



Delburn Wind Farm

Preliminary Economic Impact Assessment of Delburn Wind Farm

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1. Background

Project Description

The Project will involve the construction of a wind farm comprising 35 wind turbines built on three existing timber plantations (Darlimurla, Silver Creek and Thorpdale) in the Latrobe Valley. The Project is being developed by OSMI Australia, which will lease land from the owner of the timber plantations. It is anticipated that the wind farm will generate approximately 620,000 MW hours of electricity per annum. Construction is assumed to commence in 2022, with wind generation beginning 12 months later. The expected timelines for each of the phases are outlined in Table 1.

Table 1: Timelines for Delburn wind farm

	Period
Construction phase	18 – 24 months
Operation and maintenance phase	25 – 30 years

Location

The proposed development site is over the plantation land centred in the Delburn area, covering the Darlimurla, Silver Creek and Thorpdale plantations. The site is generally bounded by Coalville and Hernes Oak to the north, Thorpdale to the west, Darlimurla to the south, and Boolarra and Yinnar to the east¹. The township of Morwell is approximately 5km to the north-east of the development site (as measured from the outer boundaries of both the township and the project land) and the township of Moe is approximately 5km to the north.

The site is located within the Latrobe, Baw Baw and South Gippsland Shires. There are no dwellings within 1km of the wind farm and approximately 99 dwellings within 2km. In Figure 1, the orange shaded area shows the wind farm site boundaries and the pink lines show the local government boundaries. The grey dots represent nearby dwellings. The main access road is Darlimurla Road, which links to the Strzelecki Highway.

Our analysis focuses primarily on the Latrobe Shire with some analysis also including Baw Baw and South Gippsland regions. The reasons for this are:

- Most of the site is located within Latrobe Shire.
- There are large population centres close to the site in Latrobe: Morwell (6km away²), Moe (6km) and Traralgon (20km), which had populations of 13,774, 8,779 and 24,935 respectively in 2016. There are also towns near to the site: Boolarra (4km, 972 people in 2016) and Yinnar (4km, 903 people in 2016).
- The population centres in the South Gippsland Shire within comparable distance have small total populations (Mirboo North and Rural North East). Mirboo North is the closest town to the Project within this Shire (5km, 2,338 people). Leongatha is the closest relatively large population centre (25km, 5,738 people in 2016).
- The population centres in Baw Baw Shire within comparable distance have small total populations (Thorpdale (5km, 472 people) and Trafalgar (10km, 3,911 people), although Warragul is relatively large (30km, 15,760 people).

¹ Local towns surrounding the site

² CNC Projects maps distances

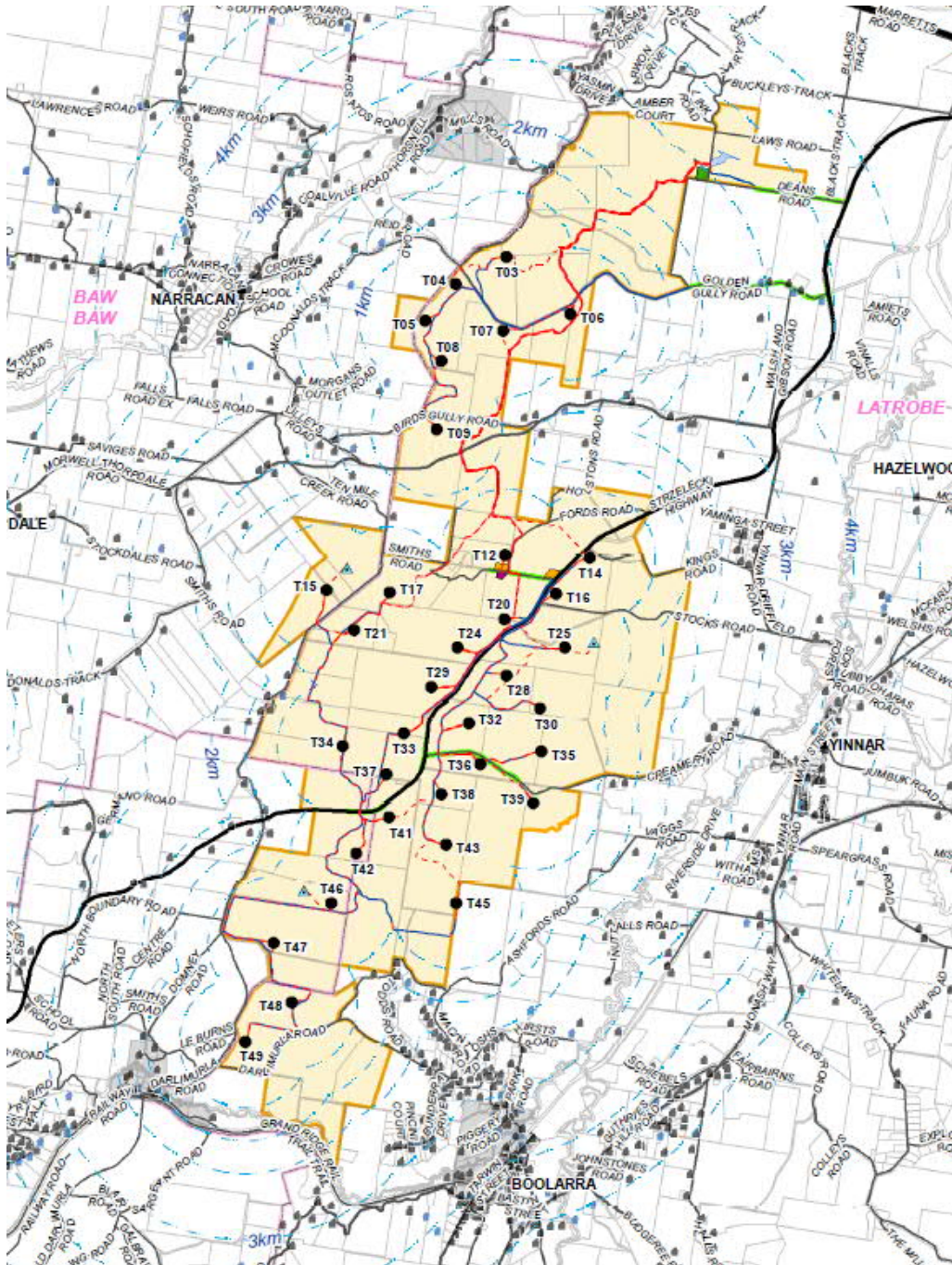


Figure 1: Map of Delburn wind farm and surrounding local councils³

³ OSMI Australia

2. Socio-economic profile for the region

Location

Latrobe, Baw Baw and South Gippsland are local government areas located within the Gippsland region, east of Melbourne. They each border the Delburn Wind farm area.

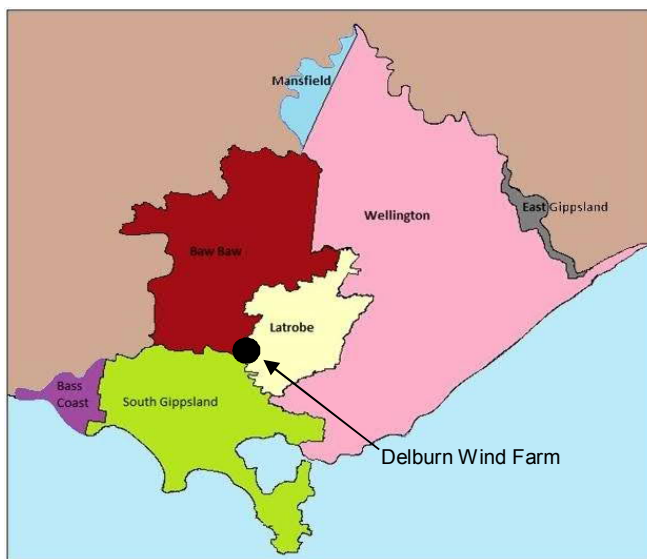


Figure 2: Location of Latrobe, Baw Baw and South Gippsland⁴

Economic output

The estimated Gross Regional Product (GRP) of Latrobe was \$4.7 billion in 2017, with a growth rate of 3.1% over the preceding five years. Latrobe's GRP represented approximately 30.5% of Gippsland's GRP and 1.2% of Victoria's Gross State Product.

The electricity, gas, water and waste water services industry had the greatest output for the Latrobe region at \$2.2 billion. Latrobe had net regional exports of \$920 million in 2017 with the electricity, gas, water and waste water services industry being the largest export⁵.

Industries

Latrobe's major industry is electricity generation, with three large brown coal power stations in operation: Loy Yang A, Loy Yang B and Yallourn. This industry is in decline: Hazelwood Power Station closed in March 2017, resulting in approximately 750 job losses⁶ and Yallourn and Loy Yang A are set to close by the middle of the century.

The area is also home to Australia's largest yoghurt manufacturing facility, the largest pulp and paper manufacturer, the new Federation University and the only manufacturer of passenger aircraft in Australia⁷. Other industries include agribusiness, retail, hospitality, and health.

⁴ Research Gate (2018). The Impact of Bushfires on Water Quality

⁵ Latrobe City Council. Economy Profile: Latrobe

⁶ ABC Gippsland (2019). Latrobe Valley optimistic two years after Hazelwood power station closure, but coal attachment remains.

⁷ Regional Development Victoria. Regional City Profile Latrobe

Employment and incomes

The employment and income statistics for the regions surrounding the Delburn Wind Farm and a comparison to Victoria, have been summarised in Table 2.

Table 2: Relevant employment statistics⁸

	Year of data	Latrobe region	Baw Baw region	South Gippsland region	Victoria ⁹
Labour force	2018	37,219	25,722	14,457	3,437,618
Unemployment rate	2018	9.1%	4.6%	4.3%	5.6%
Median employee income (excluding government pensions and allowance)	2016	\$46,527	\$41,967	\$36,585	\$46,984

Latrobe has a significantly higher rate of unemployment than the Victorian average, and this gap has been widening for the past 6 years. This gap was exacerbated by the closure of Hazelwood Power Station where the unemployment rate in Latrobe increased from 7.1% in 2016 to 10.6% in 2017, while the Victorian unemployment rate remained steady at 5.9% during this time. Statistics on employment by industry show that the electricity, gas, water and waste services industry employed 2,530 people in 2016, representing around 7% of employment in Latrobe. Hazelwood generated 2% of all jobs in the LGA and with its closure in 2017 the unemployment rate will have worsened significantly.

Figure 3 shows the percentage of workers in different occupations in Latrobe and Victoria. It demonstrates that the Latrobe region contains a relatively low proportion of professionals and managers compared with Victoria, and a higher proportion of labourers, service and trades workers. This is a typical labour mix for regional Victoria.

⁸ Department of Employment, Skills, Small and Family Business. Small Area Labour Markets.

⁹ Australian Bureau of Statistics (2019). Labour Force, Australia, June 2019, Table 5

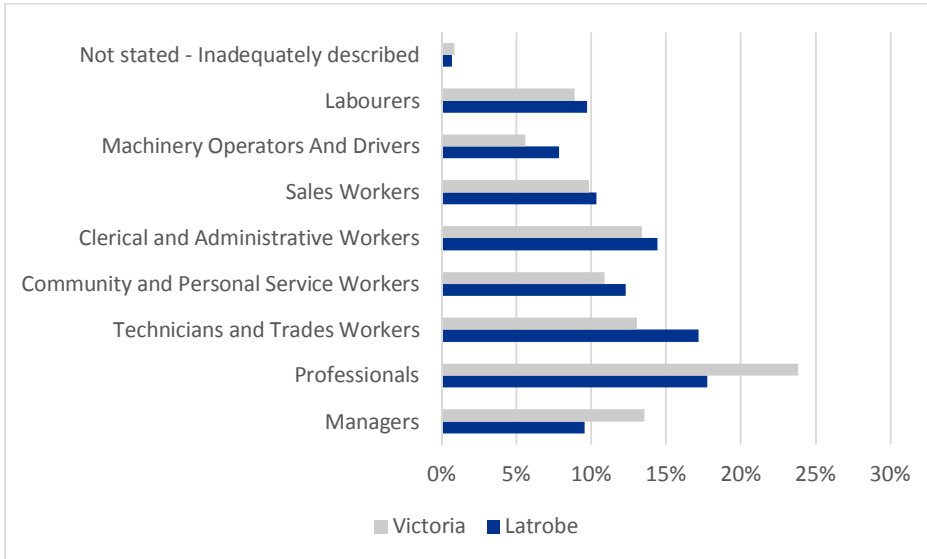


Figure 3: Workers by occupation in Latrobe and Victoria 2017

Population

The population of Latrobe in 2017 was 74,921, with an average annual growth rate of 0.25% over the preceding five years. Neighbouring Shires, Baw Baw and South Gippsland, had populations of 50,687 and 29,324 respectively. These three regions combined have a population of 154,932 which is approximately 2.5% of Victoria’s population.

Latrobe’s population growth rate is significantly lower than Victoria and Australia. In Figure 4, the index of Latrobe’s population from 2008 to 2017 is shown, compared with the index of Victoria and Australia.

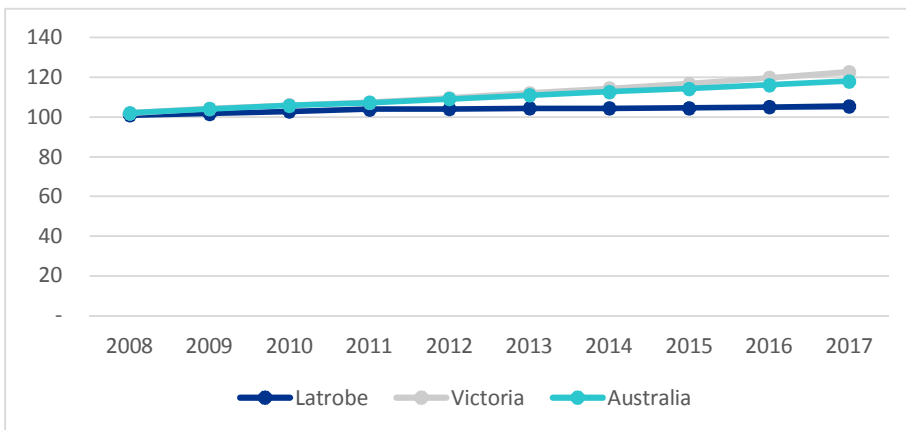


Figure 4: Population index of Latrobe, Victoria and Australia 2008-2017

Social profile

Latrobe ranks as the fourth most disadvantaged local government area in Victoria in the 2016 Socio Economic Index For Areas (SEIFA) Index of Disadvantage score, with a score of 931¹⁰. This index is derived from attributes such as low income, low educational attainment, high unemployment and jobs in relatively unskilled occupations.

2.1 Renewable energy industry

Climate change and falling technology costs are driving worldwide demand for renewable electricity generation. In Australia, the Large-scale Renewable Energy Target (LRET) scheme is a Federal Government scheme designed to encourage generation of electricity from renewable sources. LRET's target for 2020 is 33,000 GW hours of renewable electricity generation, which is expected to be met before the 2020 deadline. In 2018, 21% of total Australian electricity generation was from renewable sources, the highest level ever¹¹.

The Victorian Government is committed to Victorian renewable energy generation targets of 25% by 2020, 40% by 2025 and 50% by 2030^{12 13}. The Victorian Renewable Energy Auction Scheme (VREAS) has been established to support these targets with the Victorian government awarding six new renewable energy projects long-term contracts¹⁴.

Only 3 of the 25 major operating wind farms in Victoria are located in the east of the State, in the Gippsland region¹⁵. Latrobe currently has no operating wind farms. Wind farms create an opportunity for Latrobe to transition from coal powered electricity generation to renewable electricity generation. Due to Latrobe's past electricity generation, it already has a high-capacity transmission connection to the Victorian grid that could be utilised by Delburn Wind Farm, as well as a significant number of local employees with relevant skills.

The Delburn Wind Farm would generate approximately 620,000 MWh of renewable energy each year and would reduce the amount of carbon dioxide released into the atmosphere by approximately 620,000 tonnes per annum, compared to the weighted average emissions intensity of Victorian generation plants.

¹⁰ Id. Community. SEIFA by Local Government Area.

¹¹ Clean Energy Council (2019). Clean Energy Australia report 2019

¹² Hamilton (2019). Victoria: Renewable energy policy brief published in PV magazine

¹³ Target of 50% by 2030 is not yet legislated

¹⁴ Department of Environment, Land, Water and Planning (2019), Victoria's renewable energy targets

¹⁵ Department of Environment, Land, Water and Planning (2019). Renewable Energy – Wind Projects

3. Economic Impact Assessment

This section explores and discusses the impact of the Project on the regional economy at each stage. It considers the impact on Gross Regional Product, the employment impact and the effect on incomes, property values and the general community.

To estimate the impact on the region, the online Flinders University Economic Input-Output analysis tool¹⁶ for Regional Infrastructure Investment Projects is used. The tool, and an alternative method of assessment, are discussed further in Appendix B.

3.1 Regional employment impact

With Latrobe suffering from high unemployment, there is sufficient labour market capacity for the Project. Most employees will be sourced from the Latrobe, Baw Baw and South Gippsland Shires, as outlined in Table 3. These populations are based on the towns closest to the Project including Morwell, Moe, Traralgon, Boolarra, Yinnar, Leongatha, Thorpdale, Trafalgar and Warragul.

Table 3: Regional populations surrounding Delburn Wind Farm

	Latrobe	Baw Baw	South Gippsland	Total
Population centres close to the Project	49,363	20,143	8,076	77,582
% of Total	64%	26%	10%	100%

The expected annual impact of the Project on employment is outlined in Table 4. The construction phase of the Project is expected to be spread over 2 years, with varying levels of employment over this period, with the peak level of direct employment expected to be 75 new jobs. In the operation phase, 12 employees are expected to be directly employed and this is likely to remain relatively consistent over the 25 to 30-year period.

In addition to the direct jobs created by the project there will also be indirect jobs created due to flow on effects of purchases on suppliers to the Project and wages spent by both direct and indirect employees. These indirect expenditures create further employment. As shown in Table 4, the indirect employment within the region results in a total employment impact of 183 new jobs in the construction phase and 19 new jobs in the operation phase.

¹⁶ Flinders University. Economic Impact Analysis Tool (EIAT).

Table 4: Annual employment impact

Annual impact (FTE)	Latrobe	Baw Baw	South Gippsland	Total
Construction phase				
Direct employment	47.5	19.3	7.8	74.6
Indirect employment	68.4	28.8	11.7	108.9
Total employment	115.9	48.1	19.4	183.5
Operation phase				
Direct employment	7.8	3.2	1.3	12.3
Indirect employment	4.4	1.9	0.7	6.9
Total employment	12.2	5.0	2.0	19.2

3.2 Regional construction and operational financial impact

OSMI Australia estimates that the construction phase capital expenditure is \$354 million over a 2-year period. They estimate \$22 million of this will be spent on development, \$294 million on capital works, \$30 million on grid connection and \$8 million on other costs. It is assumed the costs are split evenly between the first and second year of construction.

The operating phase of the project is expected to add \$6.2 million of operational expenditure annually, to be split between repairs and maintenance, construction services and electrical transmission. It is assumed that these costs will continue over the 30-year period.

The manufacture of turbines and some of the other construction costs are likely to occur outside of the Gippsland region and even outside Australia. The Gippsland region will, however, benefit from the installation of the turbines and other capital spend for the Project. For simplicity, the total capital expenditure has been split by location as shown in Table 5 based on the Clean Energy Council report '*Wind farm investment, employment and carbon abatement in Australia*'.

Of the \$354 million spent during the construction phase, it is expected that \$53 million will be spent within the region. Of the \$6.2 million annual operating expenditure, approximately \$1.7 million will be spent within the region. This expenditure has been split between Latrobe, Baw Baw and South Gippsland Shires based on the population centres closest to the Project as outlined in Table 3.

Table 5: Expenditure by location

	% of total	\$m	% of total	\$m
	Construction phase		Operation phase	
Overseas	38%	134.5	0%	0.0
National	20%	70.8	58%	3.6
State	27%	95.6	14%	0.9
Region	15%	53.1	28%	1.7

The analysis found that during the construction phase around \$23 million would be spent annually in the region, resulting in approximately \$45 million total Gross Regional Product over two years. This includes indirect spend resulting from flow-on effects of the Project. During the operation phase, the regional impact is expected to be around \$1.7 million annually and over the 30-year expected life of the project, this would result in additional Gross Regional Product of around \$51 million. Therefore, the Project brings total GRP of \$96 million to the economy over the 30-year period.

Table 6: Annual financial impact

Annual impact (\$m)	Latrobe	Baw Baw	South Gippsland	Total
Construction phase				
Direct GRP	5.5	2.2	0.9	8.7
Indirect GRP	9.1	3.4	1.5	14.0
Total GRP	14.6	5.7	2.4	22.7
Operation phase				
Direct GRP	0.5	0.2	0.1	0.8
Indirect GRP	0.6	0.2	0.1	0.9
Total GRP	1.1	0.4	0.2	1.7

3.3 Income impact

The owner of the timber plantation will receive an annual lease payment. For the purposes of this assessment, \$5,000 per MW is the assumed income paid to the land owner, who would therefore receive \$1 million¹⁷ per annum to have the wind turbines and associated infrastructure located on their land. It is assumed this cost is also captured as an operational expense in the financial impact. There will be minimal reduction in timber revenue as it is expected the turbines will coexist alongside the timber trade. Additionally, OSMI has advised that neighbouring dwelling owners within 2km will receive a combined \$500,000 per annum in neighbour contributions.

The construction and operational labour force employed by the Project will directly benefit from their wages. The types of workers required to construct the wind farm are expected to include: project developers, field engineers, managers and consultants, apprentices, safety technicians and contractors. The types of workers required in the operation and maintenance phase are expected to include engineers, project managers, wind turbine technicians, environmental consultants and apprentices. Incomes paid in both construction and operation phases are expected to average around \$75,000¹⁸ per annum based on the types of employees required. This is approximately 60% higher than the median Latrobe salary. Therefore, Latrobe and surrounding regions are likely to experience an increase in median incomes during the construction phase and in the operating years following.

3.4 Property values

A study initiated by the NSW government '*Preliminary Assessment of the Impact of Wind Farms on Surrounding Land Values in Australia*' analysed the impact of wind farms on the value of land¹⁹. This study found that there are very few residential properties that are within proximity of a wind turbine in Australia in comparison to overseas countries where wind farms are often situated close to urban centres or villages with relatively high population densities. Based on a literature review and preparation of eight case studies in NSW and Victoria, they concluded that there is no evidence that wind turbines cause property values in their vicinity to reduce.

3.5 Community impact

The Project will provide further financial benefits beyond the direct lease payment to the landowner of the wind farm and estimated 99 surrounding dwellings. A Community Fund will be created, with OSMI Australia contributing approximately \$150,000 per annum. On top of this, the Project is expected to pay \$403,000 in municipal charges under the Electricity Act, which will go to Latrobe, Baw Baw and South Gippsland Shire Councils. The community is also expected to benefit from 6.2km of local road upgrades and repairs to support the construction of the wind farm and the reinstatement of roads.

¹⁷ Based on 35 turbines with approximate capacity of 200 MW

¹⁸ ABS 6306 (2018). Employee earnings and hours, Australia, Jacobs calculations

¹⁹ NSW Government of Lands (2009). Preliminary Assessment of the Impact of Wind Farms on Surrounding Land Values in Australia

4. Conclusion

The main benefits of the Project are the following:

- During the construction phase, local benefits to the Gippsland region are expected to total \$23 million additional Gross Regional Product, creating approximately 183 jobs (includes direct and flow-on effects).
- During the operation phase, approximately 19 new ongoing jobs are expected and annual benefits of about \$1.7 million to the Gippsland Gross Regional Product (includes direct and flow-on effects). The jobs created will be paid above-median wage rates.
- Significant transfers to the local community through payments to neighbouring properties, local road upgrades and a Community Fund.

Overall, the Project is expected to deliver substantial ongoing economic benefits to the Latrobe, Baw Baw and South Gippsland regions by leveraging existing transmission assets and local skillsets to create a new source of employment in the region. From a regional, State and national perspective, the Project will contribute to the achievement of renewable energy generation targets.

Appendix A. References

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Appendix B. Input-Output Methodology

B.1 Flinders University Analysis Tool

This tool applies the regional I-O model to estimate the economic impact on a specific local government area. It draws on 2011 Census industry of employment data and the 2009/10 national I-O table to calculate industry multipliers. In this assessment, employment is measured as the number of employees in the region in terms of the number of full time equivalent (FTE) jobs.

Important Assumptions:

- a) Increases in demand in the region are serviced by industries with constant proportions there are no significant price adjustments that occur
- b) industries have a linear production function, which implies constant returns to scale and fixed input proportions
- c) firms within a sector are homogeneous, which implies they produce a fixed set of products that are not produced by any other sector and that the input structure of the firms are the same
- d) the model is a static model that does not take account of the dynamic processes involved in the adjustment to an external change.

To estimate the impact on GRP and employment, the expenditures provided by OSMI Australia have been split into the ABS Standard Industrial Classifications. The multipliers are then applied to these industries to understand where the impact occurs.

Table B1: Total expenditure by ABS classification

Relevant industry	Construction phase total expenditure (\$m)	Operation phase total expenditure (\$m)
Professional, Scientific and Technical Services	22.0	
Manufacturing	176.4	
Construction	117.6	0.9
Electricity, gas, water and waste	30.0	0.3
Accommodation and Food Services	6.4	
Transport, Postal and Warehousing	1.6	
Other Services		5.0
Total	354.0	6.2

B.2 Alternative method – Clean Energy Council report

The Clean Energy Council report 'Wind Farm Investment, Employment and carbon abatement in Australia' is used as an alternative method for calculating the estimated impact. In this report, the impact on regional, state and national employment is estimated based on a per MW basis. In Table B2.1 and B2.2 the per MW regional impact is extrapolated to the installed capacity of the Project which is 70 MW based on a 2 MW capacity per turbine.

Table B2.1: Annual employment impact

Annual impact (FTE)	Regional (70 MW) FTE
Construction phase	
Direct employment	67.2
Indirect employment	157.5
Total employment	224.0
Operation phase	
Direct employment	6.3
Indirect employment	11.2
Total employment	17.5

Table B2.2: Annual financial impact

Annual impact (GRP)	Regional (70 MW) \$m
Construction phase	
Direct GRP	21.0
Indirect GRP	42.7
Total GRP	63.7

Operation phase	
Direct GRP	1.4
Indirect GRP	2.8
Total GRP	4.2

In this method, both total employment and total GRP are higher than the Flinders University method. The multipliers used in this method is based on data provided by Clean Energy Council and analysis performed by SKM. Although it is specific to Australian wind farms, it only provides a general regional estimate and does not take into consideration the local government areas that are impacted.