PRELIMINARY ASSESSMENT OF THE IMPACT OF WIND FARMS ON SURROUNDING LAND VALUES IN AUSTRALIA

Prepared for:

NSW Valuer General

August 2009

DUPONTS IN ASSOCIATION WITH PRP VALUERS AND CONSULTANTS

CONTENTS

EXECUTIVE SUMMARY

- The aim of this study was to conduct a preliminary assessment on the impacts of wind farms on surrounding land values in Australia, mainly through the analysis of property sales transaction data. This included consideration of the contribution of various factors (including distance to a wind farm, view of a wind farm, and land use) to any price changes, positive or negative.

- A review of wind farms currently operating in Australia revealed that they have been developed in locations generally removed from densely populated areas. As a result the small samples of sales transactions available for analysis limited the extent to which conclusions could be drawn.

- This study investigated eight (8) wind farms across varying land uses (rural, rural residential, residential) using conventional property valuation analysis. Two (2) wind farms were selected in NSW and six (6) in Victoria.

- The main finding was that the wind farms do not appear to have negatively affected property values in most cases. Forty (40) of the 45 sales investigated did not show any reductions in value. Five (5) properties were found to have lower than expected sale prices (based on a statistical analysis). While these small number of price reductions correlate with the construction of a wind farm further work is needed to confirm the extent to which these were due to the wind farm or if other factors may have been involved.

- Results also suggest that a property's underlying land use may affect the property's sensitivity to price impacts. No reductions in sale price were evident for rural properties or residential properties located in nearby townships with views of the wind farm.

- The results for rural residential properties (commonly known as 'lifestyle prop's') were mixed and inconsistent; there were some possible reductions in sale prices identified in some locations alongside properties whose values appeared not to have been affected. Consequently, no firm conclusions can be drawn on lifestyle properties.

- Overall, the inconclusive nature of the results is consistent with other studies that have also considered the potential impact of wind farms on property values.

- Further analysis (with additional data and expansion of the study area to other states) may yield more comprehensive results. Notwithstanding this, further studies are also likely to be limited by the availability of sales transaction data.

1. INTRODUCTION

1.1 INSTRUCTION

PRESTON ROWE PATERSON NEWCASTLE AND CENTRAL COAST WAS FORMALLY INSTRUCTED BY:

Richard Sollorz for and on behalf of Department of Lands

INSTRUCTION DATE	26/06/2009
PURPOSE OF REPORT	TO CONDUCT A PRELIMINARY ASSESSMENT OF THE IMPACT OF WIND FARMS ON SURROUNDING LAND VALUES

The report conforms to the Professional Ethics and Practice Standards of the Australian Property Institute.

1.2 BACKGROUND

Renewable energy - and wind energy in particular - is growing strongly in NSW and Australia. This growth is expected to increase with the introduction of the Commonwealth's Renewable Energy Target to 20 per cent of Australia's electricity supply by 2020, which is expected to drive major new investment.

The impact of wind farms on surrounding land values is a common source of conflict between proponents and objectors to proposed wind farms. This is hampered by the fact that there is relatively limited objective information available on this issue, including in a NSW context.

1.3 PURPOSE

The main purpose of this study is to provide objective and credible information to allow the issue to be considered in a more constructive fashion.

Furthermore, information was sought on the contribution of various factors (including distance to a wind farm, view of a wind farm, and land use) to any price changes, positive or negative.

1.4 SCOPE OF DILIGENCE

This report has been written in response to a request from the NSW Valuer General for a preliminary study on the impact of wind farms on surrounding land values in Australia. The aim of this study was to undertake a preliminary investigation through the analysis of property sales transaction data.

The authors have attempted to review all of the literature on the topic to date, and have completed a study based on the most appropriate methodology given both the sample data characteristics and the reporting time frame.

2. CONTEXT

Wind farms in Australia are a relatively new industry. The first wind farm connected to the national energy grid was built in 1998 at Crookwell in NSW. Since then, 42 wind farms have been built in Australia with many more in planning or feasibility stages (Wikipedia, 2008). In addition to the production of renewable energy, the wind farms typically provide economic benefits for the host towns. Economic benefits include the creation of jobs during construction, ongoing maintenance jobs, rental income for properties with wind turbines on them and, in some cases, increased tourism.

However, there are often community concerns emanating from perceptions about the impact a wind farm could have on the value of the surrounding properties. These perceptions are understandable as visual impacts which alter the aesthetics (i.e. views) of a property and noise are known to be able to effect property values (Simons & Saginor, 2006 cited in Hoen & Wiser, 2008). Some examples of the potential influence of aesthetics and noise are listed below.

Aesthetics:

- Properties with water views generally sell for a higher price than those without water views.
- Views of high powered transmission lines can reduce the value of a property.
- Views of highways can reduce property values.

Noise:

- Properties on main roads often sell for a lower price than those located away from main roads where there is less traffic noise.
- Properties under aircraft flight paths frequently sell for a lower price than those nearby.

A wind farm has the potential to impact the area surrounding it both visually and audibly. A wind turbine is a large structure commonly around 100 meters in height with three (3) blades with diameters almost as large as the height of the base tower. The aesthetics of a view of a wind farm are affected by the distance the observer is located away from the wind farm, the positioning, and the number of turbines. Turbines positioned closer together generally have a greater potential to impact on the aesthetic appearance than those that are spaced further apart. As the density of turbine placement increases the potential for the wind farm to take on more industrial like appearances increases. However, whether the view of a wind farm is considered to be a negative one or not is largely subjective and studies looking at people's perceptions often find varying opinions (Bond, 2009; RICS, 2004).

Wind turbines also generate noise that can be heard at varying distances, depending on a range of factors such as topography and weather conditions.

While wind farms can impact views and generate noise, studies completed to date analysing sales transaction data have not found consistent evidence of obvious discernible negative impacts on property values due to the presence of wind farms. A review of the current literature on the topic follows.

3. LITERATURE REVIEW

There has been little research in Australia and overseas on the impacts of wind farms on surrounding property values. The limited research that has been completed generally falls into two categories:

- Studies that have analysed property sales transaction data, and
- Studies that have investigated the opinions of residents and/or property industry professionals on the impact of wind farms.

3.1 PROPERTY SALES TRANSACTION DATA RESEARCH

A summary of previous studies which have analysed sales transaction data is presented below. The studies vary in size and methodology. While some studies have found slight negative impacts, the larger more comprehensive studies have generally found no statistical evidence of reductions in value associated with the development of a wind farm. A more detailed description is provided in the following subsections.

Author (Year)	Nation	Methodology	Finding
Jorgenson (1996)	Denmark	Sample: 102 locations Analysis: Hedonic price modelling	Slight reduction in value found.
Sterzinger et. al. (2003)	US	Sample: 25,000 Analysis: Hedonic price modelling	Increases in values found.
Henderson & Horning (2006)	Australia (Crookwell, NSW)	Sample: 78 Analysis: Conventional valuation analysis	No reduction in value found.
Sims & Dent (2007)	UK	Sample: 1,052 Analysis: Hedonic pricing modelling	No conclusive statistical relationship found.
Hoen & Wiser (2008)	US	Sample: 450. Analysis: Hedonic price modelling with physical inspections of each sale. Possibly most robust study to date.	No statistical relationship found. Some isolated cases of value reduction.
Hives (2008)	Australia (Waubra, Victoria)	Sample: 12 Analysis: Conventional valuation analysis	No reduction in value found for rural properties. Possible reduction found in lifestyle properties.
Jess (2008)	Australia (Victoria)	Sample: 7 Analysis: Conventional valuation analysis	Revealed developer had purchased surrounding properties. One property value estimated to have reduced by 30% but subjective.

3.1.1 *"Social Assessment of Wind Power: Visual; Effect and Noise from Windmills – Quantifying and Valuation" – Jørgensen (1996) - Denmark*

One of the earliest studies that investigated the impacts of wind farms on property prices was conducted by Jørgensen (1996) in Denmark. The impact of wind farms on property sale transaction prices in 102 locations were analysed using a 'hedonic' pricing method. Hedonic modelling investigates the relationship between variables and an item being investigated (such as property value) by deconstructing the item being researched into its constituent characteristics and obtaining estimates of the contributory value of each characteristic. This is usually achieved through a statistical method known as 'regression analysis' (Wikipedia, 2008).

Jørgensen (1996) found that, on average, properties located close to a wind turbine sold for 16,200 DKK (approximately $3,700 AUD) less than those located further afield. Furthermore, on average properties located close to 12 or more wind turbines sold for 94,000 DKK (approximately $21,600 AUD) less than those located further afield. However, as noted by Sims and Dent (2007) the impact overall was relatively small and some of the results were not statistically significant.

3.1.2 *"The Effect of Wind Development on Local Property Values" – Sterzinger, Beck & Kostiuk (2003) – United States*

One of the largest studies completed to date was undertaken in the USA by Sterzinger, Beck and Kostiuk (2003). The report was commissioned and published by the Renewable Energy Policy Project (REPP). The study compared the average monthly change in value of properties across three scenarios:

- First scenario - compared changes in value of (a) properties located in the view shed of a wind farm with (b) properties in a comparable region for a period of three (3) years before the wind farm started operating and three (3) years after it started operating.
- Second scenario - compared changes in value of properties located in the view shed of a wind farm (a) in the period before the wind farm started operating to (b) changes in the period after it started operating.
- Third scenario - compared changes in value of properties located in the view shed of a wind farm with properties in a comparable region but only for the period after the wind farm started operation.

The view shed of a wind farm was defined to include those properties located within a five (5) mile radius (approximately eight (8) kilometers) of a wind turbine. Comparable regions were selected based on the area not having a view of the turbines and having similar demographics to the view shed areas. This was performed across ten (10) wind farm locations and a total of 25,000 property sales were analysed. This resulted in 30 separate analyses (Sterzinger et al., 2003).

In all but four (4) of their analyses Sterzinger et al. (2003) found that the change in property values was positive and greater in areas affected by the wind farm than in the comparison area.

Sterzinger et al. (2003) concluded that property values generally increased faster after a wind farm started operating and faster within the view-shed of the wind farm than in comparable areas located further away from wind farms.

3.1.3 *"Property Stigma: Wind Farms Are Just the Latest Fashion" – Sims & Dent (2007) – United Kingdom*


Property stigma: wind farms are just the latest fashion

Sims and Dent (2007) investigated the impacts of wind farms on property values in the UK. The study was based on an analysis of 1,052 sales of houses over a period of five (5) years from areas surrounding two (2) wind farms in Cornwall in the UK. The two (2) wind farms were selected based on a sufficient number of residential properties being located within five (5) miles (approximately 8 kilometres) from the turbines. A third wind farm was also selected for analysis, however, the presence of an open cut mine next to the residences was considered to limit the extent to which conclusions could be drawn in this area.

Sales were adjusted to an inflation index to allow for the analysis of the present value of each property in the sample. The data was then analysed using multiple regression, correlation and frequency analysis with the main variable analysed being the distance between the properties and the wind turbines.

The results of Sims and Dent (2007) were varied for different models. Overall, there was no conclusive relationship found between distance to a wind farm turbine and property price with only terraced and semi detached properties located in a mid range (3.5 to 4 miles) from a wind farm found to be related to a reduction in property price.

Sims and Dent (2007) conclude by outlining that their results may be more reflective of the fact that wind farms are developed in suitable sites (e.g. rural areas) where potential impacts are likely to be minimised.

3.1.4 *"The Effects of Wind Facilities on Surrounding Properties - Preliminary Results" – Hoen & Wiser (2008) – United States*


The Impact of Wind Facilities on Residential Property Values
What We Know And What We Don't Know
Ben Hoen & Ryan Wiser
Lawrence Berkeley National Laboratory
10 Area Preliminary Results
June 2008

Hoen and Wiser (2008) recently presented preliminary results of a two (2) year study into the impacts of wind farms on surrounding property values in the United States. The research appears to be one of the most comprehensive studies to be carried out to date. The study employed hedonic pricing models to test the effects of wind farm impacts on sales transaction prices while controlling for variables such as dwelling size, land size, dwelling condition and quality of views. The authors inspected each property and rated the properties quality of views and the extent to which wind turbines impacted on the views. This was carried out at 10 different wind farms across the country with more than 450 property sales at each wind farm investigated. This provided the sample for subsequent statistical analysis.

The study assessed whether sale prices were affected by virtue of being simply located near a wind farm (termed "area stigma"). This was tested by comparing price changes after the construction of a wind farm with price levels before the announcement of the wind farm while controlling for house price inflation. This was carried out annually for up to four (4) years after the completion to test for effects of time. Preliminary analysis indicated no evidence of price reduction in any period after the construction of a wind farm.

The extent to which views of wind turbines contribute to property price changes (termed "scenic vista stigma") was also assessed. This was tested by comparing (a) sales of homes with views (based on the qualitative rating of the view) with (b) sales of homes without views. Preliminary analysis indicated that there was no significant difference between sale prices of homes with views and those without views.

The final assessment considered possible "Nuisance Effects" of dwelling being located very close to wind turbines (within ¼ mile, ½ mile and one (1) mile). This was tested by comparing sales of closely located properties with those located further away. Preliminary analysis indicated that there was no statistical evidence that dwellings located close to a wind farm sell for less than those located further away.

Hoen and Wiser (2008) did note that although there may be isolated cases of reductions in value, the largest potential effect found was a 15% reduction in sale price when located within ¼ mile of a wind turbine, these effects are not widespread in their sample.

The study is currently ongoing. When completed, it will provide a comprehensive piece of research that will likely make a substantial contribution to the issue at hand.

3.1.5 *"Land Value Impact of Wind Farm Development: Crookwell NSW" – Henderson & Horning (2006) – Australia*

Henderson and Horning Property Consultants prepared a report on behalf of Taurus Energy Pty Ltd on the effect of the Crookwell Wind Farm in NSW Australia on local property values. Taurus is the proponent of the wind farm.

The report included an analysis of 78 property sales surrounding the Crookwell Wind Farm over a period of 15 years from 1990 to January 2006. Sales of properties in the view shed of the wind farm (using a 6 kilometre threshold) were compared with sales of those not in the view shed.

No reductions in property values for were found for properties in the view shed of the wind farm.

3.1.6 *"Wind Farms: The Local Experience" – Hives (2008) - Australia*

In August 2008, two presentations were given by property valuation consultants at the Australian Property Institute's (API) Country Conference on recent work they had completed on wind farms and surrounding property values. Hives (2008) presented an analysis of individual sales transactions from properties surrounding the Waubra wind farm near Ballarat in Victoria. The wind farm was being constructed at the time of the study, although many turbines had already been erected. Hives hypothesised that:

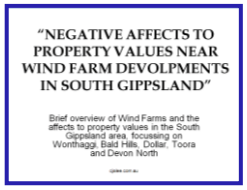
- Agricultural land with turbine leases would become more valuable
- Adjoining agricultural land values would not be affected
- Lifestyle properties and residential properties located in the town might be affected

Results of 12 individual sales analysis indicated that:

- Properties benefiting from turbine leases increased in value.
- Rural properties were unaffected.
- Some detrimental effects were evident on lifestyle properties.

Hives (2008) concluded that lifestyle values had the greatest potential to be affected as a large part of their value is typically derived from the aesthetic qualities of the surrounding environment.

3.1.7 *"Negative Affects to Property Values near Wind Farm Developments in South Gippsland" – Jess (2008) - Australia*


"NEGATIVE AFFECTS TO PROPERTY VALUES NEAR WIND FARM DEVOLPMENTS IN SOUTH GIPPSLAND"

Brief overview of Wind Farms and the affects to property values in the South Gippsland area, focussing on Wonthaggi, Bald Hills, Dollar, Toora and Devon North

In a separate presentation at the API Country Conference Jess (2008) presented a range of sales transactions that had occurred at the Toora wind farm in south east Victoria. The sales transactions indicated that the wind farm developer had been purchasing surrounding properties following planning approval and completion. Also, a sales transaction of a 'lifestyle' property which sold both before and after the construction of the wind farm was presented. The property was located close to the wind turbines with substantial views of the turbines. It was estimated that the sale after the construction of the wind farm was approximately 30% below the market value of the property had the wind farm not existed. However, this was a single transaction and such a decrease has not been evident in other sales nearby.

3.2 PERCEPTUAL STUDIES

In addition to research on property sales transaction data, there has also been some research conducted into local residents' and industry professionals' opinions of the effect of wind farms. Perceptual research generally indicates that a portion of the public both in Australia and internationally believe that wind farms negatively affect property values.

3.2.1 *"A Tale of Two Windy Cities: Public Attitudes towards Wind Farm Development" – Bond (2009) - Australia*

Bond (2009) researched public attitudes towards wind farms and property values among residents living in the towns Albany and Esperance, Western Australia (WA). Each town is located close to a wind farm in WA. The siting of the wind farms in these locations was deemed to be too far away (more than 10 kilometers) from residential areas to conduct hedonic modeling. Rather postal surveys were used in order to gain a qualitative understanding of resident's attitudes towards the wind farms. A total of 800 paper surveys were posted to Albany with a 38% response rate. Additionally 500 surveys were posted to Esperance with a 21% response rate.

Survey responses indicated that residents generally considered wind farm developments to be positive providing they were located a sufficient distance away from homes as to not disturb them. The distance reported to be acceptable was generally over five (5) kilometers away. Approximately two thirds of Albany residents and one third of Esperance residents felt more in favor of the wind farms after the farms were completed.

Over two thirds of survey respondents indicated that a wind farm would not influence the price they would be willing to pay for a property. On the other hand, nearly a quarter of survey respondents indicated that they would pay less, with 38% indicating they would pay 1-9% less, while 22% of respondents indicated they would pay 10-19% less.

3.2.2 *"Impact of Wind Farms on the Value of Residential Property and Agricultural Land" – RICS (2004) – United Kingdom*

A survey of members of the UK Royal Institute of Chartered Surveyors in 2004 found that 60% of the 405 respondents believed residential property values decreased if the property was in view of a wind farm. Further, 72% of respondents believed wind farm developments had either no effect or a positive effect on the agricultural value of the land. Visual impact, fear of blight and the proximity of a property to a wind farm were considered the main drivers to reductions in property values.

3.2.3 *Bald Hills Wind Farm Panel Inquiry (2004) - Australia*

As reported in the Bald Hills Wind Farm Panel Inquiry (2004), similar views on the impact of wind farms were expressed by Australian property industry professionals. In June 2004 the Victorian Minister for Planning appointed a panel to examine a proposal for a wind farm at Bald Hills, near Tarwin Lower in South Gippsland, Victoria. The Panel's inquiry included a report on the effects of the wind farm development on property values. The Panel considered a number of submissions from property valuers and real estate agents. The Panel's response to the submissions was:

"All that appears to emerge from the range of submissions and evidence on valuation issues is the view that the effect of wind energy facilities on surrounding property values is inconclusive, beyond the position that the agricultural land component of value would remain unchanged. On this there appeared to be general agreement. It therefore follows that it has not been demonstrated to the satisfaction of this Panel that significant value changes, transfers or inequities would result from the project proceeding."

In their final conclusion on property values, the Panel noted that valuation effects from the wind farm development may occur, specifically, devaluation of the amenity, lifestyle and non-agricultural development component of the surrounding land. However, the Panel also noted that these effects would not impact the planning permit as the wind farm is permissible within the rural land use zone and is consistent with relevant planning guidelines (Bald Hills Wind Farm Panel Inquiry, 2004).

3.2.4 *Judicial Interpretation on Compensation Issues - Australia*

The issue of compensation in regards to the reduction in values of surrounding properties of a wind farm development has been ruled upon in a case in the Land and Environment Court of NSW.

In February 2007, in *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd,* the plaintiff (Taralga Landscape Guardians) argued that properties surrounding the wind farm development would suffer from blight in the form of loss of future property value or from loss of amenity and, consequently, there should be payment of compensation if the project where to proceed. The judgement ruled in favour of the defendant:

> *"If the concepts of blight and compensation, as pressed by the Guardians, were to be applied to this private project (a proposition which I reject) then any otherwise compliant private project which had some impact in lowering the amenity of another property (although not so great as to warrant refusal on general planning grounds when tested against the criteria in s 79C of the Act) would be exposed to such a claim.*
>
> *Creating such a right to compensation (for creating such a right it would be) would not merely strike at the basis of the conventional framework of landuse planning but would also be contrary to the relevant objective of the Act, in s 5(a)(ii), for "the promotion and co-ordination of the orderly and economic use and development of land"."*

While this case does not answer the question as to whether a property reduces in value due to the development of a wind farm, it sets a clear precedent as to how the courts may view compensation claims in relation to this.

From the literature review, it is apparent that the perceptions of the negative effect on land values are not borne out by the statistical analysis of sales data, except in very few cases.

4. METHODOLOGY

4.1 SAMPLE SELECTION

A total of eight wind farm sites were selected for analysis comprising six (6) wind farms from Victoria and two (2) from NSW. Victorian wind farms selected were Waubra, Challicum Hills, Toora, Wonthaggi, Cape Bridgewater and Codrington/Yambuk. NSW wind farms selected were Blayney and Capital. A review of wind farms completed in Australia to date and the eight (8) sites selected is shown in the table overleaf.

Wind farm sites were selected based on the availability of market data (i.e. property sale transactions) and the surrounding land use. The aim was to select sites from differing surrounding land uses including rural land, rural residential/lifestyle land and urban housing.

On investigation it was evident that wind farms completed in Australia are generally located in rural areas, either inland or on the coast, but visually removed from densely populated areas. This limited the availability of property sales transactions data for analysis.

Of the five wind farms completed to date in NSW, only Blayney and Capital were selected for analysis. Crookwell has been comprehensively covered by Henderson and Horning (2006), while Hampton and Kooragang were considered too small, with each having only around one (1) MW capacity (1-2 turbines).

In Australia, at the time of investigation it was rare for a project to be less than 30 MW and an average scale is closer to 100 MW. In NSW, it is understood that the trend is towards larger projects. The median generating capacity of planned projects in NSW is understood to be around 200 MW, while the average is closer to 300 MW. As there were limited sites in NSW with larger sites being located in other states the sample selection was expanded to include wind farms outside of NSW.

The largest concentrations of wind farms in Australia are in Victoria and South Australia. Aerial photography analysis indicated that South Australian wind farms were located in remote areas that have limited, if any, surrounding development. Similar conditions were evident at Victorian wind farms, although a number of Victorian wind farms appeared to be located closer to more densely populated areas. Victorian wind farms were selected for analysis on the basis that they provided the best opportunity to yield the most sales transaction data from sites across differing land uses.

Project Name	Capacity (MW)	Surrounding Land Use	Selected
NSW			
Capital Wind Farm	177	Rural	✓
Blayney Wind Farm	10	Rural/State Forest	✓
Crookwell Wind Farm	5	Rural	
Hampton Wind Park	1	Rural/Forest	
Kooragang , Newcastle	<1	Industrial	
SA			
Snowtown Wind Farm (Barunga Ranges)	170	Rural/Rural Township	
Lake Bonney Wind Farm - Stage 2	159	Coastal Rural/Small Coastal Town	
Hallett Wind Farm - Hallett 1 Brown Hill	95	Rural/Rural Township	
Wattle Point Wind Farm	91	Coastal Rural/Small Coastal Town	
Lake Bonney Wind Farm - Stage 1	81	Coastal Rural/Small Coastal Town	
Mount Millar Wind Farm	70	Rural/Forrest	
Cathedral Rocks Wind Farm	66	National Park	
Canunda Wind Farm	46	Coastal Rural/Small Coastal Town	
Starfish Hill Wind Farm	35	Coastal Rural/Small Coastal Town	
Coober Pedy	<1	Desert	
VIC			
Waubra Wind Farm	192	Rural/Rural Township	✓
Challicum Hills Wind Farm	53	Rural	✓
Cape Bridgewater	51	Rural/Coastal Lifestyle	✓
Yambuk	30	Coastal Rural	✓
Toora Wind Farm	21	Coastal Rural/Small Coastal Town	✓
Codrington Wind Farm	18	Coastal Rural	✓
Wonthaggi Wind Farm	12	Coastal Rural/Small Coastal Town	✓
QLD			
Thursday Island	<1	Coastal Township	
Windy Hill Wind Farm	12	Rural/Forest	
TAS			
Woolnorth Wind Farm	140	Coastal Rural	
Musselroe Wind Farm	138	Coastal Rural	
Huxley Hill Wind Farm	3	Coastal Rural/Small coastal Town	
WA			
Walkaway Wind Farm	90	Rural	
Emu Downs Wind Farm	80	Rural	
Albany Wind Farm	21	Coastal Bushland/National Park	
Nine Mile Beach	4	Coastal Bushland	
Ten Mile Lagoon	2	Coastal Bushland	

*Approximate. Values rounded. Please note Codrington and Yambuk wind farms are located next to each other and considered as one site in the analysis.
Source: Department of Lands, Wikipedia (2008).

4.2 ADPOTED METHOD OF ANALYSIS

Wind farm sites were investigated using the following analytical techniques:

- 'Before and after' sales analysis
- 'Matched pairs' sales analysis

The process involved in each of these is described below. These are conventional valuation techniques and have been widely used and accepted by the industry in property compensation matters. Additionally, a direct comparison of sales provides reasonably clear evidence as to whether or not there is a difference in price attributable to a property's proximity to a wind farm.

The 'before and after' method was mainly applied to Victorian sites due to limited sales data able to be investigated within the bounds of the preliminary scope of the exercise. Conversely, the 'matched pairs' method was mainly applied to one (1) NSW site as it provided sufficient data for this type of analysis.

For each of the wind farm sites all of the property sales transactions that occurred in a ten (10) kilometre radius from the wind farm in the period after construction had begun were investigated and analysed. The analysis was generally limited to sales that had occurred up to four (4) years after construction of the wind farm, but in some cases due to low number of sales the search was extended to include all sales available to date. Sample wind farms sites were physically/visually inspected, and properties were categorised according to whether a wind farm was visible from the property or not.

Limited discussions were also held with local property professionals to gauge anecdotally how the local market had perceived the wind farms.

4.2.1 *Rationale*

Due to limitations surrounding sales data availability and large differences in the physical characteristics of properties, the sample was not considered suitable for hedonic modelling techniques as used in previous research (Hoen & Wiser, 2008; Sims & Dent, 2007; Sterzinger, Beck & Kostiuk, 2003).

The availability of sale data for analysis was limited as much of the wind farm development that has occurred to date has been in remote and/or farmland areas with low population densities and a corresponding small number of property sales. This limited the scope for statistical analysis.

Additionally, there was significant variation in the characteristics of the properties surrounding the wind farms; this included characteristics which are commonly known to influence the value or sale price of a property. Examples include land size, dwelling size, dwelling condition, and improvements. These differences further limited the extent to which sales data could be compared using statistical analysis.

Also, the use of hedonic price indexes in conjunction with statistical analysis can have its problems. A complex array of factors affects property sales prices (especially residential properties). Some difficulty can usually be expected in deriving a meaningful coefficient for the detriment being studied (in this case, sale price reductions). Because of this, studies which concentrate on a conventional valuation analysis of individual sales can provide useful results depending upon the data being available.

4.2.2 *'Before and After' Method*

In the 'before and after' method:

1. The percentage change in sale price was calculated for properties that sold before the construction of a wind farm and after the construction of a wind farm.
2. The percentage change in sale price was then compared to the market movement in the local area (i.e. the wider local government area).
3. Those properties that showed a change in value that did not keep pace (i.e. was less than) the market movement were deemed to be possibly affected by the wind farm.
4. Properties that showed a change in sale price that was either higher or in line with the broader market movement were deemed to not have been negatively affected by the wind farm.
5. Where possible, factors in addition to the wind farm that could influence a change in a property's sale price were noted, for example, an improvement to the property in between the sale dates, although the capacity to do this was limited to some extent by the preliminary scope of the assessment.

The comparable market movement was calculated using the change in median value of the local government area (LGA) in which the wind farm was located. The LGA area was considered to be large enough that the LGA median sale price value would not be materially affected by any wind farm related impacts. It should be noted that the trend in LGA median sale price may differ to corresponding trends in individual suburbs. This difference may be even more pronounced when comparing different property types. Notwithstanding this, on balance the LGA median sale price value was considered the best representation of the broader market movement available.

In some areas, the LGA's median price movement was also compared to the median price movement of the suburb in which the wind farm was located. This was done to provide additional background to the primary analysis method. However, evidence is so thin that there is no actual statistical data for some discrete study areas.

4.2.3 *'Matched Pairs' Method*

In the 'matched pairs' method:

1. Properties that (a) had sold after the construction of the wind farm and were located in the view shed of the wind farm were compared to (b) comparable properties that had also sold after the construction of the wind farm but weren't located in the view shed.
2. If a property located in the view shed sold for less than the comparable property outside the view shed it was deemed to be affected by the wind farm.

5. RESULTS

A total of 45 property transactions were investigated within the eight (8) study areas applying the 'before and after' and/or 'matched pairs' evaluation method. Of these, only five (5) showed an indication of being adversely affected by the view of wind farms. A summary of the results is presented in the table below, while a detailed overview of the results for each wind farm site is presented in the subsections following.

Wind Farm Site	Age	Number of Turbines	Method	Useable Sample	Results	
					Unaffected Properties (No Value reduction found)	**Affected Properties** (Actual or possible value reduction found)
Blayney, NSW	2000	15	Matched pairs	12	12 *(8 rural properties;* *4 lifestyle properties)*	0
Capital, NSW	2009	67	-	0	Inconclusive	-
Toora, VIC	2002	12	Before and after	14	10 *(3 rural properties;* *4 township properties;* *3 lifestyle properties)*	1 *(1 lifestyle property with possible 24% reduction)* *3 properties purchased by wind farm developer*
Waubra, VIC	2009	128	Both	6	5 *(4 township properties;* *1 lifestyle property)*	1 *(1 lifestyle property with possible 27% reduction)*
Wonthaggi, VIC	2005	6	Both	7	6 (1 rural property; 5 township properties)	1 *(1 township property with actual 6% reduction)*
Codrington / Yambuk, VIC	2001 / 2005	34	Before and after	3	1 (1 lifestyle property)	2 *(2 lifestyle properties with possible 6% & 25% reductions)*
Cape Bridgewater, VIC	2008	29	-	0	Inconclusive	-
Challicum Hills, VIC	2002	35	-	3	Inconclusive	-
Total				45	34	5 (6 inconclusive)

Note: Sites with samples of 0 were found to have no sales transactions since the construction of the wind farm. 'Actual' means an absolute reduction in values, while 'Possible' means an observed slower rate of increase relative to comparators. 'Lifestyle properties' mean properties over 2,000 square meters in size but in use for primarily residential purposes only (e.g. hobby farms).

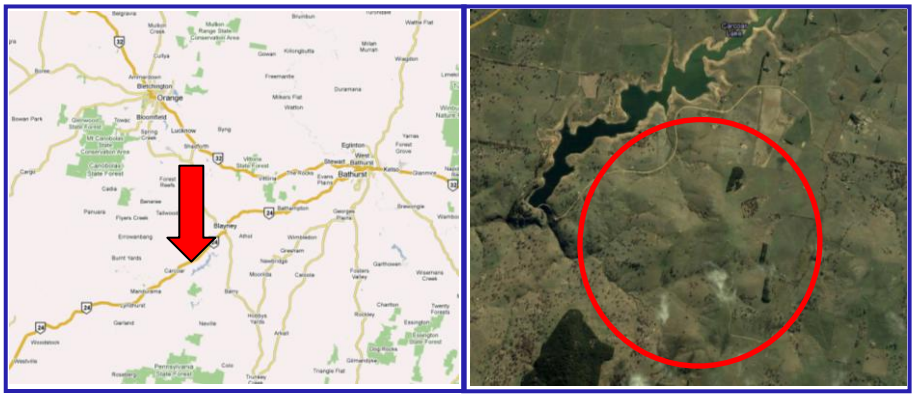
Overall, there were no observed impacts on the 12 rural properties, a small observed impact on 1 out of the 14 township properties (which may have been due to other factors e.g. a 'distressed sale'), and observed impacts on 4 out of the 13 lifestyle properties.

5.1 SITE 1: BLAYNEY WIND FARM – BLAYNEY, NSW

View looking south east to Blayney wind farm from Carcoar Dam Road

5.1.1 SITE DESCRIPTION

Number of Turbines:	Blayney wind farm consists of 15 turbines approximately 45 metres high with a blade diameter of 47 metres.
Age:	The wind farm commenced operations in October 2000.
Location:	Blayney wind farm is located in the Blayney Shire in NSW, 52 kilometres south west of Bathurst and approximately 255 kilometres west of Sydney.
Demographic context:	In the 2006 Census Blayney had a population of 3,091 persons with 1,285 dwellings and Carcoar had a population of 504 persons with 236 dwellings.
Site Description:	The wind farm is located in an elevated position in the hills to the south west of Lake Carcoar on two rural properties. The turbines are well spaced and do not appear overly visually prominent. The surrounding properties primarily consist of rural farmland with the Carcoar town centre located approximately 5 kilometres from the wind farm and Blayney town centre located approximately 10 kilometres away.



5.1.2 MARKET OVERVIEW

The change in the median price of house sales in the local government are of Blayney from 1998 to 2008 is presented in the table below (No comparison median analysis was available due to the wind farm being located in a rural area):

BLAYNEY LGA HOUSE SALES ANALYSIS			
Year	**Median**	**Frequency**	**% Change over Previous Year**
1998	$59,000	86	-
1999	$75,000	79	27%
2000	$80,000	81	7%
2001	$82,500	93	3%
2002	$102,000	145	24%
2003	$125,000	151	23%
2004	$150,000	94	20%
2005	$173,500	90	16%
2006	$179,000	70	3%
2007	$180,000	100	1%
2008	$185,000	75	3%

5.1.3 MARKET EVIDENCE:

Blayney was considered a good example for this study as a number of sales of surrounding properties both with and without views of the wind farm have occurred over an extended period of time following the wind farm's construction. In the nine (9) year period after the construction of the wind farm (between 2000 and 2009) a total of 21 sales were recorded within a 10 kilometre radius of the wind farm once transactions to related parties were removed (e.g. interfamily transfers). The similarity of the properties allowed for a 'matched pairs' sales analysis.

It was not possible to find a comparable sale to match each individual property in the study area surrounding Blayney Wind Farm. Instead the base market land values across rural and lifestyle properties were established based on the pool of available sales without views of the wind farm. The sales of properties with views of the wind farm were then compared to the base land values for the area.

Rural properties without views:

The following rural properties have no views of the wind farm and form the base market land values for comparison with properties that have views of the wind farm.

Property Address	Sale Date	Sale Price	Area	Analysed Land Value per Ha
Property A BLAYNEY	11/12/2000	$457,000	246.77 Ha	$1,850
Vacant undulating to hilly grazing land with 25% slightly timbered. Possible distant views of wind farm from elevated ridge but large area would not have views. Located approximately 8 kilometres from wind farm.				
Property B CARCOAR	02/08/2002	$125,000	41.18 Ha	$3,035
Vacant hilly mostly cleared grazing land with gully through middle. Long elongated lot with no attractive home site available. The property is located slightly out of town along a gravel road. No views of wind farm.				
Property C BLAYNEY	28/05/2003	$300,000	93 Ha	$3,226
Vacant undulating grazing land slightly timbered in part. Possible distant views of wind farm from elevated portion but could find a home site without views of wind farm. Located approximately 8 kilometres from wind farm. Temporary dwelling appears to be installed since sale.				
Property D CARCOAR	15/11/2004	$471,800	90.36 Ha	$5,221
Vacant undulating to hilly cleared grazing land. The property is located slightly out of town along a gravel road with the rear boundary bordered by a train line. No views of wind farm.				
Property E NEVILLE	04/12/2007	$285,000	38.75 Ha	$7,097
Vacant valley floor cleared grazing land with some evidence of pasture improvement and an old sheering shed. Value of improvements estimated to be $10,000. No views of wind farm.				

Rural properties with views:

The following rural properties have views of the wind farm and are compared to the base market land values to determine if the wind farm has impacted the value.

Property Address	Sale Date	Sale Price	Area	Analysed Land Value per Ha	Finding
Property F BLAYNEY	07/05/2000	$135,000	39.79 Ha	$3,393	No reduction in value found
Vacant hilltop grazing land with poor access on a secluded ridge. Distant views of wind farm located approximately 7 kilometres away. House built since sale in full view of wind farm. Compared to property B ($3,035 per Ha) which is a slightly inferior property and sold two years later in a rising market. Thus land value considered to be in line with market rates.					
Property G NEVILLE	24/07/2004 24/12/2001	$680,000 $532,880	83.98 Ha	$8,097 $6,345	No reduction in value found
Vacant hilly to steep cleared grazing land with steep river frontage and extensive views to the north. Boarders wind farm property with turbines located within 1 kilometre. Has extensive views of wind turbines. A superior property to property C ($3,226 per Ha) and property D ($5,221) but inferior to property E ($7,097 per Ha). Shows no reduction in value.					
Property H BLAYNEY	14/03/2003	$900,000	278.4 Ha	$3,017	No reduction in value found
Vacant undulating to hilly cleared grazing land with Carcoar dam at rear. Older homestead with very small weatherboard and iron detached dwelling and old sheds. Estimated value of improvements $60,000. The property has views of the wind farm to the southerly aspect (approximately 6 kilometres away) but house is facing the northerly aspect. Compared to property C ($3,226 per Ha) shows no reduction in value.					
Property I BLAYNEY	09/11/2004	$350,000	100.81 Ha	$3,472	No reduction in value found
Vacant undulating to hilly primarily cleared grazing land with scattered timber in part. The property is located approximately 4.5 kilometres to the west of wind farm with full views of turbines. Compared to property C ($3,226 per Ha) which is a slightly superior property shows no reduction in value.					

Rural properties with views:

Property Address	Sale Date	Sale Price	Area	Analysed Land Value per Ha	Finding
Property J BLAYNEY	24/05/2005	$660,000	83.15 Ha	$6,735	No reduction in value found
Undulating valley floor cleared grazing land. Improvements include a circa 1980s basic concrete block and colourbond detached dwelling with double garage and water tank. Value of improvements estimated to be $100,000. The property is located approximately 4 kilometres from wind farm with distant views of turbines. Compared to property E ($7,097 per Ha) which is a slightly superior property and after allowance for slight increase in market values between sales dates (4%) shows no reduction in value.					
Property K BLAYNEY	09/05/2005	$290,000	24.82 Ha	$11,281	No reduction in value found
Vacant slightly undulating valley floor cleared grazing land. Irregular shaped allotment with long elongated section along Neville Road. Improvements include old machinery and bail sheds. Value of improvements estimated to be $10,000. The property is located approximately 2 kilometres from wind farm with distant views of turbines. Compared to property E ($7,097 per Ha) shows no reduction in value and is an increased rate per hectare as expected with a smaller area.					
Property L CARCOAR	01/11/2006	$525,000	44.67 Ha	$9,066	No reduction in value found
Hilly cleared grazing land. Improvements include a circa 1990s basic three bedroom brick veneer and colourbond detached dwelling with double garage and shed. Value of improvements estimated to be $120,000. Gravel road access. The property has extensive views in all directions with distant glimpses of wind farm approximately 5 kilometres away. Compared to property E ($7,097 per Ha) shows no reduction in value.					
Property M NEVILLE	10/10/2008	$445,000	93.6 Ha	$4,754	No reduction in value found
Vacant undulating to hilly cleared grazing land located approximately 1 kilometre from wind farm with extensive views of wind turbines. Located opposite property E ($7,097 per Ha). Property E land considered to be superior as it is on the valley floor and shows some evidence of pasture improvement. Also, as property M is approximately twice the size of property E it would be expected to have a lower rate per hectare. Thus shows no reduction in value.					

Lifestyle properties without views:

The following lifestyle properties have no views of the wind farm and form the base market land values for comparison with properties that have views of the wind farm.

Property Address	Sale Date	Sale Price	Area	Analysed Land Value
Property N BLAYNEY	13/12/2001	$135,000	2.5 Ha	$85,000
Hobby farm with quaint circa 1920s weatherboard and iron detached dwelling. Land partly cleared and located in a gully below the road line. Value of improvements estimated to be $50,000. Appears to have been renovated since sale. No views of wind farm.				
Property O BLAYNEY	11/12/2007 13/03/2002	$340,000 $215,000	2.741 Ha	$270,000 $145,000
Rural residential property on valley floor. Improvements include a circa 1950s basic brick and iron detached dwelling. Value of improvements estimated to be $70,000. The property is located approximately 4 kilometres from wind farm with no views of turbines from dwelling due to the tree line.				
Property P BLAYNEY	16/06/2003	$560,000	17.88 Ha	$410,000 $22,931 per Ha
Hobby farm with attractive modern four bedroom brick veneer and corrugated metal detached dwelling on a long elongated allotment. Located adjacent to Blayney golf course. Cleared undulating grazing land. Value of improvements estimated to be $150,000. No views of wind farm. Located approximately 8 kilometres from wind farm.				
Property Q CARCOAR	30/10/2007	$300,000	4.43 Ha	$200,000
Mostly level land on hillside. Large circa 1960s brick and iron dwelling with shed and managers quarters. Value of improvements estimated to be $100,000. No views of wind farms.				

Lifestyle properties with views:

The following lifestyle properties have views of the wind farm and are compared to the base market land values to determine if the wind farm has impacted the value.

Property Address	Sale Date	Sale Price	Area	Analysed Land Value	Finding
Property R CARCOAR	19/05/2004	$315,000	2.377 Ha	$165,000	No reduction in value found
Hilly partially cleared land with scattered timber. Long elongated lot following the road line with valley views from home site. Improvements include a circa 1980s basic brick veneer and concrete tile detached dwelling with double garage and work shed. Value of improvements estimated to be $150,000. The property has distant views of wind farm located approximately 5 kilometres away. Compared to property Q ($200,000) which is a superior property with mostly level land with a greater area shows no reduction in value. Compared to property N ($85,000) which has inferior views but superior land and is located closer to Blayney. Considered overall comparable. After allowance for market movement since sale of property N shows no reduction in value.					
Property S CARCOAR	04/08/2006	$160,000	4.227 Ha	$160,000	No reduction in value found
Vacant hilly exposed cleared grazing land. Extensive views in all directions with distant views of wind farm approximately 5 kilometres away. Modern dwelling built since sale facing the wind farm. Home site located on ridgeline close to road. Compared to property Q ($200,000) which is a superior relatively level allotment shows no reduction in value.					
Property T BARRY	12/10/2006	$265,000	10.47 Ha	$215,000 $20,535 per Ha	No reduction in value found
Hobby farm located on primarily cleared level land on the valley floor. Improvements include a circa 1940s basic weatherboard and iron detached dwelling and an old ex shearing shed. Value of improvements estimated to be $50,000. The property is located approximately 1.5 kilometres from wind farm with turbines in full view. The house faces the turbines. Compared to property P ($22,931) which is considered to be a superior property as it is almost twice the size and located adjacent to Blayney golf course and closer to Blayney. After allowance for market movement since date of sale of property P shows no reduction in value.					

Lifestyle properties with views:

Property Address	Sale Date	Sale Price	Area	Analysed Land Value	Finding
Property U NEVILLE	21/12/2006	$350,000	12.92 Ha	$280,000 $22,783 per Ha	No reduction in value found
Hobby farm located on primarily cleared level land on the valley floor with some landscaping. Improvements include a circa 1960s basic weatherboard and tile detached dwelling and two sheds. Value of improvements estimated to be $70,000. The property is located approximately 1.5 kilometres from wind farm with turbines in full view. The house faces the turbines. Compared to property P ($22,931) which is considered to be a superior property as it is almost twice the size and located adjacent to Blayney golf course and closer to Blayney. After allowance for market movement since date of sale of property P shows no reduction in value.					

5.1.4 SUMMARY

Although Blayney wind farm is in a rural area, a reasonable number of sales have occurred for properties both with and without views of the wind farm following the wind farm's completion in 2000. This allowed for a relatively comprehensive analysis applying the 'matched pairs' analysis technique.

No reductions in value associated with the wind farm were identified based on the 'matched pairs' analysis. This included both rural and lifestyle properties.

No reductions in value were found for eight (8) rural properties with various view of the wind farm. Similarly, no reduction was found for four (4) lifestyle properties with various views of the wind farm.

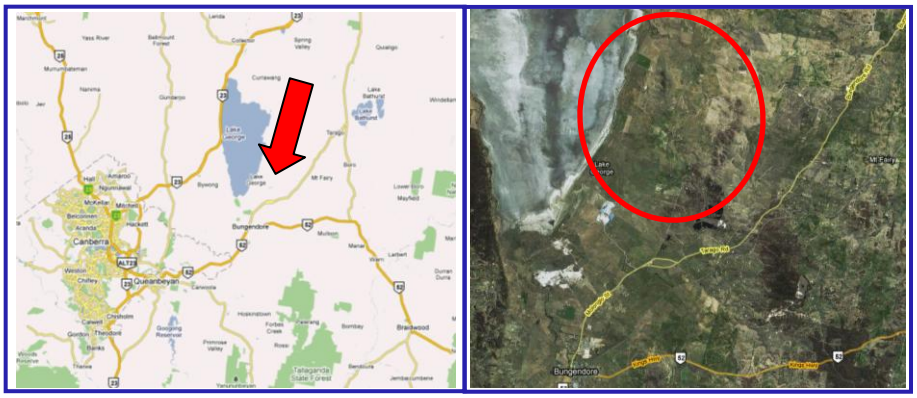
The wind farm does not appear to have deterred the construction of new homes in the area. This is evident by the fact that three (3) relatively newly constructed properties have been oriented with views towards the turbines despite views being available in alternative directions.

5.2 SITE 2: CAPITAL WIND FARM – LAKE GEORGE, NSW

View of turbines at Capital wind farm

5.2.1 SITE DESCRIPTION

Number of Turbines:	Capital wind farm will consists of 67 turbines approximately 80 metres high with a blade diameter of 45 metres.
Age:	The wind farm is currently under construction and expected to be fully commissioned in October 2009.
Location:	Capital wind farm is located between Bungendore and Tarago in the Goulburn Mulwaree Shire in NSW, approximately 50 kilometres north east of Canberra.
Demographic context:	In the 2006 Census Bungendore had a population of 2,806 persons with 1,089 dwellings.
Site Description:	The wind turbines are located among the hills on the eastern shore of Lake George on predominantly fully cleared light granite undulating country. The surrounding properties are primarily rural with some hobby farms located along Taylors Creek road. The Bungendore town centre is located approximately 15 kilometres from the wind farm.



5.2.2 SUMMARY

Investigations revealed no sale transactions have occurred in the area surrounding the Capital wind farm in 2008 or 2009 to date. As the wind farm is still in construction more data may become available over the following years.

Local agents reported that they had not seen an influx of listings since the construction of the wind farm began in the area. Consultation with local valuers revealed that the properties most likely to be affected, if at all, where a concentration of hobby farms along Taylors Creek road. A review of RP data's market history revealed that only three of these properties had been put on the market since the wind farm had been announced. It is noted that these properties have not sold and have been on the market for an extended period of time. However, discussions with the local agents revealed that potential buyers had not been discouraged by the wind farm and the reason these properties had not sold was primarily optimistic pricing.

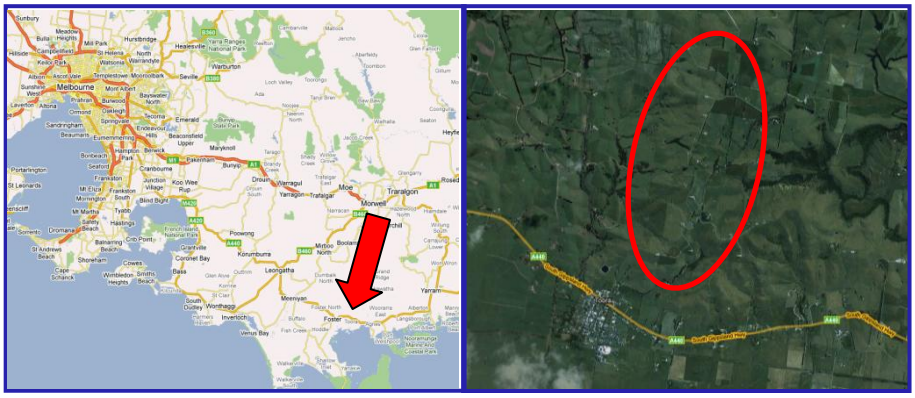
The sales transactions in the Bungendore town centre were considered too far away from the wind farm to be impacted.

5.3 SITE 3: TOORA WIND FARM – SOUTH GIPPSLAND, VIC

View looking south over Toora wind farm

5.3.1 SITE DESCRITPTION

Number of Turbines:	Toora wind farm consists of 12 Vesta V66 turbines approximately 67 metres high with a blade diameter of 66 metres.
Age:	Construction of the Toora wind farm began in 2001 and the wind farm commenced operations in October 2002.
Location:	Toora wind farm is located in the South Gippsland Shire in Victoria approximately 185 kilometres south east of Melbourne.
Demographic context:	In the 2006 Census Toora had a population of 674 persons with 324 dwellings.
Site Description:	The wind turbines are located in an elevated position across five properties in the hills to the north of the Toora town centre off Silcocks Hill road. Toora is a small coastal town surrounded by undulating hills which are primarily used for dairying. The surrounding properties can be considered to have a high rural lifestyle attraction with a number of hobby farms with coastal views being in an area with high scenic beauty and less than two hours drive from Melbourne CBD. The majority of dwellings are located on standard residential allotments in the Toora town centre. The closest wind turbines are located approximately 1 kilometre to the north of the town on top of the hills and are visible from most properties. However, at the site they are tightly placed in a random pattern which creates a visually prominent aesthetic for those properties located amongst them in close proximity.



5.3.2 MARKET OVERVIEW

The change in the median price of house sales in the suburb of Toora as well as the local government are of South Gippsland from 1998 to 2008 is presented in the tables below:

SOUTH GIPPSLAND LGA HOUSE SALES ANALYSIS			
Year	Median	Frequency	% Change over Previous Year
1998	$76,000	471	6%
1999	$84,000	483	11%
2000	$87,500	617	4%
2001	$93,000	806	6%
2002	$130,000	760	40%
2003	$158,000	727	22%
2004	$180,000	526	14%
2005	$200,000	461	11%
2006	$205,000	491	3%
2007	$215,000	636	5%
2008	$220,000	504	2%

TOORA HOUSE SALES ANALYSIS			
Year	Median	Frequency	% Change over Previous Year
1998	$50,000	17	0%
1999	$65,000	17	30%
2000	$55,000	10	-15%
2001	$70,000	20	27%
2002	$70,000	27	0%
2003	$82,500	18	18%
2004	$117,500	13	42%
2005	$187,000	12	59%
2006	$172,500	8	-8%
2007	$165,000	17	-4%
2008	$150,000	15	-9%

Source: RP Data

The South Gippsland region went through a boom from approximately 2001 to 2005 with an increase to the median value year on year during this period. The change in median value in Toora is more volatile compared to South Gippsland which is likely to be due to the low base number of sales in the suburb of Toora. There is some fluctuation in the median price for Toora around the construction period 2001 to 2002 with this period also seeing the highest frequency of sales. This may be an indication of the market's anticipation of the wind farm having an effect on the local market. However, due to the low base number of sales in Toora no conclusions from the data can be taken as they would not be statistically significant. Also, the median value began to increase again from 2003 at a higher rate than evidenced in the LGA once the wind farm had been constructed and was operational.

5.3.3 MARKET EVIDENCE

Before and After Sales Analysis - The following table lists those properties that had sales transactions which occurred both before and after the construction of the wind farm. The change in sale price for each property is compared to the market change. Where the change in sale price is in line or greater than the market change the property is considered not to have been affected by the development of the wind farm.

Where available sale transactions from Jess (2008) have been investigated and analysed.

The following properties are considered unaffected:

Property Address	Sale Date	Sale Price	Area	Finding
Property A1 TOORA	13/6/2002 9/4/1999	$66,000 $42,500	745 m²	No reduction in value found.
Small basic dwelling located in the town centre approximately 1 kilometre from closest wind turbine. Distant views with some turbines visible to the rear of property. Shows 55% increase in value between 1999 and 2002 which is in line with the South Gippsland market movement which shows a 55% increase during the same period. Sale price considered not to be negatively affected by wind farm.				
Property B1 TOORA	29/10/2003 12/7/2000	$130,000 $50,000	953 m²	No reduction in value found.
Basic weatherboard and tile dwelling located in the town centre approximately 1.5 kilometres from closest wind turbine. Distant views with some turbines visible to the rear of property. Shows 160% increase in value between 2000 and 2003 which is larger than the South Gippsland market movement which shows an 81% increase during the same period. Sale price considered not to be negatively affected by wind farm.				

Property Address	Sale Date	Sale Price	Area	Finding
Property C1 TOORA	22/12/2002 22/11/1999	$155,000 $85,000	934 m²	No reduction in value found.
Neat weatherboard and iron dwelling located in the town centre approximately 1.7 kilometres from closest wind turbine on a corner allotment with rear laneway access. Distant views with some turbines visible to the rear and north-eastern side of the property. Shows 82% increase in value between 1999 and 2002 which is larger than the South Gippsland market movement which shows a 55% increase during the same period. Sale price considered not to be negatively affected by wind farm.				
Property D1 TOORA	17/10/2003 12/10/1999	$129,000 $70,000	725 m²	No reduction in value found.
Brick and tile dwelling located in the town centre approximately 1.2 kilometres from closest wind turbine. Glimpses of turbines to the north although view is partially blocked by natural tree line in places. Shows 84% increase in value between 1999 and 2002 which is in line with the South Gippsland market movement which shows an 88% increase during the same period. Sale price considered not to be negatively affected by wind farm.				
Property E1 TOORA	27/7/2006 23/6/2001	$375,000 $197,500	51.93 Ha	No reduction in value found.
Improved cattle farm located approximately 200 metres from wind turbines. The wind turbines would likely be audible from the property. Shows approximately 90% increase in value between 2001 and 2006 during a rising market. This compares to an increase of 120% in the South Gippsland residential housing market movement although this is a different market. The sale is unlikely to be affected.				
Property F1 TOORA	18/5/2006 4/2/2002	$177,500 $78,000	1,895 m²	No reduction in value found.
Very basic weatherboard and corrugated metal detached dwelling located approximately 2 kilometres from wind turbines. Valley views and slight glimpses of water. Shows approximately 128% increase in value between 2002 and 2006 which is larger than the South Gippsland area market movement which shows a 58% increase during the same period. It is noted that at the date of sale in 2002 construction of the wind farm had begun and while not operational yet there may have been an effect on the original sale price.				

Property Address	Sale Date	Sale Price	Area	Finding
Property G1 TOORA	21/5/2007 24/8/1997	$345,000 $117,500	4,028 m²	
Neat weatherboard and corrugated metal federation style detached dwelling located approximately 1.4 kilometres from wind turbines. Water and valley. Only has glimpses of wind turbines with views interrupted by natural tree line and topography of the land. Shows approximately 194% increase in value between 1997 and 2007 which is similar to the South Gippsland area market movement which shows a 200% increase during the same period. While slightly below this is in the range of normal market fluctuations.				No reduction in value found.
Property H1 TOORA	29/7/2002 13/5/1998	$145,000 $100,000	54.85 Ha	
Improved sheep farm located approximately 1.5 kilometres from wind turbines which are positioned on the hill to the rear of the property. Shows a 45% increase in value between 1998 and 2002 during a rising market. This compares to an increase of 71% in the South Gippsland residential housing market movement although this is a different market. Sold before wind farm was operational.				No reduction in value found.
Property I1 TOORA	29/7/2002 13/5/1998	$145,000 $100,000	54.85 Ha	
Improved sheep farm located approximately 1.5 kilometres from wind turbines which are positioned on the hill to the rear of the property. Shows a 45% increase in value between 1998 and 2002 during a rising market. This compares to an increase of 71% in the South Gippsland residential housing market movement although this is a different market. Sold before wind farm was operational.				No reduction in value found.

The following properties are considered to be affected:

Property Address	Sale Date	Sale Price	Area	Finding
Property J1 TOORA	21/3/2003 11/11/1993	$265,000 $220,000	42.53 Ha	Possible reduction in value found.
Improved property with inlet views located approximately 400 meters from wind turbines. The wind turbines would be audible from the property. Sold after wind farm had been constructed in 2003. A comparable property in which to make a matched pairs comparison was unable to be sourced but according to a local valuer this property was on the market for a long period of time in a rising market and should have sold for $350,000 with the actual sale being 24% below this. But this is anecdotal. While no absolute reduction in the sale price was evident it appears that it was sold slightly below the market rate.				

The following properties were purchased by the developer of the wind farm. The purchase price was based on a current market valuation performed by a local property valuation firm assuming the wind farm did not exist. The fact that the developer was involved in purchasing them indicates that the residents no longer wished to live in them and potentially could not find buyers on the open market. However, this is purely speculative and it is not possible to gauge if the values of these properties had been affected by the development of the wind farm. They are included simply as evidence that this had occurred.

Property Address	Sale Date	Sale Price	Area	Finding
Property K1 TOORA	8/4/2005	$140,000	10.32 Ha	Property purchased by wind farm developer.
Cleared vacant farmland with a small dam located approximately 350 metres from wind turbines. The wind turbines would be audible from the property. Purchased by wind farm developer Stanwell Corp Limited based on a current market valuation assuming wind farm did not exist.				
Property L1 TOORA	26/11/1999	$190,000	5,118 m²	Property purchased by wind farm developer.
Brick and tile dwelling located approximately 70 metres from wind turbine. Purchased by Stanwell Corp Limited before the construction of the wind farm and now used as site office and visitor viewing/information centre.				

Property Address	Sale Date	Sale Price	Area	Finding
Property M1 TOORA	23/8/2005	$230,000	Approx 7,500 m²	Property purchased by wind farm developer.
Cleared vacant land located approximately 430 metres from wind turbines. Purchased by wind farm developer Stanwell Corp Limited based on a current market valuation assuming wind farm did not exist.				
Property N1 TOORA	29/11/2001 16/11/2000	$155,000 $135,000	1.1 Ha	Property purchased by wind farm developer but then on sold at an increased price.
Rural residential property with a two storey dwelling located approximately 500 metres from wind turbines. The wind turbines would likely be audible from the property. Purchased by wind farm developer Stanwell Corp Limited in 2000 based on a current market valuation assuming wind farm did not exist then sold in 2001 to a private purchaser at an increased price.				

No further sales evidence was located that could be used in paired sales analysis.

5.3.4 SUMMARY

Based on before and after sales analysis no reductions in value were found for properties located in the town centre with distant views (from 1 to 3 kilometres) of turbines.

Mixed information was found for larger rural lifestyle properties located close (within 1 kilometre) to the wind turbines. Some appear to have decreased in value while some show increase in value. As the developer appears to have bought out many surrounding land owners based on current market valuations this may be masking the full effect of the wind farm. Although, one of these properties was then on sold to a private purchaser at an increased price.

Discussions with local agents suggest that the wind farm has deterred some buyers. Agents generally reported that the number of potential buyers decreases the closer a property is located to the wind farm. Agents also reported that those properties located within one kilometre of the wind farm tend to stay on the market for longer periods compared to properties located further away from the wind farms.

5.4 SITE 4: WAUBRA WIND FARM – BALLARAT, VIC

View of turbines at Waubra wind farm

View of wind farms to the North West from Kimberly Drive in Waubra town centre

5.4.1 SITE DESCRIPTION

Number of Turbines:	Waubra wind farm consists of 128 ACCIONA turbines ranging in size from 110 to 120 metres.
Age:	Turbine installation commenced in December 2007 with the first turbines at the Waubra wind farm began operating in February 2009 and the farm was reported to be fully operational from the end of June 2009.
Location:	Waubra is located approximately 35 kilometres north-west of Ballarat along the Sunraysia Highway. The wind farm is situated in two municipalities, the Shire of Pyrenees and the City of Ballarat. The area consists primarily of cleared agricultural land used for sheep and cattle grazing and potato growing. There is also a small cluster of smaller rural residential/lifestyle lots located in the Waubra town centre.
Demographic context:	In the 2006 Census Waubra had a population of 494 persons with 185 dwellings.
Site Description:	The wind turbines are located on a series of hills and high plateaus which form part of the Great Dividing Range. The closest turbines are approximately 1.2 kilometres from the town centre and extend outwards up to 10 kilometres away. Not all surrounding properties have views of the wind turbines with natural tree lines and other housing often blocking out the view. Nonetheless, there are a sufficient number of towers within a small area to create a visually intrusive aesthetic to a predominately rural lifestyle location.

5.4.2 MARKET OVERVIEW

The change in the median price of house sales in the suburb of Waubra as well as the local government are of Pyrenees from 2000 to 2009 is presented in the tables below (Note 2009 figures extrapolated from the first 6 months of sales data):

PYRENEES LGA HOUSE SALES ANALYSIS			
Year	**Median**	**Frequency**	**% Change over Previous Year**
2000	$62,500	102	-
2001	$70,000	122	12%
2002	$89,000	116	27%
2003	$104,514	94	17%
2004	$118,000	93	13%
2005	$135,000	107	14%
2006	$135,000	88	0%
2007	$145,000	80	7%
2008	$153,000	89	6%
2009	$146,000	72	-5%

WAUBRA HOUSE SALES ANALYSIS			
Year	**Median**	**Frequency**	**% Change over Previous Year**
2000	$88,000	2	-
2001	$76,750	6	-13%
2002	$97,955	4	28%
2003	$145,067	3	48%
2004	$145,000	3	0%
2005	$125,000	6	-14%
2006	$147,625	3	18%
2007	$179,950	4	22%
2008	$183,000	4	2%
2009	$235,000	2	28%

Source: RP Data

The Pyrenees region went through a boom in the first half of the decade with values continuing to rise slightly up to 2007. The market declined towards the latter half of 2008 and 2009 with both sales rates and values slightly decreasing. The change in median value in Waubra is more volatile compared to Pyrenees which is likely to be due to the low base number of sales in the suburb of Waubra. Sales rates of properties in the Waubra town centre are low due to limited demand and development. The value of properties in the Waubra town centre and surrounding lifestyle properties have reportedly declined recently by 5% to 10% which is in line with the LGA average reduction (Hives, 2008).

The rural sector of the market has been reportedly very strong in recent times with increases in values occurring with a shortage of supply in a tightly held market. This has occurred during a drought and rising costs. The market increased in value by approximately 20% to 25% from 2007 to 2008 (Hives, 2008).

No firm conclusion can be reached from a comparison of the median prices.

5.4.3 MARKET EVIDENCE

Where available sale transactions from Hives (2008) have been investigated and analysed.

The following sales are considered unaffected when analysed using the before and after method:

<table>
<tr><th>Property Address</th><th>Sale Date</th><th>Sale Price</th><th>Area</th><th>Finding</th></tr>
<tr><td>Property A2
WAUBRA</td><td>19/2/2008
2/6/2003
8/12/2000</td><td>$155,000
$25,000
$12,000</td><td>8,659 m²</td><td rowspan="2">No reduction in value found.</td></tr>
<tr><td colspan="4">Lifestyle property comprising a modern but basic clad and corrugated metal detached dwelling with garage, carport and some basic landscaping to grounds. Located approximately 1.2 kilometres from closest wind turbine with some views but not prominent.
Improvements added since 2003 sale. Analysed land value of $90,000 in 2008 sale.
Shows 160% increase in value between 2003 and 2008. Appears to have no reduction in value due to the wind farm.</td></tr>
<tr><td>Property B2
WAUBRA</td><td>3/9/2008
31/3/2003</td><td>$40,000
$22,500</td><td>9,672 m²</td><td rowspan="2">No reduction in value found.</td></tr>
<tr><td colspan="4">Cleared vacant level land. Located in the Waubra town centre approximately 1.2 kilometres from closest wind turbine with minimal view that can be screened out.
Shows 78% increase in value between 2003 and 2008 which is larger than the Pyrenees market movement which shows a 46% increase during the same period. Note the 2008 transaction does not represent an open market sale but rather an estate transfer. It is assumed that it was transferred based on a current market value.
Sale price considered not to be negatively affected by wind farm.</td></tr>
</table>

Property Address	Sale Date	Sale Price	Area	Finding
Property C2 WAUBRA	2/2008 8/1/2004	$183,000 $135,000	1.6 Ha	
Basic hardiplank detached dwelling with garage located approximately 2.1 kilometres from closest wind turbine with some views of turbines but tree line protects main dwelling. Shows 36% increase in value between 2004 and 2008 which is in line with the Pyrenees market movement which shows a 30% increase during the same period. Sale price considered not to be negatively affected by wind farm.				No reduction in value found.
Property D2 WAUBRA	23/2/2008	$70,000	9,967 m²	
Cleared vacant level land. Located in the Waubra town centre approximately 1.2 kilometres from closest wind turbine with minimal views. Investigation of surrounding area did not reveal a comparable sale. However, 8600 square meters of vacant land at property G2 Waubra sold in 2004 for $33,000 and $53,000 in 2006 before the construction of the wind farm. Thus, similar vacant land shows values rising by approximately 32% between 2006 and 2008 which is larger than the Pyrenees market movement which shows a 13% increase during the same period. Sale price considered not to be negatively affected by wind farm.				No reduction in value found.

The following sale is considered unaffected as analysed using the 'matched pairs' comparison method:

Property Address	Sale Date	Sale Price	Area	Finding
Property E2 WAUBRA	20/11/2008	$215,577	1,958 m²	
Approximately 40 year old basic brick veneer and colorbond detached dwelling. Located on the edge of the town centre approximately 2.5 kilometres from closest wind turbine with prominent views of turbines to the rear of the property. Comparable to sale at property H2 Learmonth which sold for $225,000 on 29/10/2008. Similar construction in slightly better condition, smaller land area (1293 m²) with landscaped grounds. Learmonth is located closer to Ballarat and has no views of wind farm. Sale price considered not be negatively affected by wind farm.				No reduction in value found.

The following sale is considered to be affected as analysed using the before and after sales method:

Property Address	Sale Date	Sale Price	Area	Finding
Property F2 WAUBRA	5/1/2009 4/6/2001 1/6/1989	$235,000 $154,000 $145,000	1.75 Ha	Possible reduction in value found.
Lifestyle property comprising a large brick and tile dwelling with slate floor and landscaped grounds. Located approximately 2.1 kilometres from closest wind turbine with quite prominent views of turbines to the north-west. Shows 52% increase in value between 2001 and 2009 which is lower than the Pyrenees market movement which shows a 109% increase during the same period. Sale price appears to be negatively affected as the increase in value is below the market movement. Indexing the property's original sale price to the market change results in a value of $321,860 with the actual sale price of $235,000 being approximately 27% below this. However, the magnitude of the reduction cannot be taken as indicative for this property class due to the large number of factors impacting on negotiation of property prices.				

No further sales evidence was located that could be used in paired sales analysis.

5.4.3 SUMMARY

There is generally little sales activity in the area surrounding the Waubra wind farm.

Sale prices of residential properties located in the Waubra town centre do not appear to be negatively affected by the construction of the wind farm.

There is some evidence of a reduction in value for one rural lifestyle property with views of turbines. However, due to limited evidence no firm conclusions can be made.

These results are generally consistent with Hives (2008) analysis.

As the construction of the Waubra wind farm was only completed in June 2009 the full effect on surrounding property values will be more evident with time as more sales transactions occur.

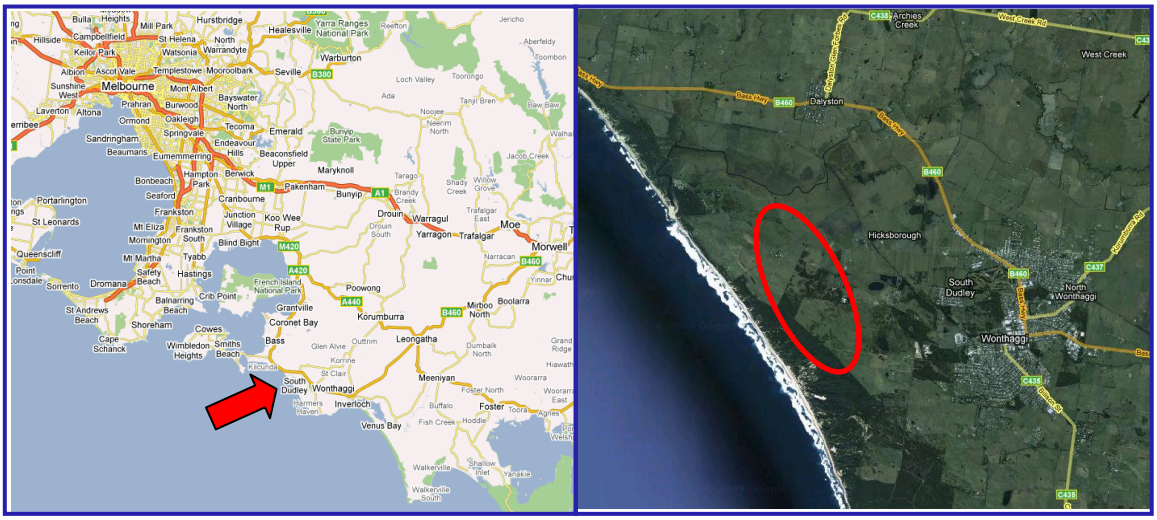
5.5 SITE 5: WONTHAGGI WIND FARM – BASS COAST, VIC

View of turbines at Wonthaggi wind farm

View of wind farms to the south from Dalyston

5.5.1 SITE DESCRIPTION

Number of Turbines:	Wonthaggi wind farm consists of 6 Repower MM82 turbines each of 2MW capacity.
Age:	The Wonthaggi wind farm was commissioned in December 2005.
Location:	Wonthaggi is located approximately 136 kilometres south-east of Melbourne in the Bass Coast Shire of Victoria.
Demographic context:	In the 2006 Census Wonthaggi had a population of 4,239 persons with 2,251 dwellings.
Site Description:	The wind farm is situated approximately 3 kilometres from the Wonthaggi town centre with the turbines built on 120 acres of rural flat grazing land which traverses land behind sand dunes and a foreshore reserve. Views of the wind farm are limited from the Wonthaggi town centre with more prominent views from the nearby town of Dalyston. The flat topography of the surrounding area combined with various vegetation growths blocks out the view of the turbines from the majority of Wonthaggi. The wind farm is small and well removed from the immediate development and generally unobtrusive. Noise would not be a factor.



5.5.2 MARKET OVERVIEW

The change in the median price of house sales in the suburb of Wonthagi as well as the Local Government Area of Bass Coast from 2000 to 2008 is presented in the table below:

BASS COAST LGA HOUSE SALES ANALYSIS			
Year	Median	Frequency	% Change over Previous Year
2000	$98,250	1334	-
2001	$130,000	1506	32%
2002	$172,250	1408	33%
2003	$215,000	1329	25%
2004	$225,000	1077	5%
2005	$240,000	1037	7%
2006	$255,000	1046	6%
2007	$265,000	1400	4%
2008	$275,000	1079	4%

WONTHAGGI HOUSE SALES ANALYSIS			
Year	Median	Frequency	% Change over Previous Year
2000	$75,000	136	-
2001	$92,750	172	24%
2002	$132,000	142	42%
2003	$155,000	155	17%
2004	$189,000	118	22%
2005	$194,000	126	3%
2006	$191,500	126	-1%
2007	$220,000	175	15%
2008	$230,000	135	5%

Source: RP Data.

The Bass Coast region went through a boom at the start of the decade up to approximately 2003. From 2004 to 2008 values continued to rise but at a much slower rate. Wonthaggi appears to have gone through a similar cycle with values continuing to increase up to 2004. In 2006 the median value decreased by approximately one percent. While this coincided with the commencement of operations of the wind farm starting in late 2005 in the following year the median value in Wonthaggi increased by fifteen percent. During the same period the Bass Coast market change in median value was relatively steady at approximately six percent increase in 2006 and four percent increase in 2007. From this statistical analysis no conclusive trend can be observed but median values generally indicate no effect. An analysis of individual sales with and without views of the wind farm follows to allow for a greater understanding of the effect of the wind farm construction on the surrounding properties.

5.5.3 MARKET EVIDENCE

The following sales are considered unaffected when analysed using the before and after method:

<table>
<tr><th>Property Address</th><th>Sale Date</th><th>Sale Price</th><th>Area</th><th>Finding</th></tr>
<tr><td>Property A3
DALYSTON</td><td>7/7/2006
20/8/2002</td><td>$588,955
$350,000</td><td>39.09 Ha</td><td rowspan="2">No reduction in value found.</td></tr>
<tr><td colspan="3">Mostly cleared level farmland with dam and improvements. Located approximately 4 kilometres from wind farm.
Shows 68% increase in value between 2002 and 2006 which is slightly larger than the Bass Coast market movement which shows a 48% increase during the same period.
Sale price considered not be negatively affected by wind farm.</td></tr>
<tr><td>Property B3
DALYSTON</td><td>15/8/2006
5/2/2001</td><td>$145,000
$40,000</td><td>N/a</td><td rowspan="2">No reduction in value found.</td></tr>
<tr><td colspan="3">Older fibro and corrugated metal residential dwelling with garage on a corner allotment. Located approximately 3.5 kilometres from wind farm.
Shows 263% increase in value between 2001 and 2006 which larger than the Bass Coast market movement which shows a 96% increase during the same period.
Sale price considered not be negatively affected by wind farm.</td></tr>
</table>

Property Address	Sale Date	Sale Price	Area	Finding
Property C3 DALYSTON	6/12/2005 23/3/2001	$180,000 $86,000	723 m²	No reduction in value found.
Neat weatherboard and corrugated metal detached dwelling with carport. Located approximately 3 kilometres from wind farm. Shows 109% increase in value between 2001 and 2006 which is slightly larger than the Bass Coast market movement which shows a 96% increase during the same period. Sale price considered not be negatively affected by wind farm.				
Property D3 DALYSTON	12/7/2006 24/11/2003 31/8/2001	$70,000 $56,000 $8,750	795 m²	No reduction in value found.
Cleared vacant land. Located approximately 3.5 kilometres from wind farm. Shows 25% increase in value between 2003 and 2006 which is slightly larger than the Bass Coast market movement which shows a 19% increase during the same period. Sale price considered not be negatively affected by wind farm.				

The following sales are considered unaffected when analysed using the 'matched pairs' method:

Property Address	Sale Date	Sale Price	Area	Finding
Property E3 DALYSTON	29/9/2005	$180,000	510 m²	No reduction in value found.
Modern brick veneer and colorbond dwelling with carport on a corner allotment. Located approximately 3 kilometres from wind farm. Comparable to Property H3 Dalyston which sold for $210,000 on 23/06/2006. A very neat modern western red cedar and corrugated metal detached dwelling with detached lock up garage on a 676 square meter allotment. Larger improvements and land size compared to property E3 sale which make it a slightly superior property. No significant reduction in value evident.				
Property F3 DALYSTON	22/12/2005	$80,000	831 m²	No reduction in value found.
Cleared vacant land. Located approximately 3.5 kilometres from wind farm. Comparable to vacant land sale at property I3 Dalyston on 13/07/2005 for $72,500. Slightly smaller land size of 737 square meters. Overall comparable properties with no reduction in value evident.				

The following sale is considered affected when analysed using the before and after method:

Property Address	Sale Date	Sale Price	Area	Finding
Property G3 DALYSTON	12/12/2005 31/10/2004 8/8/2003	$132,000 $140,000 $112,000	N/a	
Basic fibro and corrugated metal detached dwelling with carport. Located approximately 3.5 kilometres from wind farm. Shows a 6% decrease in value between 2004 and 2005 while the Bass Coast market movement saw a 7% increase during the same period. Sale price reduced by a possible 13% after construction of wind farm.				13% reduction in value found.

5.5.4 SUMMARY

The Wonthaggi wind farm is small in size and one of the relatively less aesthetically prominent.

A review of the sales of properties in view of the wind farm has found that the majority of sales appear to have not been negatively affected.

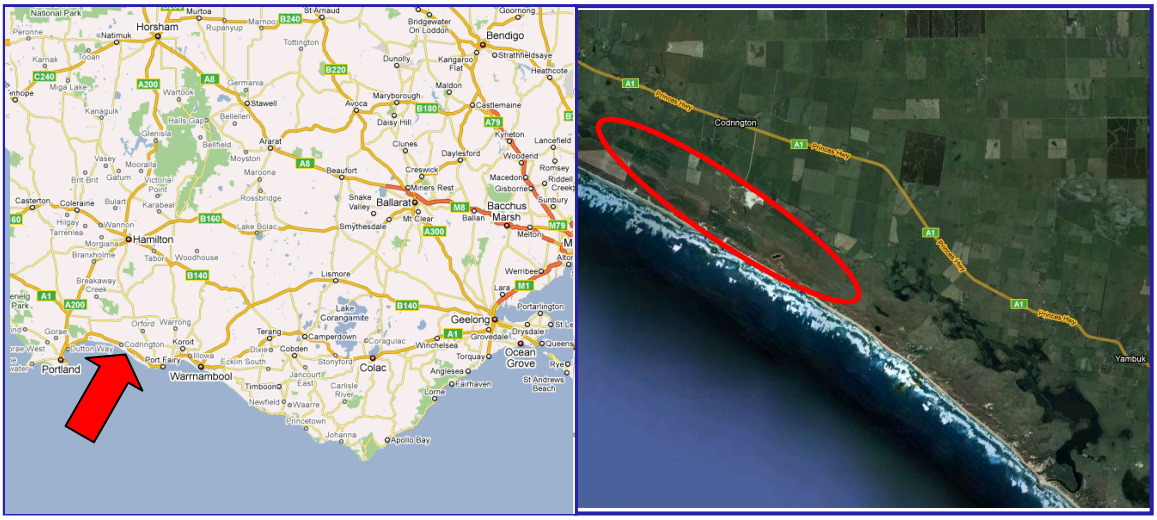
One sale did show an absolute reduction of 6% after the construction of the wind farm which equated to a possible 13% reduction once the market movement was considered. This is a possible affect of the wind farm but also there may be other factors impacting (e.g. an urgent sale).

5.6 SITE 6: CODRINGTON AND YAMBUK WIND FARMS – MOYNE, VIC

View of turbines at Codrington and Yambuk wind farm

5.6.1 SITE DESCRIPTION

Number of Turbines:	Codrington wind farm consists of 14 x 1.3 MW turbines and Yambuk consists of 20 x 1.5 MW turbines. These wind farms are located next to each other.
Age:	Construction on the Codrington wind farm started in November 2000 and was completed in July 2001. The Yambuk wind farm was commissioned in December 2005.
Location:	The Codrington and Yambuk wind farms are located next to each other along the south-western Victoria coastline near Port Fairy in the Moyne Shire.
Demographic context:	In the 2006 Census the area represented by the state suburb of Yambuk (census data covers both Codrington and Yambuk in the one collection area) had a population of 540 persons with 235 dwellings.
Site Description:	The wind farms are situated along the coast on farmland between the Princes Highway and the ocean. Mid to distant views of the wind turbines are evident from along the Princes Highway. Aesthetically the wind farms are less prominent as the turbines are well spaced apart and appear to be in one line when viewing from the Princes Highway.



5.6.2 MARKET OVERVIEW

The change in the median price of house sales in the Moyne local government from 1998 to 2008 is presented in the table below. Due to limited sales activity (approximately 2 to 4 sales per year) an analysis of the suburb of Yambuk's median value was not available:

MOYNE LGA HOUSE SALES ANALYSIS			
Year	**Median**	**Frequency**	**% Change over Previous Year**
1998	$94,500	169	-
1999	$105,000	195	11%
2000	$105,000	218	0%
2001	$130,500	260	24%
2002	$145,759	276	12%
2003	$170,050	256	17%
2004	$200,000	185	18%
2005	$202,900	184	1%
2006	$222,500	210	10%
2007	$250,000	255	12%
2008	$258,000	205	3%

Source: RP Data

The Moyne region went through a boom at the start of the decade up to approximately 2004. In 2005 the median value was relatively steady and then in 2006 and 2007 values began to increase again. The median value was then steady again in 2008.

The Codrington/Yambuk area is a thinly traded market consisting primarily of rural farmland properties around the wind farms with some rural residential properties located further away to the east in the Yambuk town centre. An analysis of some individual sales transactions is presented below although a review of sales transaction revealed little market activity.

5.6.3 MARKET EVIDENCE

The following sale is considered unaffected when analysed using the before and after method:

Property Address	Sale Date	Sale Price	Area	Finding
Property A4 YAMBUK	2/6/2008 18/10/2004 8/2/2001 7/3/1998	$230,000 $160,000 $75,000 $55,000	2.41 Ha	
Improved hobby farm with distant views to turbines. Located approximately 4.5 kilometres from wind farm. Shows 36% increase in value between 1998 and 2001 and then 44% increase between 2004 and 2008 which is in line with the Moyne market movement of 38% and 29% for both periods respectively. Sale price considered not to be negatively affected by wind farm.				No reduction in value found.

The following sales are considered to be affected when analysed using the before and after method:

Property Address	Sale Date	Sale Price	Area	Finding
Property B4 YAMBUK	7/4/2008 7/11/2002 9/1/1998	$220,000 $165,000 $88,500	Approx. 2,916 m²	
Improved property with distant views of wind turbines. Located approximately 6 kilometres from wind farm. Shows 33% increase in value between 2002 and 2008 which is below the Moyne market movement of 78% for the same period. Sale price may have been affected.				Possible reduction in value found.

Property Address	Sale Date	Sale Price	Area	Finding
Property C4 YAMBUK	25/9/2007 14/1/2005	$110,000 $95,000	966 m²	Possible slight reduction in value found.
Basic weatherboard and corrugated metal detached residential dwelling in Yambuk town centre. Located approximately 5 kilometres from wind farm. Shows 16% increase in value between 2005 and 2007 which is slightly below the Moyne market movement of 23% for the same period. Sale price may have been slightly affected.				

5.6.4 SUMMARY

While limited evidence was found there was some indication of reduced value found in two residential property sales around the Yambuk and Codrington wind farm. These properties did not appear to have increased at a rate in line with the local market movement, but this may have been due to influences other than the wind farm. Also, the data is inconsistent as one other sale analysed was considered not to be affected.

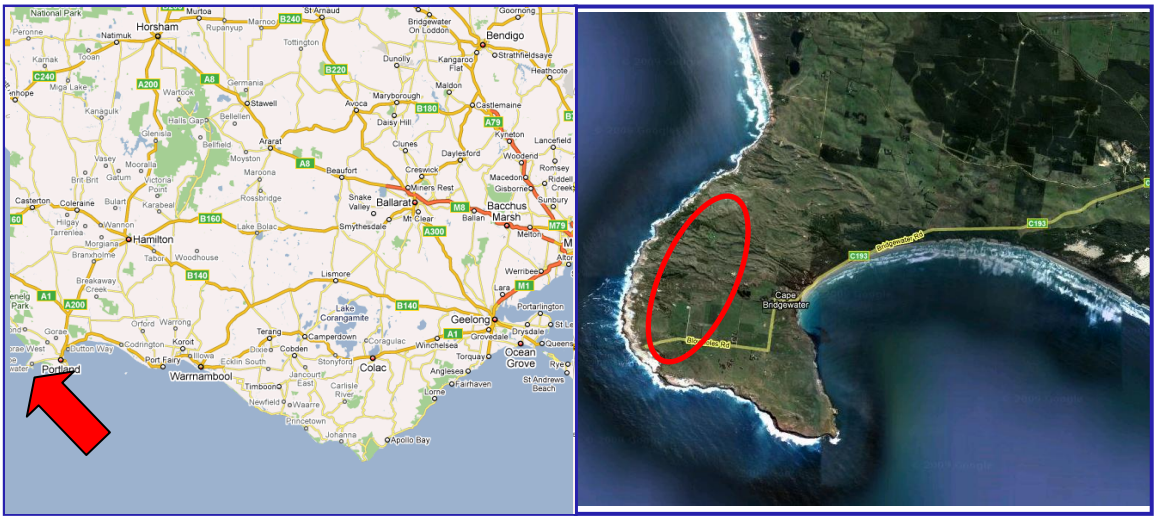
The area is primarily surrounded by farmland which is not likely to have been affected by the construction of the wind farm but due to limited sales activity investigations were limited to the above sales.

5.7 SITE 7: CAPE BRIDGEWATER WIND FARM – GLENELG, VIC

View of turbines at Cape Bridgewater wind farm from Blowholes Road

5.7.1 SITE DESCRIPTION

Number of Turbines:	Cape Bridgewater wind farm consists of 29 x 2MW REpower turbines.
Age:	The Cape Bridgewater wind farm was commissioned in mid 2008.
Location:	Cape Bridgewater is located is at the western most end of the Great Ocean Road, about 21 kilometres south-west of Portland and approximately 378 kilometres south-west of Melbourne in the suburb of Portland West in the Glenelg Shire of Victoria.
Demographic context:	In the 2006 Census Portland West had a population of 799 persons with 342 dwellings.
Site Description:	The wind farm is situated on the south-western side of Cape Bridgewater on rural farmland. The surrounding area consists mainly of farmland and a small cluster of dwellings and tourist accommodation on the eastern side of the cape. Views of the wind farm are limited from the majority of surrounding dwellings due to hills between them. The views are only aesthetically prominent when within approximately one kilometre of the turbines as the hills generally block out their view from the eastern side of the cape.



5.7.2 MARKET OVERVIEW:

The change in the median price of house sales in the Glenelg local government area from 2000 to 2009 is presented in the table below. Due to limited sales activity an analysis of the Cape Bridgewater median value was not available:

GLENELG LGA HOUSE SALES ANALYSIS			
Year	**Median**	**Frequency**	**% Change over Previous Year**
2000	$75,000	363	-
2001	$85,000	444	13%
2002	$100,000	489	18%
2003	$133,000	433	33%
2004	$160,000	375	20%
2005	$165,000	388	3%
2006	$187,000	422	13%
2007	$200,000	395	7%
2008	$190,000	359	-5%
2009*	$178,500	122	-6%

Source: RP Data

The Glenelg region went through a boom at the start of the decade up to approximately 2004. From 2004 to 2007 values continued to rise but at a much slower rate. Then in 2008 and 2009 values have come back slightly. As per the other wind farm sites an attempted was made to complete an analysis of individual sales with and without views. However, on inspection it was evident that only a couple properties were in the view shed of the Cape Bridgewater wind farm and none of these properties had sold since the construction of the wind farm.

5.7.3 SUMMARY

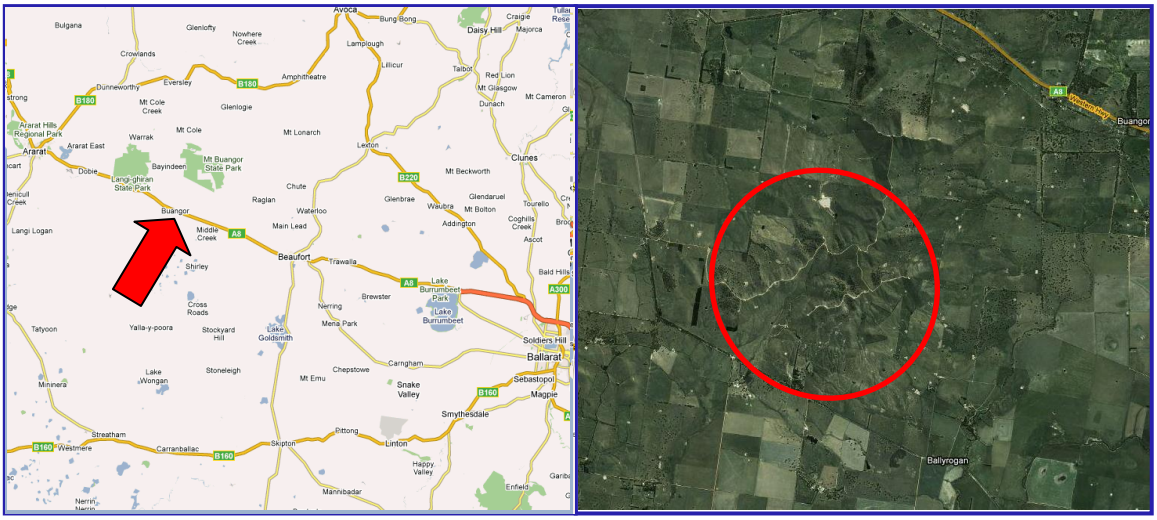
The Cape Bridgewater wind farm is in a coastal location with highly aesthetic ocean views. While no sales transaction evidence was found this may be representative of the wind farm posing little disturbance to the local residents and property owners. It was noted that there were only a few for sale signs on properties when inspecting the site. However, as this is a relatively new wind farm more sales transactions may occur over time.

5.8 SITE 8: CHALLICUM HILLS WIND FARM – ARARAT, VIC

View of turbines at Challicum Hills wind farm from viewing area off Geelong Road

5.8.1 SITE DESCRIPTION

Number of Turbines:	Challicum Hills wind farm consists of 35 turbines.
Age:	Construction commenced in October 2002 and was completed in August 2003.
Location:	The Challicum Hills wind farm is located approximately 20 kilometres east of Ararat along the Western Highway in the town of Buangor in western Victoria. The surrounding area is rural consisting primarily of cleared agricultural land with the Mt Buangor and Langi-ghiran State Parks located to the north-+west of the wind farm.
Demographic context:	In the 2006 Census Buangor had a population of 213 persons with 87 dwellings.
Site Description:	The wind turbines are located on a series of hills to the south of the Western Highway bordered by Challicum Road to the east and Geelong Road to the west and south. The wind farm is only visible from these roads that surround it. The turbines are well spaced along a ridge line that is relatively less prominent from a distance.



5.8.2 MARKET OVERVIEW

The change in the median price of house sales in the local government are of Ararat from 2000 to 2008 is presented in the table below. Due to limited sales activity (approximately 0 to 1 sales per year) an analysis of the suburb of Buangor's median value was not available:

ARARAT LGA HOUSE SALES ANALYSIS			
Year	**Median**	**Frequency**	**% Change over Previous Year**
2000	$62,500	195	8%
2001	$65,000	241	4%
2002	$78,500	261	21%
2003	$93,000	257	18%
2004	$125,000	206	34%
2005	$145,000	233	16%
2006	$143,000	168	-1%
2007	$153,750	228	8%
2008	$142,750	152	-7%

Source: RP Data

The area surrounding the Challicum Hills wind farm is a thinly traded market with little sales activity evident. The majority of sales have been to Macquarie Bank which has been quite active in the local rural market over the last decade reportedly buying up land for timber plantations. A review of sales in the surrounding area since construction of the wind farm began in 2002 revealed that 15 of these were purchased by Macquarie Bank. These appear to be at market rates and a selection of sales located closest to the wind farm is presented below. No other sales with views of turbines were found.

5.8.3 MARKET EVIDENCE

Property Address	Sale Date	Sale Price	Area
Property A5 BUANGOR	25/01/2005	$333,658	135.17 ha
Purchased by Macquarie Bank Limited. Rural land shows $2,468 per hectare.			
Property B5 BUANGOR	05/05/2006	$465,375	6.98 ha
Rural property purchased by Macquarie Bank Limited.			
Property C5 BUANGOR	15/07/2004	$111,201	39.9 ha
Rural property purchased by Macquarie Bank Limited.			

Note while there is limited sales in the area analysis is further limited by a lack of land area being reported on sales transaction records with the majority not specifying the land area.

5.8.4 SUMMARY

Challicum Hills wind farm is in a rural area that is mostly comprised of agricultural land and timber plantations. The wind farm is well sited in that it is relatively aesthetically less prominent to surrounding properties. While limited transaction evidence was found it is estimated that the wind farm has had little effect to the surrounding rural property values.

6. DISCUSSION

The aim of this study was to undertake a preliminary assessment of the impact of wind farms on surrounding land values in an Australian context through the analysis of sales transaction data. The main finding was that the wind farms erected to date do not appear to have negatively affected property values in most cases.

A review of wind farms currently operating in Australia revealed that they have primarily been developed in rural areas either inland or on the coast but generally removed from densely populated areas. Thus, the issue of impacts of land values has not arisen for most wind farms as they are located away from developed areas. As a result small samples of sales transactions limited the extent to which conclusions could be drawn. This is not a unique situation with similar findings and limitations being reported in the UK (Sims & Dent, 2007).

A total of 45 property transactions within eight (8) study areas were investigated through conventional valuation sales analysis. Forty (40) of the 45 sales investigated did not show any reductions in value. Five (5) properties were found to have lower than expected sale prices (based on a statistical analysis). While these small number of price reductions correlate with the construction of a wind farm further work is needed to confirm the extent to which these were primarily due to the wind farm or if other factors may have been involved.

Results also suggest that a property's underlying land use may affect the property's sensitivity to price impacts. Properties in rural / agricultural areas appeared to be the least likely to be affected by a wind farm with no reductions in value for rural propertied evident at any of the eight (8) wind farms investigated.

Residential properties in townships with distant views of a wind farm (more than 2-3 kilometres away), also appeared to not have been negatively affected by a wind farm. Transactions of 13 residential properties in townships with distant views of a wind farm did not show any negative price impacts. This was evident at the Waubra, Toora and Wonthaggi wind farms. A price reduction of 13% was recorded for one (1) property's sale, however, further information is required to determine if other factors were involved (e.g. it may have been an urgent sale).

Results for 'lifestyle' properties were not consistent. On the one hand, no reductions in value were identified in the four (4) 'lifestyle' properties investigated at the Blayney wind farm in NSW. On the other hand, possible reductions in value were found for one (1) lifestyle property at the Waubra wind farm, one (1) property at the Toora wind farm, and two (2) at the Codrington wind farm. The possible reduction in value ranged from 6-27% with a weight in the mid twenties percentile. However, in most locations there were other lifestyle properties located nearby which showed no reduction in value.

Finally, an increase in the time it takes to sell a property might be a possible effect of wind farm developments. As people can sometimes be polarized around wind farms with some in support and some refusing to live near one the potential market may be reduced. However, this does not seem to be translated into reduced sale prices for the majority of sales data investigated in this study.

The uncertainty of the current results is not specific to this research project and instead appears to be a common finding of this sort of study. Studies of property markets will always be influenced by the subjectivity that often accompanies the property purchase decision. Additionally, a very wide range of (often interacting) property features affect the price paid. These factors often militate against statistical analysis.

This study was intended as a preliminary assessment and has been limited by the time frame available and the number of sales transactions available for study. Further analysis (with additional data) may yield more comprehensive results.

Future research may look at expanding the study to incorporate more properties in other study areas (e.g. South Australia). Also, a deeper examination of the cases in the current research which did indicate a negative effect may provide further information on the factors behind the reduction in values. Notwithstanding this, the capacity of further studies to contribute is also likely to be limited by the corresponding limited availability of sales transaction data. More sales evidence will be available in NSW over coming years with a number of wind farms understood to be in the 'pre-construction' stage (i.e. feasibility, development assessment or planning approval).

6.1 CONCLUSION

From our analysis of previous studies and our own investigations, the majority of wind farms erected in Australia appear to have had no quantifiable effect on land values. A relatively small number of "lifestyle" type properties located very close (less than 500 metres) to wind farms in Victoria were found to have lower than expected sale prices (based on a statistical analysis), and it is possible that audio and visual aspects of wind farms contributed to this. Evidence suggests that any such wind farm related impacts on land values can be readily alleviated by ensuring a suitable separation distance between the wind turbines and any nearest residential dwellings. Generally, the separation distances identified in NSW appear to be sufficient in this regard. It is noted that standard separation distances are not used in NSW in the major project approval process. Instead, each wind farm proposal is assessed individually on its merits.

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Report completed: August 2009

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