodgement of this application HREA has a total of 370 paid-up members.

The primary aim of the Association is to initiate a small scale wind power project in the Daylesford/Hepburn region. The Association believes a project of this size is the most environmentally appropriate and economically responsible for meeting the energy needs of our community.

The Association also aims to provide Hepburn Shire residents with the opportunity to invest in this project as it will provide both financial and social dividends for our community.

HREA Committee:

President	Per Bernard
Vice President	Scott Kinnear
Secretary	Brett Dutton
Treasurer	Allan Meers
Committee Member	Maureen Corbett
Committee Member	Phil Hanson
Committee Member	Greg Simmons
Committee Member	Jane Knight

## Future Energy Pty Ltd

**Future Energy Pty Ltd.** (ACN 105 609 603), P. O. Box 2007, Richmond Vic 3121,  
Tel: 03 9429 5629, [www.futureenergy.com.au](http://www.futureenergy.com.au).

Future Energy is a private Australian owned company, established in July 2003. The company's area of expertise centres on the establishment of community based renewable energy projects.

Future Energy has co-ordinated and performed all necessary expert assessments and works required to develop the Wind Park to this point including the preparation of this Application for Planning Permit. It is expected to continue to co-ordinate the establishment and eventual fund raising of the Co-operative and project manage the overall Wind Park through to completion.

# 1 PROJECT OVERVIEW

The Victorian Government has a policy of reducing the greenhouse emissions of the State. A key part of that policy is to encourage the development of wind energy generation throughout the State.

The Hepburn Community is renowned throughout Victoria for its commitment to sustainable policies and practices.

The proposed Wind Park comprises two wind turbines, allowing it to provide sufficient renewable, greenhouse-free energy to power approximately 2,500 homes. The project will be Australia's first community owned wind farm, a model which has been applied with great success overseas.

A locally owned and managed Wind Park gives the local region a wide array of benefits. These include:

- ❑ The community is provided with a non-polluting renewable energy source which will meet a large part of its energy needs for at least 25 years.
- ❑ The enhancement of Hepburn Shire's reputation for implementing sustainable development initiatives and environmentally sound practices.
- ❑ The financial benefits remain local.
- ❑ The Wind Park will provide financial support for other community programs.
- ❑ The widespread involvement of the community in the project will lead to the development of local leadership and organisational skills.
- ❑ The Wind Park will be a great vehicle for broader community education about sustainable development and renewable energy.
- ❑ The community gains a new icon they can be proud of, which highlights the progressive and cohesive nature of the community.

## **1.1 *Climate Change***

The seriousness of climate change is becoming more apparent with each new report and research finding. The latest Australian review of the rate of global warming and likely impacts is provided in the Steffen Report in Volume 2. It warns global warming is accelerating and that the need to move to mitigation and adaptive strategies - such as moving away from fossil fuel based energy sources to the creation and development of renewable energy - is becoming urgent.

## **1.2 *Wind Energy***

Wind energy is a proven energy technology. Since the first sailing ships and windmills of over 2,000 years ago, wind energy has been successfully harnessed by mankind.

Energy is a cornerstone of our lives. Furthermore, our use of energy is increasing each and every year. Until relatively recently we have not needed to concern ourselves with the type of energy we use.

But our climate is changing. Unless every community makes significant changes to the way we generate and use our energy resources, climate change and its impacts such as severe floods and droughts, will devastate not only our economy and lifestyles but our lives.

Wind energy will be one part of the solution to the climate change challenge. The wind is a clean and inexhaustible fuel source which can be easily converted into useful energy without the global warming effects of fossil fuels.

## **1.3 *Government Policy***

This project directly aligns with Victorian State Government policies to diversify energy supply and develop the renewable energy sector. It also supports other objectives to increase investment in regional areas.

In particular this project dovetails well with the Hepburn Shire Council's objectives and values. It is a project that:

- ❑ Delivers an outstanding and tangible impact upon increasing sustainability and protecting the environment.
- ❑ Aligns with aims of community building.
- ❑ Encourages local investment.
- ❑ Will have a positive impact upon the tourist experience.

## **1.4 Site Selection**

The proposed Leonards Hill site was assessed as the most appropriate within the region after careful consideration and analysis as well as discussions with the Shire Planning Department. Its key strengths are: its unobtrusive position which eliminates visual impact upon any key historical or tourist sites; its proximity to the electricity grid; and its ability to harvest strong and consistent winds. Meteorological reports and wind resource modelling attest to the suitability of the site to produce the requisite energy.

## **1.5 The Project Site**

The Leonards Hill site is approximately 10 kilometres south of Daylesford. It is located on the eastern side of the Ballan–Daylesford Road. The site is cleared farming land used predominantly for cattle grazing as well as some potato cropping activities.

Leonards Hill forms part of the Great Dividing Range. It lies within a generally cleared corridor which follows the Ballan–Daylesford Road. The Wombat State Forest is beyond this corridor to the east and west.

## **1.6 The Project**

The project consists of two 2 Megawatt wind turbines located on the southern side of Leonards Hill. The site is privately owned and a 25 year lease has been secured with the landowner. A 22 kilovolt (kV) powerline runs through the property and will be used as the point of connection to the grid.

The project cost is expected to be completed within approximately 18 months.

Section 3 provides a detailed description of all aspects of the project.

## 1.7 Energy and Environmental Benefits

Each wind turbine will have a rated capacity of 2 megawatts (2MW). Together they will produce up to 14,000 megawatt hours (MWh) of energy per annum. This represents an amount of energy roughly equal to all the homes in Daylesford and Hepburn Springs.

The environmental and greenhouse benefits are summarised below.

**Table 1.1 – Energy and Environmental Benefits**

Energy production per annum	<b>14,000 MWh</b>
Equivalent <b>number of households</b> <sup>1</sup>	<b>Approx. 2,500</b>
<b>Greenhouse</b> gas abatement	<b>Approx. 14,000 tonnes of CO<sub>2</sub></b>
Equivalent number of <b>cars off the road</b>	<b>3,200</b>
Equivalent number of <b>trees planted</b>	<b>20,000</b>

1: The Australian Bureau of Statistics (ABS) in 2001 records Daylesford as having 2,118 registered dwellings, which includes an allocation for transient tourists.

## 1.8 Community Ownership

The Hepburn Community Wind Park will be Australia's first community owned wind farm.

The community ownership is based on the European model where community ownership has seen decades of success.

The Hepburn Community Wind Park will be owned and operated by the Hepburn Wind Co-operative Ltd, a community owned co-operative. Profits from the operation of the

Wind Park will be distributed annually to the Co-operative members. The Co-operative will also make an annual allocation of funds to community programs.

Community ownership allows local people to become directly involved in a project which will significantly contribute to the future energy needs of Hepburn Shire. It gives individuals an opportunity to take responsibility for local energy needs and be part of the solution to climate change.

Under the Co-operative model both the control and the financial benefits of the project remain in local hands. Each member of the Co-operative will share in the profits derived from producing renewable energy over the 25 years of the project.

Locally owned renewable energy generation will reaffirm the reputation of the Hepburn Shire as a leader in taking on the climate change challenge.



**Plate 1.1 – HREA Bus Tour to Challicum Hills Wind Farm, Ararat**

## 1.9 *Planning Considerations*

A full discussion of each requirement set out within the planning framework is provided in Section 7. Below is a summary of those results.

### **Planning Zone**

The Wind Park is located within a Farming Zone (FZ) under the Hepburn Shire Planning Scheme. Within this zone a permit is required for the installation of a wind energy facility. The site is also covered by an Environmental Significance Overlay (ESO1 – Proclaimed Catchment Protection). ESO1 requirements are relevant to soil protection during construction.

### **Fauna**

There are no indications that significant species utilise the proposed Wind Park site. Leonards Hill does not provide suitable habitat for any significant species. Overall the proposed Wind Park poses a low risk for any of the threatened and listed species that may be found within 5km of the site.

### **Flora**

DSE has advised that a Flora Survey Report is not required as the cleared farmland site has no value in terms of native vegetation.

### **Nearby Dwellings**

There are no dwellings within 500 m of the Wind Park site.

There are 18 dwellings within 1 km of the Wind Park site of which two are owned by the landowner.

### **Landscape and Visual Impact**

Landscape and visual impacts are considered to be acceptable. The turbines have been located to maximise the screening effect of Leonards Hill on neighbours.

Photo simulations suggest that the wind turbines will be barely discernible from key vantage points within Daylesford. Importantly the Wind Park will have no impact upon the visual amenity of cultural, heritage or tourist sites.

**Noise Impacts**

Noise modelling based upon the proposed location of the wind turbines has found that predicted noise impacts upon nearby dwellings are well within the required standard used for wind energy facilities in Victoria.

**Cultural Heritage**

The construction of the Wind Park will not impact on either Aboriginal or European cultural heritage.

**Geotechnical**

The site is well suited to construction activities associated with the Wind Park with no difficulties foreseen.

**Shadow Flicker**

All houses will be under the allowable limit for shadow flicker for Victorian wind energy facilities.

**Blade Glint**

There will be no significant impact from blade glint.

**Telecommunications**

There will be no impact from electromagnetic interference.

**Aviation**

The Wind Park does not impact nearby airfields. Civil Aviation Services Australia (CASA) have advised that, as the wind turbines have a maximum height less than 110 m above ground level, obstacle lighting will not be required.

**Socio-economic**

The overall socio-economic impacts of this project are overwhelmingly positive.

**Environmental Management Plan**

A full EMP will be developed as part of the Wind Park design. The EMP will include the works to be undertaken to remove the turbines at the end of the project life.

## 1.10 **Consultation**

HREA with the assistance of Future Energy has already conducted an extensive community consultation program with surrounding residents and the broader community. This has included:

- ❑ Free Wind Farm tours
- ❑ Over 50 personal home visits to local residents
- ❑ 2 public forums
- ❑ 2 Visual Assessment workshops
- ❑ Over 20 street stalls
- ❑ Displays at local festivals
- ❑ Regular newsletters
- ❑ Development of a website with detailed amounts of background information

HREA is committed to ensuring this consultation process continues throughout and beyond project completion.

## 1.11 **Conclusion**

This project is an outstanding opportunity for the Hepburn Shire to take a significant and tangible step towards building a sustainable community. The development of renewable energy facilities can make the largest possible contribution towards protecting the environment for future generations. The proposed site is ideal in terms of being unobtrusive yet able to access consistent strong winds and conveniently located near the existing electricity grid. The project will have positive ramifications for the entire Shire: new employment, investment in local infrastructure; upskilling of the community; provision of sustainability education; a potential increase in tourists and visitors; increased public profile; and increased investment in the region. The project benefits the environment, the community, the region and the economy.

This project has undergone rigorous risk evaluation in terms of financial and physical viability. Extensive consultation has been conducted to ensure the project has widespread community understanding and support. This is an excellent and low risk

opportunity for the Hepburn Shire to take a strong and positive step towards sustainability.

## 2 DETAILED SITE ANALYSIS and DESIGN RESPONSE

### 2.1 *Selection Process*

The site selection process was conducted over nine months with sites considered based primarily upon wind strength, environmental impact, impact upon landscape and visual amenity, and proximity to the electricity grid. The Hepburn Shire Planning Department was consulted in the initial stages for advice regarding any specific zoning constraints on potential locations throughout the Shire.

#### 2.1.1 Site Selection Criteria

A range of initial criteria were used to assess potential sites. Each one of the criteria was assessed to the maximum extent possible at each stage of the investigations. Table 2.1 sets out the Selection Criteria. When all criteria were considered, Leonards Hill was the best site available. In particular its strengths are:

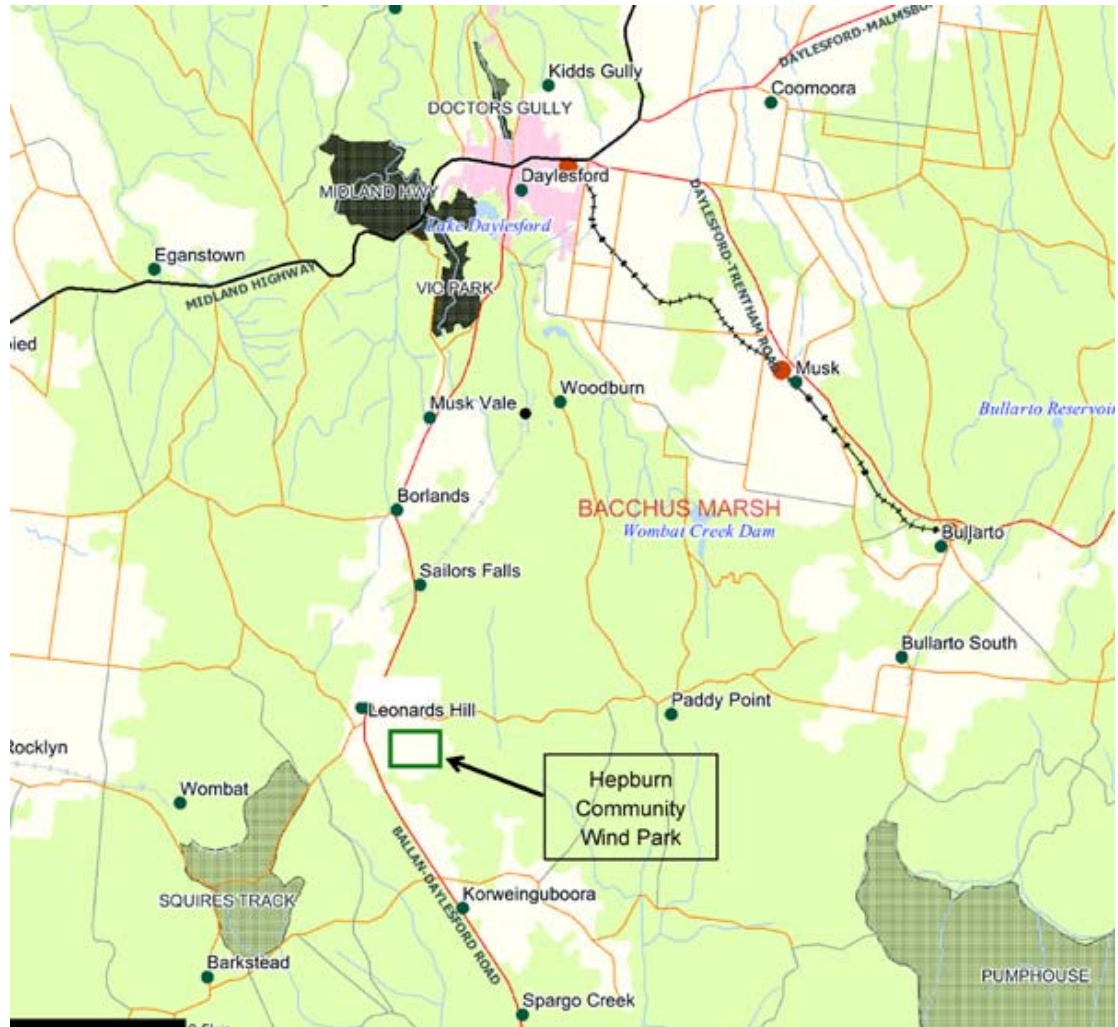
- Wind resource
- Proximity to a robust electrical connection
- Accessibility
- Planning zone suitability
- Low visual impact
- Good orientation

**Table 2.1 – Site Selection Criteria**

<b>Criteria</b>	<b>Description</b>
<b>Wind resource</b>	An early assessment using forecasting models was made of the expected wind resource.
<b>Topographic conditions</b>	Height above sea level; rising land, hill effect present.
<b>Surface Roughness</b>	Vegetation height and density, water bodies, plantations, rocky outcrops.
<b>Geographical setting</b>	Surrounding areas.
<b>Current Land Use</b>	Potential effect on current land practices.
<b>Grid Connection</b>	Proximity, robustness of existing grid, distance to sub-station.
<b>Accessibility</b>	Property access, steepness, road infrastructure, proximity to major routes.
<b>Planning Zone</b>	Overlays or other relevant zoning.
<b>Safety &amp; Infrastructure</b>	Proximity to airfields, communications towers etc.
<b>Proximity to residences</b>	Number of residences within a certain distance of potential turbines.
<b>Local visual effect</b>	The extent of visibility from, in and around neighbouring dwellings.
<b>Orientation</b>	Orientation of potential turbines, the sun and nearby dwellings.
<b>Avifauna</b>	Presence or support for species of State, Federal or International significance.
<b>Heritage</b>	Aboriginal and European archaeological significance.

## **2.2 Site Description**

The site is located on rural land at Leonards Hill, approximately 10 km south of Daylesford. The subject land is bordered by the Leonards Hill–Bullarto South Road to the north and the Ballan–Daylesford Road to the east. The hill protrudes above the Wombat State Forest, and is cleared ground presently used for grazing and some cropping. The location of the site is shown in Figure 2.1.



**Figure 2.1 – Wind Park Location**

## 2.3 Land Ownership

The subject land is owned by one landowner, R&N Liversidge Pty Ltd, as trustee for the R&N Liversidge Family Trust of RMB 1207, Leonards Hill, Victoria.

The legal records of the land referred to as Leonards Hill are:

- ❑ Certificate of Title Volume 9845 Folio 484
- ❑ Certificate of Title Volume 10172 Folio 201

- ❑ Certificate of Title Volume 10172 Folio 202
- ❑ Certificate of Title Volume 10172 Folio 203

## **2.4 Wind Energy Resource**

### **2.4.1 Victorian Wind Atlas**

Victoria's average wind resources have been modeled by the Wind Energy Research Unit of CSIRO in order to produce the Victorian Wind Atlas, by applying existing Bureau of Meteorology data to the Windscape wind resource mapping tool developed by CSIRO. The level of analytical detail in the published Wind Atlas is limited to 3 km areas. The Victorian Wind Atlas identifies the area of the site as having levels of wind suitable for the viable generation of wind energy.

### **2.4.2 Wind Modelling for the Site**

A detailed assessment of the Wind Park site using CSIRO's Windscape wind resource mapping tool has been provided by Sustainability Victoria. This analysis demonstrates the wind regime of the Wind Park site is well above the Victorian average and is ideal for the generation of wind energy.

### **2.4.3 Wind Monitoring**

A wind monitoring mast was installed on the site in August 2006. The mast itself is 50 metres in height with wind anemometers and direction vanes located at 20 metres and 50 metres above ground level. Initial data reinforces the original computer modelling assessment to indicate the site is ideal for wind energy generation. Over time, the collected data will be correlated with local Bureau of Meteorology data to extend the veracity of collected data. Monitoring will continue to ensure seasonal variation is captured.

## **2.5 Dwellings within Proximity to the Site**

There are no dwellings within 500 m of the site.

There are 18 dwellings within 1 km of the Wind Park site of which two are owned by the landowner. A full discussion of each of these dwellings is provided in the Landscape and Visual Assessment in Volume 2.

## **2.6 Landscape Character**

Leonards Hill is cleared and lies within a largely cleared corridor that follows the north–south alignment of the Ballan–Daylesford Road. Beyond this cleared corridor to the east and west lies Wombat State Forest with tall messmate forest. The cleared areas are used for agriculture and rural lifestyle properties.

## **2.7 Grid Connection**

The power output from the Wind Park will connect into the existing 22 kilovolt (kV) distribution powerlines. A series of 22 kV distribution powerlines run across and alongside the Wind Park site. A System Study was conducted by Peter Wallace Engineer Pty Ltd to investigate the interaction of the Wind Park with the Powercor Distribution network and concluded the wind farm could operate within the requirements of the Victorian Electricity Code. These investigations were performed with the assistance of Powercor Australia Ltd. Powercor have indicated they will offer the Wind Park a full Connection Agreement.

## **2.8 Accessibility**

The Wind Park site is very well catered for by existing transport infrastructure. The Ballan–Daylesford Road adjacent to the site is a good quality main road which currently caters easily for vehicles of all sizes. It feeds directly into the Western Freeway approximately 20 kms from the Wind Park site.

The site itself is easily accessed from the Ballan–Daylesford Road west of the turbine locations. The site has gentle undulations allowing for relatively easy movement of equipment.

## **2.9 Flora**

The Wind Park site was inspected by the Department of Sustainability and Environment (DSE). The DSE assessed that the land has been used for grazing and cultivation for many years. Over that time exotic flora species have been introduced to the site. These activities have significantly impacted native vegetation and, as a result, little or no native vegetation now exists on the site.

The Wind Park construction process does not require the pulling down of large trees. Additionally, the Wind Park will not cause any erosion issues.

## **2.10 Fauna**

The Centre for Environmental Management, University of Ballarat was commissioned to prepare a Fauna Assessment for the Wind Park site. The full Assessment is provided in Volume 2.

The report concludes that avifauna species moving through the landscape are likely to use the native vegetation corridors located to the east and west of the site as well as the surrounding forest rather than the cleared area where the Wind Park is situated. There are no significant wetland habitats (Ramsar wetlands and protected areas) or other wetlands within five kilometres of the Wind Park site.

## **2.11 Cultural Heritage**

Under the Regulations of the Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*, the site falls within the boundaries of the Wurrundjeri Tribe Land Compensation and Cultural Heritage Council Incorporated. After consultation with the Hepburn Shire Council Planning Department and various State Government

authorities it was confirmed the Wurrundjeri are the relevant statutory authority for the site. It was noted however that the traditional landowners are the Dja Dja Wurrung.

An initial desktop Archaeological Assessment was completed by TerraCulture Pty Ltd and is provided in Volume 3. The Assessment examined legislative requirements for cultural heritage sites, and assessed the likelihood of the site having significance in terms of European or Aboriginal archaeology. It found that there were no Aboriginal nor historical archaeological sites known to be on or within the vicinity of the subject land. However, given that there were several significant Aboriginal and historical archaeological sites elsewhere within the Hepburn Shire, it was recommended that a field survey and sub-surface testing be undertaken on the subject land by a qualified archaeologist and an Aboriginal monitor.

The subsequent investigations were carried out by TerraCulture Pty Ltd along with a Wurrundjeri representative, Mr Bill Nicholson. A representative from the Dja Dja Wurrung was also invited to attend the on site investigations.

The field survey and sub-surface testing found no traces of either Aboriginal or European archaeological features or artefactual material.

The final assessment including the results of the on site investigations is provided in Volume 3.

## **2.12 Geotechnical Aspects**

The general region is comprised of 'newer volcanics' and 'basalt,' and an eruption point at the apex of Leonards Hill indicates that it is an ancient volcano.

The subsurface profile of the area generally comprises shallow surface residual silts, underlain by highly reactive silty clays which grade to variably weathered basalt rock with depth. Basalt floaters and closely packed boulders may be present above the basalt rock interface.

A Geotechnical Assessment of the site was conducted by Hardrock Geotechnical Pty Ltd, and is provided in Volume 3.

The Assessment found that the Leonards Hill site was well suited to construction activities. It made the following findings:

- ❑ The natural clay soils or low capacity rock should readily accommodate the load of the Wind Park.
- ❑ No significant difficulties are expected with the construction of the wind turbine foundations.
- ❑ The pavement construction plan was considered common practice with no difficulties foreseen.

Further targeted subsurface investigations including core sampling will be conducted as part of the Wind Park's design plan phase.

### 3 DETAILED PROJECT DESCRIPTION

The project will comprise the installation of two turbines to a maximum height below 110 metres and associated facilities as described within this Section.

In line with common best practice within Australia the construction of the Wind Park will be contracted with the turbine manufacture on a full Engineering Procurement and Construction (EPC) contract. This is a 'turnkey' contract. This approach gives the benefit of fully utilising the engineering and project management experience and skills of the turbine manufacturer to ensure the construction of a world class Wind Park.

#### 3.1 *Wind Turbine Generators*

The final design layout of the two turbines is in response to the site analysis as detailed in Section 2. The layout is shown in Figure 3.1.

It is intended the Wind Park will consist of two 2 MW wind turbines. The height of each wind turbine generator to the tip of the blade will be below 110 metres. The final selection of the particular wind turbine will depend upon commercial analysis, market changes and intervening technological developments. All modelling within this document is based on the Repower MM82 2 MW turbines. All modelling within this application assumes a tower height of approximately 68 metres and a blade length of approximately 41 metres.

The wind turbines are housed within nacelles which will be mounted on steel towers. The nacelle mounting allows it to pivot in all directions to ensure the blades are able to face directly into the wind at all times. The towers will have a diameter at the base of between approximately 4 and 5 metres and will taper to the top.

The wind turbines, blades and nacelle are expected to be imported whilst the towers are expected to be manufactured within Victoria.

The turbine blades rotate in a clockwise direction. The rotational speed varies with the wind between approximately 10 and 20 rpm. These turbines commence power

generation at wind speeds of approximately 3.5 metres per second, produce maximum power output at approximately 13 metres per second and cut out at wind speeds in excess of 25 metres per second.

### **3.2 Reflectivity and Colour**

The Landscape and Visual Assessment Study performed by John Cleary and provided in Volume 2 recommends the use of specific coatings for the towers, turbines and blades to blend with the background and reduce visibility.

The recommendations are:

<b>Blades and nacelle</b>	RAL 7035 – a very pale grey-blue coating which is low reflectivity.
<b>Tower above 10 m</b>	Pantone 427 C – very pale grey-blue coating.
<b>Tower below 10 m</b>	Pantone 5773 C - pale grey-green coating.

The paint type and colours selected are considered the most unobtrusive within a landscape and as the most 'easy on the eye' to observe. These colours and paint types are also effective at reducing any glare or reflectivity from the wind turbine tower and blades.

### **3.3 Engineering Design**

After Development Approval is secured the Hepburn Wind Co-operative Ltd will work with Future Energy Pty Ltd and engineering consultants to prepare the detailed Wind Park engineering design and documentation, the required tender documents and the Environmental Management Plan (refer to Section 7.11).

The Wind Park will be a turnkey contract (one contract with a turbine manufacturer to build the entire Wind Park and associated infrastructure) and will be project managed by Future Energy Pty Ltd with assistance from specialist project management consultants.

## **3.4 Associated Buildings and Works**

A representation of the site and the location of key features is shown in Figure 3.1. The following associated buildings and works will occur as part of the Wind Park construction.

### **3.4.1 Grid Connection**

An electricity industry specialist, Peter Wallace Engineer Pty Ltd, has completed a grid connection study in consultation with the local Distribution Network Service Provider (DNSP), Powercor Australia. The grid connection study concluded that the wind facility could operate within the requirements of customer voltage and line loading limits. The grid connection point for the assessment and agreed to by Powercor Australia is indicated in Figure 3.1.

No sub-station will be required. A small booth to house metering and control equipment and maintenance staff facilities will be located next to the point of grid connection. See Figure 3.1.

### **3.4.2 Underground cabling**

The turbines will be connected to the local electricity grid via underground 22 kV cable. This underground cable will follow the route of the access track. The trench for the cables will measure approximately 300 mm wide and 600 mm deep and be dug alongside the access track. The layout of the access tracks can be seen in Figure 3.1

### **3.4.3 Foundations**

Concrete foundations will be required for each wind turbine. The type of foundations will depend on the highly detailed geotechnical analysis which forms part of the wind farm engineering design phase. However the initial Geotechnical Assessment anticipates that mass pad footings will prove to be the most practicable foundation type. This type of footing comprises a below ground-level concrete mass footing approximately 2.5 m deep and 12-15 metres in diameter and does not require rock anchors.

### **3.4.4 Wind Monitoring Mast**

The existing 50 m monitoring mast may remain on site.

### **3.4.5 Site Office**

During construction a temporary site office will be located close to the turbine locations. The approximate position is shown in Figure 3.1.

### **3.4.6 Hard Standing Areas**

Hard standing areas next to the base of each wind turbine will be used for turbine assembly during the construction of the Wind Park and will measure approximately 20 m by 40 m. These hard standing areas will be re-covered with topsoil after commissioning to return the area to pasture. A small concrete batching plant may be required in the event local suppliers are not able to meet the construction demand. This will be determined as part of the engineering design and EMP for the Wind Park. If required on site, the batching plant would be alongside the staging area.

### **3.4.7 Access Tracks**

An access track will be constructed from the site entrance on the Ballan–Daylesford Road to the turbines. The route of this track is shown in Figure 3.1. The track will be approximately 5 m wide. This track will be used during the Wind Park construction and thereafter for maintenance vehicles to access each wind turbine.

The materials required for the construction of the access track are expected to be sourced locally. The detailed engineering of the track will form part of the Wind Park engineering and design phase of the project and be incorporated within the EMP.

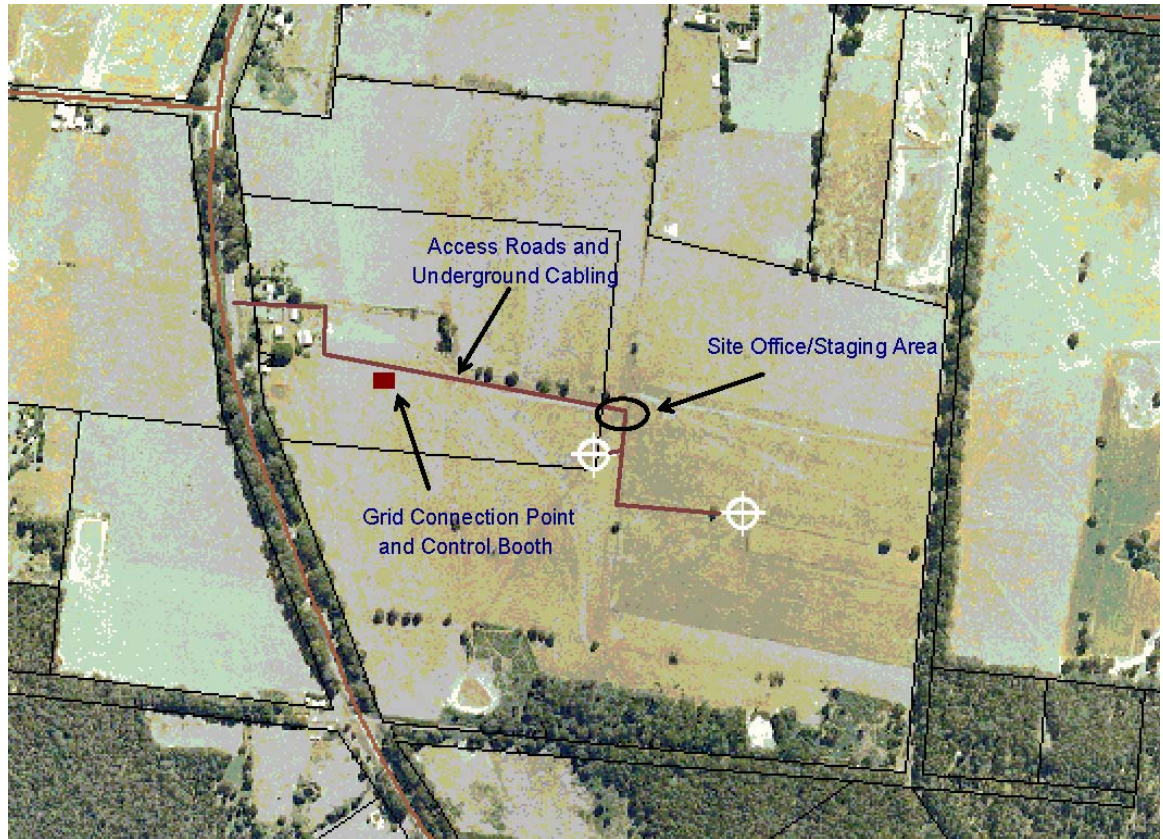


Figure 3.1 – Wind Park Layout

### 3.4.8 Parking Areas

The Wind Park will not require designated parking areas for its continued operation. The nature of the Wind Park site itself allows vehicles easy access to both turbine locations. The majority of ongoing visits to the Wind Park will involve general maintenance staff in 4WD cars. These visitors will simply use the areas around the turbines for parking.

### 3.4.9 Lighting

Under Subpart 139.E Obstacles and Hazards of the *Civil Aviation Safety Regulations 1998 (CASR)* there is no requirement to have night lighting on the turbines due to the overall height being below 110 metres.

### **3.5 *Micro-siting***

Prior to construction the project will undergo a complete engineering design phase as discussed in Section 3.3. During this phase, micro-siting of the turbines is required. There are many potential reasons for small changes to the initial Wind Park layout. These reasons may relate to construction issues, environmental imperatives or energy considerations. Allowance for micro-siting of each turbine by up to 100 m is required for best practice engineering design and construction. In the event of any change in the exact locations of either or both turbines due to the micro-siting process, all aspects of the Wind Park will maintain compliance with the conditions of the Development Approval.

### **3.6 *Construction Timeline***

The final completion date of the Wind Park will largely depend upon turbine availability. Due to the urgent and growing need for all forms of renewable energy installations around the world, currently there are quite significant worldwide delays in turbine deliveries. Notwithstanding this, it is hoped the Wind Park will be completed within 18 months of securing the Planning Permit.

The period of construction activity for the Wind Park will be approximately two months.

### **3.7 *Traffic***

The construction phase of the Wind Park will see an increase in local traffic. Once the Wind Park is operational the increase in traffic above present levels will not be discernible.

Traffic movements will be spread over the construction period of approximately two months. The first stage will involve truck traffic to bring materials for foundation and access track work. The second stage will involve the delivery of the turbine components. Six or seven trucks will be required to deliver each turbine (tower, nacelle and blades). The turbine components will be delivered via the Western Highway and the Ballan–Daylesford Road which is of a sufficient standard to easily handle this type of transport.

Cranes will remain on site for the installation hence will only arrive and depart once. It is intended that all deliveries are made on a 'just-in-time' basis.

Engineering, project and construction personnel will visit the site as required during the construction period. It is expected the majority of these personnel will either live locally or be staying locally during the construction period.

After construction the Wind Park will go through a period of commissioning followed by close monitoring. During this period there will be regular visits from technicians and maintenance personnel. This will decrease to an operational maintenance requirement of scheduled infrequent visits using a 4WD vehicle. These may be as often as one visit per month.

### **3.8 Reinstatement**

At the completion of construction and commissioning all areas such as road verges, hard stands, staging area and the site office area will be re-covered with topsoil to return to active pasture. The access track will remain for ongoing maintenance requirements.

### **3.9 Operation and Maintenance**

The operation of the Wind Park will not need anyone to be in attendance. The wind turbines automatically commence turning and producing energy as the wind reaches a cut-in speed. Likewise turbines cease turning as soon as high wind speeds are reached. Energy produced is automatically fed into the local grid and used.

The Wind Park automatically disconnects from the grid in the event of pre-determined scenarios (faults) according to the connection protocols of the local Distribution Network Service provider, Powercor Australia.

The Wind Park will be monitored remotely 24 hours per day under an agreement with the turbine manufacturer.

Under a long term maintenance agreement entered into as part of the Wind Park Construction Contract, routine scheduled maintenance will be undertaken each six

months. The maintenance function is likely to be carried out by local personnel who have received sufficient training from the turbine manufacturer. This maintenance will take approximately one day per turbine.

### **3.10 Decommissioning**

The Lease Agreement in place with the landowner requires the owner of the Wind Park to remove the wind turbines from the land at the end of the 25 year lease period. Additionally, the Environmental Management Plan will contain provisions to remove the turbines at the end of the final lease period.

However, depending upon the landowner's acceptance or otherwise of a new agreement, the following options may also be available:

- ❑ Continue maintaining and operating the turbines to produce renewable energy.
- ❑ Upgrade the turbines to more current technology and generate higher levels of renewable energy into the future.
- ❑ Remove the turbines in accordance with the Landowner Lease Agreement and the EMP.

It is expected a continuation or upgrade of the Wind Park at the end of the lease period will require new permits and conditions.

The procedure for the decommissioning of the Wind Park will be detailed in the EMP. It will involve the removal of the wind turbines including the towers. Access tracks would remain to assist the landowner with farming activities. The wind turbine footings would be re-covered with topsoil to return the area to pasture.

## 4 COMMUNITY OWNERSHIP AND CONSULTATION

### 4.1 *Project Objectives*

The project's objectives are to:

- ❑ Develop a community owned wind energy facility which will significantly contribute towards meeting the Hepburn Shire's present and future energy needs.
- ❑ Provide a demonstration project for uptake within other regional areas.
- ❑ Provide a long term viable investment opportunity for Hepburn Shire residents and contribute to the economic prosperity of the region.
- ❑ Promote the uptake of renewable energy to take responsibility for our own energy needs and to reduce the impact of global warming caused through using fossil fuels.

### 4.2 *Community Ownership Model*

Victoria has numerous successful corporately owned large scale wind farms, such as Challicum Hills (35 turbines), Codrington (14 turbines), Toora (12 turbines), Wonthaggi (6 turbines), and this year Yambuk (20 turbines). However, there is limited opportunity for Victorians to participate and directly invest in these projects because the facilities are owned by superannuation funds, private companies or government businesses.

Australia does not yet have any smaller scale community owned wind farms. Community owned wind farms have proven highly successful in Europe, U.S. and Canada. Examples of these can be found at the following websites:

- ❑ [www.windshare.ca](http://www.windshare.ca)
- ❑ [www.baywind.co.uk](http://www.baywind.co.uk)
- ❑ [www.westmill.coop](http://www.westmill.coop)
- ❑ [www.middlegrunden.dk](http://www.middlegrunden.dk)

The success of community ownership throughout Europe has resulted in many communities looking to participate in this type of renewable energy development. The approach has led to increased community acceptance and support for wind energy in regional areas.

#### 4.2.1 Community Ownership Benefits

The benefits of small scale community wind farms are:

- ❑ The community is provided with an income-generating renewable energy source, where the financial benefits remain local, rather than going towards large corporate or investment funds groups.
- ❑ The community is provided with a non-polluting renewable energy source which will meet its energy needs for at least 25 years.
- ❑ A smaller sized wind farm requires less land and hence will have less environmental impact during construction. The smaller size also reduces impacts upon visual amenity.
- ❑ It is easier to find small sites with consistently strong winds that are located close to the electricity grid.
- ❑ The wind farm is owned, controlled and supported by local communities with opportunities to contribute to a community's economy and social cohesion.
- ❑ Local control of the project increases community acceptance levels.

- ❑ The involvement of a large number of community members in the project leads to the development of local leadership and organisational skills, and the cementing of social bonds and 'sense of belonging'. This can translate into increased co-operation and collaboration in other community and business pursuits.
- ❑ The model provides a powerful vehicle for broader community education about sustainable development and renewable energy.
- ❑ The community gains a new icon they can be proud of, which highlights the progressive and cohesive nature of the community.

## 4.2.2 Ownership Structure and Management

Based upon examining international best practice, it is proposed that the Wind Park will be owned by the Hepburn Wind Co-operative Ltd (HWC) via a Special Purpose Vehicle (SPV) private company, Hepburn Community Wind Park Pty Ltd. The company will be 100% owned by HWC.

Under Victoria's *Co-operatives Act 1996* each Member of the Co-operative is entitled to one vote, regardless of their level of investment. This will ensure control is spread across the community.

The Hepburn Wind Co-operative (HWC) will be established in accordance with the *Victorian Co-operatives Act 1996* and be controlled by its elected Board of Directors. In accordance with *The Act* the Board will have no fewer than five elected Directors. It is expected one director will be a nominee of Future Energy Pty Ltd, to provide ongoing industry advice.

All matters relating to membership, structure, rules and management of the Co-operative will ultimately be determined by the Co-operative's Board of Directors.

### 4.2.3 Membership and Investment

As stated above all matters relating to membership of the Hepburn Wind Co-operative will ultimately be determined by the Co-operative's Board of Directors, however the objective is for 100% of the required funds to be sourced from local investors (Members). This will be achieved by giving priority to residents within pre-determined distances from the Wind Park. The range of Members may include individuals, businesses and superannuation funds.

After securing Development Approval, Future Energy will continue developing the project in conjunction with the Hepburn Wind Co-operative Ltd.

Future Energy will co-ordinate the preparation and distribution of a Product Disclosure Statement (previously known as a prospectus) in conjunction with the Hepburn Wind Co-operative Ltd. All financial aspects of the Wind Park will be clearly detailed in the Product Disclosure Statement.

In order to minimise any risk for Members the Product Disclosure Statement will only be issued after:

- All necessary approval processes are complete.
- Wind regime and energy output is known.
- Final grid connection agreement is secured.
- Terms for Wind Park construction, maintenance and energy sales are known.

Therefore the majority of the project risk is borne by Future Energy Pty Ltd in the stages prior to investor funds being committed.

Early financial modelling carried out by Future Energy Pty Ltd demonstrates that Members should receive an attractive overall return on their investment. This return has been enhanced as a result of the announcement of State Government funding support of \$975,000 from the Renewable Energy Support Fund (RESF) administered by Sustainability Victoria. Independent assessment of the project's financial framework, conducted by Sustainability Victoria, shows the project has a sound financial basis.

The Co-operative Rules will detail the exit process for Members who wish to curtail their membership and liquidate their investment. This process, along with all the Co-operative Rules, will be available as part of the Product Disclosure Statement.

### **4.3 Consultation**

Whilst it is intended to conduct further consultation activities during the detailed project planning phase, HREA and Future Energy have already commenced an extensive consultation and awareness raising program with both Daylesford residents and the communities closer to the Leonards Hill site. Additionally, a core part of HREA's activities will be continued consultation and education of energy issues throughout all phases of the Wind Park's life, from planning and construction to commencement and ongoing operation.

#### **4.3.1 HREA**

One of the key methods of communicating to the public has been through the establishment of the Hepburn Renewable Energy Association (HREA). At the time of lodgement, HREA had 370 members. It is expected this may reach 500 by the end of 2006. The Association is run by a Committee which comprises eight high profile and influential community members. It provides an excellent informal communication network into the community of the Hepburn Shire. It held its Annual General Meeting on 27<sup>th</sup> April 2006.

#### **4.3.2 Public Forums**

Two public forums have been conducted as follows:

The first, at Daylesford Town Hall on 14<sup>th</sup> September 2005, was attended by at least 55 people. Of those attendees, 46 people completed a Forum Feedback Questionnaire. The results demonstrated 95% of respondents were in favour of the concept of a community owned wind farm for the Shire.

The Feedback results are provided in Volume 3.

A second forum was held at the Leonards Hill Hall on 22<sup>nd</sup> November 2005. This forum was attended by approximately 16 people.

### **4.3.3 Visual Assessment Workshops**

Two Landscape and Visual Assessment Workshops were held on 3<sup>rd</sup> August 2006. The first workshop was specifically for residents within approximately 3 kms of the site and was held at Leonards Hill Hall at 6 pm. The second workshop was held at Daylesford Town Hall from 8 pm.

The Assessment Workshops were facilitated by Planning Consultant, John Cleary, and were attended by 34 people. Comments and feedback from the workshops were used in the formulation of the Landscape and Visual Assessment Study provided in Volume 2.

### **4.3.4 Website**

HREA established its website at [www.hrea.org.au](http://www.hrea.org.au) in May 2006. The website provides background and ongoing updates on the proposal, research articles, fact sheets, links, media releases, a Q&A section, and includes an easy facility for the public to submit questions and comments.

### **4.3.5 Home Visits**

Over 50 separate personal home visits have been made to landowners near the Wind Park site. This has enabled people living closest to the proposed Wind Park to speak directly with members of the HREA Committee to discuss all aspects of the project.

### **4.3.6 Information Tables**

Over 20 Information Tables have been set up in the main street of Daylesford, on Saturday mornings at peak shopping time. Additionally a number of Information Tables have been set up at local festivals including Harvest, Glenfest and Chillout.

The response from visitors to the Information Tables has been one of interest and encouragement. After learning about the project at the Information table many people have subsequently signed up as members of the Association.

Additionally nearly 100% of tourists who have visited the Street Tables have indicated their very strong support for the proposed project.

### **4.3.7 Newspaper**

Advice on the dates of public forums and general proposal information has been made available through paid newspaper notifications and letters. Over eight newspaper articles have been published on the subject of the Wind Park.

### **4.3.8 Information Newsletters**

HREA Newsletters have been published since November 2005 and distributed to all forum attendees, members and site neighbours. All issues are available on the website and have been reproduced in Volume 3.

### **4.3.9 Wind Farm Tours**

To allow local residents to experience the characteristics of wind turbines and wind farms for themselves, HREA organises free bus tours to the Challicum Hills wind farm. To date, approximately 130 people have gone on the wind farm tours:

- 34 people on 9<sup>th</sup> April 2006
- 37 people on 4<sup>th</sup> June 2006

- ❑ 31 people on 16<sup>th</sup> July 2006
- ❑ 29 people on 27<sup>th</sup> August 2006

HREA continues to organise regular tours. The tours are free but bookings are required by registering on the website, [www.hrea.org.au](http://www.hrea.org.au) or telephoning 5348 1298.

#### **4.4 Future Consultation Plan**

HREA plans to continue and expand the above types of consultation and communication activities. In addition, public awareness will be enhanced through the following supplementary activities:

- ❑ Further regular meetings with all residents within proximity of the Wind Park site.
- ❑ Further information briefing nights in Daylesford and around the Shire.
- ❑ Public display of this Planning Application.
- ❑ Display of information posters in public places.
- ❑ Distribution of information leaflets in main public areas.
- ❑ Publication of a PDS (prospectus).

## 5 ENERGY ISSUES, ENVIRONMENTAL and OTHER BENEFITS

### 5.1 Greenhouse

Victoria's Environmental Protection Agency (EPA) has recently conducted eco-footprint analysis to benchmark Victoria's sustainability progress against other countries. This found that Victoria has an eco-footprint of 8.1 global hectares, which is one of the worst in the world. One of the key reasons it is so high is Victoria's reliance upon energy from brown coal which has the largest impact upon creating greenhouse gases. Overall, Australia emits more greenhouse gases per capita than any other country in the developed world.

This Wind Park will assist the Shire of Hepburn to reduce its greenhouse footprint through:

Energy production per annum	<b>14,000 MWh</b>
Equivalent <b>number of households</b> <sup>1</sup>	<b>Approx. 2,500</b>
<b>Greenhouse</b> gas abatement	<b>Approx. 14,000 tonnes of CO<sub>2</sub></b>
Equivalent number of <b>cars off the road</b>	<b>3,200</b>
Equivalent number of <b>trees planted</b>	<b>20,000</b>

1: The Australian Bureau of Statistics (ABS) in 2001 records Daylesford as having 2,118 registered dwellings, which includes an allocation for transient tourists.

Over the 25 year life of the Wind Park, this equates to a reduction of 350,000 tonnes of CO<sub>2</sub>.

The Wind Park may also impact greenhouse emissions through the indirect benefits associated with education and raising awareness. Programs conducted through the HREA may assist local residents to incorporate other energy saving and efficiency measures into their way of life.

## **5.2 Community and Social**

The community and social benefits of the project are far-reaching and will span the lifetime of the project.

### **5.2.1 Community Programs**

It is intended that the Hepburn Wind Co-operative will use a portion of the annual profits from the operation of the Wind Park to fund local community programs.

The nature of the programs and the amount of funding will be determined by the Co-operative Board, however the initial financial modelling conducted by Future Energy demonstrates that the Co-operative will be able to allocate significant amounts to community programs each year and still maintain a very attractive investment return to Co-operative Members.

### **5.2.2 Employment and Training Opportunities**

The project will provide direct local employment opportunities during the construction period as well as during the operating life of the Wind Park. Other indirect employment opportunities are feasible through related activities.

With wide participation by members of the Shire, a large number of people involved in the Co-operative will develop expertise and knowledge of small scale wind farms and the wind energy industry in general. There is an opportunity to capitalise on this, as it is likely the concept will quickly be replicated throughout regional Victoria. Currently two other regional areas are investigating their own community owned wind energy. There are likely to be opportunities to conduct training for other regions and for some Members to fulfil consultancy roles. There will be ongoing employment in:

- Community education and training activities.
- Wind Park management, operation and maintenance.

There may be opportune employment in:

- ❑ General roles within the broader wind energy industry.
- ❑ Developing community co-operatives.

### 5.2.3 Development of Community Cohesion and Leadership

The project is initiated, funded and managed by members of the community. As such, it provides opportunities for Members to work constructively together which can increase social cohesion and help develop a feeling of connectedness and belonging amongst community members.

A key strength is that there are multiple avenues of participation available. This will maximise involvement as there is likely to be an approach that suits most people's individual needs. Roles may include:

- ❑ **Observer role.** Observing meetings and project construction, reading newsletters, or attending information sessions.
- ❑ **Participatory role.** Invest, participate in discussions/forums and wind farm tours, become a member of the HREA, attend Wind Park programs.
- ❑ **Leadership role.** Leadership roles are available at a senior level, with positions for Directors on the Co-operative Board. There will also be management and junior leadership roles in managing other aspects of the Wind Park, the Co-operative itself and the ongoing operation of HREA. Participation in such roles increases the skills, capacity and confidence of local people.

### 5.2.4 Increase in Social Bonds

Co-operative and shared activities amongst the community reduces social isolation and the potential negative aspects associated with this such as alienation and mental illness. There are also the benefits of synergies associated with increased interaction. This often

translates into further co-operative activities between like-minded businesses, parents and families, plus increased social activities enhancing community members' sense of well-being and enjoyment of life. A society with strong bonds provides resilience for both the Shire and the individuals and assists in making the Shire a desirable place to live.

## **5.3 Economic**

The Wind Park will bring economic benefits to the Shire, and to individual investors.

### **5.3.1 Shire**

The Shire will benefit economically as follows:

#### **Tourism and Visitors**

As the first community owned Wind Park within Australia, the project will draw interest from tourists with environmental concerns, plus interest from the wider society who have research or media interests. The Wind Park's profile as a demonstration project will draw attention to the Shire, providing more exposure and indirectly positively impacting upon visitor numbers. Increases in visitor numbers and tourism translates into increases in trade for local service oriented industries.

#### **Local Purchase**

During the construction and operational phases, aside from the main turbines, equipment pieces, it will be the project policy to 'buy local' wherever possible. This policy will result in the maximum possible amount of materials, services and staff being sourced from the local area. This may include the following products and services:

- Civil, electrical and general contractors
- Concrete supplies
- Construction equipment
- Earthmoving equipment
- General engineering and construction supplies
- Road construction materials
- Road construction contractors and equipment

### **5.3.2 Investors**

Early financial modelling carried out by Future Energy Pty Ltd demonstrates Members should receive an attractive overall return on their investment. This return has been enhanced as a result of the announcement of State Government funding support of \$975,000 from the Renewable Energy Support Fund (RESF) administered by Sustainability Victoria. Independent assessment of the project's financial framework, conducted by Sustainability Victoria, shows the project has a sound financial basis.

Overall, investors are offered a sound opportunity for a solid return for a 25 year duration. This means the financial returns from this worthwhile project will be distributed to the local owners. Funds will remain local and ultimately be spent locally which results in local economic benefits.

### **5.3.3 Landowner**

The landowner will receive a reliable annual rental return for each turbine which is indexed to inflation. This rental income adds to the local economy.

## 6 ALIGNMENT with GOVERNMENT POLICY

The development of the Hepburn Community Wind Park is an activity which directly supports the policies of the Commonwealth Government, the State Government and the Hepburn Shire Council. The dramatic impact it will have upon the Shire's greenhouse emissions solidly aligns the activity with Government's desire to create a sustainable society. In addition, the proposal supports numerous other objectives such as contributing to community cohesion and developing regional areas.

### 6.1 Commonwealth Government

The Federal Government's *National Greenhouse Strategy 1998* established Australia's Mandatory Renewable Energy Target (MRET). This target was set at 2% and required electricity companies to purchase new renewable energy to comply. The MRET was established to encourage the uptake of renewable energy.

### 6.2 Victorian State Government

Victorian Government policies are strongly supportive of the development of wind energy sources. Premier Bracks's statement in the *Policy and Planning Guidelines for Development of Wind Energy Facilities for Victoria* states that wind energy will be 'critical in achieving our goals for a sustainable future' and that 'we owe it to current and future generations of Victorians to ensure that we utilise this resource in the best way possible.' This support is reiterated throughout several policies:

#### 6.2.1 Our Environment Our Future

*Our Environment Our Future, Victoria's Environmental Sustainability Framework* set the following interim targets for the State:

- Increase the share of Victoria's electricity consumption from renewable energy sources from the current 4% to 10% by the year 2016 through the new Victorian Renewable Energy Target (VRET).
  
- Facilitate the development of up to 1,000 megawatts of wind energy in environmentally acceptable locations throughout Victoria by 2006.

## 6.2.2 Renewable Energy Policy Statement

In this statement, the Victorian Government reiterates its strong commitment to sustainable development. The policy aim is to diversify Victoria's energy sources, with renewable energy making an important contribution to meeting future energy needs.

## 6.2.3 Victorian Greenhouse Strategy Action Plan

As part of Victoria's broader Greenhouse Strategy, a *Renewable Energy Strategy for Victoria* was developed. This aims to address barriers to renewable energy investment and to facilitate growth of the industry. It also recognises and seeks to harness the opportunity the wind energy industry brings to stimulate innovation and new employment throughout Victoria. Long term strategies such as this highlight that wind energy facilities are a part of the future for Victoria, and that the industry is poised for growth and expansion.

## 6.2.4 Sustainability Victoria

Sustainability Victoria (formerly SEAV) is a strong supporter of community owned wind farms in Australia.

The Renewable Energy Support Fund which is managed by Sustainability Victoria was established in 2003 to assist the development of renewable energy in the State. After extensive investigation and assessment of the Hepburn Community Wind Park, Sustainability Victoria decided to give its full support to its development.

Sustainability Victoria, on behalf of the Victorian Government, has committed \$975,000 to help with the establishment of the Hepburn Community Wind Park. A letter of support from Sustainability Victoria is provided in Volume 3.

## 6.3 *Hepburn Shire Council*

The Hepburn Community Wind Park will assist the Shire in:

- Realising its Vision.
- Directly supporting several stated Objectives and Strategies within the 2006-2011 Council Plan.
- Supporting objectives of the Hepburn Shire Council Tourism Policy.

### 6.3.1 Vision

The Council's vision is for the Hepburn Shire to be a vibrant, creative rural Shire with strong and healthy connected communities. The natural environment, productive agricultural land and rich heritage will remain valued and protected as assets for residents and visitors to appreciate and enjoy.

The Wind Park supports this vision. Firstly, the Wind Park is an excellent example of a creative community-based solution to taking responsibility for local energy needs. The project is initiated and will be funded and managed by members of the community. As such, it provides opportunities for members to work constructively together and help develop a feeling of connectedness and belonging amongst community members.

Secondly, the Wind Park supports the image of Hepburn as a socially and environmentally responsible Shire, one which values the natural environment and has made a local contribution to protecting it.

With 80% of Australia's mineral springs, the Shire is enjoyed by visitors as an area of beauty and relaxation, as a leading centre in sustainable lifestyle choices. The Wind Park enhances that reputation.

### 6.3.2 Specific Objectives and Strategies

The Hepburn Community Wind Park directly supports several Objectives and Strategies set out in the 2006-2011 Council Plan, as listed in Table 6.1.

**Table 6.1 – Alignment with Council Strategy**

No.	Objective	Alignment
1.2	Enhance community connectedness, capacity building and leadership	<p>Community connectedness strengthened by:</p> <ul style="list-style-type: none"> <li>❑ Widespread participation in a large community owned and managed project.</li> </ul> <p>Leadership developed through:</p> <ul style="list-style-type: none"> <li>❑ Owning and managing the Wind Park, and the Co-operative.</li> <li>❑ Conducting community education and Wind Park sponsored programs.</li> <li>❑ The operation of the HREA (Association).</li> </ul>
3.2	Foster and encourage leadership	The Wind Park will be the first community owned wind farm within Australia. It will demonstrate the Shire's visionary leadership in providing strategic direction, quality decision making and enhanced community leadership.
3.4	Promote and encourage innovation	Undoubtedly the status of being the first Shire to facilitate such an innovation will become a source of pride within the community, reflecting the community's strong regard for innovation and sustainable living.
4.1	Develop partnerships with educational and research organisations	<ul style="list-style-type: none"> <li>❑ The project requires community and government co-operation and hence develops these links.</li> <li>❑ The Wind Park will incorporate community education programs.</li> <li>❑ Community education on sustainability has already occurred as part of the proposed development and through HREA. (Forums, Information Tables, wind farm tours, etc).</li> <li>❑ The mere existence of the Wind Park will indirectly educate Victorians about clean energy possibilities.</li> </ul>

No.	Objective	Alignment
4.2	Promote and market the Shire	<p>The Wind Park:</p> <ul style="list-style-type: none"> <li>❑ Will position the Shire as the Australian leader in community owned renewable energy innovation.</li> <li>❑ Will promote the Shire as being environmentally progressive.</li> <li>❑ Is a vehicle for investment in local infrastructure for Shire residents.</li> <li>❑ Makes a substantial contribution to building a friendly, connected and environmentally responsible community which makes the Shire an increasingly attractive place to live, work and invest.</li> </ul>
4.3	Encourage and support diversity of economic activity and employment	<ul style="list-style-type: none"> <li>❑ The Wind Park is a new economic activity and source of employment for the Shire.</li> <li>❑ Local staff and sub-contractors will be hired during construction and for ongoing management of the Wind Park as well as the Co-operative itself.</li> <li>❑ Local businesses will supply a large percentage of the products and services required for the Wind Park.</li> <li>❑ The Wind Park will bring tourists and observers to the Shire.</li> <li>❑ There is potential to capitalise on education and training opportunities within the wind energy sector.</li> </ul>
5.1	Promote and practise environmental management and sustainability	<ul style="list-style-type: none"> <li>❑ The Wind Park is a significant contribution to sustainable development through providing a large proportion of the Shire's energy using a sustainable resource (wind).</li> <li>❑ Removes the damaging environmental impact and intensive use of limited resources created through using fossil fuel based energy sources.</li> <li>❑ Reduces Shire greenhouse emissions by approximately 14,000 tonnes of CO<sub>2</sub> per annum.</li> </ul>

### 6.3.3 Hepburn Shire Council Tourism Policy

The Shire's Tourism Policy lists its first objective as supporting sustainable tourism.

The Hepburn Community Wind Park offers an excellent opportunity in this area. The Wind Park will be a symbol of the sustainable policies and practices of the Hepburn

community. Visitors to the Shire will learn about the need for renewable energy within a sustainable environment. Visitors to the Shire will feel they too are taking responsibility for their energy requirements.

The Wind Park may also prove to be a model for employing small scale wind energy in regional areas. It is likely that being the first community owned wind farm in Australia it will be the subject of much interest by media agencies, community groups and educational institutions. All of this will draw attention and visitors to the Hepburn Shire.

Regional areas with wind farms have enjoyed the benefits of increased visitors and tourists. There have been flow-on effects such as opportunities for tour operators, construction of visitor and interpretative centres, plus roles for educators. Community owned wind farms in Europe and Canada have been the subject of many documentaries, case studies and research articles.

The Wind Park brings another attraction to the Shire, one which is congruent with the Shire's image of being environmentally conscious and innovative, with a cohesive community and social structure.

## 7 PLANNING ASSESSMENT

The proposed design of the Hepburn Community Wind Park is the culmination of over 18 months investigation and assessment.

As the effects of climate change are being discussed more widely and seriously than ever before, the value of this project to the Hepburn community becomes ever greater.

This section details the various criteria for planning assessment of the Wind Park.

### 7.1 *Landscape and Visual Assessment*

There are no dwellings within 500 metres of the Wind Park's turbines.

A full Landscape and Visual Assessment Study has been completed by John Cleary Planning and is provided in Volume 2.

The assessment process included a number of components as follows:

- ❑ Identification of places or characteristics that the local community values highly (conducted as part of the project's community involvement program – see Section 4.3.3).
- ❑ An assessment of existing landscape values of the region.
- ❑ Definition of management aims and standards based on the objectives of key agencies, management precedents, and contemporary approaches to the management of landscape values.
- ❑ An assessment of physical changes, areas visually affected, visibility and appearance.
- ❑ An assessment of the impact that the assessed physical and visual changes will have on the landscape values of the region.
- ❑ An evaluation of the development based on the assessed impact and its compliance with objectives and standards.

- ❑ Recommendations and design guidelines (that may include modifications) outlining design treatments that will help ensure the development is appropriate for the site, that area's values, and will minimise impacts on values.

The Landscape and Visual Assessment made the following evaluations:

- ❑ The siting of the turbines has been designed to respond to the values of the area with the turbines located on the south-east side of Leonards Hill thereby maximising the distance from residences and roads.
- ❑ The Wind Park lies within a rural character type and this character will be retained but will be affected by the Wind Park structure, largely at a local level. The Wind Park will have a low effect on landscape character at a regional level. It will have a low to moderate effect on the character of a Level 2 travel route (Ballan–Daylesford Road).
- ❑ A low proportion of the significant features of the region (the high point of Leonards Hill) will be affected.
- ❑ The Wind Park will have little effect on views (i.e. will not obstruct them), access, wilderness quality and recreation values.
- ❑ The cumulative effect on the country to the south of Daylesford, from the Wind Park, is very low.
- ❑ The effect on tourism values could be positive.

The Landscape and Visual Assessment includes various recommendations including:

- ❑ The use of specific paint types and colours. These have been accepted and incorporated into the design of the Wind Park (see Section 3.2).
- ❑ Continuing to consult with nearby neighbours in relation to potential screening techniques such as providing planting of selected vegetation if reduced views are preferred.

## **7.2 Views of the Wind Park**

One of the key reasons behind the selection of the Leonards Hill site was its minimal impact upon significant landscape values. Unlike many of the other hills within the Shire, Leonards Hill has not had a Significant Landscape Overlay placed on it.

Due to the large amounts of natural vegetation around the hill, views of the turbines will be heavily screened when close to the hill.

The best uninterrupted views of the Wind Park will be further from the hill at distances of approximately 3 kms. Some areas in Sailors Falls will provide the best views of the Wind Park.

The Landscape and Visual Assessment Study provided in Volume 2 contains photographic simulations of the Wind Park from a series of vantage points around the district.

### **7.2.1 Views from Close to the Wind Park**

The ideal method for gaining an understanding of the potential views of the Wind Park from near the site is to assess the current views of the installed wind monitoring tower. This monitoring tower is placed relatively close to the proposed position of western turbine.

The existing monitoring tower is 50 m high and is therefore close to three quarters the height of the proposed wind turbine towers and a little less than half the height of both the wind turbine tower and turbine blade.

Much of the area around Leonards Hill will not afford views of the turbines due to the large amount of roadside vegetation along both the Ballan–Daylesford Road and the Leonards Hill–Bullarto South Road.

There are no dwellings within 500 metres of a wind turbine.

A visual assessment for each of the 18 dwellings within 1 kilometre of a wind turbine is provided in the Landscape and Visual Assessment Study in Volume 2.

### **7.2.2 Sailors Falls Vantage Points**

Residents in Sailors Falls will see the wind turbines from certain locations. The best views are from Telegraph Road relatively close to the Ballan–Daylesford Road. A photographic simulation from Telegraph Road is included in the Landscape and Visual Assessment Study in Volume 2.

### **7.2.3 Daylesford Vantage Points**

Daylesford is approximately 10 kms from the Wind Park. From key vantage points, Leonards Hill is quite discernable given good weather conditions. Correspondingly, in good weather conditions, it will be possible to have a clear view, if somewhat distant, of the wind turbines at the Wind Park.

### **7.2.4 Visitor Driving Routes**

The main access routes to Daylesford and other Hepburn Shire key tourist locations are via Ballan and Woodend.

The route via Ballan (Western Highway) provides limited to non-existent views of the Wind Park due to the roadside vegetation and the Wombat State Forest in general.

The route out of Daylesford towards Ballan provides intermittent clear views of the Wind Park from areas around Sailors Falls and the Sault Reception Centre through to the Leonards Hill area.

## 7.3 Flora

The Department of Sustainability and Environment (DSE) has advised that a Flora Survey Report is not required as part of this application for a planning permit. This is explained as follows:

*The department has inspected the subject site and found that past and present land uses (e.g. cultivation, grazing, introduction of exotic species, etc.) have had such significant impacts on native vegetation, that little or no native vegetation exists on the site (i.e. with the exception of a small area at the southern end of CA B4, which is unlikely to be impacted upon).*

The letter of advice from DSE is attached in Volume 2.

## 7.4 Fauna

### 7.4.1 Background

(Below information sourced from [www.AUSWEA.com.au](http://www.AUSWEA.com.au)) Wind turbines, like virtually all tall man-made structures, present a collision risk to birds and bats. The risks however are very low when compared to risks of collision with other structures such as communications towers, tall buildings and transmission towers. The impact of wind turbines on birds and bats is insignificant compared to the impact of domestic cats and the loss of habitat through development or even more dramatically, the chronic impact of ecological change due to climate change. Statistics gathered from wind farm experiences both overseas and within Australia demonstrate this.

#### Overseas Experience

A US study published in 2001 found that the number of bird collisions per year were as follows:

- ❑ Vehicles: 60 – 80 million
- ❑ Buildings and windows: 98 – 980 million
- ❑ Powerlines: (tens of thousands) – 174 million

- ❑ Communications Towers: Up to 50 million
- ❑ Wind Generation Activities: Up to 40,000

The study found that wind farms killed an average of 2.9 birds per turbine, per year. However this statistic included the fatalities at early wind farms which were unfortunately sited in areas of high avian usage.

### **Australian Experience**

Australian figures are lower than overseas rates due to a lower overall quantity of night-migrating songbirds and more carefully sited wind farms.

- ❑ **Codrington Wind farm:** (14 Turbines). 4 bird deaths and 1 bat death over 3 years. None of these were rare, threatened or endangered species. Behavioral studies since opening indicate that water-birds seem adept at avoiding the turbines.
- ❑ **Stanwell's Toora Wind farm:** (12 Turbines). 6 bat deaths in 1 year, declined magpies and ravens in the area, while skylarks and gold-finches increased. Wedge-tailed eagles were regularly observed before and after operations began, but these were observed to avoid the turbines by flying around or between them, not into them. Over two years, surveys have found no evidence of significant levels of bird mortality, with the impact confined to indirect effects on common farmland birds. Impact upon bats has no conservation significance.
- ❑ **Woolnorth Wind Farm, Tasmania:** (37 Turbines). Stage 1 bird study results found mortality rates were lower than predicted. After 2003, 9 birds were reported as having collided with the wind turbines, one being a wedge-tailed eagle, which is threatened within Tasmania but not mainland Australia. Hydro Tasmania has been required to make a contribution to species recovery.

Overall, these Australian experiences repeatedly show a consistent situation of wind farms having a low impact upon birds or bats.

## 7.4.2 Wind Park Fauna Assessment

A Fauna Assessment was conducted by Ballarat University and is provided in Volume 2.

The Assessment found that there are no indications within the existing Atlas of Victorian Wildlife (AVW) records, or from the site assessment, that significant species utilise the proposed Wind Park site. The habitat present at the Wind Park site does not provide a suitable habitat for significant species recorded in the surrounding area. There are no indications that the Wind Park would have a significant impact on any species or species group.

Overall it was assessed that the risk associated with the Wind Park is low for threatened and listed species, birds that flock or occur in low numbers, and species or groups of species that are prone to collision with turbines or to indirect effects from wind farms.

## 7.5 Biodiversity

As described by DSE, the site is considered to have little or no native vegetation, whilst the Fauna Assessment found the site provides no significant habitat location for any species. Accordingly, it assessed that the development of the Wind Park will have a low impact on the biodiversity of the bio-region.

Animals, birds and plants that currently use the site (such as common farmland birds, and insects) will continue to utilise the area during construction and operation of the wind farm. Construction of the wind farm will disrupt the soil in select areas and the noise of construction may cause some birds to fly away from the site. The overall impact upon biodiversity is considered minimal and is comparable to any other construction activity or other human activities, such as vehicle use on roads, within the area.

In terms of perspective, it is important to recall that the aim of renewable energy sources is to reduce the impact of climate change, which, in comparison to wind turbines, presents a massive threat to biodiversity. As quoted in the Steffen Report (Volume 2):

*The Millennium Ecosystem Assessment (MEA) projects significant and largely irreversible loss of biodiversity this century, due to a combination of direct human modification of habitat and climate change, with the latter expected to play an increasingly important role later in the century. The extinction rate, currently 100 to 1000 times greater than the background rate as shown in the fossil record, is projected to increase by more than 10 times this already high rate. The MEA reports, with medium to high certainty, that 10-30% of all mammal, bird and amphibian species are currently threatened with extinction.*

## **7.6 Cultural Heritage Impact**

The Wind Park site falls under the area of the Wurrundjeri Tribe Land Compensation and Cultural Heritage Council Incorporated for statutory purposes. However the traditional landowners of the Wind Park site are the Dja Dja Wurrung people. (Refer to letter from Department of Victorian Communities, Aboriginal Affairs Victoria provided in Volume 3.)

An Archaeological Assessment was contracted to be performed by consultant archaeologists under the monitoring of a representative from the Wurrundjeri people. However, as a matter of respect, the Dja Dja Wurrung were invited to attend the assessment.

Additionally, regular communication with Uncle Brien Nelson, a respected elder of the Dja Dja Wurrung, continues in order to ensure he is informed of all aspects of the Wind Park design and progress.

It is hoped the Dja Dja Wurrung people will continue to be involved in the Hepburn Community Wind Park.

### **7.6.1 Aboriginal Heritage Issues**

An Archaeological Field Survey including sub-surface testing was conducted by TerraCulture Pty Ltd on 3<sup>rd</sup> August 2006 and monitored by Mr Bill Nicholson representing the Wurrundjeri Tribe Land Compensation and Cultural Heritage Council Incorporated.

Sub-surface testing was conducted around the sites of each turbine location. No traces of Aboriginal archaeological artefacts or features were recorded in either turbine area.

The Assessment recommended no further investigations were required.

## **7.6.2 European Heritage**

The Archaeological Assessment found that no historical sites are known to be on or within the vicinity of the subject land.

As such there is no identified impact upon European heritage issues.

## **7.7 Noise Impact**

### **7.7.1 General**

Anyone who has visited a modern wind turbine will attest to how surprisingly quiet they are.

Advances in technology have reduced the noise that wind turbines make. The wind turbine gearbox and generator will emit some noise, and noise is also created from the 'swoosh' of the blades. The wind blade noise decreases in low wind periods and increases in high wind. Noise impact needs to be considered against the amount of background noise to which the listener is already subjected. Hence in high wind periods, the noise of wind itself may mask the increased noise of the wind turbine blades. Similarly the regular sounds of traffic and hums of electrical goods in homes can mask low sounds. The sound of a wind farm 100 metres away would be inaudible in many urban areas due to normal background noise. In general terms, the type of wind turbines being considered for the Wind Park are such that a normal conversation could be held at the base of a wind turbine without any need to raise one's voice.

## 7.7.2 Required Standards

The *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria* state that noise levels should comply with the *New Zealand Standard NZS6808:1988 Acoustics – The Assessment and Measurement of Sound from Wind Turbine Generators* ([www.standards.co.nz](http://www.standards.co.nz)). This requires that for nearby dwellings, the noise of the wind farm must be below 40 decibels (dBA) or 5 dBA above background noise levels, whichever is the greater.

A full Noise Assessment has been carried out by Marshall Day Acoustics Pty Ltd and is provided in Volume 2. This Assessment found that all resident sites clearly and easily comply with the Guidelines.

## 7.7.3 Noise During Construction

Noise will be created through the actual construction of the Wind Park. This will be caused by truck movements and some building activities. These type of activities will only occur during normal working hours to reduce the impact upon nearby dwellings. The total construction period is expected to be approximately two months, half of which will involve very little on site activity.

## 7.8 Other Potential Impacts

### 7.8.1 Blade Glint

Blade glint occurs with reflection of the sun's rays off the turbine blades. In accordance with the recommendations contained within the Landscape and Visual Assessment (Volume 2) the blades for the Wind Park will be finished with a low-reflectivity paint. This will ensure that any potential impact from blade glint will be minimised or avoided completely.

## 7.8.2 Shadow Flicker

The movement of wind turbine blades can create a moving shadow, which varies in length and size depending upon the position of the sun in the sky. This rotating shadow does not turn fast enough to produce any health effects. However, it could cause a nuisance if it affects a dwelling.

Careful siting of individual wind turbines can avoid the potential for shadow flicker. Shadow flicker is largely limited to locations to the east or west of wind turbines in line with the setting and rising sun, respectively.

A draft South Australian planning bulletin on wind farms notes that shadow flicker is unlikely to be a significant issue if a separation distance of 500 metres is maintained between the turbine and any dwelling or defined urban area. There are no dwellings within 500 metres of either turbine in the Wind Park.

It is a further guideline of the *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria* that shadow flicker experienced by any dwelling must not exceed 30 hours per year.

A full Assessment of Shadow Flicker impact was carried out by Garrad Hassan Pacific Pty Ltd and is provided in Volume 3. This Assessment incorporates information about the turbine positions, locations of dwellings, the varying position of the sun in the sky throughout the year, the incidence of cloud cover and surrounding screening vegetation.

The Assessment found all dwellings comply with the Guidelines.

## 7.8.3 Electromagnetic Interference (EMI)

In general VHF and UHF frequency band radio signal and digital voice based technologies such as GSM and CDMA mobile are essentially unaffected by a wind farm development.

An Assessment of Electromagnetic Interference Issues was carried out by Garrad Hassan Pacific Pty Ltd and is provided in Volume 3.

It concluded that no broadcast or communication towers were identified within 1 km of the Wind Park and therefore analogue television broadcast signals will not be affected.

Additionally no point to point transmission signals were identified within 2 kms of the site and therefore the Wind Park will not interfere with any microwave communications.

There will be no impact on radio or television transmission.

## **7.9 Aviation Impact**

### **7.9.1 Aviation Facilities Nearby**

The Civil Aviation Safety Authority (CASA) have been consulted regarding the proposed Wind Park. CASA has advised there are no certified or registered aerodromes near the Wind Park site.

Mr Frank Leonardi, Aerodrome Engineer in the Airways and Aerodromes Branch of CASA has advised that the site is not within any Obstacle Limitations Surfaces. CASA advises therefore, that due to the top of the wind turbine structures being lower than 110 metres above ground level, there is no requirement to advise CASA. This is covered under Subpart 139.E Obstacles and Hazards of the *Civil Aviation Safety Regulations 1998* (CASR) a copy of which is provided in Volume 3.

However in keeping with *CASA Advisory Circular AC 139-08(0) April 2005 Reporting of Tall Structures* which is provided in Volume 3, notification will be made to the Royal Australian Air Force Aeronautical Information Service to include the wind turbines on their database of tall structures upon construction of the Wind Park.

### **7.9.2 Night Lighting**

As the overall height of the wind turbines will be less than 110 metres above ground level there will be no requirement to install night lighting on the turbines.

## **7.10 Socio-Economic Impact**

The socio-economic impacts of the Wind Park will be overwhelmingly more positive than negative. A discussion of these impacts is provided below.

### **7.10.1 Positive Impacts**

As described earlier (Section 5), it is predicted with confidence that the Hepburn Community Wind Park will have many positive impacts upon the Shire's society and community, plus several economic benefits. In summary these include:

#### **Community**

Increased social cohesion, co-operation and local pride, via the use of a Co-operative, and through the HREA's continued community activities.

#### **Social**

Increased regional employment, opportunities for individuals to gain new skills and knowledge of the wind industry.

#### **Economic**

Increased tourism and visitors as a result of high exposure as the first Australian community owned wind farm, benefits of local employment and the 'buy local policy' of the project, benefits of increasing the skills and capacity of local residents.

## **7.11 Environmental Management Plan**

An Environmental Management Plan (EMP) will be developed on project authorisation. Given the strong environmental concerns of the HREA, it is intended that the EMP will achieve best practice in delivering the project in the most environmentally conscious and sustainable manner. The EMP will be published on the HREA website for public viewing. The EMP will include:

- ❑ Principles of environmental management.
- ❑ Measures to mitigate environmental effects.
- ❑ Standards to be met.
- ❑ Maintenance and monitoring requirements.
- ❑ Decommissioning and rehabilitation requirements.
- ❑ Post-construction review of management measures to ensure best possible outcomes.

## 8 CONCLUSION

In conclusion, the Hepburn Community Wind Park presents immense benefits with very low impacts. These can be summarised as:

### Impacts

- ❑ Very low impact upon visual amenity.
- ❑ Very low to negligible impact upon fauna/flora or biodiversity.
- ❑ Minor impacts upon traffic and noise during construction.
- ❑ No impacts upon heritage or Aboriginal values.
- ❑ No impact upon aviation activities.
- ❑ Widespread community support.

### Benefits

- ❑ A clean source of energy for the Hepburn Shire region, for 25 years.
- ❑ Shelter the Hepburn shire from possible impacts of reductions in fossil fuel availability or increased fossil fuel prices as society seeks to implement legislative and fiscal responses to curb climate change.
- ❑ Financial benefits for individuals, landowner, and local businesses through increased local investment, employment and visitor numbers.
- ❑ Community building and opportunities for participation and leadership for community members in a local project.
- ❑ A new tourist site for the region, bringing increased visitors and profile.
- ❑ Enhanced image of Hepburn Shire as being a progressive, cohesive and environmentally friendly region.

## Context

With reliable evidence that climate change is occurring and even accelerating, governments globally face the difficult task of responding to this threat. As stressed within the United Nations sponsored IPCC reports, the sooner communities and regions commence an adaptation strategy, the easier the inevitable change and transition will be. Recognising the seriousness of this situation the Victorian Government has multiple strategies and policies in place to support the development of renewable energy sources.

The model of community owned wind farms has already proven highly successful in Europe and the U.S. The two turbine Hepburn Community Wind Park fits perfectly with the reputation of the Hepburn Shire.

The Hepburn Shire is in a unique position to be the leading Australian community, taking responsibility for its own energy requirements and at the same time enhancing the Shire's profile and reputation.

## 9 REFERENCES

Steffen, Will, *Stronger Evidence but New Challenges: Climate Change Science 2001-2005*. Department of Environment and Heritage, Australian Greenhouse Office, March 2006

Intergovernmental Panel on Climate Change (IPCC), Third Assessment Report (TAR). *Climate Change 2001: Synthesis Report Summary for Policymakers*. Presented at the IPCC Plenary XVIII (Wembley, United Kingdom, 24-29 September 2001)