Pottinger Wind Farm
Economic Assessment

Prepared for

RPS Australia Pty Ltd

By

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Disclaimer

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EXECUTIVE SUMMARY

Pottinger Renewables Pty Ltd (the Applicant) is seeking approval for the construction, operation, and decommissioning of the Pottinger Wind Farm (the Project) inclusive of approximately up to 247 Wind Turbine Generators, with a total capacity of 1.3 Gigawatts, and a Battery Energy Storage System (BESS) facility with a capacity of up to 500MW/2 Giga Watt hours (GWh). The Project is situated about 60 kilometres (km) south of Hay in the rural locality of Booroorban in south-western NSW, entirely within the South West Renewable Energy Zone (REZ).

This report assesses the potential economic impacts of the construction and operation of Project on the regional and NSW economy. It has been prepared to support and inform 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 then NSW Department of Planning and Environment (DPE) and in accordance with 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 minor reduction in regional economic activity from foregone potential agriculture 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 other potential impacts of the Project, and cumulative projects on demand for regional and NSW labour resources and other inputs to production.

Existing environment

The regional economy is defined as the combined LGAs of Hay, Edward River, and Murrumbidgee. This is the region within which the Project is located, which has the potential to provide inputs to the Project and to derive economic benefits from the construction and operation of the Project. The population of the region in 2021 was 14,691 and has been contracting over time. Edward River LGA accounts for 58 per cent of the total population and 56 per cent of the total labour force. The population of the region is predicted to continue to contract, largely driven by population decline in the Hay LGA. The population of Edward River LGA is also predicted to decline, while the population of Murrumbidgee LGA is predicted to grow slightly (NSW DPE, 2022).

Aggregated one-digit Australian and New Zealand Industry Classification (ANZSIC) place of work data indicates the significance of the *Agriculture, Forestry and Fishing* sectors followed by *Health Care and Social Assistance* sectors and *Retail Trade* sectors. However, the main employment in the region varies between LGAs. In the Hay LGA the main employment sectors are *Agriculture, Forestry and Fishing* and *Retail Trade*. In the Edward River LGA the main employment sectors are *Health Care and Social Assistance* followed by *Agriculture, Forestry and Fishing*. In the Murrumbidgee LGA the main employment sectors are the *Agriculture, Forestry and Fishing* followed by *Manufacturing*.

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, Utilities, Manufacturing,* and *Construction.*

Potential construction impacts

Project construction, comprising commencement of design, procurement, onsite construction, and commissioning will occur over a 55-month period. Onsite construction will occur over a 47-month period with a peak workforce of 900 full time equivalents (FTE) personal and average annual FTE personnel of 430. The average annual construction impacts of the Project on the regional economy (during the four-year onsite construction phase) are estimated at up to:

- $250M in direct and indirect output.
- $91M in direct and indirect value-added.
- $49M in direct and indirect household income.
- 623 direct and indirect jobs.

The annual construction impacts of the Project on the NSW economy are estimated at up to:

- $486M in direct and indirect output.
- $209M in direct and indirect value added.
- $134M in direct and indirect household income.
- 1,365 direct and indirect jobs.

Conservatively, it was assumed that the construction phase will disturb 1,066 ha of agricultural land that could otherwise be used for 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. However, this is not expected to lead to any significant impacts on regional wages or prices.

Potential operational impacts

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

- $371M in direct and indirect output.
- $318M in direct and indirect value-added.
- $7M in direct and indirect household income.
- 97 direct and indirect jobs.

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

- $482M in direct and indirect output.
- $375M in direct and indirect value-added.
- $39M in direct and indirect household income.
- 399 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 is also assumed to impact 1,066 ha of land that could otherwise be used for sheep grazing. This level of agricultural impact during the operation of the Project is negligible.

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 term 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. However, the extent of these impacts will depend on the ability of suppliers to adjust to increased demand.

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

Management measures

The Applicant proposes to work in partnership with the local councils and community to help maximise the projected economic regional benefits whist 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, experience, and commitment.

- 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 fund community projects and support a range of benefit sharing initiatives.

- Lease payments to host landowners that provide an alternative drought proof income with potential flow-on benefits to the regional economy.

- Continued agricultural activities during the operational phase of the Project and following Project decommissioning, reinstatement of the Project Area, as far as practicable, to its condition prior to commencement of construction.

- Use of FIFO/DIDO labour, investigate option to construct 'legacy housing (quality homes)' to offset operations phase staffing, and investigate partnership/s with other organisations to utilise existing or approved accommodation camps to house the construction workforce. The aim of these measures is to reduce impacts on the regional labour market (wage increases and labour shortages) and reduce project housing demand on short term accommodation used for tourism and recreation.

1 INTRODUCTION

1.1 Project overview

Pottinger Renewables Pty Ltd (the Applicant) is seeking approval for the construction, operation, and decommissioning of the Pottinger Wind Farm (the Project), located 60 km south of Hay in the rural locality of Booroorban in south-western NSW, entirely within the South West Renewable Energy Zone (REZ).

The Project will involve the construction, in-perpetuity operation and decommissioning of a wind farm, and associated infrastructure. The Project will occur within a 26,400 ha Project Area and generally includes the following components:

- Up to 247 Wind Turbine Generators (WTGs) of which each has a tip height of up to 280 m and capacity up to 8 MW;
- Electrical reticulation network:
    - Up to six substations and 13 transformers;
        - One BESS 33/330kV substation with three transformers;
        - Internal 33 kV, 66 kV, 132 kV, or 330 kV electrical reticulation network and infrastructure connecting to the 330 kV Project EnergyConnect line via a switchyard and collector station;
    - Approximately 500 MW / 2 gigawatt hours (GWh) Battery Energy Storage (BESS);
- Other temporary and permanent infrastructure including:
    - Operations and Maintenance (O&M) facilities and infrastructure including site office, control room, storage facilities, car parking and fencing;
    - Accommodation facilities;
    - Construction and operational compounds;
    - Hardstands for WTGs and other infrastructure;
    - Internal access tracks and road turning head connecting Project infrastructure;
    - Meteorological masts; and
    - Concrete batching plants, crushing facilities, gravel / borrow pits, construction laydown areas;
- Ancillary activities including sourcing of materials and equipment for construction; sourcing of water for construction; subdivision and boundary adjustments, visual screening and associated ancillary works;
- Access road use via four locations and Project-required upgrades:
    - Project Area access: via the Cobb Highway from Jerilderie Road in the north east, from Wargam Road in the west, from East West Road in the south and West Burrabogie Road in the west, as well as emergency access; and
    - Wind farm major components transported via Port of Adelaide;
- Operational workforce of 50 Full Time Equivalent (FTE) and construction up to 900 FTE;
- Construction generally within standard construction hours and operations 24 hours per day 7 days per week; and
- Preliminary disturbance footprint of up to 1,066 ha.

No external transmission lines or associated easements are currently anticipated for the Project. Some of the Project-associated infrastructure will be shared with the Pottinger Solar Farm (the subject of a separate application)

1.2 Purpose of this report

Gillespie Economics was engaged by RPS AAP Consulting Pty Ltd (RPS) to conduct an Economic Assessment of the Pottinger Wind Farm for the Applicant.

This report supports a State Significant Development (SSD) Development Consent application under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (SSD-59235464), as an appendix to the Environmental Impact Statement (EIS) for the Project.

1.3 Assessment guidelines and requirements

The Economic Assessment was prepared in accordance with the requirements of the then NSW Department of Planning Environment (now the Department of Planning, Housing and Infrastructure (DPHI)), which are set out in the project-specific Secretary's Environmental Assessment Requirements (SEARs), dated 10 July 2023. The SEARs identify matters which must be addressed in the EIS. Table 1.1 lists the requirements relevant to this Economic Assessment and where they are addressed in this report.

Table 1.1 - Relevant matters raised in SEARs

Requirement	Section addressed
The EIS must include:	
an assessment of the economic impacts or benefits of the project for the region and the State as a whole	Sections 4, 5 and 6 of this report.
including any consideration of any increase in demand for community infrastructure services	Addressed in the Social Impact Assessment
and details of how the construction workforce will be managed to minimise local impacts including a consideration of the construction workforce accommodation.	Sections 4, 5 and 6 of this report and in the Social Impact Assessment

To inform preparation of the SEARs, DPHI invited relevant government agencies to advise on matters to be addressed in the EIS. These matters were considered by the Secretary for DPHI when preparing the SEARs. There were no specific economic assessment requirements in agency submissions.

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.

- 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 Hay, Edward River, and Murrumbidgee.[1] This is the region within which the Project is located, which has the potential to provide 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), 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.

- 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 the proponent, published data on renewable energy costs and wages, and production ratios in the IO tables. Indirect effects were estimated using the *EconImp* program.[2]

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.

- Employment – the number of people employed (including self-employed, full-time, and part-time).

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[1] These LGAs contain the closest population centres and key towns.

[2] 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.

2.5 Analysis of other issues

Qualitative consideration is given other economic issues, including potential "crowding out" impacts from the Project and cumulative projects on the region and State, based on general principles of supply and demand and reference to any relevant literature.

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 14,691 and a labour force of 6,953, with Edward River LGA accounting for 58 per cent of the total population and 56 per cent of the total labour force. The median age ranged from 45 in the Murrumbidgee LGA to 48 in the Hay LGA. In the 2021 Census, 243 people (about 3.5 per cent of the total regional labour force) were unemployed with the majority of these located in the Edward River LGA. Median weekly household incomes were highest in the Murrumbidgee LGA ($1,401) and lowest in the Hay LGA ($1,236). Median weekly rents were highest in the Edward River LGA ($220) and lowest in the Murrumbidgee LGA ($190).

The main occupations of usual residents[3] in the region (Figure 3.1) were Managers (which includes farm managers) (22 per cent) followed by Labourers (14 per cent) and Technicians and Trade Workers (13 per cent). While the Edward River LGA has the greatest number of all occupations, the relative importance of different occupations varies by LGA. In the Hay LGA the main occupations were Managers, Labourers and Technicians and Trade Workers. In the Murrumbidgee LGA the main occupations were Managers, Labourers and Clerical and Administrative Workers. In the Edward River LGA the main occupation was Managers followed by Professionals and Community and Personal Service Workers.

Figure 3.1 – Employment by Occupation of Usual Residents

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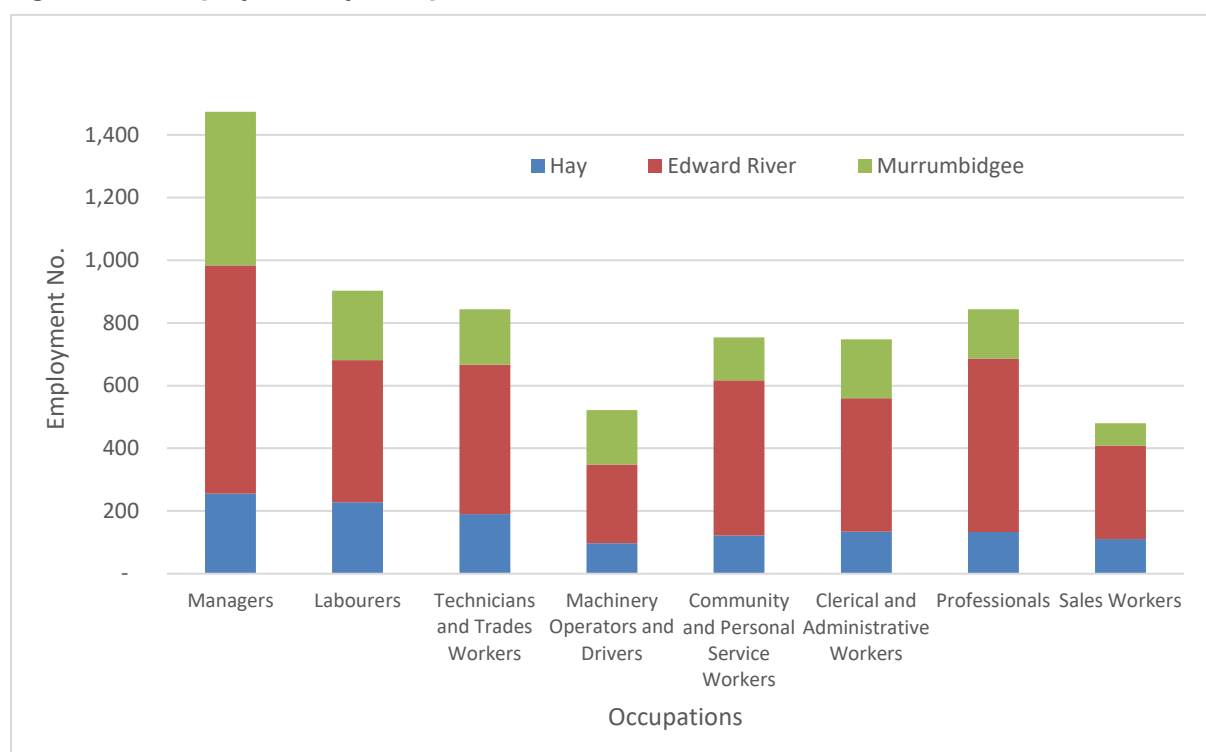
[3] Employed people aged 15 years and over.

Table 3.1 - Characteristics of Usual Residents

	Hay		Edward River		Murrumbidgee		Total Region		NSW	
Demographics	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Population	2,882		8,456		3,353		14,691		8,072,163	
Median Age	48		46		45				39	
In labour force	1,337	55.3	3,918	56.2	1,698	61	6,953	57.1	3,874,012	58.7
Unemployed	54	4	140	3.6	49	2.9	243	3.5	189,852	4.9
Median household weekly income	1,236		1,240		1,401				1,829	
Unoccupied private dwellings %	239	17.4	523	13.6	191	12.8	953	14.2	299,524	9.4
Median rent	175		220		190				420	
Occupations	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Managers	256	19.9	728	14.7	490	29.8	1,474	22.4	536,820	14.6
Labourers	228	17.7	453	12.0	222	13.5	903	13.7	300,966	8.2
Technicians and Trades Workers	190	14.8	477	12.6	177	10.8	844	12.8	436,589	11.9
Machinery Operators and Drivers	97	7.5	251	6.7	174	10.6	522	7.9	480,612	13.0
Community and Personal Service Workers	122	9.5	495	13.1	137	8.3	754	11.5	952,131	25.8
Clerical and Administrative Workers	134	10.4	426	11.3	188	11.4	748	11.4	390,779	10.6
Professionals	133	10.3	553	14.7	158	9.6	844	12.8	294,889	8.0
Sales Workers	110	8.6	299	7.9	71	4.3	480	7.3	222,186	6.0

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. *Grain-Sheep or Grain-Beef Cattle Farming* was the most significant employment sector for residents of the region, followed by *Other Grain Growing, Sheep Farming (Specialised), Local Government Administration,* and *Primary Education*.

Twelve per cent of employed usual residents work outside the region, mainly 'no fixed address' (NSW) (4%), Griffith LGA (3%), Berrigan LGA (2%) and Murray River LGA (2%).

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

Hay	%	Edward River	%	Murrumbidgee	%	Total Region	%
Sheep Farming (Specialised)	7.5	Other Social Assistance Services	4.5	Other Grain Growing	9.6	Grain-Sheep or Grain-Beef Cattle Farming	3.9
Local Government Administration	4.0	Hospitals (except Psychiatric Hospitals)	3.7	Grain-Sheep or Grain-Beef Cattle Farming	8.2	Other Grain Growing	3.8
Primary Education	3.8	Grain-Sheep or Grain-Beef Cattle Farming	3.3	Local Government Administration	4.6	Sheep Farming (Specialised)	3.5
Supermarket and Grocery Stores	3.4	Primary Education	3.2	Poultry Processing	3.3	Local Government Administration	3.5
State Government Administration	3.1	Supermarket and Grocery Stores	3.2	Sheep Farming (Specialised)	2.7	Primary Education	3.2

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 immigration[4] 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.

- 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.

Against this backdrop, it is evident that the population of the regional economy has been declining at an average annual rate of -0.8 per cent since 2006, compared to average annual growth of 1.3% for NSW. All three LGAs that comprise the regional economy have been experiencing declining population growth.

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[4] Mainly due to natural endowments and comparative advantage in certain industry sectors.

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
Hay	3,483	3,085	2,984	2,883	-2.3%	-0.7%	-0.7%	-1.1%
Edward River	9,287	8,888	8,991	8,437	-0.9%	0.2%	-1.2%	-0.6%
Murrumbidgee	4,219	3,888	3,929	3,564	-1.6%	0.2%	-1.9%	-1.0%
Total Region	*16,989*	*15,861*	*15,904*	*14,884*	*-1.3%*	*0.1%*	*-1.3%*	*-0.8%*
NSW	**6,742,690**	**7,218,529**	**7,732,858**	**8,093,815**	**1.4%**	**1.4%**	**0.9%**	**1.3%**

Source: Australian Bureau of Statistics (2021-22)

The population of the region (Table 3.4) is predicted to continue to decline at an average annual rate of -0.1 percent (compared to NSW growth of 1%), largely driven by population decline in the Hay LGA and Edward River LGA. The population Murrumbidgee LGA is forecast to grow at an average annual rate of 0.1% (NSW DPE, 2022).

Table 3.4 – Projected population growth

| Local Government Area	2021	2041	Change	Annual %
Hay	2,862	2,594	-267	-0.5%
Edward River	9,073	9,012	-62	0.0%
Murrumbidgee	3,895	3,998	103	0.1%
Total Region	**15,830**	**15,604**	**-226**	**-0.1%**
NSW	**8,166,757**	**9,872,934**	**1,706,176**	**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* sectors followed by *Health Care and Social Assistance* sectors and *Retail Trade* sectors. However, the main employment in the region varies between LGAs. In the Hay LGA the main employment sectors are *Agriculture, Forestry and Fishing* sectors and *Retail Trade* sectors. In the Edward River LGA the main employment sectors are *Health Care and Social Assistance* sectors followed by *Agriculture, Forestry and Fishing* sectors. In the Murrumbidgee LGA the main employment sectors are the *Agriculture, Forestry and Fishing* sectors followed by *Manufacturing* sectors.

Seventeen per cent of people who work in the region live outside region, mainly in Murray River LGA (3%), Griffith LGA (3%), Berrigan LGA (1%), and Carrathool (1%).

Figure 3.2 - Place of work employment by industry (One-digit ANZSIC)
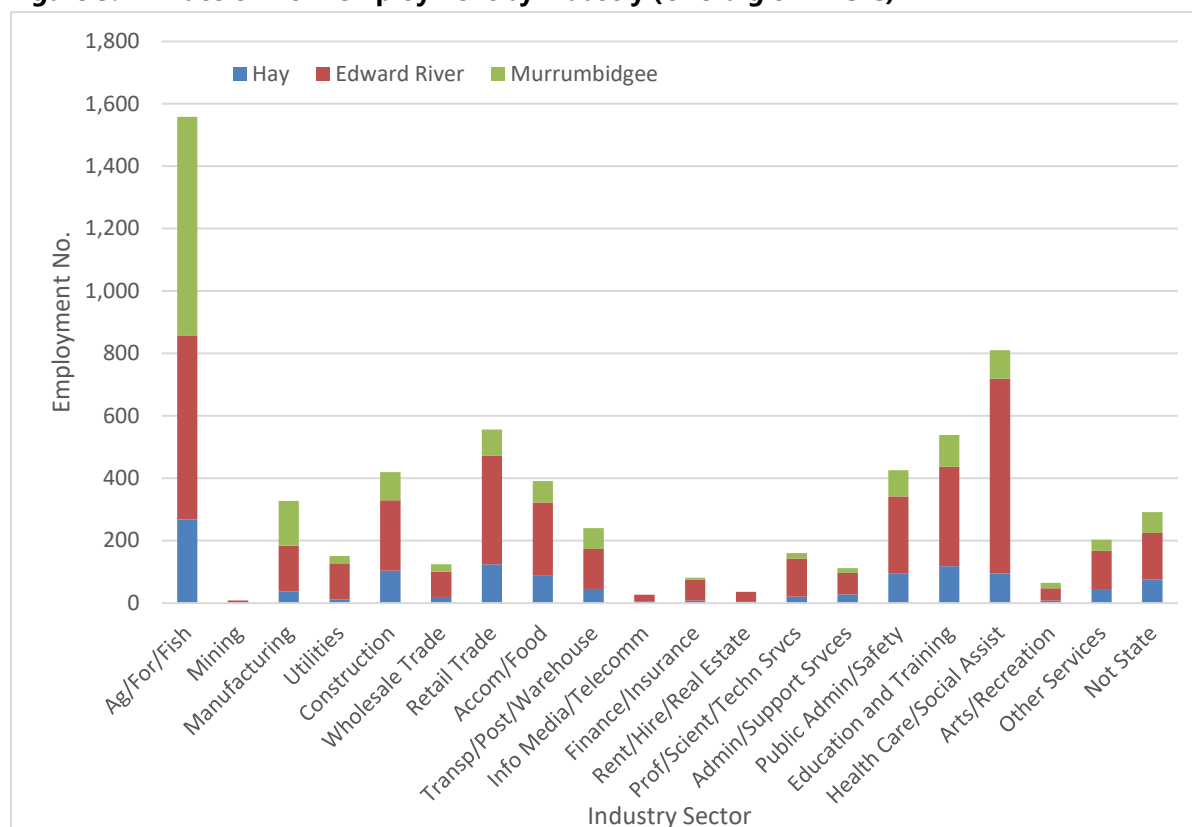
Source: Australian Bureau of Statistics, 2021 Census of Population and Housing, Working Population Profiles

At the more disaggregated level (place of work employment by four-digit ANZSIC) the main industry sectors of employment in the region are *Other Grain Growing*, and *Grain-Sheep or Grain-Beef Cattle Farming, Primary Education, Local Government Administration* and *Sheep Farming (Specialised)* (see Table 3.5). In the Hay LGA the main industry sector of employment is *Sheep Farming (Specialised)*. In the Edward River LGA the main industry sectors of employment are *Other Social Assistance Services* and *Hospitals (except Psychiatric Hospitals)*. In the Murrumbidgee LGA, *Wine and other Alcoholic Beverage Manufacturing* is the main employment sector.

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

Hay	%	Edward River	%	Murrumbidgee	%	Total Region	%
Sheep Farming (Specialised)	7.1	Other Social Assistance Services	4.8	Wine and Other Alcoholic Beverage Manufacturing	10.7	Other Grain Growing	4.1
Local Government Administration	4.4	Hospitals (except Psychiatric Hospitals)	4.2	Supermarket and Grocery Stores	8.6	Grain-Sheep or Grain-Beef Cattle Farming	4.0
Primary Education	3.9	Primary Education	3.5	Other Crop Growing nec	5.8	Primary Education	3.5
Supermarket and Grocery Stores	3.8	Supermarket and Grocery Stores	3.5	Computer System Design and Related Services	5.0	Local Government Administration	3.5
Accommodation	3.8	Grain-Sheep or Grain-Beef Cattle Farming	3.2	Sheep Farming (Specialised)	4.6	Sheep Farming (Specialised)	3.4

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

The Gross Regional Product (GRP) of the regional economy was estimated at $877 million for 2020/21 (Gillespie Economics IO Table). The largest exporting industries (One-digit ANZSIC) are:

- *Agriculture, Forestry and Fishing ($361 million)* mainly *Sheep, Grains, Beef and Dairy Cattle Sector*.

- *Utilities ($109 million)* mainly *Water Supply, Sewerage and Drainage Services, and Electricity Transmission.*

- *Manufacturing ($104 million),* mainly *Meat and Meat Product Manufacturing, and Grain Mill and Cereal Product Manufacturing.*

- *Construction ($60 million)* mainly *Heavy and Civil Engineering Construction.*

In combination these four industries accounted for $1.9 billion in total or 75% 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, it is estimated that *Agriculture, Forestry and Fishing; Utilities; Rental, Hiring and Real Estate; Health Care and Social Assistance;* and *Construction* had the highest value-added in total, equal to approximately 57% of the regional economy and 48% of regional employment - Table 3.6.[5]

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	206	24%	25%
Utilities	79	9%	2%
Rental, Hiring and Real Estate Services	72	8%	0%
Health Care and Social Assistance	71	8%	13%
Construction	67	8%	7%
Total	**495**	**57%**	**48%**

Source: Gillespie Economics IO table of the regional economy

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[5] Gross Value Added (GVA) measures the value of goods and services produced in a region.

4 CONSTRUCTION ASSESSMENT

4.1 The Project

The Project would provide economic activity to the regional and NSW economy during the construction phase.

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.

- 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.

Project construction will occur over 55 months from commencement of design and procurement to commissioning, with onsite construction occurring over a 47-month period i.e. month 9 to 55. A peak construction workforce of up to 900 full time equivalent (FTE) personnel will be required. However, the average annual FTE workforce over the four-year onsite construction is estimated at 430 (423 in year 1, 648 in year 2, 588 in year 3, and 62 in year 4). [6]

Based on the IO coefficients of the abovementioned three construction sectors in the regional IO table, $159M of expenditure per year would be required across these sectors to generate an average of 430 onsite construction workforce.

The estimated direct and indirect regional economic impact of $159M expenditure in the regional and NSW economy is reported in Tables 4.1 and 4.2.

Table 4.1 –Annual Economic Impacts of the Construction on the Regional Economy ($2023)

	Direct	Production induced	Consumption induced	Total Flow on	TOTAL EFFECT
OUTPUT ($M)	159	72	19	91	250
Type 11A Ratio	1.00	0.46	0.12	0.57	1.57
VALUE ADDED ($M)	65	15	11	26	91
Type 11A Ratio	1.00	0.23	0.17	0.40	1.40
INCOME ($M)	36	9	4	14	49
Type 11A Ratio	1.00	0.25	0.12	0.38	1.38
EMPL. (No.)	430	120	73	193	623
Type 11A Ratio	1.00	0.28	0.17	0.45	1.45

Note: Totals may have minor discrepancies due to rounding.

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[6] 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.

Table 4.2 –Annual Economic Impacts of the Construction on the NSW Economy ($2023)

	Direct	Production induced	Consumption induced	Total Flow on	TOTAL EFFECT
OUTPUT ($M)	159	179	148	327	486
Type 11A Ratio	1.00	1.12	0.93	2.05	3.05
VALUE ADDED ($M)	64	62	82	144	209
Type 11A Ratio	1.00	0.96	1.28	2.24	3.24
INCOME ($M)	48	44	42	86	134
Type 11A Ratio	1.00	0.92	0.88	1.80	2.80
EMPL. (No.)	430	425	509	935	1,365
Type 11A Ratio	1.00	0.99	1.18	2.17	3.17

Note: Totals may have minor discrepancies due to rounding.

In estimating the 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. For this analysis, it is assumed that approximately 50% of the construction workforce would be from the region. Consequently, Table 4.2 has been adjusted to only include 50% of consumption-induced flow-ons. At the NSW level, 80% of the construction workforce is assumed to come from NSW and so only 80% of consumption-induced flow-ons are included in Table 4.2.

The average annual construction impacts of the Project on the regional economy (during the 4-year construction phase) are estimated at up to:

- $250M in direct and indirect output.

- $91M in direct and indirect value-added.

- $49M in direct and indirect household income.

- 623 direct and indirect jobs.

The annual construction impacts of the Project on the NSW economy are estimated at up to:

- $486M in direct and indirect output.

- $209M in direct and indirect value added.

- $134M in direct and indirect household income.

- 1,365 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 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 1.38 for income up to 1.57 for output. The NSW type 11A ratio multipliers for the construction workforce range from 2.80 for income up to 3.24 for value-added. 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.*
- *Employment, Travel Agency, and Other Administrative Services.*
- *Food and Beverage Services.*
- *Iron and Steel Manufacturing.*
- *Structural Metal Product Manufacturing.*

For the NSW economy the *Non-Residential Property Operators and Real Estate Services* sector, *Finance sector* and *Auxiliary Finance and Insurance* sector 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.*

For the NSW economy the *Finance; Professional, Scientific and Technical Services; Insurance and Superannuation; Personal Services; Other Services; Non-Residential Property Operators and Real Estate Services;* are also important consumption induced flow-on sectors.

4.2 Agricultural impacts

The Project will disturb an area of approximately 1,066 ha of land that is currently subject to agriculture land use. While only a portion of this will be disturbed during construction, the Soil and Agricultural Impact Assessment, took a conservative approach, and assumed that agriculture will cease in this area during construction.

Based on the NSW Department of Primary Industries (DPI) (2023) *Gross Margin Budgets for Livestock* Merino ewes (20 micron) – Merino rams and a stocking rate of 1.5 Dry Sheep Equivalent (DSE)/ha, the Soil and Agricultural Impact Assessment estimated the productivity (gross margin) of the Project Area at $75,105 per annum. The annual revenue associated with this gross margin is $127,015.[7]

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[7] It should be noted that the landowner will receive rent from the proponent that will more than offset any loss in agricultural income.

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 4.3 and 4.4.

Table 4.3 Annual Regional Economic Impacts of Foregone Agriculture During Project Construction ($2023)

	Direct	Production induced	Consumption induced	Total Flow on	TOTAL EFFECT
OUTPUT ($M)	0.13	0.06	0.02	0.08	0.21
Type 11A Ratio	1.00	0.47	0.20	0.67	1.67
VALUE ADDED ($M)	0.05	0.03	0.01	0.04	0.09
Type 11A Ratio	1.00	0.51	0.29	0.80	1.80
INCOME ($M)	0.02	0.01	0.01	0.02	0.04
Type 11A Ratio	1.00	0.67	0.33	1.00	2.00
EMPL. (No.)	0.32	0.20	0.10	0.30	0.61
Type 11A Ratio	1.00	0.63	0.31	0.94	1.94

Table 4.4 Annual NSW Economic Impacts of Foregone Agriculture During Project Construction ($2023)

	Direct	Production induced	Consumption induced	Total Flow on	TOTAL EFFECT
OUTPUT ($M)	0.13	0.11	0.11	0.22	0.35
Type 11A Ratio	1.00	0.89	0.85	1.75	2.75
VALUE ADDED ($M)	0.05	0.05	0.06	0.11	0.17
Type 11A Ratio	1.00	1.05	1.18	2.23	3.23
INCOME ($M)	0.02	0.03	0.03	0.06	0.08
Type 11A Ratio	1.00	1.59	1.48	3.07	4.07
EMPL. (No.)	0.32	0.36	0.37	0.73	1.05
Type 11A Ratio	1.00	1.13	1.17	2.30	3.30

These impacts would occur for approximately four years. It is evident from the above that agricultural impacts to the region, and NSW, 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.

Notwithstanding, 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 is for in the order

of 430 workers (50% of which are assumed to come from the region - which has a labour force of 6,953), no or modest observable price effects are anticipated.

5 OPERATION PHASE

5.1 The Project

The Project would provide economic activity to the regional and NSW economy during the operation phase.

5.1.1 Impacts

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.[8] The proponent advised of an operational employment of 50 (75% of which are assumed to already reside in the region and 100% of which assumed to reside in NSW). 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.

On this basis the total and disaggregated average annual impacts of the Project on the regional and NSW economy (in 2023 dollars) are 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 ($M)	349	18	5	22	371
Type 11A Ratio	1.00	0.05	0.01	0.06	1.06
VALUE ADDED ($M)	308	7	3	10	318
Type 11A Ratio	1.00	0.02	0.01	0.03	1.03
INCOME ($M)	3	3	1	4	7
Type 11A Ratio	1.00	0.92	0.38	1.30	2.30
EMPL. (No.)	50	28	19	47	97
Type 11A Ratio	1.00	0.56	0.38	0.93	1.93

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 ($M)	349	82	50	133	482
Type 11A Ratio	1.00	0.24	0.14	0.38	1.38
VALUE ADDED ($M)	308	40	28	68	375
Type 11A Ratio	1.00	0.13	0.09	0.22	1.22
INCOME ($M)	4	21	14	35	39
Type 11A Ratio	1.00	5.25	3.59	8.84	9.84
EMPL. (No.)	50	176	173	349	399
Type 11A Ratio	1.00	3.52	3.46	6.98	7.98

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

- $371M in direct and indirect output.

- $318M in direct and indirect value-added.

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[8] 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.

- $7M in direct and indirect household income.

- 97 direct and indirect jobs.

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

- $482M in direct and indirect output.

- $375M in direct and indirect value-added.

- $39M in direct and indirect household income.

- 399 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 2.30 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 and income 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 and income. Capital intensive projects also typically have 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 1.22 for value-added up to 9.84 for employment. 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.*

- *Auxiliary Finance and Insurance Services.*

- *Professional, Scientific and Technical Services.*

- *Employment, Travel Agency and Other Administrative Services.*

- *Wholesale Trade.*

- *Road Transport.*

For the NSW economy the *Computer Systems Design and Related Services;* is also an important production induced flow-on sector.

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

- *Retail and Wholesale Trade.*

- *Food and Beverage Services.*

- *Health Care Services.*

- *Residential Care and Social Assistance.*

- *Road Transport.*

- *Construction Services.*

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

5.2 Agricultural impacts

The Project operation will disturb an area of approximately 1,066 ha of land that is currently subject to agriculture land use.

As identified above, based on the NSW Department of Primary Industries (DPI) (2023) *Gross Margin Budgets for Livestock* Merino ewes (20 micron) – Merino rams and a stocking rate of 1.5 DSE/ha, the Soil and Agricultural Impact Assessment estimated the productivity (gross margin) of the Project Area at $75,105 per annum. The annual revenue associated with this gross margin is $127,015.[9]

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 the higher level of potential foregone revenue is summarised in Tables 5.3 and 5.4.

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 ($M)	0.13	0.06	0.02	0.08	0.21
Type 11A Ratio	1.00	0.47	0.20	0.67	1.67
VALUE ADDED ($M)	0.05	0.03	0.01	0.04	0.09
Type 11A Ratio	1.00	0.51	0.29	0.80	1.80
INCOME ($M)	0.02	0.01	0.01	0.02	0.04
Type 11A Ratio	1.00	0.67	0.33	1.00	2.00
EMPL. (No.)	0.32	0.20	0.10	0.30	0.61
Type 11A Ratio	1.00	0.63	0.31	0.94	1.94

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 ($M)	0.13	0.11	0.11	0.22	0.35
Type 11A Ratio	1.00	0.89	0.85	1.75	2.75
VALUE ADDED ($M)	0.05	0.05	0.06	0.11	0.17
Type 11A Ratio	1.00	1.05	1.18	2.23	3.23
INCOME ($M)	0.02	0.03	0.03	0.06	0.08
Type 11A Ratio	1.00	1.59	1.48	3.07	4.07
EMPL. (No.)	0.32	0.36	0.37	0.73	1.05
Type 11A Ratio	1.00	1.13	1.17	2.30	3.30

These impacts would occur for the duration of the Project operation. It is evident from the above that the agricultural impacts from the operation of the Project are negligible.

5.3 Other impacts

The operation of the Project will create a very small demand for regional labour resources and regional inputs to production. Consequently, no "crowding out" effects on other industry sectors are anticipated.

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[9] It should be noted that the landowner will receive rent from the proponent that will more than offset any loss in agricultural income.

6 CUMULATIVE IMPACTS

6.1 Introduction

Other renewable energy developments in proximity to the Project with cumulative impact potential are identified in Table 6.1. In addition, there a plethora of renewable energy projects and transmission projects in various states of approval across the rest of NSW, QLD, and Victoria.

Table 6.1 - Projects in Proximity with Cumulative Impact Potential

Project name	Distance to Project Area	Key Dates
Pottinger Wind Farm	N/A	• Construction: Q1 2026 to Q3 2030 date (55 months) • Operations: Q3 2028 (from month 30) to perpetuity • Life: 35 years
Pottinger Solar Farm	N/A	• Construction: Q3 2027 to Q2 2030 (34 months from month 19 of Pottinger Wind Farm construction schedule) • Operations: Q3 2029 to perpetuity date • Life: 35 years
Project EnergyConnect (NSW – Eastern Section)	<1 km (within Project Area)	• Construction: underway • Operation: 2025
Bullawah Wind Farm	< 1km (adjacent)	• Construction: Q3 2025 to Q3 2027 date (24 months) • Operations: 2027 to 2057 date (360 months) • Life: 30 years
The Plains Wind Farm	< 1km (adjacent)	• Construction: 2026 to 2028 date (24 months) • Operations: 2028 to 2058 date (360 months) • Life: 30 years
The Plains Solar Farm	< 1km (adjacent)	• Construction: 2026 to 2028 date (18-24 months) • Operations: 2028 to 2058 date (360 months) • Life: 30 years
Dinawan Wind Farm	25 km	• Construction: 2025 to 2028 date (36 months) • Operations: 2028 to 2058 date (360 months) • Life: 25-30 years
Dinawan Solar Farm	25 km	• Construction: 2025 to 2026/28 date (18 months) • Operations: 2026 to 2061 date (420 months) • Life: 25-35 years

6.2 Potential cumulative impacts

6.2.1 Initial Cumulative Labour Stimulus

The main cumulative economic impact of the projects identified above is to generate large demand for a suitably qualified construction workforce in regional areas. This labour demand will be met from:

• the local region either from:

   – the unemployment pool.

   – increased labour force participation.

   – workers from other industries.

- outside the region with labour
  - moving into the region to live during the employment period.
  - 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 (including from the Project) 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 impact 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 bear the cost (DAE, 2012). However, price rises also impact lower income households who may get squeezed out of the market. Provided that there are no market distortions, in the medium to longer term, the local housing and short-term accommodation supply may adjust to demand, and prices return to their previous levels (DAE, 2012).

The extent of these short turn 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, as well as adjustment of the overall housing supply in response to increased demand. Early provision of additional accommodation options 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.

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.

The sectors of regional economies most impacted by production induced flow-ons, associated with firms buying goods and services from each other are likely to be as follows:

- professional, scientific, and technical services.
- wholesale and retail trade.
- structural metal product manufacturing.
- road transport.
- employment, travel agency and other administrative services.
- cement lime and ready-mixed concrete manufacturing.

Consumption-induced flow-on effects in the region, associated the expenditure of wages will be mainly experienced in the following sectors:

- retail and wholesale trade.
- food and beverage services.
- health care services.
- primary and secondary education.
- residential care and social assistance services.
- road transport.
- professional, scientific, and technical services.

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 potentially 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 prices 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 to longer term markets should adjust 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

Section 4.2 and 5.2 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.

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 and other inputs to production.

The Applicant proposes to work in partnership with the local councils and community to help maximise the projected economic regional benefits whist 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, experience, and commitment.

- 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 fund community projects and support a range of benefit sharing initiatives.

- Lease payments to host landowners that provide an alternative drought proof income with potential flow-on benefits to the regional economy.

- Continued agricultural activities during the operational phase of the Project and following Project decommissioning, reinstatement of the Project Area, as far as practicable, to its condition prior to commencement of construction.

- Use of FIFO/DIDO workforce, investigate option to construct 'legacy housing (quality homes)' to offset operations phase staffing, and investigate partnership/s with other organisations to utilise existing or approved accommodation camps to house the construction workforce. The aim of these measures is to reduce impacts on the regional labour market (wage increases and labour shortages) and reduce project housing demand on short term accommodation used for tourism and recreation.

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 Project boundary and, more specifically, 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.

The Applicant 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.

9 REFERENCES

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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		ADJUSTMENTS TO NATIONAL TABLE
	1	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 = $\dfrac{\text{Initial + First Round Effects}}{\text{Initial Effects}}$

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

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

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

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

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