

# Silverton Wind Farm: Far West region NSW

Assessment of the social and economic impacts

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Silverton Wind Farm Developments Pty Ltd

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This Report has been prepared for:

## Silverton Wind Farm Developments Pty Ltd

This report has been prepared by:

**SGS Economics and Planning Pty Ltd**

ACN 007 437 729

Level 1, 55 Woolley Street

Or PO Box 788

Dickson ACT 2602

phone: 61 2 6262 7603

fax: 61 2 6262 7564

email: [sgsact@sgsep.com.au](mailto:sgsact@sgsep.com.au)

web: [www.sgsep.com.au](http://www.sgsep.com.au)

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# Executive summary

This report is an assessment of the potential social and economic impacts of a proposed wind farm on the Barrier Ranges in the far west region of NSW, approximately 30 km west of Broken Hill Local Government Area (LGA). SGS Economics and Planning has been engaged by Silverton Wind Farm Developments Pty Ltd to undertake this assessment and consider the potential impacts on the Broken Hill community and economy.

According to publicly available information released by the proponent for the development, Silverton Wind Farm Developments Pty Ltd, the Silverton Wind Farm will be Australia's largest project of this type and one of the largest in the world once in operation. The project consists of up to 500 turbines and with the potential to generate almost 1,000 megawatts (MW) of renewable energy capacity, enough to power up to 400,000 homes. The nearest locality to the project site is the historic village of Silverton, which is situated in an unincorporated area of NSW, approximately 25 kilometres west of Broken Hill.

The project has potential to deliver significant benefits to the economy of Broken Hill and its economic Catchment community. Approximately 80–85% of the economic benefits stimulated by the project will potentially stay in the region, depending on the capacity of the Broken Hill economy's businesses and labour force to absorb this additional demand.

## **Initial economic stimulus provided by the Silverton Wind Farm project**

Total construction costs likely to be expended in Broken Hill are estimated at \$625 million for the installation of up to 500 turbines over a five-year period. The total life of the project is assumed to be 30 years. Total operational costs are estimated to be \$770 million over a 29-year period (assuming there is no operation in year one).

## **Total economic impact of the Silverton Wind Farm project**

An input-output model has enabled a forecast of the potential economic benefits stimulated by the activities of the Silverton Wind Farm to be estimated. As a result of investments in the construction and operation of the Silverton Wind Farm, the additional economic activity stimulated over a 30-year period is estimated to be:

- o Regional employment increased by 3,988 full-time equivalent (FTE)<sup>1</sup> jobs; and
- o Gross Regional Product (GRP) increased by \$701 million.

These additional jobs can be broken down into 'direct jobs', or those jobs created in Broken Hill as a result of the increased need for labour, goods and services to directly service the project (put at 2,244 jobs over the life of the project) and 'indirect jobs', the second wave of jobs created in Broken Hill in order to service the first round of additional economic activity stimulated (put at 1,744 additional jobs over the life of the project). These direct and indirect effects are in addition to the estimated 80 or so workers employed by Silverton Wind Farm Developments to maintain and operate the turbines.

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<sup>1</sup> (FTE) Full-time equivalent employment refers to the total number of full-time jobs that the economy could sustain based on an average working week of 40 hours. This measure recognises, for instance, that two employed persons working part-time could equate to 1 full time job.

These first round and flow-on effects can also be split into construction phase effects and operational phase effects over the life of the project.

### **Construction phase economic benefit**

Based on the proposed five-year construction phase:

- o Employment will increase by 2,040 FTE jobs; and
- o GRP will increase by \$270 million.

Construction (667 jobs), Property and Business Services (399), Retail Trade (206) and Wholesale Trade (205) industries account for most of the employment growth.

### **Operational period economic benefit**

During the 29-year operational period:

- o Employment will increase by 1,948 FTE jobs; and
- o GRP will increase by \$431 million.

During the 29-year operational period used in the analysis, employment is expected to increase by 1,948 FTE jobs and GRP by \$431 million. Employment in Electricity, Gas and Water – of which wind energy is an industry – is estimated to increase by 528 jobs over the period. Property and Business Services (339) and Wholesale Trade (209) will also see a strong increase in employment.

### **Opportunities and constraints**

The socioeconomic indicators for Broken Hill and the regional Catchment – ageing and declining population, exacerbated by out-migration of youth and working age adults, a low skills base and high unemployment – highlight possible constraints to the level of growth anticipated by the forecast.

The potential economic stimulus assumes that there will be a sufficient supply of (skilled) labour and that the Broken Hill economy has the capacity to capture increased demand for investment and spending. A number of regional economic development strategies have already comprehensively identified the strengths, weakness, opportunities and threats characteristic of Broken Hill's economy, and of its capacity to meet existing demand as well as respond to new and large-scale development opportunities.

Broken Hill's labour market is already stretched with many existing industries relying on importing labour for skilled positions from overseas and elsewhere in Australia. This means that demand for skilled labour is unlikely to be met through local supply. The undersupply of local labour has flow-on effects to Broken Hill's small business sector and the capacity to meet demands for services through local supply. Constraints in the capacity of local businesses to meet the increase in demand have meant that suppliers from Adelaide, Mildura and elsewhere are being used more frequently and large mining companies are increasingly providing their own in-house resources. Broken Hill's capacity to retain skilled labour beyond the period of their initial contract is a further supply-side

constraint. Factors influencing labour supply retention commonly cited include lack of services, retail trade attractions and quality housing.

This conclusion is not, however, detrimental to the argument that the potential economic impact of the Silverton Wind Farm will be significant; the presence of the wind farm presents an opportunity for Broken Hill that would not otherwise be there. Whether this opportunity can be fully realised will depend on the success of local, State and private sector strategies to up-skill workers, attract migrants and investment and to develop the capacity of local businesses so that this growth potential might be captured.

# 1 Introduction

This report is an assessment of the potential social and economic impacts of the Silverton Wind Farm proposed to be sited on the Barrier Ranges in the Far West region of NSW, approximately 30 km west of the Broken Hill Local Government Area (LGA). SGS Economics and Planning (SGS) is engaged by Silverton Wind Farm Developments Pty Ltd, as proponents of the windfarm, to undertake this assessment and consider the potential impacts on the Broken Hill community and economy.

Some of the issues mentioned in this report, in particular public perceptions and attitudes towards the project, were raised by residents of Broken Hill and Silverton community in response to public consultations undertaken by and on behalf of the project proponent. The consultation program and responses to direct public consultation are discussed elsewhere. The role of SGS is to undertake an assessment of the social and economic impacts of the project, primarily focussing on the Broken Hill community and economy. Potential impacts on the Silverton community and economy are briefly discussed in a qualitative manner.

## 1.1 The proposal

According to publicly available information released by the proponent for the development, the proposed wind farm will be Australia's largest project of this type and one of the largest in the world once operational. The project consists of up to 500 turbines and with the potential to generate almost 1,000 megawatts (MW) of renewable energy capacity; enough to power up to 400,000 homes at current levels of consumption.

The project is proposed to be sited on the Barrier Ranges approximately 30km west of the Broken Hill LGA. The nearest locality to the project site is the historic village of Silverton, which is situated in the unincorporated area of NSW, approximately 25 kilometres west of Broken Hill.

## 1.2 Methodology

The methodology for undertaking the assessment comprises:

### ***Review of Australian and international literature***

A review of existing surveys and assessments of the social and economic impacts of wind farm projects in Australia and elsewhere was undertaken. Publicly available information was sourced from Broken Hill City Council, the Australian Bureau of Statistics (ABS), government agencies and the parliament of NSW Hansard, as well as various websites with media releases, articles and papers relating to wind farms, wind energy and their social and economic impacts.

### ***Socioeconomic profiling of Broken Hill***

To provide a benchmark and context, a socioeconomic profile of Broken Hill and its regional Catchment was prepared. The profile includes population, employment and industry statistics



compiled from data held by the ABS, Broken Hill City Council and in reports such as the Outback Development Forum's *Far West Region Growth & Investment Strategy* for Broken Hill.<sup>2</sup>

***Consultation with elected representatives, council and community associations***

In order to determine the potential social impacts of the project, views and information were gathered from a small number of interviews conducted with government agencies and regional development forums and committees. State and Federal elected representatives were contacted in writing regarding their views on the project.

***Economic modelling of expenditure effects***

The likely construction and production expenditure for the project is modelled, including information on the likely geographic distribution of expenditures.

***Economic model of direct and indirect flow-on effects***

An input-output model is used to assess the aggregate economic effects of the project, and the wind electricity generation industry generally, on the Broken Hill economy. The model examines how the activities of a particular industry affect an economy through its upstream and downstream linkages. Construction and operation effects are discussed separately and dollar and employment output multipliers – the increased economic output as a result of the change in demand – are determined.

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<sup>2</sup> Outback Development Forum, (2007) *Far West Region Growth and Investment Strategy*.

## 2 National policy context

### 2.1 Renewable energy

Since the federal Mandatory Renewable Energy Target (MRET) scheme commenced in January 2001, wind energy has been one of the fastest growing energy sectors in Australia. Installed wind capacity increased from 104 megawatts (MW) in 2002 to a current installed capacity of 817.275MW with proposed projects with a capacity of 6,155.42 MW<sup>3</sup>.

There are now approximately 551 wind turbines in Australia at 43 wind farms generating enough energy to power over 400,000 homes. Despite this number, wind farms constitute only a small part of the electricity market and nationally contribute about 1% of total electricity production. The MRET was credited as the main driving force for the establishment of wind farms in Australia<sup>4</sup> up until mid-2006, by which time sufficient renewable energy had been installed or was under construction to meet the MRET for 2010.<sup>5</sup>

Shortly after a decision by the federal government in April 2006 to refuse a wind farm project under the *Environment Protection & Biodiversity Act 1999* (Cwlth)<sup>6</sup>, the Australian Greenhouse Office released a discussion paper in May 2006 to help stimulate discussion on the issue of the development of a national code for wind farms.<sup>7</sup>

The Minister's foreword in the discussion paper acknowledges the industry had expressed concerns about the need for more consistency and transparency in the approval process. However, the discussion paper focuses on adopting a consistent national agreement to address 'the perceived lack of consistency and transparency in the public consultation process, and a consequent failure to understand how the views of local communities are taken into account in the approval process.'<sup>8</sup>

According to correspondence received from the Department of Environment, Water, Heritage and the Arts, the Government is currently considering if and how to proceed with the previous government's proposal to develop a national wind code. A decision is anticipated in the first quarter of this year. The submissions made in response to the Discussions Paper were not publicly released<sup>9</sup>.

<sup>3</sup> Auswind 2008, 'Wind Energy projects in Australia' <http://www.auswind.org/projects/> (21.01.2008)

<sup>4</sup> Diesendorf, Mark (2007). *Greenhouse Solutions with Sustainable Energy*, UNSW Press, p.107.

<sup>5</sup> Macintosh, A., Downie, C., Wind (2006). *Wind Farms The facts and the Fallacies*. Discussion Paper number 91, The Australia Institute, p1-2.

<sup>6</sup> In April 2006, the Federal environment Minister, Ian Campbell, invoked his discretionary powers under the *Environment Protection and Biodiversity Conservation Act (Cwlth) 1999* and refused to approve a wind farm proposal for 80 turbines in Bald Hills, Victoria - on the basis of an alleged threat to the endangered orange-bellied parrot. The project is now approved for development. It was only the fourth time a development proposal had been refused approval under the EPBC Act. Between July 2000 to July 2007, 60 wind farm projects had been referred to the Commonwealth under the assessment and approval provisions of the EPBC Act and only one project was refused. Following this decision, the Federal Agriculture Minister, Peter McGaruan made media statements to the effect that because of the deleterious effect wind farms have on neighbours and rural communities they should not be allowed to proceed unless they have strong community support.

<sup>7</sup> Australian Government Department of the Environment and Heritage, Australian Greenhouse Office (2006) A National Code for Wind Farms, A Discussion Paper.

<sup>8</sup> Ibid p.2.

<sup>9</sup> Email from Jadranka McAlpine Program Manager Renewable Energy Deployment Renewable Energy Branch (21 January 2008)

Prior to the 2007 federal election, as shadow minister for the environment, Peter Garrett gave the key note address to a wind energy conference<sup>10</sup>, outlining a new commitment to address the climate change challenge by signalling a significant increase in the MRET. Specifically the policy platform undertook to:

- o Set a 20% renewable energy target to be achieved by 2020; and
- o Establish a national emissions trading scheme.

A robust policy platform, a higher overall target and a move towards consolidating targets into a single national scheme is seen by the wind industry as an incentive for further project development. Dr Robert Passey in a 2003 report advocates that 'Australia is already reaping significant employment and financial benefits from wind power, particularly in the rural and regional sector through employment and inward investment.'<sup>11</sup>

Furthermore, Passey points out that an MRET of up to 10% by 2010 would potentially increase the economic benefits of wind farm production to Australia, by providing an incentive for domestic manufacturers of turbines to invest in increased manufacturing capacity. He goes on to acknowledge that estimates of the Australian component of total investment are imprecise and require significant approximations and assumptions. However, Passey does quote examples of projects<sup>12</sup> that have achieved an estimated Australian content (by value) of 44–50% of capital costs, by focussing on local sourcing where possible.

## 2.2 Literature review

The Silverton Wind Farm Developments project is of a large scale, particularly in the Australian context. The largest existing wind farm in the world – Horse Hollow in Texas – currently produces around 735 MW (421 turbines); Europe's largest onshore wind farm – Whitelee in Scotland, yet to come on line – will produce less than 400 MW (140 turbines). The largest wind farm operating in Australia – AGL & Wind Farm Developments at Wattle Point in South Australia – has an operating capacity of 90.75 MW (55 turbines). Of the approximately 30 projects currently proposed in Australia (in feasibility stage, seeking approval, planning approved or under construction) with a capacity over 100 MW, the largest project other than Silverton is AGL Energy's project in Macarthur, Victoria, which has a 329 MW capacity and is at the 'planning approved' stage.

Large-scale wind energy projects are also new to Australia. To put the scale of the proposed wind farm project in Barrier Ranges near Silverton into context: There are approximately 551 turbines currently operating in Australia over 43 wind farms.<sup>13</sup> This proposed single project proposes up to 500 turbines to be constructed in three phases of 140 to 180 turbines each stage.

<sup>10</sup> [http://www.bcse.org.au/docs/media\\_releases/2007/Auswind%202007%20Communique.pdf](http://www.bcse.org.au/docs/media_releases/2007/Auswind%202007%20Communique.pdf)

<sup>11</sup> Passey, Dr Robert (2003) *Driving Investment, Greening Jobs: Wind Energy as a Powerhouse for Rural & Regional Development in Australia*. A Report for the Australian Wind Energy Association, p.9.

<sup>12</sup> Ibid. P30. The Albany wind Farm, WA (Verve Energy 21 MW installed) had an estimated 44% Australian content. The Toora windfarm, Vic (Stanwell Corporation 21 MW installed) had an estimated 50% Australian content. Passey quotes MacGill and Watt (2003) *Australian Industry Scenarios- Wind (DRAFT)*, School of Electrical Engineering and Telecommunications, and ACRE and the Centre for Photovoltaics Engineering, University of New South Wales, Sydney, Australia.

<sup>13</sup> Source: Auswind 2008, 'Wind Energy projects in Australia' <http://www.auswind.org/projects/> (21.01.2008)

Most of the larger wind farms are recent installations, and findings regarding the social and economic impacts on adjacent communities tend to be anecdotal in nature. This study attempts to provide a more quantitative assessment of impacts, but nevertheless a review of relevant literature provides some noteworthy insights.

## 2.2.1 General social impacts

The literature search revealed little in the way of post-installation evaluations that have been conducted to measure social impacts attributable to Australian wind farm projects. There are, however, some useful guidelines that provide a framework for considering potential social impacts prior to project construction.

One such evaluation<sup>14</sup> was conducted for Wind Power Pty Ltd regarding the proposed 104 MW Bald Hills wind farm in South Gippsland Shire, Victoria. In an attempt to canvas likely social impacts of the project, a number of assessment categories were identified for consideration, namely: Population Characteristics; Community Infrastructure; Community Functioning (behaviour and perceptions) and Social Equity. Against these criteria were listed a number of indicators defined to track impacts over time (for example, Population Characteristics included: changes in the population profile; changes in the employment profile; and changes in the number of tourists). Moreover it finds that, 'Social and economic impacts from the Bald Hills wind farm may occur in any of four stages of the project: planning, construction, operation and decommissioning'.<sup>15</sup>

While the above report describes some valuable evaluation tools for assessing what might be the social impact of a wind farm at Silverton, as mentioned, there is yet scant quantifiable evidence of how the project actually affected the community adjacent to Bald Hills. The focus of much of the Bald Hills evaluation consisted of gauging local attitudes to the visual aspect of the development. Landscape amenity was often cited as an issue, not only in terms of visual preference, but also in terms of location identity. This may be a negative issue for Silverton and the Barrier Ranges given the heritage value of the village, the iconic attractiveness of the outback location and the associated use of the area as a location for film production; the outback's vast, timelessness being cited as the foremost attraction of the location for filming. Issues regarding heritage values and local attitudes and perceptions of the proposed wind farm project are addressed in a separate report.

A recent paper release by the Australia Institute<sup>16</sup> addresses the facts and fallacies of wind farms, examining many of the recurrent issues identified in the literature. The main arguments put forward by what are described as 'anti-wind' groups, include the perception that: wind energy is expensive, does not significantly reduce greenhouse gas emissions, that wind turbines are a fire risk and a source of noise pollution, and that wind farms have deleterious impacts on biodiversity, landscape values, heritage and property prices<sup>17</sup>.

<sup>14</sup> Offor Sharp & Associates Pty Ltd (OfforSharp) (2003), *APPENDIX 10. Supplementary Report Social, Economic & Tourism Assessment, "Social, Economic and Tourism Impact Assessment for the Proposed Wind Farm Project at Bald Hills"*, prepared for Wind Power Pty Ltd, October 2003, cited Jan 2008 at <http://www.nrel.gov/docs/fy04osti/35953.pdf>

<sup>15</sup> Offor Sharp & Associates Pty Ltd (OfforSharp) (2003), *APPENDIX 10. Supplementary Report Social, Economic & Tourism Assessment, "Social, Economic and Tourism Impact Assessment for the Proposed Wind Farm Project at Bald Hills"*, prepared for Wind Power Pty Ltd, October 2003, cited Jan 2008 at <http://www.nrel.gov/docs/fy04osti/35953.pdf>

<sup>16</sup> Macintosh, A. & Downie, C. (2006) *Wind Farms The Facts and Fallacies*. Discussion Paper Number 91, prepared by The Australia Institute October 2006

<sup>17</sup> Ibid. P.2

In its conclusion, the paper expressed the view that the 'only concerns that have merit are impacts of wind developments on biodiversity and landscape and heritage values'.<sup>18</sup> And furthermore concluded: '...When appropriate planning procedures are followed, the heritage and landscape risks should be minimal. Some people may still object to wind farms, perhaps on the grounds of aesthetics, but their concerns should be weighed against the need to address the threats posed by climate change and the opinions of the broader community.'<sup>19</sup>

To quantify in some small measure the post-installation perceptions of communities who are now living close to wind farms, it is worth noting a survey conducted in Scotland of 1,810 people living in the vicinity of ten wind farms:

*'People who live within 20 kilometres of Scotland's wind farms often live in remote and widely dispersed communities. Many only see the turbines on their local site occasionally, for example, when using roads. The existence of wind farms does not appear to be prominent in people's minds. Concerns, where they existed, that the construction of a wind farm would have a damaging impact have largely not materialised, according to local people. The most prominent long-term impact that people would consider a problem is the visual effect of the landscape. Overall, however, twice as many people think the local wind farm has had a positive impact than think it has had a negative impact on the area.'*

*'People living in zones closest to the wind farms tend to have more positive views, even though they are more likely to see the turbines as they go about their daily lives. They are also more likely than others to support the idea of an expansion by 50 per cent of the number of turbines on the site.[...] Support for the principle of expansion of electricity generation using wind power is overwhelming among people living within 20 kilometres of an existing site.'*<sup>20</sup>

The wind farms in question are of a small scale compared with the Silverton Wind Farm Developments project, but it is worth noting that pre-project fears about wind farms were not necessarily realised, and that support for future projects often comes from people living in close proximity to them. Factors commonly mentioned include an enhanced sense of place and an increase in tourist trade. Surveys identified through the literature review have shown that attitudes towards wind farms tend to improve over time, particularly after they start operating as many people thought that the positives of wind energy outweighed negatives of the wind farm.

## 2.2.2 General economic impacts

A 2003 report for the Australian Wind Energy Association by Dr Robert Passey<sup>21</sup> offers a broad overview of some of the economic opportunities open to wind farm communities. In addition to his suggestion of a general expectation of 'between 11 and 15 total jobs in Australia per megawatt installed', Passey notes where the potential economic growth may be realised:

<sup>18</sup> Macintosh & Downie. P. 28.

<sup>19</sup> Ibid.

<sup>20</sup> Brauholtz, 2003 cited in: <sup>20</sup> Offor Sharp & Associates Pty Ltd (OfforSharp) (2003), APPENDIX 10. Supplementary Report Social, Economic & Tourism Assessment, "Social, Economic and Tourism Impact Assessment for the Proposed Wind Farm Project at Bald Hills", prepared for Wind Power Pty Ltd, October 2003, cited Jan 2008 at <http://www.nrel.gov/docs/fy04osti/35953.pdf>

<sup>21</sup> Passey, Robert (2003), *Driving Investment, Generating Jobs: Wind Energy as a Powerhouse for Rural & Regional Development in Australia*, a Report for the Australian Wind Energy Association, March 2003

- An increased level of wind farm development would result in economies of scale sufficient to support local manufacture. This would in turn increase local content and employment generated for each wind farm.
- In order to maximise local benefits from projects, wind farm developers commonly source as many goods and services as possible locally. Local employment is generated through construction of roadworks, foundations, electrical transformers and cabling, viewing areas and other basic infrastructure such as fencing.
- There is also the need for professional services that may be available regionally. These include environmental, civil, electrical and mechanical engineering services as well as legal and financial services.
- Over the last 20 years, tourism has developed into an important source of income for many rural and regional areas. While it is difficult to quantify the impacts of a wind farm on tourism, they do appear to act as tourist destinations that bring dollars into the area.

By way of example, Passey states of the Waubra Wind Farm (193 MW) due to come into production in late 2008:

*The civil works phase of the project has generated significant employment and community benefits for Waubra and the region. Of the 100 workers on site during the peak of civil works, approximately 70% are locals from Waubra and the surrounding areas. As well as creating jobs locally, Acciona Energy has used local equipment, services and materials wherever possible, further stimulating the regional economy. [...] 'The peak of construction activity during the electrical works and erection of the wind turbines is expected to create around 100 jobs early next year.' Acciona Energy is also planning for 25 permanent on-site jobs to maintain the wind farm as it begins operating in late 2008. These staff will be involved in maintenance work, plus office and management support staff. [...] 'Ongoing support for local community projects during the operation of the wind farm will flow from a Sustainable Community Fund of \$64,000 per year, established to share the benefits widely.'*<sup>22</sup>

In the Broken Hill context, the view expressed in consultations with the regional development board is that local business would be better positioned to take advantage of this potential opportunity by forming 'business clusters' to achieve economies of scale and scope and to optimise the potential economic benefit for Broken Hill and the region. The strategy of local businesses clustering and sharing resources to optimise potential economic opportunities is already identified as an approach to achieving identified key regional priorities, such as addressing barriers to development, maximising regional opportunities and enhancing the region's strategic advantages.<sup>23</sup>

Clustering of local businesses and sharing resources is also seen as an opportunity to diversifying the economic base, adding value to existing business and promoting the development of small business around existing larger industries. It is also a way of overcoming a general lack of skills and capacity within the community to implement development opportunities.<sup>24</sup> This is reportedly the case for the construction and trades industries, which are described as a low capacity sector not meeting current demand.

<sup>22</sup> Waubrawindfarm.com.au, July 2007, "Acciona Energy is proud to support the local community during construction of the wind farm", Web article cited Jan 2008 at <http://waubrawindfarm.com.au/AEproudtosupportthelocalcommunity.htm>

<sup>23</sup> Outback NSW Are Consultative Committee. (2007) Strategic Regional Plan 2007-2010.

<sup>24</sup> Ibid

In reference to the largest existing wind farm in the world – the 735 MW Horse Hollow Wind Energy Center, located 20 miles from the 160,000 resident city of Abilene, Texas – an October 2007 Palm Beach Post article reports:

*'The first big thing we saw ... it really impacted the smaller communities who had things like small diners,' said Bill Ehrle, president of the Abilene Industrial Foundation. 'They saw a significant increase right away.'*

*The company spends \$76 million a year locally and \$115 million across Texas on an industry that has created at least 1,000 construction jobs and has led to contracts with more than 70 local vendors: cement, rebar, tools, uniforms, trucks, tires, gasoline.*

*'It's completely revitalised the small communities,' he said. 'High school kids up to people in their 70s, they have a totally different attitude about where they are from. You can see it in their faces.'*

Despite a lack of empirical analysis relating to observed economic impacts of wind farm installations on communities over time, the available literature suggests that economic impacts are generally significant in terms of the number of new jobs created and amount of money in local businesses expended.

## 2.3 Summary findings

While there are a number of wind developments installed and more proposed in Australia, the Silverton Wind Farm Developments project is of a scale currently unmatched in the Australian context. It is difficult to transpose to new wind farm developments in Australia the experience of other Australian wind energy projects or international projects due to issues of scale, siting and the inherent natural values of a particular location. The literature shows this is best approached on a case-by-case basis, having regard to views of residents and the broader community, and finding locally relevant planning solutions.

Of the recurrent issues associated with wind energy projects identified – wind turbines are a fire risk, a source of noise pollution and have deleterious impacts on biodiversity, landscape, heritage and property values – the only concerns that are considered to have merit are impacts on biodiversity, landscape and heritage values.

Generally, pre-project concerns about wind energy projects seem to subside over time. However, the literature search revealed little in the way of post-installation evaluations and assessments, which limits the evidence base. In Australia, the aesthetic impacts of wind turbines has been one of the major drivers behind anti-wind campaigns and this view is likely to continue because of the inherently subjective nature of aesthetic values. Overall, concerns about the projects should be weighed against the need to address the threats posed by climate change and the opinions of the broader community.

Support for future projects often comes from people living in close proximity to them. Factors commonly mentioned include an enhanced sense of place and an increase in tourist trade. The available literature suggests that on a project basis, economic impacts are generally significant in terms of the number of new jobs created and benefits for local business. It seems that the positives of wind energy outweigh the negatives of the wind farm.

On a national scale, for the wind development industry in Australia, the focus is to increase the Australian component of total investment in projects, through a 'buy local' policy.

## 3 Broken Hill socioeconomic profile

### 3.1 Current and historical resident population

The population of Broken Hill and its outlying Catchment – including unincorporated Pirie (to the west of Broken Hill in South Australia), unincorporated Far West and Central Darling – has reduced over the past decade, although in recent years the rate of population decline may have slowed. As Figure 1 shows, at the 1996 census there were 21,399 persons counted for the Broken Hill LGA and 25,517 persons counted for the regional Catchment as a whole. By the 2006 census, the total population of Broken Hill was counted at 19,401 persons, while the total population of the regional Catchment was 22,847.

The historical rate of population growth in the years between 1996 and 2006 was therefore negative, at -0.98% and -1.1% per annum for Broken Hill and the regional Catchment respectively. This compares to an overall rate of population growth for New South Wales over the period of 0.89% per annum.

**Figure 1** Population and population growth rate (1996 to 2006)

	Population (1996)	Population (2006)	Rate of Growth (1996-2006)
Broken Hill	21,399	19,401	-0.98%
Catchment	25,517	22,847	-1.10%
New South Wales	6,081,847	6,642,774	0.89%

Source: ABS Population Census and SGS Economics & Planning calculations

According to community and business leaders consulted, the historical decline in Broken Hill's population can be attributed to:

- Historical decreases in the employment needs of key driver industries, including mining and agriculture;
- A lack of capacity among the local private sector to invest in and diversify Broken Hill's industrial base;
- A lack of investment in community facilities and public services including health and education; and
- An associated net out-migration of working age persons, youth and young families.

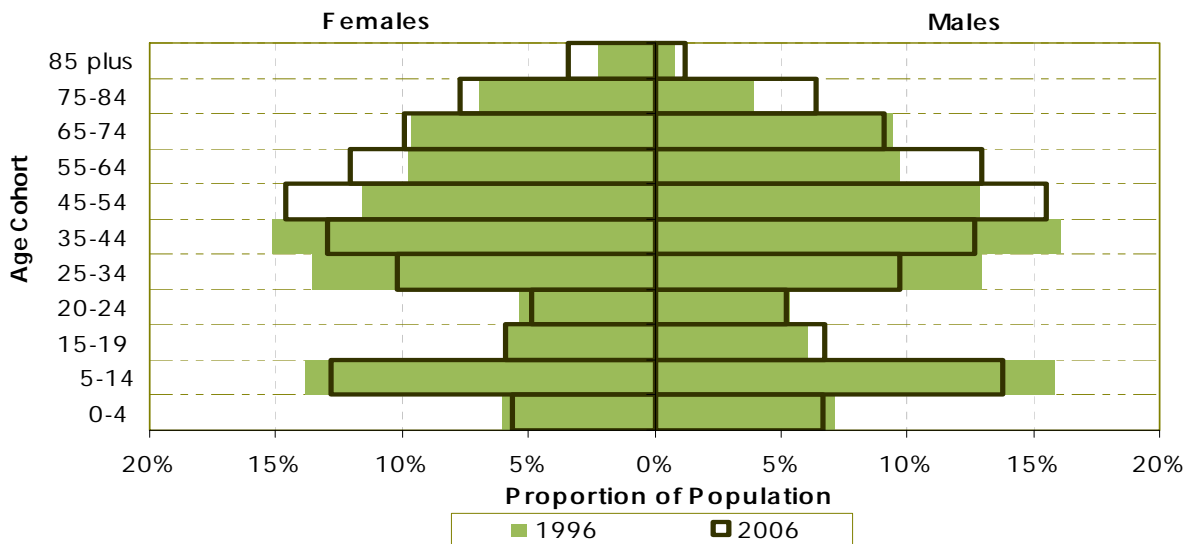
### 3.2 Population age and sex structure

As Figure 2 demonstrates, the greatest proportion of residents in Broken Hill and its surrounding Catchment are in the 45–54 years age cohort; while there are a larger proportion of persons aged 45 years and over than in NSW as a whole. In contrast, persons aged between 15 and 44 years are resident in lower proportions than for NSW, meaning that the region has an older population structure than its parent State (even taking into account the relatively high proportion of Indigenous persons, with a characteristically young population profile).



This pattern supports anecdotal information regarding the historical out-migration of youth and young families; estimated to be 780 people for the 25–34 years age cohort alone (calculated by deducting Broken Hill’s current resident population in this age group from the number it would have been, assuming 25–34 year olds were resident in the same proportion as in NSW as a whole). This has clear and detrimental implications for the supply of working age adults to meet any future increases in employment demand locally, and to contribute to natural population growth through births.

**Figure 2 Population age structure: Broken Hill SLA (1996 to 2006)**



Source: ABS Population Census & SGS Economics & Planning calculations

The change in Broken Hill’s population age profile between 1996 and 2006 suggests that the population is likely to age further in coming decades, as remaining residents currently aged over 45 years progress into older age cohorts. According to interviews with community and business leaders, many such residents are generally retired and reliant on a publicly provided income; or else low skilled, unemployed or under employed. As a result – unlike some persons in the 15–34 years age cohorts – they lack the means and aspiration to leave.

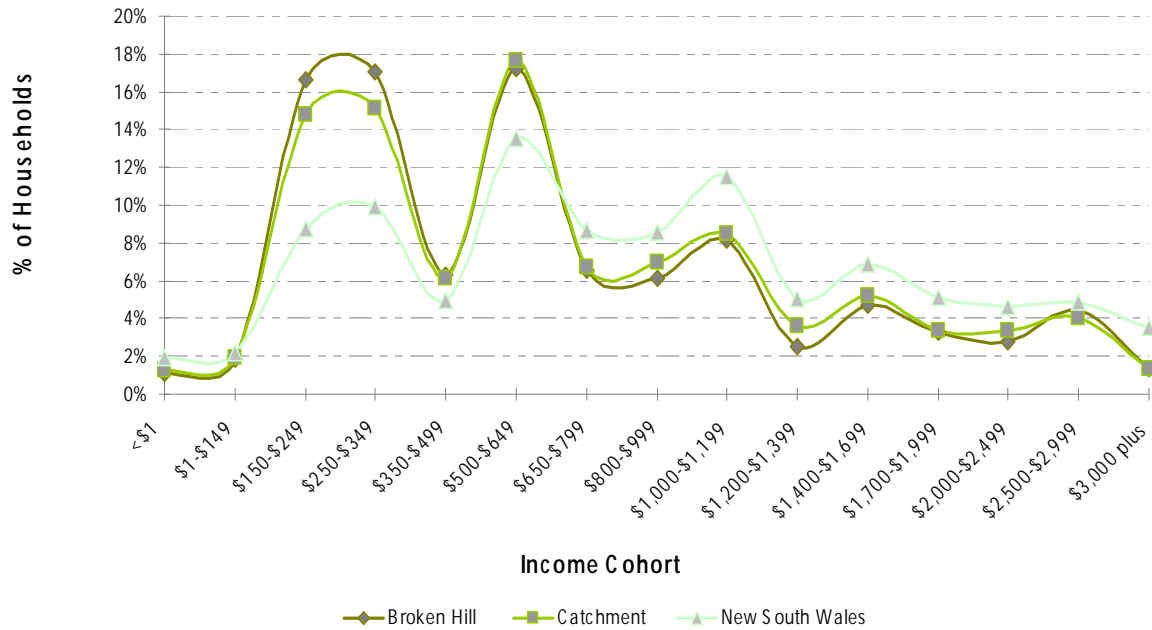
### 3.3 Weekly household and individual income

Trends in household income for 2006, demonstrate that the despite high incomes reported by employers for the Broken Hill Catchment mining sector<sup>25</sup>, the overall pattern is for household incomes at Broken Hill and across the Catchment to be less than those for NSW as a whole. Figure 3 shows that proportionately more households in Broken Hill have incomes of less than \$800 per week compared to NSW; whereas proportionately more households in NSW have weekly incomes of more than \$800 per week compared to Broken Hill. Indicatively, the difference in the household income proportion by income cohort is greatest for the \$150–249 and \$250–349 low income cohorts;

<sup>25</sup> Local mining employers indicated during consultations that salaries for non-managerial site workers were commonly between 75k and 100k per annum.

suggesting that Broken Hill and its Catchment contain a disproportionate number of low income households. Data for median weekly individual incomes confirm this trend, with a 2006 median weekly individual income of \$334 for Broken Hill and \$461 compared to NSW<sup>26</sup>.

**Figure 3 Weekly household income: Broken Hill, Catchment and NSW (2006)**



Source: ABS (2006) Population Census and SGS Economics and Planning calculations

### 3.4 Unemployment

Figure 4 provides a summary of key labour force statistics for Broken Hill, the Catchment and NSW. It shows that the number of employed residents at Broken Hill was 6,879 persons at the 2006 census, and 8,238 for the Broken Hill Catchment. Also of note is the relatively high proportion of persons not in the labour force, with approximately 10% more residents at Broken Hill not working compared to the NSW total. This is largely the effect of Broken Hill’s elderly population profile.

As shown in Figure 4, the total number of unemployed persons was 687 and 783 persons respectively (or 9.1% and 8.7% of the total work force), which can be considered ‘high’ given that the corresponding figure for NSW is 5.9%. Given the employment demand in the area, this figure is likely to indicate a core of long-term unemployed persons and low skilled persons, lacking the skills (or else otherwise disadvantaged) to fill the demand for positions locally.

<sup>26</sup> ABS (2006) Population Census.

**Figure 4 Labour force statistics: Broken Hill, Catchment and NSW (2006)**

		Broken Hill		Catchment		New South Wales	
		No.	%	No.	%	No.	%
Employed	Full-time(a)	4,179	55.20%	5,147	57.10%	1,879,628	60.80%
	Part-time	2,151	28.40%	2,425	26.90%	842,713	27.20%
	Employed, away from work	324	4.30%	397	4.40%	103,525	3.30%
	Hours worked not stated	225	3.00%	269	3.00%	83,578	2.70%
	<b>Total Employed</b>	<b>6,879</b>	<b>90.90%</b>	<b>8,238</b>	<b>91.30%</b>	<b>2,909,444</b>	<b>94.10%</b>
Unemployed	Full-time work	493	6.50%	558	6.20%	115,165	3.70%
	Part-time work	194	2.60%	225	2.50%	67,994	2.20%
	<b>Total Unemployed</b>	<b>687</b>	<b>9.10%</b>	<b>783</b>	<b>8.70%</b>	<b>183,159</b>	<b>5.90%</b>
Total labour force		7,566	48.60%	9,021	50.30%	3,092,603	58.90%
Not in the labour force		6,890	44.30%	7,627	42.60%	1,801,010	34.30%
Labour force status not stated		1,107	7.10%	1,272	7.10%	356,648	6.80%
<b>Total</b>		<b>15,563</b>	<b>100%</b>	<b>17,920</b>	<b>100%</b>	<b>5,250,261</b>	<b>100%</b>

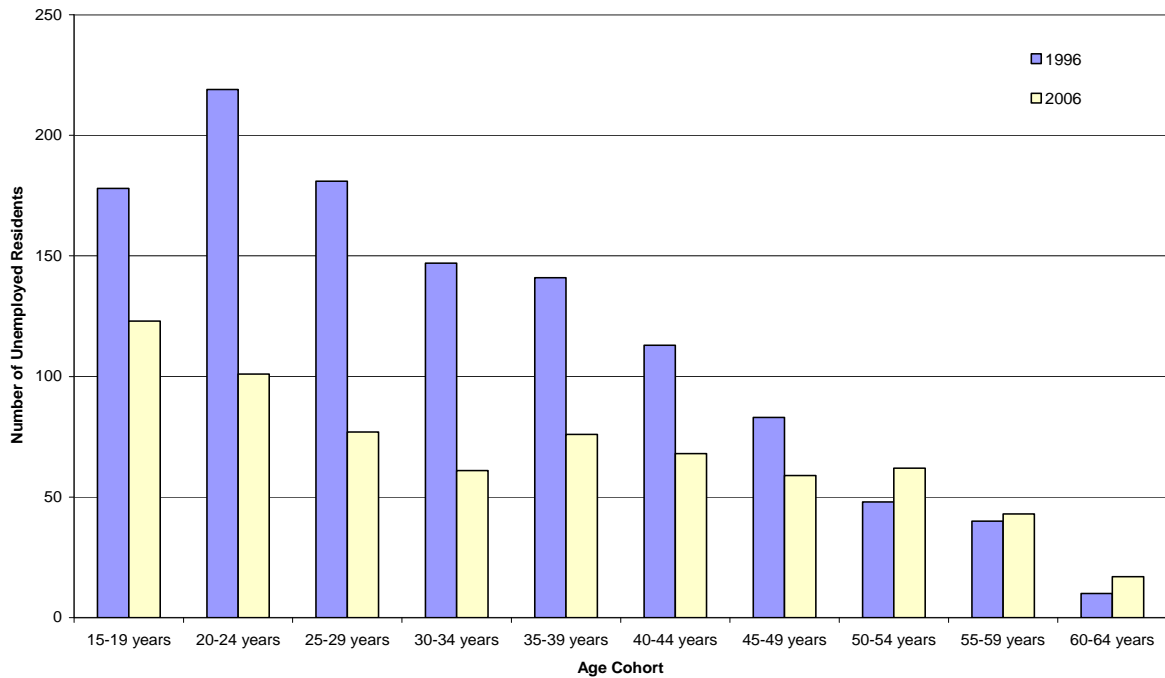
Source: ABS (2006) Population Census

Figure 5 below interrogates the unemployment data further, by showing the number of unemployed residents by age for Broken Hill at 1996 and 2006. It reveals that the profile of unemployment changed over the period, with the number of older unemployed persons (persons aged 35 years and over) increasing relative to the number of younger unemployed persons (persons aged under 35 years).

While some of this pattern can be explained by the overall decrease in the number of 15–34 year olds over the period, since the rate of decrease in the unemployment figures is greater than the rate of decrease in resident numbers, the data suggests that more of Broken Hill's remaining young people are finding work. The 20–24 years cohort provides an example, in that the number of unemployed persons in this cohort reduced by 54% between 1996 and 2006, while the total number of residents of this age reduced by less than 1% (see Figure 4). Backed by consultations, much of this transition can be explained by the expansion of the service sector economy, and in particular the growth in retail, cafes and restaurants and accommodation. That said, the greatest number of unemployed persons continue to be in the 15–19, 20–24 and 25–29 years age cohorts (both in absolute terms and as a proportion of the total population for these groups).

Persons aged 35 years and over also appear to be finding jobs (the number of unemployed persons has decreased while the total number of persons of this age has increased) but not to the same extent as those aged 34 years and younger. This observation is backed by qualitative evidence provided during consultations with community and business leaders, who commented that significant numbers of low skilled 'middle aged' males who lost their jobs in the late 1990s have remained out of work.

Figure 5 Unemployed persons by age: Broken Hill (1996 to 2006)



Source: ABS Population Census (2006; 1996)

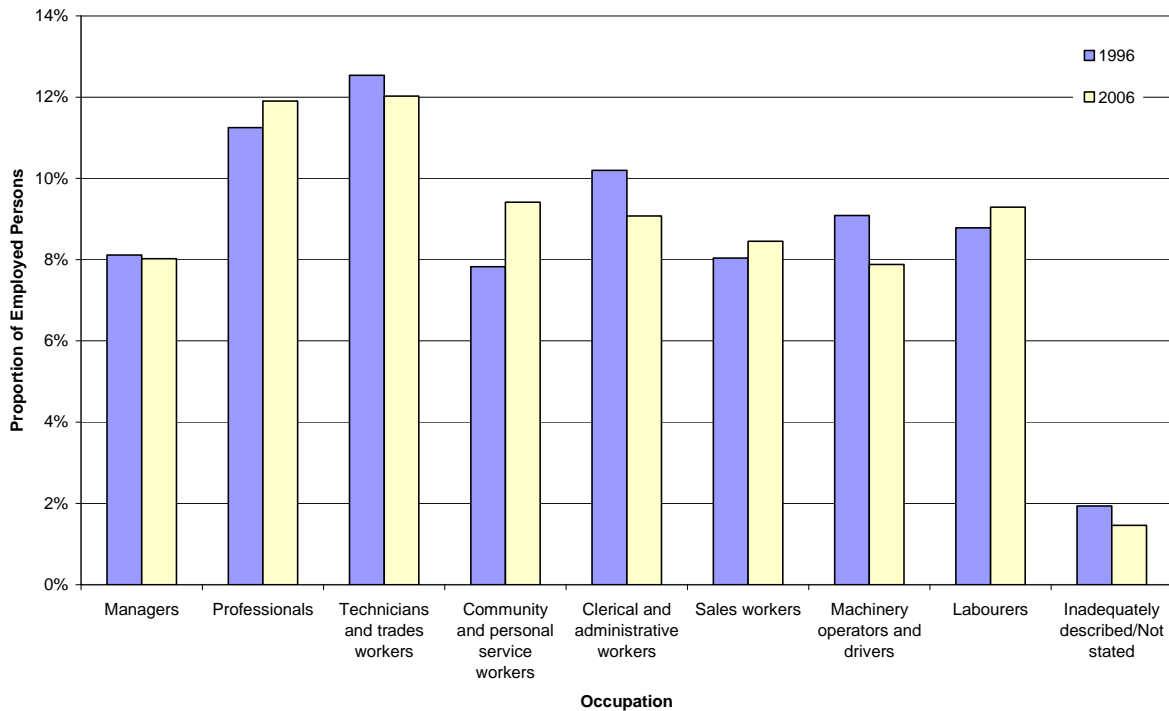
### 3.5 Occupation profile

Figure 6 below shows the occupational profile for residents of Broken Hill in 1996 and 2006. The three most prominent occupations for residents in 2006 include Technicians and Trades Workers (12%), Professionals (12%) and Community and Personal Service Workers (9%). The number of Community and Personal Service Workers, Professionals and Sales Workers increased slightly, by one percentage point or more over the decade, suggestive of the development of the service sector economy over the decade, although the number of Labourers also increased.

Conversely, Clerical and Administrative Workers, Machinery Operators and Drivers, and Technicians and Trades Workers all declined in proportion by one percentage point or more, suggestive of a slight downturn in employment among government and information intensive industries, manufacturing, engineering, transport and trades.

The number of trade persons and small businesses has declined sharply in Broken Hill in recent years. The combined effect of prospective retirees failing to take on apprentices to replace them, and as younger qualified trades persons take up higher paid employment in the mining industry.

Figure 6 Occupation profile: Broken Hill (1996 to 2006)



Source: ABS Population Census (2006; 1996)

Despite the observed dependence of Broken Hill on mining and related industries, the pattern – although weak – is broadly indicative of a shift over the decade from ‘traditional’ to service sector industries such as retail, personal services, accommodation, cafes and restaurants.

### 3.6 Summary of socioeconomic profile

In summary, the Broken Hill region’s prosperity has traditionally been reliant on the success of the local resources and agricultural sectors. A weakening of these sectors over the past 20–25 years has seen the region’s population decline by more than 30%. In more recent times, the rate of decline has slowed (-0.89%) and there is now the prospect of many new industry developments with the potential to retain and attract population and boost economic growth.

Broken Hill has an ageing population with the greatest proportion of residents in the 45–54 years age cohort. The ageing population is further exacerbated by the out-migration of youth and young families, estimated to be 780 people for the 25–34 years age cohort alone (over the 1996–2006 period). This has clear and detrimental implications for the supply of working age adults to meet any future increases in employment demand locally, and to contribute to natural population growth through births.

Despite high incomes reported by employers for the Broken Hill Catchment mining sector, the weekly household and individual income data suggest that Broken Hill contains a disproportionate number of low income households compared to NSW. The difference in the household income proportion by income cohort is greatest for the \$150–249 and \$250–349 low income cohort.

Broken Hill unemployment rate is 9.1%, which can be considered 'high' given that the corresponding figure for NSW is 5.9%. Given the employment demand in the area, this figure is likely to indicate a core of long term unemployed persons and low skilled persons, lacking the skills (or else otherwise disadvantaged) to fill the demand for positions locally.

The unemployment profile has changed over the period, with the number of older unemployed persons (persons aged 35 years and over) increasing relative to the number of younger unemployed persons (persons aged under 35 years). Some of this pattern can be explained by the overall decrease in the number of 15 to 34 year olds. Persons aged 35 years and over also appear to be finding jobs (the number of unemployed persons has decreased while the total number of persons of this age has increased). The greatest number of unemployed persons continues to be in the 15–19, 20–24 and 25–29 years age cohorts (both in absolute terms and as a proportion of the total population for these groups).

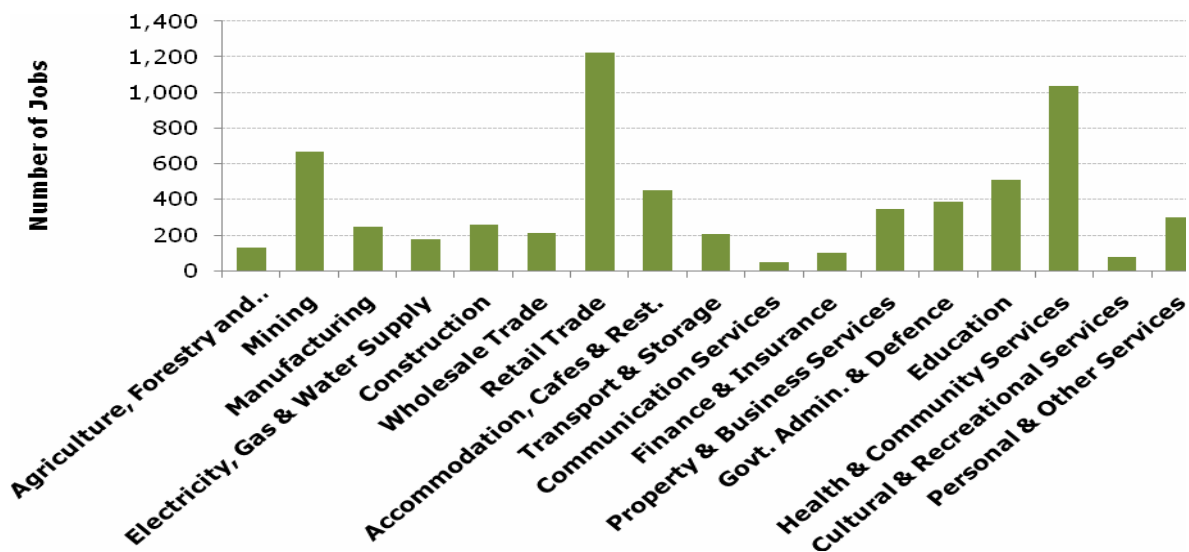
The occupation profile shows the three most prominent occupations for residents in 2006 include Technicians and Trades Workers (12%), Professionals (12%) and Community and Personal Service Workers (9%). The slow-down of mining activity in the area and a concerted effort to capture the outback tourism market is reflected by a weak but indicative shift over the decade from 'traditional' to service sector industries such as Retail Trade, Personal Services, and Accommodation, Cafes and Restaurants.

## 4 Broken Hill industry employment structure

As with NSW as a whole, Broken Hill's Retail Trade businesses employ more persons than any other industry, at 1,224 persons (see Figure 7). This is closely followed by the Health and Community Services industry, which employs over 1,036 persons (also employing a high proportion of workers across NSW).

With the exception of Mining, for which there were counted to be 665 employees in 2006, the Broken Hill economy contains relatively few jobs in traditional export industries; although tourism type industries such as Accommodation, Cafes and Restaurants (450 employees) are Broken Hill's fourth largest employer.

Figure 7 Employment by industry: Broken Hill SLA (2006)



Source: ABS (2006) Population Census

### 4.1 Industry employment structure changes

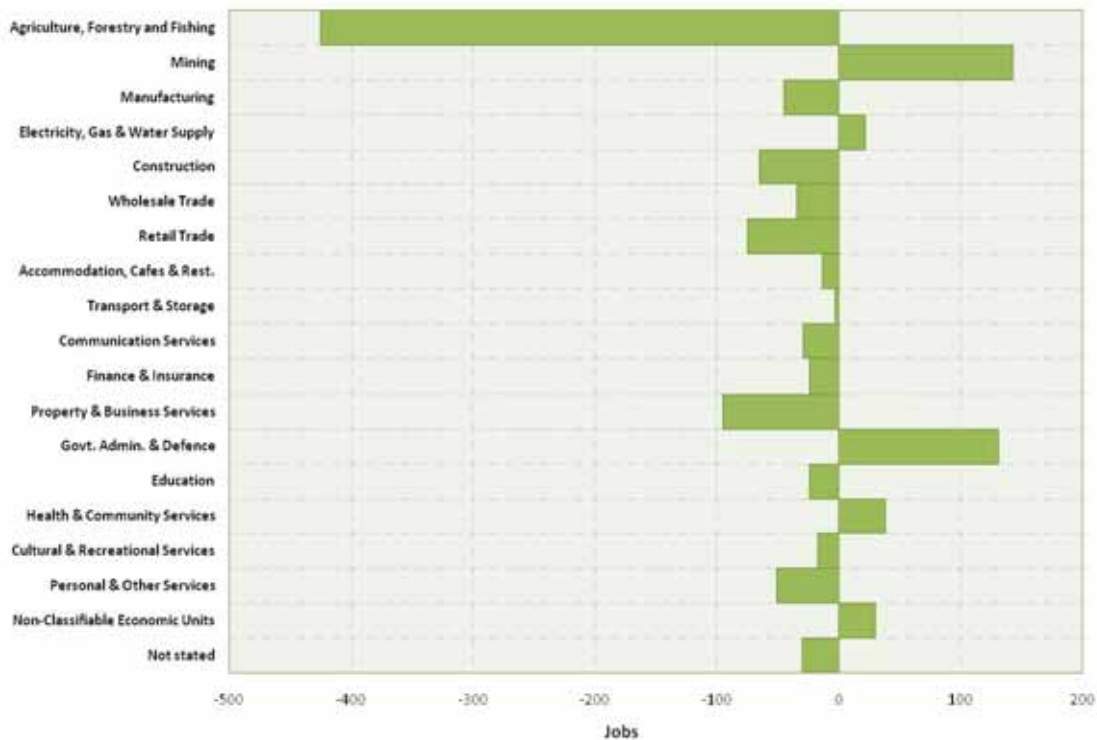
The total number of jobs across the Catchment fell by 566 in the five years from 2001 to 2006. Figure 8 shows the change in the industry employment structure for the Broken Hill Catchment over this period. As might be expected given the reduction in population, the number of jobs fell for all except four industries, with Mining (143 new employees) and Government Administration and Defence (131 new employees) accounting for the majority of new jobs.

Typical of isolated rural Catchments in NSW, the number of jobs in Agriculture, Forestry and Fishing fell substantially, by 425 employees (with the 2003 drought likely to have been a contributing factor). The number of Property and Business Service, Retail Trade and Construction jobs also decreased by more than 65 jobs for each industry. This change is likely to reflect the consequence of supply-side factors such as the absence of skilled labour, innovation and retail offerings locally. A

related factor is likely to be leakage of expenditure on goods and services such as skilled trades, bulky and durable consumer goods and business services to places such as Mildura.

Employment in Manufacturing, Wholesale Trade and Personal and Other Services also declined, and despite the perceived availability of cheap land and Broken Hill's location as an inter-State transport node, employment in industries such as Transport and Storage also stagnated; with the overall effect that Broken Hill's economy became less diverse over the 2001 to 2006 period.

Figure 8 Change in industry employment: Broken Hill, Catchment (2001–2006)



Source: ABS Population Census: Special Purchase, plus SGS Economics and Planning Calculations

## 4.2 Industry specialisation

Broken Hill's economy became less diverse between 2001 and 2006, which is evident from indicators of 'industrial specialisation'; in this case, an index showing the concentration of employment in Broken Hill for an industry, relative to that for NSW as a whole<sup>27</sup>. Figure 9 shows the Location Quotient (LQ) or index of industrial specialisation for Broken Hill and its Catchment in 2001 and 2006. LQs are used to identify the driver industries for a location; whereby the higher the index, the more specialised a region is in that industry and the more jobs it supports that can be attributed to the export sector<sup>28</sup>.

<sup>27</sup> Each ratio of specialisation is given by dividing the proportion of employed persons by industry for Broken Hill or Catchment by the proportion of employed persons by industry for NSW. Where an LQ is greater than 1.0

<sup>28</sup> Where:  $LQ > 1.0$ .



Figure 9 Industry specialisation: Broken Hill; Catchment (2001–2006)

Industry	Broken Hill			Catchment		
	LQ 2001	LQ 2006	Change	LQ 2001	LQ 2006	Change
Agriculture, Forestry and Fishing	<b>1.35</b>	0.71	-47%	<b>3.52</b>	<b>2.61</b>	-26%
Mining	<b>14.59</b>	<b>15.03</b>	3%	<b>12.11</b>	<b>13.01</b>	7%
Manufacturing	0.33	0.37	11%	0.34	0.35	3%
Electricity, Gas & Water Supply	<b>3.08</b>	<b>3.36</b>	9%	<b>2.83</b>	<b>3.19</b>	13%
Construction	0.63	0.57	-10%	0.64	0.54	-16%
Wholesale Trade	0.63	0.63	-1%	0.57	0.58	2%
Retail Trade	<b>1.33</b>	<b>1.33</b>	0%	<b>1.17</b>	<b>1.20</b>	3%
Accommodation, Cafes & Rest.	<b>1.29</b>	<b>1.39</b>	8%	<b>1.29</b>	<b>1.40</b>	9%
Transport & Storage	0.66	0.66	0%	0.63	0.64	3%
Communication Services	0.55	0.47	-14%	0.53	0.48	-10%
Finance & Insurance	0.36	0.30	-18%	0.31	0.25	-17%
Property & Business Services	0.52	0.46	-12%	0.46	0.41	-11%
Govt. Admin. & Defence	<b>1.07</b>	<b>1.31</b>	22%	<b>1.08</b>	<b>1.34</b>	24%
Education	<b>1.18</b>	<b>1.06</b>	-11%	<b>1.15</b>	<b>1.10</b>	-4%
Health & Community Services	<b>1.60</b>	<b>1.48</b>	-7%	<b>1.41</b>	<b>1.38</b>	-2%
Cultural & Recreational Services	0.58	0.52	-11%	0.62	0.61	-1%
Personal & Other Services	<b>1.43</b>	<b>1.27</b>	-11%	<b>1.33</b>	<b>1.23</b>	-7%
Non-Classifiable Economic Units	0.52	0.54	2%	0.60	0.62	3%
Not stated	0.63	0.88	38%	0.99	<b>1.25</b>	26%

Source: ABS (2006) Population Census: special purchase; and SGS Economics & Planning calculations

\* Concentrations were set to one for NSW

Broken Hill's specialisation in Electricity, Gas and Water Supply – which as a category includes wind farms and wind energy production – increased 9% in the period from 2001 to 2006, as did the total number of jobs in this industry. Similarly Broken Hill's specialisation in Government Administration and Defence increased by 22% (from an LQ of 1.07 to 1.31) thanks to an increase of 131 new jobs (in the context of an overall fall in the total number of employed persons).

Broken Hill's investment in tourism and related businesses – marked by the opening of new restaurants, the sculpture symposium and regional gallery – is reflected in the degree of specialisation in Accommodation, Cafes and Restaurants also increased (up 8% from 1.29 to an LQ of 1.39 in 2006); although the absolute number of jobs in this industry decreased over the period. A similar trend has occurred in Manufacturing, which has increased its concentration of employment but experienced an overall fall in the total number of jobs.

Figure 9 confirms that Broken Hill is highly specialised in Mining (LQ=15.03) and to a lesser extent Electricity, Gas and Water Supply (LQ=3.36) and Health and Community Services (LQ=1.48). The pattern for the Broken Hill Catchment is similar to that of Broken Hill, with the exception of Agriculture, Forestry and Fishing; for which there are proportionately 2.61 times more persons employed compared to NSW.

## 5 Economic stimulus and modelling

### 5.1 Initial economic stimulus

The estimate provided by Silverton Wind Farm Developments of the initial capital expenditure for the project (turbines, building and civil construction and any network infrastructure) is \$2.0–2.5 billion for 500 turbines. It is estimated that between 70% and 80% of the project capital works cost is for turbine supply and installation. The manufacture of turbines is likely to occur elsewhere, and much of this expenditure is considered as an import into the Broken Hill economy. Broken Hill will, however, potentially benefit from the installation of the turbines. The balance of plant capital costs (which includes site civil works and electrical works and offsite design and management functions) comprises 20–30% of the total capital cost.<sup>29</sup>

Figure 10 outlines the estimated economic stimulus – that is, the initial expenditure effect of the project – during three construction phases and over its operational lifespan. Total construction costs likely to be expended in Broken Hill are estimated at \$625 million for the installation of up to 500 turbines over a five-year period. The total life of the project is assumed to be 30 years. Total operational costs, put at \$770 million over a 29-year period are derived as follows:

#### Number of turbines x Cost of turbine maintenance + Workforce x Average wage

Workforce numbers here include ongoing (non-construction) operational and maintenance workers employed by Silverton Wind Farm Developments only. The average wage for the ‘workforce’ is estimated at \$50,000 (after tax and other deductions) while the average maintenance costs per turbine is put at \$50,000. Estimated construction costs for phase 1 of the project (installation of approximately 140 turbines) are estimated at \$87.5 million with a workforce of 60. Estimated construction costs for both Phase 2 and 3 of the project are \$112.5 million for the installation of 180 turbines in each phase, with a workforce of 70 and 80 respectively.

**Figure 10 Economic stimulus of the Silverton Wind Farm on the Broken Hill economy**

Stimulus	Phase 1	Phase 2	Phase 3
Construction <sup>1</sup>	\$87.5 million	\$112.5 million	\$112.5 million
Total operational costs	\$10 million (Beginning in Year 2. Assume Year 1 is just construction hence no operation)	\$19.5 million (Beginning in Year 4)	\$29 million (Beginning in Year 6 – up until Year 30)
Workforce <sup>2</sup>	60	70	80
Turbines constructed	140	180	180
Turbines in operation <sup>3</sup>	140	320	500

Source: EPURON Pty Ltd and SGS Economics & Planning calculations

<sup>1</sup> Total construction costs of installing turbines within the Broken Hill Catchment are \$625 million.

<sup>2</sup> Average wage (post tax) of \$50,000.

<sup>3</sup> Average maintenance costs of \$50,000 per turbine.

<sup>29</sup> Cost estimates provided by EPURON, January 2008.

## 5.2 Input-output modelling

In order to derive the aggregate or flow-on impact of this stimulus on the Broken Hill and Catchment economy a regional Input/Output (IO) model was constructed, using the methodology outlined in Figure 11. In constructing an IO table for an area as small as the Broken Hill Catchment (in terms of population), it is important to validate the results of the statistical model to ensure that the results accurately represent the real world.

**Figure 11** Input-output model explanation

An input-output model assesses the direct and indirect (multiplier or flow-on) effects stimulated by an industry's supply/output into a given economy. In regional economic studies, an input-output model quantifies the affect on an economy resulting from the activities of a particular industry through its upstream and downstream linkages. These relationships can be expressed in terms of a simple equation:

$$\begin{aligned} \text{Total Effects} &= (\text{Initial Effect}) &+ & (\text{Flow-on Effects}) \\ &= (\text{Initial Effect}) &+ & (\text{Production Induced Effects} + \\ & & & \text{Consumption Induced Effects}) \end{aligned}$$

*An industry's initial effect (direct output from expenditures made locally) and its flow on effects are usually expressed in terms of impacts on value added and employment output. Production induced effects are the benefits to local upstream industries resulting from the increased demand for their goods and services (as a result of winning supply contracts) together with an associated increase in local purchasing to service these contracts. Consumption induced effects relate to increased regional spending from wage earners, and the resulting increase in expenditure from local suppliers.*

Data from the Australian Bureau of Statistics on wages and salaries<sup>30</sup> and business profits<sup>31</sup> can be compared to the results from the Broken Hill Catchment IO table. The ABS statistics estimated that income in the region was around \$450 million compared with an estimate of \$460 million from the IO table. This provides additional confidence that the IO table is accurately reflecting the economy of the Broken Hill Catchment.

### 5.2.1 Estimated total economic impact

The total economic impact across the region from the construction and operation of the project over a 30-year period is estimated to be:

- Employment growth of 3,988 FTE jobs; and
- Gross Regional Product increased by \$701 million.

This reflects the direct and indirect effect of the project's initial stimulus (outlined in section 5.1) on the Broken Hill and Catchment economy.

<sup>30</sup> *National Regional Profile* combined with data from *Australian System of National Accounts, 2006-07* (cat. no. 5204.0).

<sup>31</sup> *Counts of Australian Businesses, including Entries and Exits, Jun 2003 to Jun 2007* (cat. no. 8165.0).

- Direct jobs (often referred to as 'first round effects') are jobs which, excluding non-construction Silverton Wind Farm Development employees, are created as an immediate consequence of the economic activity stimulated by the project. Construction workers employed on a contract basis, and other non-Silverton Wind Farm Development trades persons and engineers providing labour to the project are counted as 'direct employment effects'.
- Indirect jobs (often referred to as 'second round effects') are those which are created as a result of the flow-on effects of the initial stimulus and the subsequent direct employment. Indirect jobs include, for example, those jobs created by the production and consumption activities of the project's construction workforce, whose purchase of goods and services within the Broken Hill economy creates jobs across a variety of industry sectors.

The potential total effects of the project therefore include production induced effects, such as the benefits to local upstream industries resulting from the increased demand for their goods and services; and consumption induced effects, which relate to increased regional spending from wage earners, and the resulting increase in expenditure from local suppliers. The figures derived are based around industries rather than the consumption patterns of wage earners.

Approximately 80–85% of the economic benefits stimulated by the project will occur in the Broken Hill SLA, based on the proportion of the population being located in Broken Hill relative to the broader Catchment, and upon its higher concentration of construction and related industries.

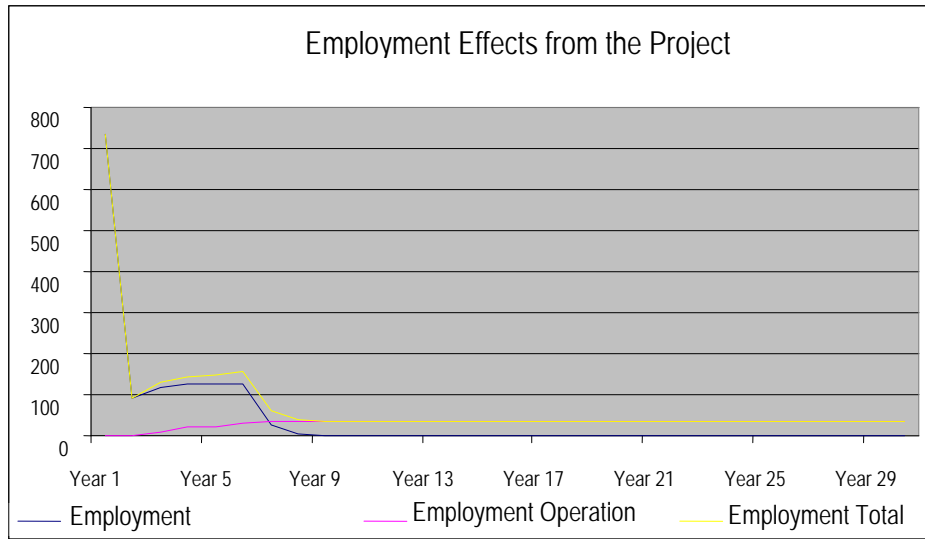
It is an assumption of the model that the production and consumption induced effects of the project can be entirely generated within and satisfied by the Broken Hill economy. This means that the results of the growth forecast should be interpreted with a degree of caution, since they assume that the economy of Broken Hill has sufficient supply-side capacity to capture expenditure on goods and business services locally. Supply-side constraints such as the availability of skilled labour, the level of business investment and the ability of businesses to innovate will, however, affect the degree to which the opportunities presented by the wind farm can be realised. Possible supply-side constraints are discussed in further detail in section 5.3.

It should be noted however that these supply-side constraints refer to the capacity of the Broken Hill economy to absorb the total economic stimulus presented by the wind farm, rather than to constraints on the delivery of the wind farm project itself. Any shortfall in the availability of skilled labour and goods and services locally would be imported.

### **Direct employment impact**

Figure 12 provides an overview of the direct employment impact of the wind farm over time. The figure shows that over 700 FTE direct jobs will be created at the commencement of the project's construction phase, falling to approximately 100 as the initial construction phase slows down. Following on from that, employment is estimated to grow to around 157 direct FTE jobs in Year 6 as the flow-on effects from construction and the peak of the operational phase are combined. Employment growth then falls away to remain steady at around 30 direct jobs for each year of operation.

**Figure 12** Graph: Direct impact on employment over time

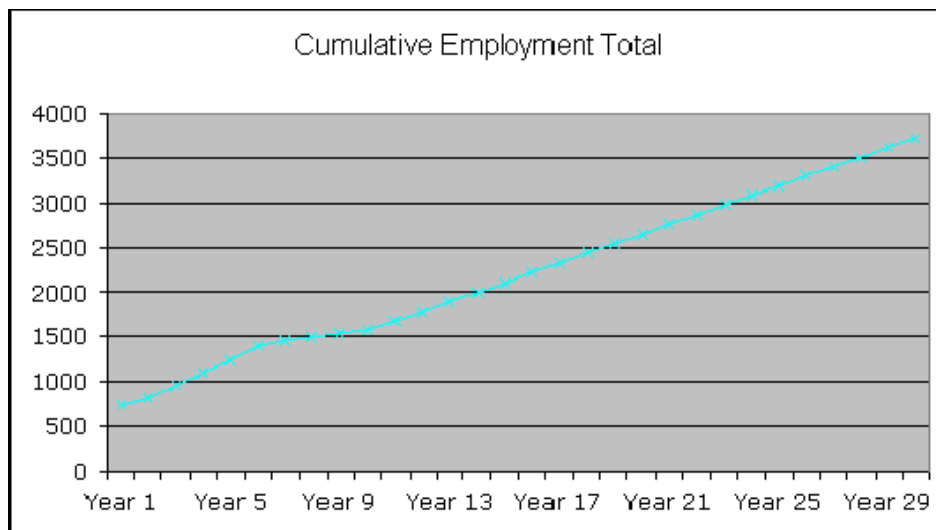


Source: ABS (2006) Population Census and SGS Economics & Planning calculations

**Direct and indirect employment impacts combined**

Figure 13 shows the cumulative impact on employment stimulated by the project’s construction and operational phases over the life of the project. The figure represents both the cumulative impact on employment from the project’s direct employment effect (see Figure 12 for year on year job numbers) together with the cumulative impacts from the growth in indirect employment. The figure shows that 3,988 FTE jobs will be created in total over the life of the project (including 2,244 direct jobs and 1,744 indirect jobs).

**Figure 13** Graph: Cumulative impact on employment over time



Source: ABS (2006) Population Census and SGS Economics & Planning calculations

Figure 14 provides a break down of this cumulative effect by industry for the construction and operation phases of the project over the assumed 30-year project lifecycle.

**Figure 14 Employment impacts by industry stimulated by the project over 30 years**

Industry	Construction		Operation	
	Employment (Full Time Equivalent)	Value added	Employment (Full Time Equivalent)	Value added
Agriculture	37	1	11	0
Mining*	1	0	10	2
Manufacturing	153	4	129	4
Electricity, gas & water	4	1	528	338
Construction	667	203	16	11
Wholesale trade	205	11	209	11
Retail trade	206	6	122	5
Accommodation, cafes & restaurants	100	3	147	4
Transport & storage	108	7	110	7
Communication services	25	2	50	4
Finance & insurance	42	4	151	16
Property & business services	399	23	339	20
Government administration	54	3	23	1
Education	13	1	46	2
Health & community services*	3	0	4	0
Cultural & recreational services*	7	0	8	0
Personal & other services	16	1	45	2
<b>Total</b>	<b>2,040</b>	<b>270</b>	<b>1,948</b>	<b>431</b>

Source: ABS (2006) Population Census: special purchase; and SGS Economics & Planning calculations

\* Due to the size of the impact on these industries the results should be viewed with caution.

### Economic impact: construction phase

Based on the proposed five-year construction phase, employment will increase by 2,040 FTE jobs across the Catchment and GRP will increase by \$270 million over the life of the project. Construction (667 jobs), Property and Business Services (399), Retail Trade (206) and Wholesale Trade (205) make up most of the employment growth.

### Economic impact: operational period

During the 29-year operational period used in the analysis, employment is expected to increase by 1,948 FTE jobs and GRP by \$431 million. Employment in Electricity, Gas and Water – of which wind energy is an industry – is estimated to increase by 528 jobs over the period. Property and Business Services (339) and Wholesale Trade (209) will also see a strong increase in employment.

## 5.3 Possible constraints

Several supply-side opportunities and constraints characteristic of the Broken Hill economy are likely to affect the degree to which economic benefits – and hence aggregate employment growth – will be realised. These include the supply of labour and the capacity of local business to service new

contracts; together with the quality of local housing and other physical and social infrastructure and amenities needed to attract and retain workers.

These possible constraints relate to the capacity of the Broken Hill economy to realise the full economic potential presented by the wind farm project, and do not relate to the project's internal capacity to attract labour during the construction and operation phases. According to Silverton Wind Farm Developments, any shortfall in labour supply will be imported.

### **Supply of labour to satisfy employment opportunities**

As demonstrated in Section 3 of this report, the population of Broken Hill has an older, lower skilled profile than NSW as a whole. The proportion of persons within the labour force is also lower than that of NSW, and a significant proportion of those within the labour force are either low-skilled, approaching retirement age or unemployed.

This means that demand for skilled labour is unlikely to be met through local supply, and will depend upon the capacity of Broken Hill to attract large numbers of skilled migrant labour. According to employers, the local market for labour is already stretched, with those persons able to transition into mining from other industries having already done so. Many of those in higher paid and skilled positions are already from overseas and elsewhere in Australia.

Increasing the supply of local skilled labour has been identified as a complex activity, which will rely not only upon attracting skilled migrants, but on the capacity of the education and training system to up-skill existing workers. Skills shortages are prevalent across much of Australia, which suggests the need for intervention by government and the private sector to ensure training is effectively targeted according to future labour requirements. Some advances have been made in this regard, with industry and government forums working in consultation with TAFE and group training bodies in the region.<sup>32</sup>

### **Local Business Capacity**

The high demand for labour locally has reportedly had detrimental effects on industries such as trades, manufacturing and engineering, from which labour has been 'poached' by the mining sector. According to industry peak bodies in Broken Hill, capacity constraints experienced by local small businesses relate to the quality as well as the quantity of entrepreneurs and business managers. And overall there is considered to be a lack of skills, business development know-how and investment necessary to increase productivity in Broken Hill's small business sector.

Constraints in the capacity of local businesses to meet the increase in demand have meant that suppliers from Adelaide, Mildura and elsewhere are being used more frequently; alternatively large (mining) companies are turning to 'in-house' support services.

A further supply-side constraint relates to Broken Hill's capacity to retain skilled labour beyond the period of their initial contract. Factors influencing labour supply retention commonly cited during consultations include the provision of quality social and community infrastructure, services, retail attractions and quality housing.

<sup>32</sup> Outback Development Forum (June 2007), Far West Region Growth & Investment Strategy

## 5.4 Sensitivity analysis

By altering the assumptions underlying the construction and operational costs, lower and upper estimates of the economic impact of the project can be created. Figure 15 presents the results, with operational costs over the life of the project reduced to \$745 million and construction costs reduced to \$500 million. Under these assumptions, employment is estimated to increase by 3,756 FTE jobs and GRP by \$628 million. Using a higher set of assumptions, employment is estimated to increase by 4,367 FTE jobs and GRP by \$768 million. Inputs provided by Silverton Wind Farm Developments constitute those of the most likely growth model.

**Figure 15** Sensitivity analysis of economic impact

Impact	Lower	Most likely	Upper
Operational costs (\$,m)	745	770	808
Construction (\$,m)	500	625	750
Employment (FTE)	3756	3,988	4367
GRP (\$,m)	628	701	768

Source: ABS (2006) Population Census: special purchase; and SGS Economics & Planning calculations

## 5.5 Summary

The input-output model has enabled a forecast of the potential economic benefits stimulated by the activities of the Silverton Wind Farm to be estimated; with the aggregate employment impact of the project put at 3,988 FTE jobs (see Figure 13). As shown in Figure 16 below, these additional jobs can be broken down into direct jobs (2,244) indirect jobs (1,744) and into construction (2,040 jobs) and operational (1948 jobs) phases.

**Figure 16** Summary of the Silverton Wind Farm's estimated employment impacts

	Construction phase	Operation phase	Total
Direct employment	1,374	870	2,244
Indirect employment	666	1,078	1,744
Total	2,040	1,948	3,988

Source: ABS (2006) Population Census: special purchase; and SGS Economics & Planning calculations

Several supply-side opportunities and constraints characteristic of the Broken Hill economy will, however, affect the degree to which much of the employment and value-added flow-on effects will be realised.

To optimise the potential aggregate economic impact of the project, the Broken Hill economy will need to address several underlying limitations: attracting, retaining and training labour for upstream and downstream suppliers; and improving the quality and choice of offerings for wage earners so that consumption expenditure might be captured.



## 6 Consultations

In order to determine the potential social impacts of the project, views and information were gathered during a small number of interviews conducted with government agencies and regional development forums and committees. State and Federal elected representatives were contacted in writing regarding their views on the project. Figure 16 contains a list of people and organisations consulted in preparing this report.

It was initially proposed to conduct a small number of interviews with Council, State and Federal elected representatives to gain a representative public view of the potential impacts of the project. However, since Broken Hill City Council is currently under administration, only State and Federal members were contacted.

Silverton is situated within the unincorporated area of NSW and does not have an elected local government. The Silverton Village Committee Trust, which is elected to perform a number of functions that a local council would normally undertake, has been consulted directly by EPURON Pty Ltd. Direct consultation by EPURON Pty Ltd has also been undertaken with State elected representative (24 October 2007). Views and perceptions about the project were made available from the responses to the public consultation undertaken by EPURON by way of an 'open house' meeting at Silverton (28 November 2007) and are not discussed in this report.

The State Member for Murray-Darling, Mr John Williams MP, and the Federal Member for the Electoral Division of Farrer, the Honourable Ms Sussan Ley, were invited by letter and subsequent telephone calls to provide comments, but at the time of writing no response had been received.

In a media release (posted 23 January 2008) the state Member for Murray Darling, John Williams, commented that he supports the establishment of the wind farm since it will provide jobs for the community and is a move towards greener energy, though it will create a new landscape for the Barrier Ranges<sup>33</sup>.

Consultation with the key regional economic development bodies focused on the potential for the Silverton Wind Farm Developments project to influence or lead a change to the local industry structure, and on the impacts and opportunities for existing and new business.

In summary, the responses considered the project offered great potential for the community and by diversifying the local economy would reduce Broken Hill's historical dependence on mining. Opposing views were given regarding the impact of the project: from the view that it would depend on the level of ongoing green energy demand; to the view that any project that generated 50+ ongoing jobs is considered 'significant'. Strengths, weaknesses, opportunities and constraints of the economy, local business or in social infrastructure (including demand for quality housing and residential and industrial land supply) are factors identified by the council and industry bodies.

Consultation with the Council focused on the potential for the Silverton Wind Farm Developments project to affect the tourism market for Broken Hill and impacts on social and community infrastructure. With respect to whether the project would serve as an attraction or detraction for the

<sup>33</sup> <http://www.abc.net.au/news/stories/2008/01/23/2144804.htm>

existing tourism market, the view was that it was not likely to influence people's choice or reason to visit Broken Hill.<sup>34</sup> However the project was perceived to have a potentially negative impact, should it 'dominate' the outback landscape; particularly if the project is visible from existing important attractions (such as the Mundi Mundi lookout, sculptures). The impact on the film industry is likely to be negligible for the first stage of the project, however the larger the project the greater the impact, particularly in terms of the attractiveness and cost effectiveness of the area as a film location (with the increased costs of editing being raised as an issue).

Informal consultations with Silverton residents/businesses uncovered concerns regarding impacts on the local sense of place given Silverton's notoriety as a historic village. Potential impacts on local businesses caused by traffic and transport disruptions during the project construction phase were also noted, although it was acknowledged that these effects could be managed. These issues are discussed in another report for the project.

**Figure 17 Consultation list**

Contact	
Federal Member for the Electoral Division of Farrer, the Honourable Ms Sussan Ley	Letter dated 17 January 2008
State Member for Murray Darling, John Williams	Letter dated 17 January 2008
Mr Kevin Taylor, Chair Outback Development Forum	Telephone interview (18 January 2008)
Mr Scott Howe, CEO Outback NSW Consultative Committee	Telephone interview (18 January 2008)
Neville Gasmier, Chair Far West Regional Development Board	Interview (23 January 2008)
Mr Robert Sidford, Business Development Board, NSW Department of State & Regional Development	Interview (23 January 2008)
Ms Fiona Ellis, Manager Tourism Broken Hill City Council	Interview 24 January 2008
o Informal conversations with Silverton businesses	24 January 2008

<sup>34</sup> Broken Hill is the primary destination for 75% of visitors. Citing the desire to 'visit Broken Hill' as the key driver of visitation. The outback experience is the key drawcard: the special unique attractions being desert landscapes and the history of the town. Silverton is a town most likely to be visited prior to and immediately after Broken Hill. TNS Consultants. Broken Hill Draft Report – Pilot Visitor Destination Study (2006). Prepared for Tourism Research Australia October 2006). [http://www.brokenhill.nsw.gov.au/news/pages/4412/NewsDoc/Final\\_Visitor\\_Satisfaction\\_Report.pdf](http://www.brokenhill.nsw.gov.au/news/pages/4412/NewsDoc/Final_Visitor_Satisfaction_Report.pdf). Cited 30 January 2008.

## 7 Concluding remarks

The Silverton Wind Farm project presents a large-scale economic opportunity for Broken Hill and the surrounding region, with the potential to stimulate growth of close to 4,000 jobs and increase Gross Regional Product by over \$700 million during the life of the project.

Given the limitations characteristic of the Broken Hill economy – in particular supply-side constraints around the availability of skilled labour and the strained capacity of local business – realising the potential offered by the project will depend upon the degree to which State and local government, together with existing industry forums, can successfully devise and implement the strategies necessary to respond.

In the course of consultations, the Council, local industry and economic development groups expressed the view that the opportunity presented by the wind farm is welcomed, while a variety of strategies are already in place to help ensure that potential benefits can be maximised. Documents such as the Outback Development Forum's *Combined Economic Development Plan*, the *Far West Region, Growth and Investment Strategy* and the Outback NSW Area Consultative Committee's *Strategic Regional Plan 2007–2010* are evidence of this thinking and clearly demonstrate a community-wide commitment to mitigating supply-side constraints through improvements to vocational education and training, investment in business development and investment in community facilities and infrastructure.

These strategies are being developed not only in response to the Silverton Wind Farm project, but in the context of several major projects coming online over the next five years. Most will occur within the mining sector, but will similarly require a development of the capacity of 'upstream' businesses, particularly in the trades and civil and mechanical engineering sectors. One initiative of note is the Alliance Engineering Group or 'business cluster', a regional industry alliance involving five major engineering firms, cooperating to increase the sector's critical mass and capacity to compete for major projects.

The recent abatement in population decline and the current performance of the Broken Hill economy suggests that such initiatives are gaining traction. Their success offers Broken Hill the potential to expand and develop its small and medium enterprise sector, diversify its economic structure and ultimately reduce its historical reliance on the boom and bust cycles associated with a mining-based economy. The Silverton Wind Farm project would offer a sustained contribution to this objective.

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