



APPENDIX R ECONOMIC IMPACT ASSESSMENT

Keri Keri Wind Farm Economic Assessment

Prepared for

Environmental Resource Management Australia Pty Ltd

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EXECUTIVE SUMMARY

Introduction

Acciona Energy Australia Global Pty Ltd (Acciona) proposes to construct, operate, maintain, and decommission the Keri Keri Wind Farm (Project), within the rural locality of Keri Keri, New South Wales (NSW).

The project is State significant development (SSD) pursuant to schedule 1 of State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). This Economic Assessment analyses the potential economic impacts of the construction and operation of Project on the regional and NSW economy. It forms part of the Environmental Impact Statement (EIS) for the Project.

The impacts have been assessed in accordance with the Secretary's Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning and Environment (DPE) and against the relevant legislation and guidelines as they apply to economics.

The Project would provide economic activity to the regional and NSW economy during both the construction and operation phase. It would also result in some reduction in regional economic activity from foregone potential agricultural within the disturbance footprint.

Economic activity impacts in the regional and NSW economy arises from changes in:

- expenditure in the region on non-labour inputs to production;
- direct employment of local labour or in migration of labour; and
- expenditure of labour wages in the local economy.

Methodology

These regional and NSW economic impacts are assessed using input-output (IO) analysis. Qualitative consideration is also given to potential impacts of the Project, and cumulative projects, on demand for regional and NSW labour resources and other inputs to production.

Existing environment

The study area/regional economy for this economic impact assessment is defined as the combined LGAs of Balranald, Hay, and Murray River. This is the region approximately one hour's drive from the Project, which has the potential to provide labour and nonlabour inputs to, and derive economic benefits from, the construction and operation of the Project. It is also the region that may experience impacts from reduction in agricultural activity and from increased demand for labour and other inputs to production. While the region is the focus of the analysis, impacts on the NSW economy are also assessed.

The population of the region in 2021 was 17,940 and has been growing at approximately 25 per cent of the rate of NSW. This population growth rate is largely driven by the population growth rate for Murray River LGA. The population for all other LGAs in the region has declined since 2006.

Murray River LGA accounts 72 per cent of the total population of the region and 71 per cent of the total labour force of the region. Aggregated one-digit Australian and New Zealand Industry Classification (ANZSIC) place of work data for the region indicates the significance of the *Agriculture, Forestry and Fishing sector, and Accommodation and Food Services sector*. The *Agriculture, Forestry and Fishing sector* is the most significant industry sector for each of the LGAs of the region. The *Education* sector is the second most significant industry sector in the Balranald LGA, while the *Retail Trade sector* is the second most significant industry sector in Hay LGA. In Murray River LGA, the second most significant industry sector is *Accommodation and Food Services*.

Exporting sectors are key drivers of regional economies and reflect a region's endowments and competitive advantages. Using the one-digit ANZSIC, the largest exporting industries in the region by value are *Agriculture, Forestry and Fishing, Manufacturing, Public Administration and Safety, Accommodation and Food Services* and *Construction*.

Potential construction impacts

The average annual construction impacts of the Project on the regional economy for the peak year of construction (year 2 with average annual employment of 400) are estimated at up to:

- \$217M in annual direct and indirect output;
- \$74M in annual direct and indirect value-added;
- \$22M in annual direct and indirect household income; and
- 524 direct and indirect jobs.

The impacts for year 1 of construction (average annual employment of 327) would be smaller, in proportion to the average annual employment level.

The average annual construction impacts of the Project on the NSW economy for the peak 12-months of construction (year 2 with average annual employment of 400) are estimated at up to:

- \$340M in annual direct and indirect output;
- \$135M in annual direct and indirect value added;
- \$93M in annual direct and indirect household income; and
- 910 direct and indirect jobs.

As for regional impacts, the impacts on NSW in year 1 of construction would be smaller and in proportion to average annual employment level.

The construction phase of the Project will result in a temporary reduction in up to 1,137 ha of land available for agricultural activity – sheep grazing. The economic activity impacts associated with this were assessed and identified as negligible relative to the economic activity impacts of the Project construction.

The construction of the Project will create demand for regional labour resources and regional inputs to production which may result in some observable regional wages and price increases.

Potential operational impacts

The Project operation is estimated to make up to the following total annual contribution to the regional economy:

- \$244M in annual direct and indirect regional output;
- \$210M in annual direct and indirect regional value-added;
- \$1M in annual direct and indirect household income; and
- 34 direct and indirect jobs.

The Project operation is estimated to make up to the following total annual contribution to the NSW economy:

- \$282M in annual direct and indirect regional output;
- \$229M in annual direct and indirect regional value-added;
- \$13M in annual direct and indirect household income; and
- 132 direct and indirect jobs.

The construction and operation impacts are larger for the NSW economy because there is less leakage of direct and indirect expenditure out of the NSW economy compared to the regional economy i.e., the NSW economy because of its size and diversity is better placed to provide more of the inputs to production than the regional economy.

Businesses that can provide the inputs to the production process required by the Project and/or the products and services required by the workforce would directly benefit from the Project by way of an increased economic activity. However, because of the inter-linkages between sectors, many indirect businesses also benefit.

The Project operation will have negligible agricultural impacts because sheep will be able to graze between wind turbine generators and other infrastructure.

The operation of the Project will create a small demand for regional labour resources and regional inputs to production. Consequently, no wage or price increases or production shortages are anticipated.

Cumulative impact assessment

The main cumulative economic impact of this and other prospective projects in the region is to generate large demand for a suitably qualified construction workforce in the region and surrounds. This demand can help address the jobs growth imbalance between Australia's biggest cities and regions. The Project will provide opportunities for the existing and future regional workforces, attracting middle skilled and high skilled workers and families to regional areas, reducing outmigration of the regional workforce to look for employment in cities, and increase regional labour force participation.

Notwithstanding, cumulative demand for construction workers can in the short run potentially lead to increased construction wages, attraction of workers from other relevant sub-sectors and sectors of the economy leading to labour shortages in these other areas of the economy (and associated shortages of goods and services), rising prices as firms pass wage costs onto consumers. The extent of these impacts for regional economies will depend on the balance of labour supply from inside the region, outside the region and drive-in drive-out (DIDO)/fly-in fly-out (FIFO), as well as adjustment of the overall labour market to respond to increased demand.

In addition, in the short run excess demand for inputs to construction such as quarry materials and concrete can result in rising costs for these factor inputs and potentially shortages for other uses.

These potential impacts will be more likely and larger as a result of cumulative projects across the region and the State, than from the individual project.

Management measures

The positive local employment and business opportunities can be maximised via:

- Employment of regional residents where they have the required skills and experience;
- Participating, as appropriate, in business groups, events or programs in the regional community;
- Locally sourcing non-labour inputs to production where local producers can be cost and quality competitive;
- Establishment of a Community Benefit Fund to be managed through a Voluntary Planning Agreement with Murray River Council with the intention of supporting local non-profit organisations, community programs/events, local businesses, training, and services/infrastructure;
- Lease payments to host landowners that provide an alternative drought proof income with potential flow-on benefits to the regional economy; and
- Continued agricultural activities during the operational phase of the Project and reinstatement of full pre-project agricultural production following project decommissioning.

1 INTRODUCTION

1.1 Project overview

Acciona Energy Australia Global Pty Ltd (Acciona or the Applicant) proposes to construct, operate, maintain, and decommission the Keri Keri Wind Farm (Project), within the rural locality of Keri Keri, New South Wales (NSW).

The Project is situated about 30 kilometres (km) southeast of Balranald, and 75 km Southwest of Hay in the Riverina Murray Region of NSW. The Project Area is entirely within the Murray River Local Government Area (LGA) and to the south of the Sturt Highway, on land that is predominately used for sheep grazing and cropping.

The Project comprises:

- 155 Wind Turbine Generators (WTG) with a hub height of 200 metres (m) and maximum height tip height of 291.5 (vertical tip);
- Battery energy storage system (BESS) with capacity of approximately 200 megawatt (MW) / 800 MW hours (MWh);
- Electrical reticulation, on-site substations and switchyard; and
- Ancillary infrastructure including (but not limited to) internal access tracks, road upgrades, meteorological masts, and operation and maintenance (O&M) buildings.

The main objective of the project is to generate renewable energy, consistent with NSW Government policy for development of infrastructure for renewable energy generation and storage.

1.2 Purpose of this report

The Project is State significant development (SSD) pursuant to schedule 1 of State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). Accordingly, approval for the project is required under part 4, division 4.7 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). In accordance with the provisions of the *Environmental Planning and Assessment Act 1979* (EP&A Act), a development application (DA) for SSD must be accompanied by an environmental impact statement (EIS) that is lodged with the NSW Department of Planning and Environment (DPE) for Development Consent.

This report has been prepared to inform the (EIS) and development application (DA) for the Project.

1.3 Assessment guidelines and requirements

This assessment has been prepared in accordance with requirements of the NSW Department of Planning and Environment (DPE) which were set out in the Planning Secretary's Environmental Assessment Requirements (SEARs) for the project, issued on 14 April 2022. The SEARs identify matters which must be addressed in the EIS. Table 1.1 lists individual requirements relevant to this Economic Assessment and where they have been addressed.

Table 1.1 – Economic Assessment Related SEARs

Requirement	Section addressed
The EIS must address the following:	
an assessment of the economic impacts or benefits of the project for the region and the State as a whole,	Chapters 4, 5 and 6 of this report.
details of how the construction workforce will be managed to minimise local impacts, including a consideration of the construction workforce accommodation.	See the Social Impact Statement

To inform preparation of the SEARs, DPE invited relevant government agencies to advise on matters to be addressed in the EIS. These matters were considered by the Secretary for DPE when preparing the SEARs.

There are no economic assessment guidelines for SSD wind farm projects.

1.4 Structure of the report

This report is structured as follows:

- Section 2 outlines the methodology used for the Economic Assessment;
- Section 3 provides an overview of the regional economy within which the Project is located;
- Section 4 assesses the economic impacts of construction of the Project on the regional and NSW economy;
- Section 5 assesses the economic impacts of operation of the Project on the regional and NSW economy;
- Section 6 considers potential cumulative impacts on the region and State;
- Section 7 identifies measures to mitigate and manage economic impacts; and
- Section 8 provides the conclusions of the assessment.

2 Methodology

2.1 Overview

The Project would generate economic activity within the regional and NSW economy, during both construction and operation. It would also result in a minor contraction in agricultural economic activity from the construction and operation footprint. The assessment of these potential economic impacts has been undertaken using input-output (IO) analysis. Other potential impacts are discussed qualitatively.

2.2 Study area

The study area/regional economy for this economic impact assessment is defined as the combined LGAs of Murray River, Balranald, and Hay. This is the region approximately one hours drive from the Project, which has the potential to provide labour and nonlabour inputs to, and derive economic benefits from, the construction and operation of the Project. It is also the region that may experience impacts from reduction in agricultural activity and from increased demand for labour and other inputs to production. While the region is the focus of the analysis, impacts on the NSW economy are also assessed.

2.3 Description of the regional economy

Prior to the assessment of impacts using IO analysis, a description of the regional economy is provided. This is based on Australian Bureau of Statistics (ABS) Census of Population and Housing data and information from the model of the regional economy developed for the IO analysis. Data is provided at different levels of aggregation i.e., one-digit and four-digit Australian and New Zealand Standard Industrial Classification (ANZSIC), and IO sector classifications, to provide a more complete picture of the regional economy.

2.4 Input-output analysis

IO analysis is used to assess the direct and indirect impacts (gross economic footprint) of the construction and operation of the Project on the regional and NSW economy.

IO analysis involves two key steps:

- Development of an appropriate IO table (regional transaction table) that can be used to identify the economic structure of the region and multipliers for each existing sector of the economy. IO tables for the regional and NSW economy were developed using the Generation of Regional Input Output Tables (GRIT) procedure developed by the University of Queensland and recognised internationally - Refer to Attachment 1; and
- Identification of the direct impact or stimulus of the Project, in a form that is compatible with the IO equations, so that the IO multipliers and flow-on effects for the impacts or stimulus of the project can then be estimated (West, 1993). The direct impact of the project was estimated from data provided by Acciona and production ratios in the IO tables. Indirect effects were estimated using the *EconImp* program.¹

IO analysis identifies the economic activity of a project on the economy in terms of four main indicators:

- Gross regional output – the gross value of business turnover in a region;
- Value-added – the difference between the gross value of business turnover and the costs of the inputs of raw materials, components and services bought in to produce the gross regional output. These costs exclude wage costs;
- Income – the wages paid to employees including imputed wages for self-employed and business owners; and
- Employment – the number of people employed (including self-employed, full-time, and part-time).

¹ The *EconImp* program uses the Leontif Inverse Matrix to estimate indirect effects.

The IO method is based on several assumptions that are outlined in Attachment 2. Most notably IO analysis assumes that the regional economy has access to sufficient labour and capital resources (from both inside and outside the region) so that an individual project does not result in any regional price changes e.g., wages in other industries or house rentals, which would lead to contractions ("crowding out") of economic activity in other sectors in the same region. Any "crowding out" is assumed to occur outside the region where the project is concentrated, and the regional impact analysis is focused. A dynamic computable general equilibrium modelling approach may overcome the limitation of IO analysis but is unlikely to be warranted at local or regional scale or with small scale impacts.

The consequence of the assumptions of IO analysis, is that IO modelling provides an estimate of the gross economic impact or footprint of the Project which is an upper bound estimate of net economic activity impacts.

Qualitative consideration is given to potential "crowding out" impacts from the Project and cumulative projects on the region and State.

3 THE REGIONAL ECONOMY

3.1 Introduction

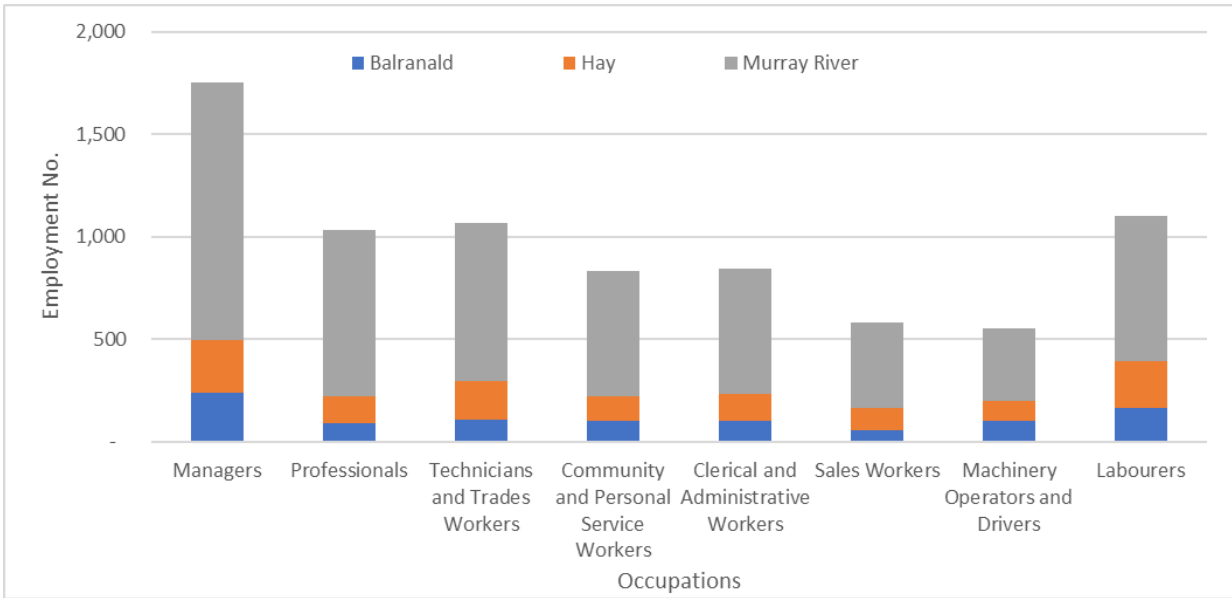
This section characterises the regional economy from two perspectives, residents of the region and workers in the region.

3.2 Residents of the Region

Table 3.1 provides some characteristics of the usual residents of the regional economy based on the 2021 ABS Census of Population and Housing. In 2021, the region had a population of 17,940 and a labour force of 8,172, with Murray River LGA accounting for 72 per cent of the total population and 71 per cent of the total labour force. In the 2021 Census, 266 people (about 3.3 per cent of the total regional labour force) were unemployed with the majority of these located in the Murray River LGA.

The main occupations of usual residents² in the region (Figure 3.1) were Managers (which includes farm managers) (35 per cent). While Murray River LGA had the greatest number of all occupations, the relative importance of different occupations varies by LGA. In Balranald and Hay LGAs, the main occupations were Managers, Labourers, and Technicians and Trade Workers. In Murray River, the main occupations were Managers, Professionals, and Technicians and Trade Workers.

Figure 3.1 – Employment by Occupation of Usual Residents



² Employed people aged 15 years and over.

Table 3.1 - Characteristics of Usual Residents

	Murray River		Balranald		Hay		Total Region		NSW	
Demographics	No.	%	No.	%	No.	%	No.	%	No.	%
Population	12,850		2,208		2,882		17,940		8,072,163	
Median Age	49		43		48		48		39	
In labour force	5,834	45.4%	1,001	45.3%	1,337	46.4%	8,172	45.6%	3,874,012	58.7
Unemployed	181	3.1%	31	3.1%	54	4.0%	266	3.3%	189,852	4.9
Median household weekly income	1,260						1,269		1,829	
Unoccupied private dwellings %	929	16.0%	192	20.8%	239	17.4%	1,360	16.8%	299,524	9.4
Median rent	260		200		175		234		420	
Occupations	No.	%	No.	%	No.	%	No.	%	No.	%
Managers	1,255	23%	238	25%	256	20%	1,752	23%	238	25%
Professionals	812	15%	88	9%	133	10%	1,031	13%	88	9%
Technicians and Trades Workers	769	14%	107	11%	190	15%	1,057	14%	107	11%
Community and Personal Service Workers	611	11%	100	10%	122	10%	839	11%	100	10%
Clerical and Administrative Workers	612	11%	99	10%	134	11%	842	11%	99	10%
Sales Workers	418	8%	54	6%	110	9%	578	7%	54	6%
Machinery Operators and Drivers	350	6%	103	11%	97	8%	553	7%	103	11%
Labourers	709	13%	165	17%	228	18%	1,100	14%	165	17%

Source: Australian Bureau of Statistics, 2021 Census of Population and Housing, Community Profiles

The main four-digit ANZSIC industry sectors in which usual residents were employed in 2021 is provided in Table 3.2. *Local Government Administration, Hospitals (except Psychiatric Hospitals, Sheep Farming (Specialised), Grain-Sheep or Grain-Beef Cattle Farming, and Primary Education*, were the most significant employment sectors for residents of the region. For Balranald LGA residents the most significant industry sector of employment was *Grape Growing*. While for residents of Hay and Murray River LGAs the most significant industry of employment was *Sheep Farming (Specialised)* and *Hospitals (except Psychiatric Hospitals)*, respectively.

43 per cent of employed usual residents work outside the region, mainly Campaspe LGA (22%), Swan Hill LGA (7%) and 'no fixed address' (NSW) (5%).

Table 3.2 - Top 5 Industry Sectors of Employment for Usual Residents (Four Digit ANZSIC)

Murray River	%	Balranald	%	Hay	%	Total Region	%
Hospitals (except Psychiatric Hospitals)	4%	Grape Growing	7%	Sheep Farming (Specialised)	8%	Local Government Administration	4%
Local Government Administration	4%	Sheep Farming (Specialised)	5%	Local Government Administration	4%	Hospitals (except Psychiatric Hospitals)	4%
Grain-Sheep or Grain-Beef Cattle Farming	3%	Other Fruit and Tree Nut Growing	5%	Primary Education	4%	Sheep Farming (Specialised)	3%
Other Grain Growing	3%	Hospitals (except Psychiatric Hospitals)	4%	Supermarket and Grocery Stores	4%	Grain-Sheep or Grain-Beef Cattle Farming	3%
Primary Education	3%	Local Government Administration	4%	Agriculture, nfd	3%	Primary Education	3%

Source: Australian Bureau of Statistics, 2021 Census of Population and Housing, Community Profiles

An indication of the health of an economy can be gained from population changes. This theory of regional economic growth suggests that places that can attract population immigration³ create increased demand for goods and services and thus more jobs. This growth leads to increasing local multiplier effects, scale economies and an increase in the rate of innovation and capital availability (Sorensen, 1990). Conversely, population losses can contribute to a cycle of decline whereby reduced populations results in closure of services, which in turn makes it difficult to attract new populations (Sorensen, 1990).

Trends in regional economies of NSW because of globalisation and associated structural adjustment include:

- Loss of significant industries such as abattoirs and timber mills from many rural areas;
- Increased mechanisation of agriculture and aggregation of properties, resulting in loss of employment opportunities in this industry;
- Growth of regional centres, at the expense of smaller towns;
- Preference of Australians for coastal living, particularly for retirement; and
- Preference of many of today's fastest growing industries for locating in large cities (Collits, 2000).

The result is that there has been declining population in many rural LGAs that are in non-coastal areas in NSW. There has also been a decline in the population of smaller towns even in regions where the population has been growing.

³ Mainly due to natural endowments and comparative advantage in certain industry sectors.

Against this backdrop, it is evident that the population of the regional economy has been growing at an average annual rate of 0.34 per cent since 2006, compared to 1.34 per annum for NSW. This population growth rate is largely driven by the population growth rate for Murray River LGA i.e., average annual rate of 1.06 per cent since 2006. The population for all other LGAs in the region has declined since 2006.

Table 3.3 - Population growth

Local Government Area	Population				Average Annual Growth Rate			
	2006	2011	2016	2021	2006 - 2011	2011 - 2016	2016 - 2021	2006 - 2021
Murray River	11,020	11,257	11,872	12,780	0.43%	1.09%	1.53 %	1.06 %
Balranald	2,507	2,353	2,330	2,207	-1.23%	-0.20%	1.06 %	0.80 %
Hay	3,483	3,085	2,984	2,883	-2.29%	-0.65%	0.68 %	1.15 %
Total Region	17,010	16,695	17,186	17,870	-0.37%	0.59%	0.80 %	0.34 %
NSW	6,742,690	7,218,529	7,732,858	8,093,815	1.41%	1.43%	0.93 %	1.34 %

Source: Australian Bureau of Statistics, 2023 Estimated Resident Population, Local Government Areas, Australia

The population of the region (Table 3.4) is predicted to continue to grow at an average annual rate of 0.7 percent (less than that for NSW), largely driven by population growth in the Murray River LGA. The population for all other LGAs in the region is forecast to remain decline (NSW DPE, 2022).

Table 3.4 – Projected population growth

Local Government Area	2021	2041	Change	Annual %
Murray River	12,426	15,456	3,030	1.2%
Balranald	2,269	1,817	-452	-1.0%
Hay	2,862	2,594	-268	-0.5%
Total Region	17,557	19,867	2,310	0.7%
NSW	8,166,757	9,872,934	1,706,177	1.0%

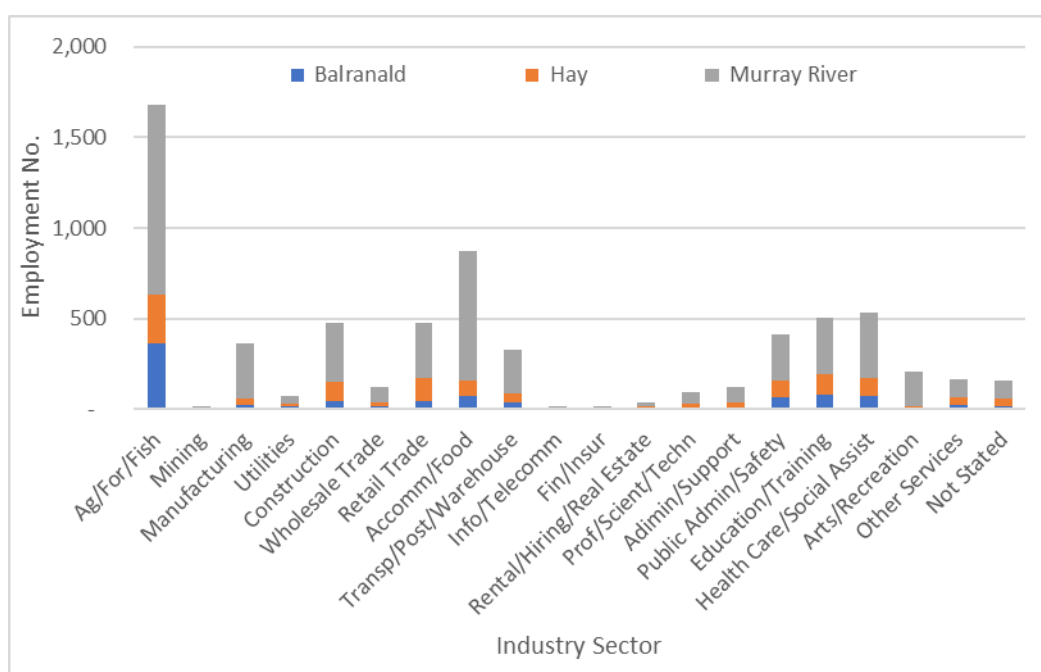
Source: NSW Department of Planning and Environment (2022)

3.3 Economic Activity in the Region

An indication of the nature of the regional economy can be gained by examining one-digit ANZSIC place of work employment by industry data - refer to Figure 3.2. This indicates the significance of the *Agriculture, Forestry and Fishing* sector, and *Accommodation and Food Services* sector. The *Agriculture, Forestry and Fishing* sector is the most significant industry sector for each of the LGAs of the region. The *Education* sector is the second most significant industry sector in the Balranald LGA, while the *Retail Trade* sector is the second most significant industry sector in Hay LGA. In Murray River LGA, the second most significant industry sector is *Accommodation and Food Services*.

43 per cent of people who work in the region live outside the region, mainly in Campaspe LGA (17%), Swan Hill LGA (6%) and Gannawarra LGA (5%).

Figure 3.2 - Place of work employment by industry (One-digit ANZSIC)



Source: Australian Bureau of Statistics, 2021 Census of Population and Housing, Working Population Profiles

At the more disaggregated level (place of work employment by four-digit ANZSIC) the main industry sectors of employment in the region are *Clubs (Hospitality)*, *Local Government Administration*, *Sheep Farming (Specialised)*, *Accommodation*, and *Grain-Sheep or Grain-Beef Cattle Farming* (See Table 3.5). This is mainly driven by employment in the Murray River LGA. In Balranald LGA the main industry sector of employment is *Grape Growing*, while in Hay LGA it is *Sheep Farming (Specialised)*.

Table 3.5 - Place of Work Top 5 Industry Sectors of Employment (Four-digit ANZSIC Sectors)

Murray River	%	Balranald	%	Hay	%	Total Region	%
Clubs (Hospitality)	7 %	Grape Growing	9 %	Sheep Farming (Specialised)	7 %	Clubs (Hospitality)	6 %
Local Government Administration	4 %	Sheep Farming (Specialised)	6 %	Local Government Administration	4 %	Local Government Administration	4 %
Grain-Sheep or Grain-Beef Cattle Farming	4 %	Local Government Administration	6 %	Primary Education	4 %	Sheep Farming (Specialised)	4 %
Accommodation	4 %	Other Fruit and Tree Nut Growing	5 %	Accommodation	4 %	Accommodation	4 %
Other Grain Growing	4 %	Hospitals (except Psychiatric Hospitals)	4 %	Supermarket and Grocery Stores	4 %	Grain-Sheep or Grain-Beef Cattle Farming	3 %

Source: Australian Bureau of Statistics, 2021 Census of Population and Housing, Table Builder

The value added of the regional economy was estimated at \$850 million for 2021 (Gillespie Economics IO Table). The largest exporting industries (One-digit ANZSIC) are:

- *Agriculture, Forestry and Fishing (\$399 million) mainly Sheep, Grains, Beef and Dairy Cattle Sector, and Other Agriculture;*
- *Manufacturing (\$95 million), mainly Iron and Steel Manufacturing, Bakery Product Manufacturing, Sawmill Production Manufacturing, Meat and Meat Product Manufacturing, Wine, Spirit and Tobacco Manufacturing;*
- *Public Administration and Safety (\$53 million) mainly Public Administration;*
- *Accommodation and Food Services (\$49 million); and*
- *Construction (\$46 million) mainly Residential Building Construction and Heavy and Civil Engineering*

In combination these five industries accounted for \$642 million in total or 78% of the total exports by industry in the region.

Exporting sectors are based on a region's endowments and competitive advantages, and in regional economic development economics are the key drivers of the economy.

In terms of value-added, the ANZSIC one-digit industry sectors of *Agriculture, Forestry and Fishing, Rental, Hiring and Real Estate Services, Construction, Public Administration and Safety, and Health Care and Social Assistance*, had the highest value-added in total, equal to approximately 58% of the regional economy and 48% of regional employment - Table 3.6.

Table 3.6 - Gross Value Added for the 5 Largest Industries in the regional economy (ANZSIC One Digit)

Industry	Gross Value Added (\$m)	Proportion of Regional Economy (%)	Proportion of Regional Employment (%)
Agriculture/Forestry/Fishing	216	25%	26%
Rental, Hiring and Real Estate Services	101	12%	1%
Construction	71	8%	8%
Public Administration and Safety	57	7%	6%
Health Care and Social Assistance	47	6%	8%
Total	493	58%	48%

Source: Gillespie Economics IO table of the regional economy

4 CONSTRUCTION ASSESSMENT

4.1 The Project

The Project would provide economic activity to the regional and NSW economy during both the construction and operation phase. It could also result in some reduction in regional economic activity from foregone agricultural activity within the disturbance footprint.

4.1.1 Impacts

Construction expenditure is associated with manufacturing of equipment and expenditure across the following three construction sectors of the IO industry classification:

- The *Heavy and Civil Engineering Construction Sector* which includes businesses involved in engineering construction and project management services for a diverse range of activities including on-site assembly of heavy electrical machinery from prefabricated components, transmission lines, road construction etc;
- The *Construction Services Sector* which includes businesses involved in earthmoving work such as levelling of construction sites, excavation of foundations, trench digging, concreting services, electrical services, hire of earthmoving plant with operator etc; and
- The *Non-Residential Building Construction Sector* which includes businesses engaged in the construction of industrial buildings.

Conservatively, all machinery manufacturing is assumed to occur outside the region/NSW.

Over the two-year construction phase, average monthly employment is estimated to peak at 650, with average annual employment for the peak year of construction (year 2) being 400.⁴⁵

Based on the IO coefficients of the abovementioned three construction sectors in the regional IO table, \$141M of expenditure would be required across these sectors to generate this level of onsite workforce for a year.

The estimated direct and indirect regional economic impact of \$141M expenditure in the regional and NSW economy is reported in Tables 4.2 and 4.3.

Table 4.2 – Average Annual Economic Impacts of the Construction on the Regional Economy (\$2023)

	Direct	Production induced	Consumption induced	Total Flow on	TOTAL EFFECT
OUTPUT (\$M)	141	74	2	76	217
<i>Type 11A Ratio</i>	1.00	0.53	0.01	0.54	1.54
VALUE ADDED (\$M)	59	15	1	15	74
<i>Type 11A Ratio</i>	1.00	0.25	0.02	0.26	1.26
INCOME (\$M)	18	4	0	4	22
<i>Type 11A Ratio</i>	1.00	0.21	0.01	0.22	1.22
EMPL. (No.)	400	118	6	124	524
<i>Type 11A Ratio</i>	1.00	0.29	0.01	0.31	1.31

Note: Totals may have minor discrepancies due to rounding.

⁴ The IO model of the regional economy is based on average annual revenue, expenditure, and employment for each industry sector. So, to model impacts it is necessary to base it on average annual employment impacts rather than peak employment.

⁵ Average annual employment for year 1 of construction is 327.

Table 4.3 – Average Annual Economic Impacts of the Construction on the NSW Economy (\$2023)

	Direct	Production induced	Consumption induced	Total Flow on	TOTAL EFFECT
OUTPUT (\$M)	141	158	41	199	340
<i>Type 11A Ratio</i>	1.00	1.12	0.29	1.41	2.41
VALUE ADDED (\$M)	59	53	23	76	135
<i>Type 11A Ratio</i>	1.00	0.90	0.39	1.29	2.29
INCOME (\$M)	44	37	12	49	93
<i>Type 11A Ratio</i>	1.00	0.85	0.27	1.12	2.12
EMPL. (No.)	400	367	143	510	910
<i>Type 11A Ratio</i>	1.00	0.92	0.36	1.28	2.28

Note: Totals may have minor discrepancies due to rounding.

In estimating the average annual regional impacts, it is important to separate the flow-on effects that are associated with firms buying goods and services from each other (production-induced effects) and the flow-on effects that are associated with employing people who subsequently buy goods and services as households (consumption-induced effects). This is because these two effects operate in different ways and have different spatial impacts.

Production-induced effects occur in a near-proportional way within a region, whereas the consumption-induced flow-on effects only occur in a proportional way if workers and their families are in the region or migrate into the region. Where workers commute from outside the region, some of the consumption-induced flow-on effects leak from the region.

It is estimated that approximately 10% of the construction workforce would be sourced from the region (within 125 km from the Project site), with the remainder (90%) residing on-site within the construction accommodation facility).

Based on the above, it is assumed for this analysis that approximately 90% of the consumption induced expenditure leaks from the region. Consequently, Table 4.2 has been adjusted to only include 10% of consumption-induced flow-ons. 25% of the workforce are assumed to come from NSW and hence only 25% of consumption induced impacts are included in Table 4.3.

The average annual construction impacts of the Project on the regional economy for the peak year of construction (year 2) are estimated at up to:

- \$217M in annual direct and indirect output;
- \$74M in annual direct and indirect value-added;
- \$22M in annual direct and indirect household income; and
- 524 direct and indirect jobs.

The impacts for year 1 of construction (average annual employment of 327) would be smaller, in proportion to the average annual employment level.

The average annual construction impacts of the Project on the NSW economy for the peak year of construction (year 2) are estimated at up to:

- \$340M in annual direct and indirect output;
- \$135M in annual direct and indirect value added;
- \$93M in annual direct and indirect household income; and
- 910 direct and indirect jobs.

As for regional impacts, the impacts on NSW in year 1 of construction would be smaller and in proportion to average annual employment level.

The impacts are larger for the NSW economy because there is less leakage of direct and indirect expenditure out of the NSW economy compared to the regional economy and hence greater production induced and consumption induced flow-on effects.

4.1.2 Multipliers

Multipliers are summary measures used for predicting the total impact on all industries in an economy from changes in the demand for the output of any one industry (ABS, 1995). There are many types of multipliers that can be generated from IO analysis (refer to Attachment 2). Type 11A ratio multipliers summarise the total impact on all industries in an economy in relation to the initial own sector effect e.g., total income effect from an initial income effect and total employment effect from an initial employment effect, etc.

At the regional level, the adjusted type 11A ratio multipliers for the construction workforce of the Project range from 1.22 for income up to 1.54 for output. The NSW type 11A ratio multipliers for the construction workforce range from 2.12 for income up to 2.41 for output. The multipliers are large for the NSW economy because of the greater level of intersectoral linkages in the larger economy and hence larger level of flow-on impacts i.e., less leakages compared to the regional economy.

4.1.3 Main Sectors Affected

The IO analysis indicates construction is most likely to directly impact the *Heavy and Civil Engineering Construction Sector*, *Construction Services Sector* and *Non-Residential Building Construction Sector*. Flow-on impacts from the construction of the Project are likely to affect several different sectors of the regional and NSW economy.

The sectors of the regional economy most impacted by output, value-added, income and employment production induced flow-ons are likely to be as follows:

- *Professional, Scientific and Technical Services.*
- *Wholesale and Retail Trade;*
- *Road Transport;*
- *Iron and Steel Manufacturing;*
- *Employment, Travel Agency and Other Administrative Services;*
- *Cement Lime and Ready-Mixed Concrete Manufacturing; and*
- *Building Cleaning, Pest Control and Other Support Services.*

For the NSW economy the *finance sector*, *auxiliary finance and insurance sector*, and *non-residential property operators and real estate services* are also important production induced flow-on sectors.

Consumption induced flow-on effects in the region will be mainly in the following sectors:

- *Retail and Wholesale Trade;*
- *Food and Beverage Services;*
- *Health Care Services;*
- *Primary and Secondary Education;*
- *Residential Care and Social Assistance;*
- *Road Transport;*
- *Automotive Repairs and Maintenance; and*
- *Construction Services.*

For the NSW economy the *Finance; Professional, Scientific and Technical Services; Insurance and Superannuation; Employment, Travel Agency and Other Administrative Services*, are also important consumption induced flow-on sectors.

4.2 Agricultural impacts

Construction of the Project will impact up to 1,137 ha of agricultural land that is currently used for sheep grazing. Tremain Ivey Advisory (2023) identify foregone agriculture during Project construction of up to a maximum of \$475,853 per annum in revenue.

Using revenue, expenditure and employment ratios in the *Sheep, Grain, Beef and Dairy Cattle* sector of the regional and NSW IO table, the direct and indirect impact of this level of revenue is summarised in Tables 4.5 and 4.6. Indirect impacts include economic activity associated with suppliers to agricultural production. These impacts would occur for approximately 3-years.

Table 4.5 Annual Regional Economic Impacts of Foregone Agriculture During Project Construction (\$2023)

	Direct	Production induced	Consumption induced	Total Flow on	TOTAL EFFECT
OUTPUT (\$M)	0.48	0.20	0.05	0.25	0.73
<i>Type 11A Ratio</i>	1.00	0.43	0.10	0.53	1.53
VALUE ADDED (\$M)	0.19	0.09	0.03	0.12	0.31
<i>Type 11A Ratio</i>	1.00	0.45	0.15	0.60	1.60
INCOME (\$M)	0.05	0.02	0.01	0.03	0.08
<i>Type 11A Ratio</i>	1.00	0.44	0.11	0.55	1.55
EMPL. (No.)	1.21	0.70	0.19	0.89	2.10
<i>Type 11A Ratio</i>	1.00	0.58	0.15	0.73	1.73

Table 4.6 Annual NSW Economic Impacts of Foregone Agriculture During Project Construction (\$2023)

	Direct	Production induced	Consumption induced	Total Flow on	TOTAL EFFECT
OUTPUT (\$M)	0.48	0.42	0.41	0.83	1.31
<i>Type 11A Ratio</i>	1.00	0.89	0.85	1.75	2.75
VALUE ADDED (\$M)	0.19	0.20	0.23	0.43	0.62
<i>Type 11A Ratio</i>	1.00	1.05	1.18	2.23	3.23
INCOME (\$M)	0.08	0.12	0.12	0.24	0.32
<i>Type 11A Ratio</i>	1.00	1.59	1.48	3.07	4.07
EMPL. (No.)	1.21	1.36	1.42	2.78	3.99
<i>Type 11A Ratio</i>	1.00	1.13	1.17	2.30	3.30

The annual regional direct and indirect impact of foregone agriculture during Project construction is estimated at up to:

- \$0.73M in annual direct and indirect regional output;
- \$0.31M in annual direct and indirect regional value-added;
- \$0.08M in annual direct and indirect household income; and
- 2 direct and indirect jobs.

This represents approximately 0.1% of direct agricultural economic activity in the region.

It is evident from the above that agricultural impacts from the construction of the Project are negligible.

4.3 Other impacts

The construction of the proposed Project will create demand for regional labour resources and regional inputs to production. Where there is excess capacity in the regional economy, or the region has access to labour and other resources from outside the region this demand will increase economic activity in the region as per the above analysis.

Non-marginal changes in labour demand from an individual project can in the short run potentially lead to increased construction wages, attraction of workers from other relevant sectors of the economy leading to labour shortages in these other areas of the economy (and associated shortages of goods and services), rising prices as firms pass wage costs onto consumers etc. The extent of these impacts for regional economies will depend on the balance of labour supply from inside the region, outside the region and drive-in drive-out (DIDO)/fly-in fly-out (FIFO), as well as adjustment of the overall labour market to respond to increased demand e.g., increased labour force participation.

In addition, in the short run excess demand for inputs to construction of an individual project such as quarry materials, concrete etc can result in rising costs for these factor inputs and potentially shortages for other uses.

Whether, and the extent to which these types of effects will arise from an individual project is uncertain. For this Project where direct average annual construction demand during the peak year of construction is for in the order of 400 workers in a region with a labour force of 8,172, some observable price effects may occur. Notwithstanding, any "crowding out" of other economic activities represents the operation of the market system where scarce resources are reallocated to where they are most highly valued and where society will benefit the most from them. This reallocation of resources is therefore a positive impact for the economy not a negative.

5 OPERATION PHASE

5.1 The Project

For the analysis of the operational phase of the Project, a new Project operation sector was inserted into regional and NSW IO tables reflecting average annual operation.

This sector is based on costs and revenues/output at the Project boundary. Output was estimated from the installed capacity and an estimate of the wholesale bundled electricity and renewable energy certificate revenue per annum, net of transmission costs.⁶ The proponent advised of an operational employment of 12 (3 of which are assumed to reside in the region). Wages for this level of employment were based on IBISworld (2023). Total nonwage expenditure was estimated from Aurecon (2022). Nonwage expenditure was allocated between imports and 114 intermediate sectors as per the coefficients in the *Electricity Generation* sector of the region and NSW IO models.

5.1.1 Impacts

On this basis the total and disaggregated average annual impacts of the Project on the regional and NSW economy (in 2023 dollars) is shown in Tables 5.1 and 5.2.

Table 5.1 – Annual Economic Impacts of the Project on the Regional Economy (\$2023)

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT
OUTPUT (\$M)	231	12	1	13	244
<i>Type 11A Ratio</i>	1.00	0.05	0.00	0.06	1.06
VALUE ADDED (\$M)	205	5	0	5	210
<i>Type 11A Ratio</i>	1.00	0.02	0.00	0.03	1.03
INCOME (\$M)	0.2	0.9	0.1	1.0	1.3
<i>Type 11A Ratio</i>	1.00	3.93	0.36	4.29	5.29
EMPL. (No.)	12	19	3	22	34
<i>Type 11A Ratio</i>	1.00	1.57	0.25	1.82	2.82

Table 5.2 – Annual Economic Impacts of the Project on the NSW Economy (\$2023)

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT
OUTPUT (\$M)	231	34	17	51	282
<i>Type 11A Ratio</i>	1.00	0.15	0.07	0.22	1.22
VALUE ADDED (\$M)	205	15	9	24	229
<i>Type 11A Ratio</i>	1.00	0.07	0.05	0.12	1.12
INCOME (\$M)	1	7	5	12	13
<i>Type 11A Ratio</i>	1.00	7.59	4.93	12.52	13.52
EMPL. (No.)	12	63	57	120	132
<i>Type 11A Ratio</i>	1.00	5.21	4.75	9.96	10.96

The Project operation is estimated to make up to the following total annual contribution to the regional economy:

- \$244M in annual direct and indirect regional output;
- \$210M in annual direct and indirect regional value-added;
- \$1M in annual direct and indirect household income; and
- 34 direct and indirect jobs.

⁶ This is a residual pricing approach to estimate value at the Project boundary. Transmission impacts are not part of the Project and have not been assessed in the EIS.

The Project operation is estimated to make up to the following total annual contribution to the NSW economy:

- \$282M in annual direct and indirect regional output;
- \$229M in annual direct and indirect regional value-added;
- \$13M in annual direct and indirect household income; and
- 132 direct and indirect jobs.

The impacts are larger for the NSW economy because there is less leakage of direct and indirect expenditure out of the NSW economy compared to the regional economy.

5.1.2 Multipliers

The Type 11A ratio multipliers for the Project's impact on the regional economy range from 1.03 for value-added up to 5.29 for income. Capital intensive developments tend to have a high level of linkage with other sectors in an economy thus contributing relatively high rates of flow-on employment while at the same time only having a lower level of direct employment (relative to output levels). This tends to lead to a relatively high ratio multiplier for employment. The even higher ratio multiplier for income is because direct income only relates to people who reside in the region and only 3 operational workers are assumed to reside in the region. The Project also has a relatively low ratio multiplier for output and value-added reflecting the relatively high direct output and value-added compared to that in flow-on sectors.

The NSW Type 11A ratio multipliers for the Project range from 1.12 for value-added up to 13.52 for income. The multipliers are large for the NSW economy because of the greater level of intersectoral linkages in the larger economy and hence larger level of flow-on impacts i.e., less leakages compared to the regional economy.

5.1.3 Main Sectors Affected

The sectors of the regional and NSW economy most impacted by output, value-added, income and employment production induced flow-ons are likely to be as follows:

- *Electricity Transmission, Distribution, On Selling and Electricity Market Operation;*
- *Finance;*
- *Construction Services;*
- *Professional, Scientific and Technical Services;*
- *Employment, Travel Agency and Other Administrative Services;*
- *Wholesale Trade;*
- *Road Transport; and*
- *Auxiliary Finance and Insurance Services.*

Consumption induced flow-on effects in the region will be mainly in the following sectors:

- *Retail and Wholesale Trade;*
- *Food and Beverage Services;*
- *Health Care Services;*
- *Construction Services;*
- *Primary and Secondary Education;*
- *Residential Care and Social Assistance; and*
- *Road Transport.*

For the NSW economy the *Finance; Professional, Scientific and Technical Services; Insurance and Superannuation; and employment, Travel Agency and Other Administrative Service* sectors are also important consumption induced flow-on sectors.

5.2 Agricultural impacts

The Project operation is assumed impact 225 ha of sheep grazing land.

Tremain Ivey Advisory (2023) identify foregone agriculture during Project operation of \$9,017 per annum.

Using revenue, expenditure and employment ratios in the *Sheep, Grain, Beef and Dairy Cattle* sector of the regional and NSW IO table, the direct and indirect impact of this level of revenue is summarised in Tables 5.3 and 5.4. Indirect impacts include economic activity associated with suppliers to agricultural production. These impacts would occur for the duration of the Project operation.

Table 5.3 Annual Regional Economic Impacts of Foregone Agriculture During Project Operation (\$2023)

	Direct	Production induced	Consumption induced	Total Flow on	TOTAL EFFECT
OUTPUT (\$M)	0.01	0.00	0.00	0.00	0.01
<i>Type 11A Ratio</i>	1.00	0.43	0.10	0.53	1.53
VALUE ADDED (\$M)	0.00	0.00	0.00	0.00	0.01
<i>Type 11A Ratio</i>	1.00	0.45	0.15	0.60	1.60
INCOME (\$M)	0.00	0.00	0.00	0.00	0.00
<i>Type 11A Ratio</i>	1.00	0.44	0.11	0.55	1.55
EMPL. (No.)	0.02	0.01	0.00	0.02	0.04
<i>Type 11A Ratio</i>	1.00	0.58	0.15	0.73	1.73

Table 5.4 Annual NSW Economic Impacts of Foregone Agriculture During Project Operation (\$2023)

	Direct	Production induced	Consumption induced	Total Flow on	TOTAL EFFECT
OUTPUT (\$M)	0.01	0.01	0.01	0.02	0.02
<i>Type 11A Ratio</i>	1.00	0.89	0.85	1.75	2.75
VALUE ADDED (\$M)	0.00	0.00	0.00	0.01	0.01
<i>Type 11A Ratio</i>	1.00	1.05	1.18	2.23	3.23
INCOME (\$M)	0.00	0.00	0.00	0.00	0.01
<i>Type 11A Ratio</i>	1.00	1.59	1.48	3.07	4.07
EMPL. (No.)	0.02	0.03	0.03	0.05	0.08
<i>Type 11A Ratio</i>	1.00	1.13	1.17	2.30	3.30

These annual agricultural impacts are minor.

5.3 Other impacts

The operation of the Project will create a very small demand for regional labour resources (12 direct jobs in a labour market of 8,172) and regional inputs to production (that from the IO analysis represent 1% of interindustry transactions in the region). Consequently, no material "crowding out" effects on other industry sectors are anticipated.

6 CUMULATIVE IMPACTS

6.1 Approach to cumulative impacts

The cumulative impact assessment approach involves considering the impacts of the Project together with the impacts of other relevant future projects on economic activity. Relevant major projects within 100 km of the Project Area and/or within the South West Renewable Energy Zone with the potential for cumulative impacts with the Project are identified in Table 6.1.

The cumulative impact of multiple projects in the region will see the magnification of impacts addressed in this report and competition for resources. These are discussed qualitatively below based on general principles of supply and demand and reference to available reports on cumulative impacts of regional projects.

Table 6.1 Significant Projects in the Region

Project (Status)	Status and Description
Junction Rivers Wind Farm (In Planning)	- Nominal generating capacity 750 MW. - Up to 107 WTGs. - Battery energy storage and ancillary infrastructure.
Baldon Wind Farm (In Planning)	- Nominal generating capacity 1000 MW. - Up to 162 WTGs. - Battery energy storage and ancillary infrastructure.
Wilan Wind Farm (In Planning)	- Nominal storage capacity of up to 200 MW / 800 MWh. - Up to 138 WTGs. - Battery energy storage and ancillary infrastructure.
Pottinger Wind Farm (In Planning)	- Nominal storage capacity of 750 MW. - Up to 108 WTGs. - Battery energy storage and ancillary infrastructure.
The Plains Wind Farm (In Planning)	- Nominal storage capacity of 1,800 MW. - Up to 226 WTGs. - Ancillary infrastructure.
Bullawah Wind Farm (In Planning)	- Nominal storage capacity of 1,000 MW. - Up to 170 WTGs. - Battery energy storage and ancillary infrastructure.
Tchelery Wind Farm (In Planning)	- Nominal storage capacity of 800 MW. - Up to 120 WTGs. - Ancillary infrastructure and future development of a battery energy storage.
Mallee Wind Farm (In Planning)	Up to 150 wind turbines, battery storage and associated infrastructure.
Dinawan Wind Farm (In Planning)	Up to 250 wind turbines and associated infrastructure.
Limondale Solar Farm (Operational)	- Approx. 250 MW solar farm. 200 MW / 400 MWh Battery energy storage and ancillary infrastructure.
Sunraysia Solar Farm (Operational)	- Approx. 200 MW solar farm. - Ancillary infrastructure.
Hay Solar Farm (Operational)	- Approx. 110 MW solar farm. - Battery energy storage and ancillary infrastructure.
Southdown Solar Farm (In Planning)	- Approx. 70 MW solar farm. - Ancillary infrastructure.
Pottinger Solar Farm (In Planning)	- Approx. 300 MW solar farm. - Battery energy storage and ancillary infrastructure.
The Plains Solar Farm (In Planning)	- Approx. 500 MW solar farm. - Battery energy storage and ancillary infrastructure.
Keri Keri Solar Farm	Approx. 500 MW solar farm.

Project (Status)	Status and Description
(In Planning)	Battery energy storage and ancillary infrastructure.

6.2 Potential cumulative impacts

6.2.1 Initial Cumulative Labour Stimulus

As of September 2023, there are more than 13 renewable energy projects of varying capacity proposed, approved or under construction in the region. The main cumulative economic impact of these projects (and other regional projects that are not related to energy) is to generate a large demand for a suitably qualified construction workforce in the region.

This labour demand will be met from:

- the region:
 - the unemployment pool;
 - increased labour force participation; and
 - workers from other industries.
- the rest of NSW and Australia, with labour:
 - moving into the region to live during the employment period; or
 - commuting from outside the region e.g. Fly-in-fly-out (FIFO) and Drive-in-drive-out (DIDO).

6.2.2 Population Impact

It is unlikely all the cumulative labour demand can be met from the existing residents of the region, only. To the extent that the cumulative job stimulus results in workers (and their families) relocating to regional areas, even temporarily, or workers from the region not emigrating from the region in search of work, this can provide population growth (or abate population decline), including in areas experiencing population decline. Trends in regional economies of NSW (because of globalization and associated structural adjustment) has resulted in many non-coastal rural areas in NSW experiencing population decline. There has also been a decline in the population of smaller towns even in regions where the population has been growing.

Population growth is an important driver of the health of regional economies. Places that can attract population immigration create increased demand for goods and services and thus more jobs. This growth leads to increasing local multiplier effects, scale economies and an increase in the rate of innovation and capital availability (Sorensen, 1990). Conversely, population losses can contribute to a 'vicious cycle' of decline whereby reduced populations results in closure of services, which in turn makes it difficult to attract new populations (Sorensen 1990).

6.2.3 Accommodation Impacts

Cumulative regional population changes driven by cumulative regional employment growth will increase demand for short-term and long-term accommodation. The impacts can be increases in housing prices and rents, and shortages of short-term accommodation that might otherwise be used for tourism or other purposes.

From an economic perspective, increases in the cost of housing are predominantly a transfer between local owners and renters, or local owners and buyers. The existing homeowners and accommodation providers of the property benefit when this happens, and the renters/buyers lose (DAE, 2012). However, price rises also impact lower income households who may get squeezed out of the market. In situations where there are no market distortions, and cumulative population changes are longer term, the local housing supply would normally adjust to demand and prices return to their previous levels (DAE, 2012). However, given the more temporary nature of population change, normal longer term housing supply adjustments may be tempered and so there will be a need to encourage and facilitate the provision of additional accommodation including temporary workforce camps, adaptive reuse or extension of existing buildings, use of existing granny flats and spare bedrooms, use of vacant housing etc.

The extent of residual housing price impacts for regional economies would depend on the balance of labour supply from inside the region, outside the region and DIDO/FIFO, the level of provision of workforce accommodation facilities, and other accommodation options, as well as adjustment of the overall housing supply in response to increased demand. Early provision of additional accommodation can reduce housing price impacts.

6.2.4 Regional Job Growth

Cumulative demand for labour in regional areas can help address the jobs growth imbalance between Australia's biggest cities which have grown by an average of 2.4 per cent per annum since 2000 and the regions which have grown at 1.0 per cent per annum (Sobyra, 2022). This imbalance has been attributed to the economy creating relatively more demand for high skilled jobs than previously with the vast majority of these located in big cities rather than regions (Sobyra, 2022).

Regional jobs growth from the cumulative project demand can partly offset this trend by providing opportunities for the existing and future regional workforces, attracting middle-and high-skilled workers and families to regional areas, reducing outmigration of the regional workforce to look for employment in cities, and increase regional labour force participation. Regional projects can therefore provide a boom to non-coastal regional economies that have experienced low growth or decline because of globalisation and associated structural adjustment.

6.2.5 Stimulus to Regional Economic Activity

Cumulative projects in regional NSW will provide a substantial boost in direct economic activity in the region as well as flow-on economic activity to businesses that are able to supply the goods and services:

- required for project construction and operation; and
- demanded by workers i.e. expenditure of wages.

Based on the Economic Assessment in Sections 4 and 5, cumulative project construction is most likely to directly impact the heavy and civil engineering construction sector, construction services sector and non-residential building construction sector, and will indirectly impact a range of sectors.

However, any business that can provide the goods and services demanded for project construction and operation, and by workers, will benefit from the cumulative economic activity.

6.2.6 Impacts on Other Sectors of the Economy

Notwithstanding the above, excess demand for construction workers can in the short run lead to increased construction sector (and other sector) wages, attraction of workers from other relevant sectors of the economy leading to labour shortages in these other areas of the economy (and associated shortages of goods and services), rising inflation as firms pass wage costs onto consumers etc.

In addition, in the short run, excess demand for inputs to construction such as quarry materials, concrete etc can result in rising costs (prices) for these factor inputs and potentially shortages for other uses. The extent of these short run impacts for regional economies would depend on the balance of labour supply from inside the region, outside the region and DIDO/FIFO, as well as adjustment of the overall labour market, and other markets, in response to increased demand. However, in the medium term markets will adjust to some extent (e.g. increased labour force participation, new quarry proposals to supply demand for aggregate etc) and enable wages and prices to return to previous levels.

Notwithstanding, any price increases and crowding out of other economic activities in the region represents the operation of the market system where scarce resources are reallocated to where they are most highly valued and where society would benefit the most from them. This reallocation of resources is therefore a positive thing for the economy not a negative. Notwithstanding, it may be associated with social impacts.

6.2.7 Agricultural Impacts

The economic assessment in sections 4 and 5, found that the negative regional economic impacts from the use of agricultural land for the project, were very small, and small in comparison to the positive regional economic activity from the project. This finding reflects the small disturbance footprint of the project and the lower value agricultural activity being impacted.

These findings are likely to be the same across most renewable energy projects e.g. for wind farm projects turbine location tends to be on low land capability soils. The cumulative impact of projects on the regional economic activity of agriculture is therefore likely to be minor.

6.2.8 Mitigation Measures

The magnitude and duration of cumulative wage, price and supply shortages will largely depend on the ability of the labour, housing, and other markets to make supply adjustments.

Greater use of FIFO/DIDO and workforce accommodation will reduce impacts on the regional labour market (wage increases and labour shortages) and accommodation market (price/rent increases) but will also reduce regional economic activity benefits, because FIFO/DIDI workers will repatriate most of their income back to their home region.

The ability of the labour, housing, and other markets to make timely supply adjustments, may in some instances (e.g. housing supply adjustments, new quarry proposals) be impacted by local planning systems, and so Council's should be cognisant of the consequences of their decisions and the impacts of delays.

7 MITIGATION AND MANAGEMENT MEASURES

It is evident from Section 4 and 5 that the economic activity associated with the construction and operation of the Project would outweigh the loss of economic activity from the minor and temporary impact on agricultural production. However, at the same time it would create a demand for a suitably qualified construction workforce in the region.

Acciona proposes to work in partnership with the local councils and community to help maximise the projected economic regional benefits whilst minimising any impacts. In this respect, a range of general economic mitigation and management measures are proposed and would include:

- Employment of regional residents where they have the required skills and experience;
- Participating, as appropriate, in business groups, events or programs in the regional community;
- Locally sourcing non-labour inputs to production where local producers can be cost and quality competitive;
- Establishment of a Community Benefit Fund to be managed through a Voluntary Planning Agreement with Councils with the intention of supporting local non-profit organisations, community programs/events, local businesses, training, and services/infrastructure;
- Lease payments to host landowners that provide an alternative drought proof income with potential flow-on benefits to the regional economy; and
- Continued agricultural activities during the operational phase of the Project and reinstatement of full pre-project agricultural production following project decommissioning.

The Agricultural Impact Assessment (Appendix L of the EIS) and the Social Impact Assessment (Appendix Q of the EIS) provides additional management measures which are relevant to the impacts discussed in this report.

8 CONCLUSION

The Project will provide economic activity to the regional economy during both the construction and operation phase. It would also result in a minor and insignificant contraction in regional economic activity from agricultural activity within the development footprint. These regional economic impacts were assessed using IO analysis.

The construction and operation of the Project will have net positive impacts on the level of economic activity in the regional and NSW economy.

Acciona proposes to work in partnership with local councils and the local community so that, as far as possible, the benefits of the projected economic growth in the region are maximised and impacts minimised. In this respect, a range of general economic impact mitigation and management measures are proposed.

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ATTACHMENT 1 – THE GRIT SYSTEM FOR GENERATING INPUT-OUTPUT TABLES

The Generation of Regional Input-Output Tables (GRIT) system was designed to:

- combine the benefits of survey-based tables (accuracy and understanding of the economic structure) with those of non-survey tables (speed and low cost).
- enable the tables to be compiled from other recently compiled tables.
- allow tables to be constructed for any region for which certain minimum amounts of data were available.
- develop regional tables from national tables using available region-specific data.
- produce tables consistent with the national tables in terms of sector classification and accounting conventions.
- proceed in a number of clearly defined stages.
- provide for the possibility of ready updates of the tables.

The resultant GRIT procedure has a number of well-defined steps. Of particular significance are those that involve the analyst incorporating region-specific data and information specific to the objectives of the study. The analyst has to be satisfied about the accuracy of the information used for the important sectors. The method allows the analyst to allocate available research resources to improving the data for those sectors of the economy that are most important for the study.

An important characteristic of GRIT-produced tables relates to their accuracy. In the past, survey-based tables involved gathering data for every cell in the table, thereby building up a table with considerable accuracy. A fundamental principle of the GRIT method is that not all cells in the table are equally important. Some are not important because they are of very small value and, therefore, have no possibility of having a significant effect on the estimates of multipliers and economic impacts. Others are not important because of the lack of linkages that relate to the particular sectors that are being studied. Therefore, the GRIT procedure involves determining those sectors and, in some cases, cells that are of particular significance for the analysis. These represent the main targets for the allocation of research resources in data gathering. For the remainder of the table, the aim is for it to be 'holistically' accurate (Jensen, 1980). This means a generally accurate representation of the economy is provided by the table, but does not guarantee the accuracy of any particular cell. A summary of the steps involved in the GRIT process is shown in Table A1.1 (Powell and Chalmers, 1995).

Table A1.1**The GRIT Method**

Phase	Step	Action
PHASE I	1	ADJUSTMENTS TO NATIONAL TABLE Selection of national input-output table (1114-sector table with direct allocation of all imports, in basic values).
	2	Adjustment of national table for updating.
	3	Adjustment for international trade.
PHASE II		ADJUSTMENTS FOR REGIONAL IMPORTS (Steps 4-14 apply to each region for which input-output tables are required)
	4	Calculation of 'non-existent' sectors.
	5	Calculation of remaining imports.
PHASE III		DEFINITION OF REGIONAL SECTORS
	6	Insertion of disaggregated superior data.
	7	Aggregation of sectors.
	8	Insertion of aggregated superior data.
PHASE IV		DERIVATION OF PROTOTYPE TRANSACTIONS TABLES
	9	Derivation of transactions values.
	10	Adjustments to complete the prototype tables.
	11	Derivation of inverses and multipliers for prototype tables.
PHASE V		DERIVATION OF FINAL TRANSACTIONS TABLES
	12	Final superior data insertions and other adjustments.
	13	Derivation of final transactions tables.
	14	Derivation of inverses and multipliers for final tables.

Source: Bayne and West (1988).

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ATTACHMENT 2 – UNDERLYING ASSUMPTIONS AND INTERPRETATIONS OF INPUT-OUTPUT ANALYSIS AND MULTIPLIERS

1. "The *basic assumptions* in IO analysis include the following:
 - there is a fixed input structure in each industry, described by fixed technological coefficients (evidence from comparisons between IO tables for the same country over time have indicated that material input requirements tend to be stable and change but slowly; however, requirements for primary factors of production, that is labour and capital, are probably less constant).
 - all products of an industry are identical or are made in fixed proportions to each other.
 - each industry exhibits constant returns to scale in production.
 - unlimited labour and capital are available at fixed prices; that is, any change in the demand for productive factors will not induce any change in their cost (in reality, constraints such as limited skilled labour or investment funds lead to competition for resources among industries, which in turn raises the prices of these scarce factors of production and of industry output generally in the face of strong demand).
 - there are no other constraints, such as the balance of payments or the actions of government, on the response of each industry to a stimulus.
 2. The multipliers therefore describe *average effects, not marginal effects*, and thus do not take account of economies of scale, unused capacity or technological change. Generally, average effects are expected to be higher than the marginal effects.
 3. The IO tables underlying multiplier analysis only take account of one form of *interdependence*, namely the sales and purchase links between industries. Other interdependence such as collective competition for factors of production, changes in commodity prices which induce producers and consumers to alter the mix of their purchases and other constraints which operate on the economy as a whole are not generally taken into account.
 4. The combination of the assumptions used and the excluded interdependence means that IO multipliers are higher than would realistically be the case. In other words, they tend to *overstate* the potential impact of final demand stimulus. The overstatement is potentially more serious when large changes in demand and production are considered.
 5. The multipliers also do not account for some important pre-existing conditions. This is especially true of Type II multipliers, in which employment generated and income earned induce further increases in demand. The implicit assumption is that those taken into employment were previously unemployed and were previously consuming nothing. In reality, however, not all 'new' employment would be drawn from the ranks of the unemployed; and to the extent that it was, those previously unemployed would presumably have consumed out of income support measures and personal savings. Employment, output and income responses are therefore overstated by the multipliers for these additional reasons.
 6. The most *appropriate interpretation* of multipliers is that they provide a relative measure (to be compared with other industries) of the interdependence between one industry and the rest of the economy which arises solely from purchases and sales of industry output based on estimates of transactions occurring over a (recent) historical period. Progressive departure from these conditions would progressively reduce the precision of multipliers as predictive device" (ABS 1995, p.24).
- Multipliers indicate the total impact of changes in demand for the output of any one industry on all industries in an economy (ABS, 1995). Conventional output, employment, value-added and income multipliers show the output, employment, value-added and income responses to an initial output stimulus (Jensen and West, 1986).

Components of the conventional output multiplier are as follows:

Initial effect - which is the initial output stimulus, usually a \$1 change in output from a particular industry (Powell and Chalmers, 1995; ABS, 1995).

First round effects - the amount of output from all intermediate sectors of the economy required to produce the initial \$1 change in output from the particular industry (Powell and Chalmers, 1995; ABS, 1995).

Industrial support effects - the subsequent or induced extra output from intermediate sectors arising from the first round effects (Powell and Chalmers, 1995; ABS, 1995).

Production induced effects - the sum of the first round effects and industrial support effects (i.e. the total amount of output from all industries in the economy required to produce the initial \$1 change in output) (Powell and Chalmers, 1995; ABS, 1995).

Consumption induced effects - the spending by households of the extra income they derive from the production of the extra \$1 of output and production induced effects. This spending in turn generates further production by industries (Powell and Chalmers, 1995; ABS, 1995).

The *simple multiplier* is the initial effect plus the production induced effects.

The *total multiplier* is the sum of the initial effect plus the production-induced effect and consumption-induced effect.

Conventional employment, value-added and income multipliers have similar components to the output multiplier, however, through conversion using the respective coefficients show the employment, value-added and income responses to an initial output stimulus (Jensen and West, 1986).

For employment, value-added and income, it is also possible to derive relationships between the initial or own sector effect and flow-on effects. For example, the flow-on income effects from an initial income effect or the flow-on employment effects from an initial employment effect, etc. These own sector relationships are referred to as ratio multipliers, although they are not technically multipliers because there is no direct line of causation between the elements of the multiplier. For instance, it is not the initial change in income that leads to income flow-on effects, both are the result of an output stimulus (Jensen and West, 1986).

A description of the different ratio multipliers is given below.

Type 1A Ratio Multiplier = $\frac{\text{Initial} + \text{First Round Effects}}{\text{Initial Effects}}$

Initial Effects

Type 1B Ratio Multiplier = $\frac{\text{Initial} + \text{Production Induced Effects}}{\text{Initial Effects}}$

Initial Effects

Type 11A Ratio Multiplier = $\frac{\text{Initial} + \text{Production Induced} + \text{Consumption Induced Effects}}{\text{Initial Effects}}$

Initial Effects

Type 11B Ratio Multiplier = $\frac{\text{Flow-on Effects}}{\text{Initial Effects}}$

Initial Effects

Source: Centre for Farm Planning and Land Management (1989).

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