APPENDIX X
ECONOMIC IMPACT ASSESSMENT

COPYRIGHT

Copyright © Iron Road Limited, 2015

All rights reserved

This document and any related documentation is protected by copyright owned by Iron Road Limited. The content of this document and any related documentation may only be copied and distributed for the purposes of section 46B of the *Development Act, 1993 (*SA) and otherwise with the prior written consent of Iron Road Limited.

DISCLAIMER

Iron Road Limited has taken all reasonable steps to review the information contained in this document and to ensure its accuracy as at the date of submission. Note that:

(a) in writing this document, Iron Road Limited has relied on information provided by specialist consultants, government agencies, and other third parties. Iron Road Limited has reviewed all information to the best of its ability but does not take responsibility for the accuracy or completeness; and

(b) this document has been prepared for information purposes only and, to the full extent permitted by law, Iron Road Limited, in respect of all persons other than the relevant government departments, makes no representation and gives no warranty or undertaking, express or implied, in respect to the information contained herein, and does not accept responsibility and is not liable for any loss or liability whatsoever arising as a result of any person acting or refraining from acting on any information contained within it.

Economic Impact Assessment of the Central Eyre Iron Project

A report to

Iron Road Limited

Prepared by

econsearch

19 August 2015

EconSearch Pty Ltd
214 Kensington Road
Marryatville SA 5068
Tel: (08) 8431 5533
Fax: (08) 8431 7710

www.econsearch.com.au

CONTENTS

TABLES

FIGURES

ABBREVIATIONS

ABS	Australian Bureau of Statistics
CEIP	Central Eyre Iron Project
CGE	computable general equilibrium
DECON	demographic economic (model)
fte	full time equivalent
GRP	gross regional product
GSP	gross state product
GDP	gross domestic product
I-O	input-output
IRD	Iron Road Limited
LGA	local government area
Mtpa	million tonnes per annum
RDA	Regional Development Australia
SA	South Australia

DOCUMENT HISTORY AND STATUS

Doc Ver	Doc Status	Issued To	Qty elec	Qty hard	Date	Reviewed	Approved
1	Draft	Steve Green	1	-	22/9/14	JBM	JBM
2	Draft	Steve Green	1	-	13/10/14	JBM	JBM
3	Draft	Steve Green	1	-	24/10/14	JBM	JBM
4	Draft	Steve Green	1	-	24/11/14	JBM	JBM
5	Final	Steve Green	1Word 1 PDF	-	20/02/15	JBM	JBM
6	Final	Stephanie Glue Steve Green	1Word 1 PDF	-	19/08/15	JBM	JBM

Printed:	17/10/2015 10:35:00 PM
Last Saved:	17/10/2015 10:35:00 PM
File Name:	S:\1_Projects\Complete\2011\1146_Iron Road\Reports\Iron Road Economic Impact_Final_150819.docx
Project Manager:	Julian Morison
Principal Author/s:	Lisa Rippin, Nick Angelakis and Julian Morison
Name of Client:	Iron Road Limited
Name of Project:	Economic Impact Assessment of the Central Eyre Iron Project
Document Version:	6
Job Number:	1146

EXECUTIVE SUMMARY

Iron Road Limited (IRD) is proposing plans for the Central Eyre Iron Project (CEIP) on the Eyre Peninsula in South Australia. The major components of the proposed project are an open pit mine and processing facilities, a deep sea port and export facility and an infrastructure corridor comprising a railway line, transmission line, water pipeline and bore field, access road and ancillary utilities. The project lies within or adjacent to the local government areas (LGAs) of Wudinna, Kimba, Elliston, Cleve and Tumby Bay and the broader region of Eyre and Western.

EconSearch was engaged by Iron Road Limited to provide estimates of the likely economic contribution of the proposed mine, infrastructure corridor and port. Impacts were estimated for the infrastructure development and operation of the project on the economies of Wudinna, Kimba, Elliston, Cleve and Tumby Bay LGAs, Eyre and Western region, South Australia and Australia. RISE models for all the above regional economies for 2012/13 have been used for this purpose. At the state and national levels computable general equilibrium (CGE) models have been utilised.

The results of the economic impact analysis, construction and operation phases, for the local and regional economies are summarised in Table ES-1. The impact on Wudinna District Council, in particular, will be transformative. Employment (direct and flow-on) during the operation phase is expected to average around 850 fte. This can be compared to current employment in the region of approximately 711 fte.

Table ES-1 Local and regional economic impact of the CEIP, construction and operation phases

	Wudinna	Kimba	Cleve	Tumby Bay	Elliston	Rest of Eyre & Western	**Total Eyre & Western**
Construction (avg/an, yrs 1-4)							
Gross Regional Product ($m)							
Direct	29	0	12	16	0	0	**57**
Flow-on	12	1	4	6	0	33	**55**
Total	**41**	**1**	**15**	**22**	**0**	**33**	**112**
Employment (fte)							
Direct	551	0	164	273	0	0	**988**
Flow-on	135	7	37	57	1	233	**470**
Total	**686**	**7**	**201**	**330**	**1**	**233**	**1,458**
Operation (avg/an, yrs 5-29)							
Gross Regional Product ($m)							
Direct	2,376	0	1	2	0	0	**2,379**
Flow-on	26	2	3	2	1	19	**52**
Total	**2,401**	**2**	**4**	**4**	**1**	**19**	**2,431**
Employment (fte)							
Direct	654	0	26	25	0	0	**705**
Flow-on	195	11	20	13	7	88	**335**
Total	**849**	**11**	**46**	**38**	**7**	**88**	**1,040**

The regional, state and national level impacts are reported in Table ES-2. For SA, the project is expected to generate an average annual increase to gross state product of around $2.7 billion over the 25 operational years of the project. This would represent an increase of 2.9 per cent over 2012/13 levels. The state employment impact of 1,985 fte jobs would add around 0.3 per cent to the state's employed labour force.

Table ES-2 Regional, state and national economic impact of the CEIP, construction and operation phases

	Eyre & Western	Rest of South Australia	**Total South Australia**	Rest of Australia	**Total Australia**
Construction (Avg/an, yrs 1-4)					
Gross State Product ($m)	112	406	**518**	653	**1,171**
Employment (fte)	1,458	1,569	**3,027**	2,451	**5,478**
Operation (Avg/an, yrs 5-29)					
Gross State Product ($m)	2,431	294	**2,725**	98	**2,823**
Employment (fte)	1,040	945	**1,985**	244	**2,228**

The key findings over the life of the mine, including the construction and operation phases, are detailed in Table ES-3.

Table ES-3 Key Findings over the life of the mine [a]

Economic measure	Outcomes under the expansion scenario (Years 1 to 29)	
GDP Australia (NPV, $m)	***31,268***	
GSP South Australia (NPV, $m)	***27,953***	
GRP (NPV, $m)		
Eyre and Western	1,097	
Wudinna	827	
Kimba	11	
Cleve	67	
Tumby Bay	78	
Elliston	7	
Full-time equivalent employment (average absolute and % change over BAU case)		
Australia	2,677	(0.02%)
South Australia	2,128	(0.3%)
Eyre and Western	1,097	(3.7%)
Wudinna	827	(98.0%)
Kimba	11	(1.5%)
Cleve	67	(6.0%)
Tumby Bay	78	(6.8%)
Elliston	7	(1.0%)
Government Revenues (NPV, $m)		
Australian Government	4,422	
SA State Government	1,510	
SA Local government	5	

[a] Present values calculated using a discount rate of 6 per cent.

1. INTRODUCTION

Iron Road Limited (IRD) is proposing plans for the Central Eyre Iron Project (CEIP) on the Eyre Peninsula in South Australia. The major components of the proposed project are:

- An open pit mine and processing facilities, including a mine site accommodation village for the construction period.
- A long term employee village located on the north east perimeter of the township of Wudinna to provide accommodation for operational employees of the mine and rail.
- A deep sea port and export facility, with capacity to export up to 30 Mtpa of iron ore, and a temporary construction village located at Cape Hardy.
- An infrastructure corridor comprising a railway line, transmission line, water pipeline and bore field, access road and ancillary utilities.

The project lies within or adjacent to the local government areas (LGAs) of Wudinna, Kimba, Elliston, Cleve and Tumby Bay and the broader region of Eyre and Western.

The construction of the mine, infrastructure corridor and port and its operation are likely to generate significant economic impacts on the local, regional and state economies. EconSearch was engaged by IRD to provide estimates of the likely economic contribution of the proposed mine, infrastructure corridor and port. Impacts were estimated for the infrastructure development and operation of the project on the economies of Wudinna, Kimba, Elliston, Cleve and Tumby Bay LGAs, and the Eyre and Western region. RISE models[1] for all the above regional economies for 2012/13 have been used for this purpose. At the state and national levels (South Australia and Australia) computable general equilibrium (CGE) models have been utilised to estimate state and national level impacts.

An outline of the method, data sources and indicators of economic impact used in the analysis are provided in Section 2. A profile of economic activity in the five LGA regions and the Eyre and Western region is presented in Section 3. Section 4 provides the estimates of the economic impacts of the proposed mine, infrastructure corridor and port during the construction and operating phases for the local, state and national economies.

[1] RISE (regional industry structure and employment) models are models designed for measuring the impact on regions of economic change. The models, which have at their core the input-output method, were originally constructed by EconSearch for the South Australian Department of Premier and Cabinet (EconSearch 2013a).

2. GENERAL APPROACH

This is an economic impact assessment. The estimates of regional economic impact presented are based on the use of an extension of the conventional input-output method. Over the past decade EconSearch has developed an extended input-output model known as the RISE model (Regional Industry Structure & Employment). The RISE model provides a comprehensive economic framework that is extremely useful in the resource planning process, particularly for regional economic impact applications[2].

The estimates of state and national economic impact presented are based on the use of computable general equilibrium (CGE) model. The Victoria University Centre of Policy Studies' (COPS) "TERM" comparative statics CGE model, licenced to EconSearch, was used for this purpose. TERM (The Enormous Regional Model) is a "bottom-up" CGE model of Australia which treats each region as a separate economy. The key feature of TERM, in comparison to predecessors such as MMRF, is its ability to handle a greater number of regions or sectors. TERM has a detailed treatment of transport costs and is naturally suited to simulating the effects of improving particular road or rail links.

The indicators used in impact analysis typically include output, employment, household income and gross state/regional product which are used in this report.

2.1 Estimation of Economic Effects – Key Concepts

2.1.1 Economic activity

Economic activity indicators: the primary focus of this report is the generation of economic activity resulting from the Central Eyre Iron Project. The key economic activity indicators considered in the analysis are output, employment, household income and gross regional/state/domestic product (GRP/GSP/GDP).

Economic impact: changes in economic activity are referred to as economic impacts. Generally, changes in *economic activity indicators* result from some stimulus or external shock imposed. In this analysis the concept of economic impact includes the increase in economic contribution from the construction and operation of the project, i.e. the contribution of the mine, infrastructure corridor and port construction and operation make to the economy. This *economic impact* is measured in terms of the *economic activity indicators* referred to above.

[2] RISE models have been constructed for both the South Australian and Victorian Governments at both a state and regional level (EconSearch 2013a, 2013b).

2.1.2 Indicators of economic activity defined

Employment units: Employment numbers are usually reported in either full time equivalent (FTE) units or total job units defined as follows:

- *FTE:* is a way to measure a worker's involvement in a project or industry activity. An FTE of 1.0 means that the person is equivalent to a full-time worker, while an FTE of 0.5 signals that the worker is only half-time. Typically, different scales are used to calibrate this number, depending on the type of industry and scope of the analysis but the basic calculation is the total hours worked divided by average annual hours worked in full-time jobs.
- *Jobs:* is used to refer to the number of workers employed in an industry or on a project at any point in time. It typically refers to either:
    - the *maximum* number of workers required at any point over the analytical period or the duration of the project; or
    - the *average* number of workers required over the analytical period/duration of the project. This can be calculated on a daily, weekly, monthly or annual basis.

In this report employment has been reported in terms of FTE units on a per annum basis.

Output (Value of): is a measure of the gross revenue of goods and services produced by commercial organisations (e.g. value of mine output) and gross expenditure by government agencies. Total output needs to be used with care as it can include elements of double counting when the output of integrated industries is added together (e.g. the value of processed product includes the value of mine output).

Gross regional/state/domestic product (GRP/GSP/GDP): is a measure of the contribution of an activity to the economy. GRP/GSP/GDP is measured as value of gross output (business revenue) less the cost of goods and services (including imports) used in producing the output. In other words, it can be measured as the sum of household income, gross operating surplus and gross mixed income net of payments to owner managers and taxes less subsidies on products and production. It represents payments to the primary inputs of production (labour, capital and land). Using GRP/GSP/GDP as a measure of economic impact avoids the problem of double counting that may arise from using value of output for this purpose.

Household income: is a component of GRP/GSP/GDP and is a measure of wages and salaries paid in cash and in-kind, drawings by owner operators and other payments to labour including overtime payments, employer's superannuation contributions and income tax excluding payroll tax.

2.1.3 Categories of economic activity in the infrastructure supply chain

A useful way to think about economic activity and economic impact (as measured by employment, GRP, etc.) is using the concept of a 'supply chain'. The supply chain, in the

context of an infrastructure project includes, the planning and management of all activities involved in sourcing and procurement, conversion of materials, and all the logistics management activities. It also includes coordination and collaboration with suppliers, intermediaries and third-party service providers.

Broadly speaking there are four categories of employment and GRP along the infrastructure supply chain.

1. *Direct employment and GRP* – this is employment in those firms, businesses and organisations that are directly engaged in project construction. Typically this will include:
    a. construction companies
    b. construction sub-contractors
    c. planning and engineering services
    d. material supply firms.
2. *First round employment and GRP* - refers to employment in firms that supply inputs and services to the 'direct employment' businesses, i.e. those categorised under #1 above.
    a. energy
    b. raw materials
    c. logistics
    d. business support services
    e. other inputs
3. *Industrial-support employment and GRP* - is the term applied to 'second and subsequent round' effects as successive waves of output increases occur in the economy to provide industrial support, as a response to the original infrastructure expenditure. This category excludes any employment associated with increased household consumption.
4. *Consumption-induced employment and GSP* - is the term applied to as those effects induced by increased household income associated with the original infrastructure expenditure. The expenditure of household income associated with all three categories of employment (direct, first round and industrial-support) will generate economic activity that will in itself generate jobs.

Flow-on (or *indirect*) *economic impact* is the sum of categories 2, 3 and 4. In this analysis *direct* and *flow-on* employment, GRP and household income generated by the infrastructure supply chain have been reported. To avoid double counting, the supply chain *value of output* is reported only in terms of the direct impact.

2.2 Economic Impact Models

Input-output (I-O) models are widely used to assess the economic impact of existing or changing levels of economic activity[3], such as regional mining. The RISE I-O models of the regional economies, constructed by EconSearch, are widely used by the Government. RISE models for the Eyre and Western regional economies have been used in this assessment. I-O models are available at the national, state and regional levels.

The Eyre and Western region, shown in Figure 3-1, consists of 11 local government areas (LGAS), namely the District Councils of Ceduna, Streaky Bay, Franklin Harbour, Elliston, Lower Eyre Peninsula, Wudinna, Cleve, Kimba, Tumby Bay and the Cities of Port Lincoln and Whyalla.

Impacts were estimated individually for the following five local government areas:

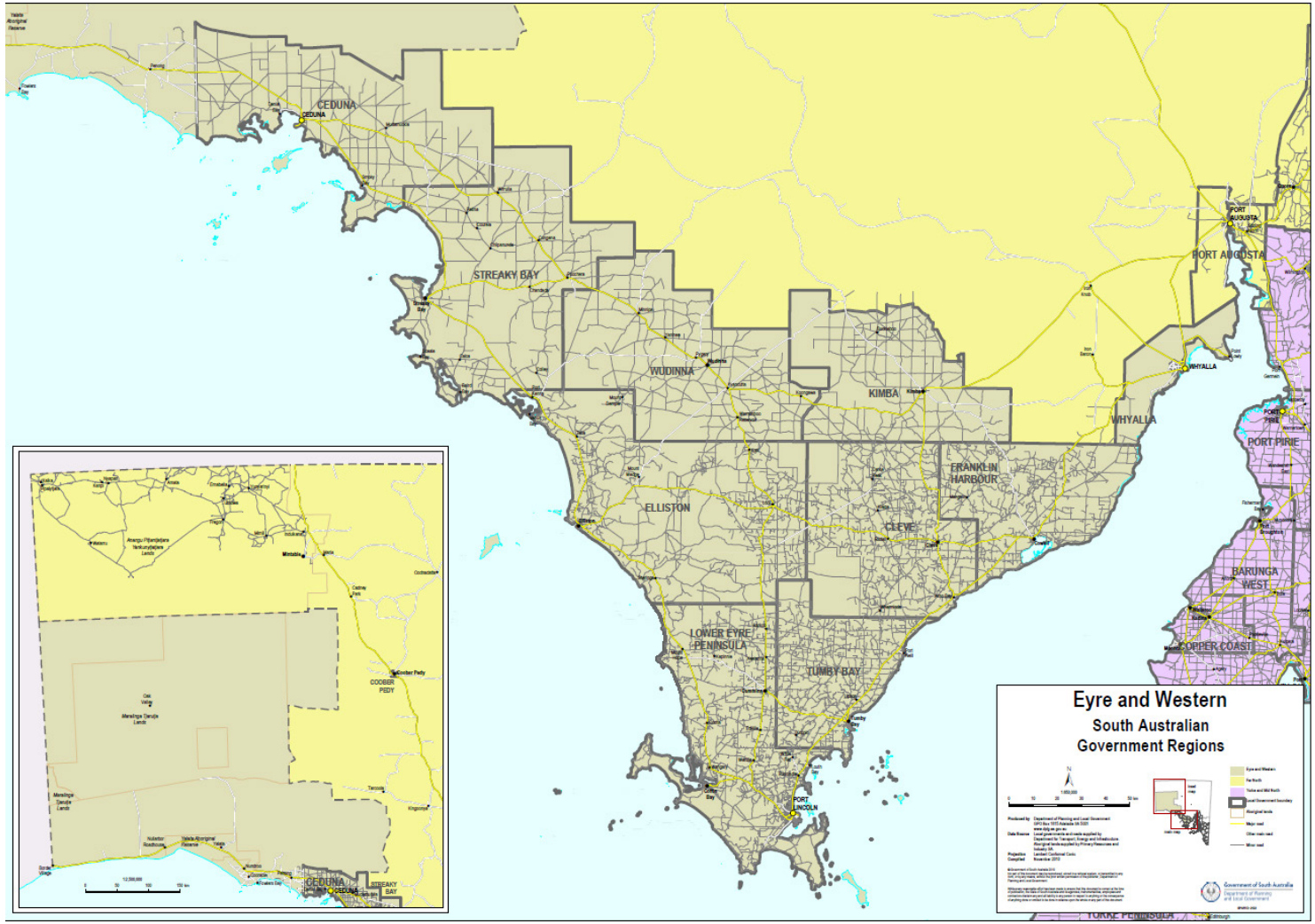
- District Council of Wudinna
- District Council of Kimba
- District Council of Cleve
- District Council of Tumby Bay
- District Council of Elliston.

Economic Impacts at the state and national level were estimated using the TERM CGE model. The EconSearch approach to the CGE modelling is to use the Victoria University Centre of Policy Studies' (COPS') "TERM" comparative statics CGE model as licenced to EconSearch. This model version is well-known to State and Commonwealth Governments and widely accepted for modelling of state and national economies. See Horridge, Madden and Wittwer (2004) for a detailed description of the TERM model.

Even though TERM is computationally efficient, it would be slow to solve if a full 144-sector, 57- or 206-region database were used. In practice, sectors and/or regions must be aggregated. The TERM database programs facilitate this aggregation. The choice of sectors or regions to aggregate is application-specific and for this application there are three regions, Eyre and Western, Rest of SA, and Rest of Australia and 19 sectors (closely aligned to the one digit ANZSIC definition).

[3] Called an 'exogenous shock' in model terminology.

Figure 2-1 The Eyre and Western region



2.3 Data and Assumptions

A detailed cost estimate of the project was provided by Iron Road Limited for the purpose of the economic impact assessment of the construction and operation of the project. The operating phase will be characterised by the additional expenditure on mine, rail and port operation.

Under the construction phase detailed expenditure data was broken down into materials and services and labour for each of the years in the construction period. Assumptions were also provided on where the expenditures are likely to occur, e.g. in each of the 5 LGAs, elsewhere in the broader Eyre and Western region, elsewhere in SA, elsewhere in Australia and outside Australia. Similar data were provided for the number of jobs that were estimated to occur in the construction phase.

Under the operating phase expenditure and employment data were provided using the same method outlined above. Additional data were provided on mine revenue per annum over the life of the project.

The data presented in the social impact assessment (Rose Bowey and Associates 2014) has been used to inform the profile of economic activity in Section 3 and the economic impact assessment results in Section 4.

The social impact assessment states that “because of the number, skill sets and relatively short duration of construction activities, most of the workforce required during construction is expected to be fly-in fly-out (FIFO) or drive-in drive-out (DIDO) workers, who would be accommodated in construction villages located on the proposed mine site near Warramboo, and the port site at Cape Hardy.” As a result, it was assumed that for the construction phase 100 per cent of the jobs would be taken up by long distance commute workers.

During the operating phase, as stated in the social impact assessment, it is anticipated that the majority of the workforce would live locally but in order to meet the large workforce requirements some long distance commute workers will be required, at least in the short term. From this information and data sourced from Iron Road it was assumed that 40 per cent of the workforce would live locally and 60 per cent would consist of long distance commute workers.

3. PROFILE OF ECONOMIC ACTIVITY

In order to set the context for the estimated economic contribution and impact of the project (which follows in Section 4), a brief profile of economic activity in the five LGAs and the broader Eyre and Western region in 2012/13 is provided below. These data were derived from the RISE model databases utilised by the consultants for this project.

A summary of the total jobs across the regions is provided in Table 3-1 and of total value added in Table 3-2.

Table 3-1 Top five employing industries by region, 2012/13 (share of region total)

	Wudinna	Kimba	Cleve	Tumby Bay	Elliston	Eyre and Western
No jobs[a]	711	604	941	971	559	25,056
Top	Ag, forestry & fishing (41%)	Ag, forestry & fishing (48%)	Ag, forestry & fishing (42%)	Ag, forestry & fishing (41%)	Ag, forestry & fishing (64%)	Ag, forestry & fishing (15%)
Second	Health care & social assist (11%)	Retail trade (9%)	Transport, postal and warehousing (11%)	Construction (12%)	Accomm. & food serv. (9%)	Manufacturing (12%)
Third	Education & training (9%)	Health care & social assist (8%)	Health care & social assist (10%)	Health care & social assist (9%)	Health care & social assist (8%)	Health care & social assist (12%)
Fourth	Retail trade (6%)	Education & training (6%)	Retail trade (8%)	Education & training (8%)	Education & training (7%)	Retail trade (9%)
Fifth	Wholesale trade (6%)	Accomm. & food serv. (6%)	Other Services (6%)	Retail trade (6%)	Retail trade (7%)	Construction (8%)

[a] Employment measured in terms of total fte jobs .

Table 3-2 Top five industries contributing to total value added by region, 2012/13

	Wudinna	Kimba	Cleve	Tumby Bay	Elliston	Eyre and Western
TVA ($m)	**88**	**91**	**118**	**145**	**80**	**3,262**
Top	Ag, forestry & fishing (53%)	Ag, forestry & fishing (57%)	Ag, forestry & fishing (50%)	Ag, forestry & fishing (42%)	Ag, forestry & fishing (77%)	Ag, forestry & fishing (17%)
Second	Health care & social assist (6%)	Finance and insurance (8%)	Transport, postal and warehousing (9%)	Mining (20%)	Accomm. & food serv. (5%)	Mining (16%)
Third	Education & training (5%)	Construction (5%)	Health care & social assist (7%)	Construction (7%)	Health care & social assist (5%)	Manufacturing (9%)
Fourth	Mining (5%)	Health care & social assist (5%)	Retail trade (5%)	Ownership of dwellings (6%)	Retail trade (4%)	Construction (7%)
Fifth	Wholesale trade (5%)	Wholesale trade (4%)	Ownership of dwellings (5%)	Health care & social assist (5%)	Ownership of dwellings (4%)	Health care & social assist (7%)

3.1 Wudinna

There was an estimated 711 fte jobs (approximately 636 total jobs) in Wudinna in 2012/13. The top five contributors to fte jobs in the region were:

- Agriculture, forestry and fishing (41 per cent)
- Health care and social assistance (11 per cent)
- Education and training (9 per cent)
- Retail trade (6 per cent)
- Wholesale trade (6 per cent).

Total value added in Wudinna in 2012/13 was estimated to be approximately $88m. The contribution of an individual industry to total value added is calculated as the sum of household income, gross operating surplus and gross mixed income. Economic activity in Wudinna is dominated by the agriculture, forestry and fishing industry. The top five contributors to total value added were:

- Agriculture, forestry and fishing (53 per cent)
- Health care and social assistance (6 per cent)
- Education and training (5 per cent)

- Mining (5 per cent)
- Wholesale trade (5 per cent)

Gross regional product (GRP) is a measure of the net contribution of an activity to the regional economy. GRP is measured as value of output less the cost of goods and services (including imports) used in producing the output. In other words, GRP is total value added plus net taxes (i.e. taxes less subsidies on products and production) paid by households and other components of final demand. GRP in Wudinna in 2012/13 was estimated to be $93m comprised of $88m in total value added and $5m in net taxes.

3.2 Kimba

There was an estimated 604 fte jobs (approximately 567 total jobs) in Kimba in 2012/13. The top five contributors to fte jobs in the region were:

- Agriculture, forestry and fishing (48 per cent)
- Retail trade (9 per cent)
- Health care and social assistance (8 per cent)
- Education and training (6 per cent)
- Accommodation and food services (6 per cent).

Total value added in Kimba in 2012/13 was estimated to be approximately $91m. Economic activity in Kimba is dominated by the agriculture, forestry and fishing industry. The top five contributors to total value added were:

- Agriculture, forestry and fishing (57 per cent)
- Finance and insurance (8 per cent)
- Construction (5 per cent)
- Health care and social assistance (5 per cent)
- Wholesale trade (4 per cent).

GRP in Kimba in 2012/13 was estimated to be $96m comprised of $91m in total value added and $5m in net taxes.

3.3 Cleve

There was an estimated 941 fte jobs (approximately 906 total jobs) in Cleve in 2012/13. The top five contributors to fte jobs in the region were:

- Agriculture, forestry and fishing (42 per cent)
- Transport, postal and warehousing (11 per cent)
- Health care and social assistance (10 per cent)

- Retail trade (8 per cent)
- Other services (6 per cent).

Total value added in Cleve in 2012/13 was estimated to be approximately $118m. Economic activity in Cleve is dominated by the agriculture, forestry and fishing and transport, postal and warehousing industries. The top five contributors to total value added were:

- Agriculture, forestry and fishing (50 per cent)
- Transport, postal and warehousing (9 per cent)
- Health care and social assistance (7 per cent)
- Retail trade (5 per cent)
- Ownership of dwellings (5 per cent).

GRP in Cleve in 2012/13 was estimated to be $125m comprised of $118m in total value added and $7m in net taxes.

3.4 Tumby Bay

There was an estimated 971 fte jobs (approximately 958 total jobs) in Tumby Bay in 2012/13. The top five contributors to fte jobs in the region were:

- Agriculture, forestry and fishing (41 per cent)
- Construction (12 per cent)
- Health care and social assistance (9 per cent)
- Education and training (8 per cent)
- Retail trade (6 per cent).

Total value added in Tumby Bay in 2012/13 was estimated to be approximately $145m. Economic activity in Tumby Bay is dominated by the agriculture, forestry and fishing and mining industries. The top five contributors to total value added were:

- Agriculture, forestry and fishing (42 per cent)
- Mining (20 per cent)
- Construction (7 per cent)
- Ownership of dwellings (6 per cent)
- Health care and social assistance (5 per cent).

GRP in Tumby Bay in 2012/13 was estimated to be $154m comprised of $145m in total value added and $9m in net taxes.

3.5 Elliston

There was an estimated 559 fte jobs (approximately 528 total jobs) in Elliston in 2012/13. The top five contributors to fte jobs in the region were:

- Agriculture, forestry and fishing (64 per cent)
- Accommodation and food services (9 per cent)
- Health care and social assistance (8 per cent)
- Education and training (7 per cent)
- Retail trade (7 per cent).

Total value added in Elliston in 2012/13 was estimated to be approximately $80m. Economic activity in Elliston is dominated by the agriculture, forestry and fishing industry. The top five contributors to total value added were:

- Agriculture, forestry and fishing (77 per cent)
- Accommodation and food services (5 per cent)
- Health care and social assistance (5 per cent)
- Retail trade (4 per cent)
- Ownership of dwellings (4 per cent).

GRP in Elliston in 2012/13 was estimated to be $85m comprised of $80m in total value added and $5m in net taxes.

3.6 Eyre and Western Region

There was an estimated 25,056 fte jobs (approximately 24,633 total jobs) in the Eyre and Western region in 2012/13. The top five contributors to fte jobs in the region were:

- Agriculture, forestry and fishing (15 per cent)
- Manufacturing (12 per cent)
- Health care and social assistance (12 per cent)
- Retail trade (9 per cent)
- Construction (8 per cent).

Total value added in the Eyre and Western region in 2012/13 was estimated to be almost $3.3b. Economic activity in the Eyre and Western region is dominated by the agriculture, forestry and fishing, mining and manufacturing industries along with a significant housing stock with associated service industries (health, retail trade and education). The top five contributors to total value added were:

- Agriculture, forestry and fishing (17 per cent)

- Mining (16 per cent)
- Manufacturing (9 per cent)
- Construction (7 per cent)
- Health care and social assistance (7 per cent)

GRP in the Eyre and Western region in 2012/13 was estimated to be $3.5b comprised of $3.3b in total value added and $0.2b in net taxes.

4. ECONOMIC IMPACT OF THE CEIP

The CEIP will involve a capital investment of almost $4.8 billion in total during the construction phase. Construction is anticipated to commence in early 2015 and be completed by mid-2018. The mine is scheduled to operate for a further 25 years, until 2042.

A detailed cost estimate of the project was provided by Iron Road Limited for the purpose of the economic impact analysis of the construction of the project. The operating phase will be characterised by the additional expenditure on mine, rail and port operation, which will begin in the second half of 2018, at around $1b per annum (provided by Iron Road Limited).

The data were used to compile a series of economic impacts in terms of GRP and employment for the local regions and the broader region using the 2012/13 RISE models. Economic impacts at the state and national levels were estimated using CGE models. The estimated impacts are reported in the following sections: construction phase impacts in Section 4.1 and the operational impacts in Section 4.2, with a summary of both phases over the life of the project in Section 4.3.

4.1 Construction Phase

The direct construction expenditures are detailed in Table 4-1 for local government area, broader region, state and national levels. From data provided by Iron Road Limited, it was estimated that, during the construction period, 11 per cent of the capital investment for the construction of the project will occur in Wudinna, less than 1 per cent in Kimba, 4 per cent in Cleve, 5 per cent in Tumby Bay, less than 1 per cent in Elliston, 4 per cent in the rest of the Eyre and Western region, 32 per cent in the rest of SA, 21 per cent in the rest of Australia and the remainder (22 per cent) overseas.

Table 4-1 CEIP direct construction expenditure ($m)

	Yr 1 2014/15	Yr 2 2015/16	Yr 3 2016/17	Yr 4 2017/18	Total [a]	Yrs 1-4 Average
Wudinna	18	113	234	151	516	129
Kimba	2	6	6	4	18	4
Cleve	11	51	67	43	173	43
Tumby Bay	7	49	109	70	235	59
Elliston	1	3	4	3	11	3
Rest of Eyre and Western	1	33	93	66	193	48
Rest of South Australia	23	278	727	517	1,544	386
Rest of Australia	15	184	480	342	1,020	255
Overseas	12	195	495	366	1,068	267
Total	**90**	**911**	**2,214**	**1,564**	**4,779**	**1,195**

[a] This is calculated as the undiscounted sum of expenditures over years 1-4 in current (2014) dollars.

Source: Derived from information supplied by Iron Road Limited.

At the regional level the indirect (flow-on) impacts were calculated using the RISE models adapted for this project. The models are used to measure the economic effects in other sectors of the economy generated by these direct activities, that is, the multiplier effects. In addition to the assumptions embodied in the RISE model itself, it was necessary to make a number of other general assumptions in estimating the economic impacts:

- The impacts were measured using models that represent the structure of the regional economies for the year in which the most recent data are available (2012/13). However, over time there are likely to be improvements in primary factor productivity in these economies. To allow for the improvements an across-the-board (all sectors) labour productivity improvement rates of 1 per cent per annum for subsequent years of the construction have been incorporated into the modelling.
- When new jobs are created, it should be determined where the people come from to fill those jobs people. In some cases the jobs will be taken by previously unemployed locals or by someone who is currently employed locally but whose own job is taken by a previously unemployed local. In both cases the impact of the newly created job and associated income is partially offset by the fact that someone who is previously receiving unemployment benefits, for example, is no longer doing so. To calculate this effect requires estimates of the parameter *rho* (see Appendix 1), the proportion of new jobs that are likely to be filled by previously unemployed locals. For the construction phase, it was estimated to be 0 per cent for the local regions and broader region (Eyre and Western region).

4.1.1 Wudinna

GRP is a measure of the net contribution of an activity or industry to the regional economy. It represents payments to the primary inputs of production (labour, capital and land) and is a regional/state level equivalent of gross domestic product. Estimates for the construction period for Wudinna are provided in Table 4-2.

Table 4-2 Economic impact of the CEIP, construction phase, Wudinna

	Yr 1 2014/15	Yr 2 2015/16	Yr 3 2016/17	Yr 4 2017/18	Yrs 1-4 Average
Wudinna					
Gross Regional Product ($m)					
Direct	1	23	56	36	29
Flow-on	0	8	23	15	12
Total	**1**	**31**	**79**	**51**	**41**
Employment (fte)					
Direct	10	381	1,088	725	551
Flow-on	3	98	268	173	135
Total	**13**	**478**	**1,356**	**898**	**686**

Source: EconSearch analysis

During the construction phase, the direct and flow-on GRP in the Wudinna region is expected to be around $1m in year 1, $31m in year 2, $79m in year 3 and $51m in year 4. In 2012/13 the

GRP in the Wudinna region was around $93 million. On this basis, the projected GRP total impact would boost the region's total by around 1 per cent in year 1, 34 per cent in year 2, 87 per cent in year 3 and 57 per cent in year 4.

Employment is an important indicator of both regional economic activity and the welfare of regional households. The estimates presented in Table 4-2 show that total (direct plus flow-on) employment in the Wudinna region is expected to increase to 13 fte jobs in year 1, 478 fte jobs in year 2, 1,356 fte jobs in year 3 and 898 fte jobs in year 4. The direct plus flow-on employment in year 1 is 2 per cent of the estimated employment (fte) for the Wudinna region for 2012/13 (711 fte jobs), 72 per cent in year 2, 203 per cent in year 3 and 134 per cent in year 4.

As noted in Section 2.3, for the construction phase 100 per cent of the jobs would be taken up by long distance commute workers. That is, workers who do not live in the region but journey to the region to work. However, flow-on employment represents job opportunities for local businesses servicing the mine and infrastructure corridor. The impact on the local job market when only the increase in jobs held by residents is taken into account is much smaller, although still significant. In year 1 this is just 0.4 per cent of the estimated employment (fte) for the Wudinna region for 2012/13, 15 per cent in year 2, 40 per cent in year 3 and 26 per cent in year 4.

It is also worth noting that direct GRP consists predominantly of wages and salaries for the direct employment (the long distance commute workers). As such, only a small about of these wages are likely to be spent in the region. However, there will be significant local expenditure on food and accommodation by (or on behalf of) these workers and this is included in the flow-on impacts.

4.1.2 Kimba

Economic impact estimates for the construction period for Kimba are provided in Table 4-3. During the construction phase, the direct and flow-on GRP in the Kimba region is expected to be less than $1m in year 1 and $1m in years 2 to 4. In 2012/13 the GRP in the Kimba region was approximately $96 million. On this basis, the projected GRP total impact would boost the region's total by less than 1 per cent in year 1, 1 per cent in year 2, 2 per cent in year 3 and 1 per cent in year 4.

The employment estimates presented in Table 4-3 show that total (direct plus flow-on) employment in the Kimba region is expected to increase by 1 fte job in year 1, 6 fte jobs in year 2, 14 fte jobs in year 3 and 8 fte jobs in year 4. The direct plus flow-on employment is less than 1 per cent of the estimated employment (fte) for the Kimba region for 2012/13 (604 fte) in year 1, 1 per cent in year 2, 3 per cent in year 3 and 2 per cent in year 4.

There is no direct employment in Kimba and, therefore, no direct GRP. The flow-on employment and GRP is a result of the demand for materials and services from the mine and infrastructure corridor.

Table 4-3 Economic impact of the CEIP, construction phase, Kimba

	Yr 1 2014/15	Yr 2 2015/16	Yr 3 2016/17	Yr 4 2017/18	Yrs 1-4 Average
Kimba					
Gross Regional Product ($m)					
Direct	0	0	0	0	0
Flow-on	0	1	1	1	1
Total	**0**	**1**	**1**	**1**	**1**
Employment (fte)					
Direct	0	0	0	0	0
Flow-on	1	6	14	8	7
Total	**1**	**6**	**14**	**8**	**7**

Source: EconSearch analysis

4.1.3 Cleve

Economic impact estimates for the construction period for Cleve are provided in Table 4-4. During the construction phase, the direct and flow-on GRP in the Cleve region is expected to be $1m in year 1, $12m in year 2, $30m in year 3 and $19m in year 4. In 2012/13 the GRP in the Cleve region was approximately $125m. On this basis, the projected GRP total impact would boost the region's total by 1 per cent in year 1, 10 per cent in year 2, 25 per cent in year 3 and 16 per cent in year 4.

The employment estimates presented in Table 4-4 show that total (direct plus flow-on) employment in the Cleve region is expected to increase by 4 fte jobs in year 1, 140 fte jobs in year 2, 397 fte jobs in year 3 and 263 fte jobs in year 4. The direct plus flow-on employment in year 1 is less than 1 per cent of the estimated employment (fte) for the Cleve region for 2012/13 (941 fte), 16 per cent in year 2, 45 per cent in year 3 and 30 per cent in year 4.

As noted earlier, for the construction phase 100 per cent of the direct jobs would be taken up by long distance commute workers whereas flow-on employment represents job opportunities for local businesses servicing the mine and infrastructure corridor. The impact on the local job market when only the increase in jobs held by residents is taken into account is less than 1 per cent in year 1, 3 per cent in year 2, 8 per cent in year 3 and 5 per cent in year 4.

Table 4-4 Economic impact of the CEIP, construction phase, Cleve

	Yr 1 2014/15	Yr 2 2015/16	Yr 3 2016/17	Yr 4 2017/18	Yrs 1-4 Average
Cleve					
Gross Regional Product ($m)					
Direct	1	9	23	14	12
Flow-on	0	3	7	5	4
Total	**1**	**12**	**30**	**19**	**15**
Employment (fte)					
Direct	3	113	323	216	164
Flow-on	1	26	74	48	37
Total	**4**	**140**	**397**	**263**	**201**

Source: EconSearch analysis

4.1.4 Tumby Bay

Economic impact estimates for the construction period for Tumby Bay are provided in Table 4-5. During the construction phase, the direct and flow-on GRP in the Tumby Bay region is expected to be around $1m in year 1, $16m in year 2, $43m in year 3 and $28m in year 4. In 2012/13 the GRP in the Tumby Bay region was approximately $154 million. On this basis, the projected GRP total impact would boost the region's total by less than 1 per cent in year 1, 10 per cent in year 2, 29 per cent in year 3 and 18 per cent in year 4.

Table 4-5 Economic impact of the CEIP, construction phase, Tumby Bay

	Yr 1 2014/15	Yr 2 2015/16	Yr 3 2016/17	Yr 4 2017/18	Yrs 1-4 Average
Tumby Bay					
Gross Regional Product ($m)					
Direct	1	12	32	20	16
Flow-on	0	4	11	8	6
Total	**1**	**16**	**43**	**28**	**22**
Employment (fte)					
Direct	5	188	539	359	273
Flow-on	1	40	113	74	57
Total	**6**	**228**	**651**	**433**	**330**

Source: EconSearch analysis

The employment estimates presented in Table 4-5 show that total (direct plus flow-on) employment in the Tumby Bay region is expected to increase by 6 fte jobs in year 1, 228 fte jobs in year 2, 651 fte jobs in year 3 and 433 fte jobs in year 4. The direct plus flow-on employment in year is 1 per cent of the estimated employment (fte) for the Tumby Bay region for 2012/13 (971 fte), 24 per cent in year 2, 68 per cent in year 3 and 46 per cent in year 4.

The impact on the local job market when only the increase in jobs held by residents is taken into account (the flow-on jobs) is less than 1 per cent in year 1, 4 per cent in year 2, 12 per cent in year 3 and 8 per cent in year 4.

4.1.5 Elliston

Economic impact estimates for the construction period for Elliston are provided in Table 4-6. During the construction phase, the direct and flow-on GRP in the Elliston region is expected to be less than $1 million in all years of construction. In 2012/13 the GRP in the Elliston region was approximately $85 million. On this basis, the projected GRP total impact would boost the region's total by less than 1 per cent in years 1 to 4.

Table 4-6 Economic impact of the CEIP, construction phase, Elliston

	Yr 1 2014/15	Yr 2 2015/16	Yr 3 2016/17	Yr 4 2017/18	Yrs 1-4 Average
Elliston					
Gross Regional Product ($m)					
Direct	0	0	0	0	0
Flow-on	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
Employment (fte)					
Direct	0	0	0	0	0
Flow-on	0	1	1	1	1
Total	**0**	**1**	**1**	**1**	**1**

Source: EconSearch analysis

The employment estimates presented in Table 4-6 show that total (direct plus flow-on) employment in the Elliston region is expected to increase by 1 fte job in years 2 to 4. The direct plus flow-on employment in years 1 to 4 is less than 1 per cent of the estimated employment (fte) for the Elliston region for 2012/13 (559 fte).

4.1.6 Rest of Eyre and Western Region

Economic impact estimates for the construction period for the rest of the Eyre and Western region are provided in Table 4-7. During the construction phase, the direct and flow-on GRP in the rest of the Eyre and western region is expected to be around $1m in year 1, $23m in year 2, $64m in year 3 and $45m in year 4. In 2012/13 the GRP in the Eyre and Western region was almost $3.5 billion. On this basis, the projected GRP total impact would boost the region's total by less than 1 per cent in years 1 and 2, 2 per cent in year 3 and 1 per cent in year 4.

Table 4-7 Economic impact of the CEIP, construction phase, rest of Eyre and Western region

Rest of Eyre and Western Region					
Gross Regional Product ($m)					
Direct	0	0	0	0	0
Flow-on	1	23	64	45	33
Total	**1**	**23**	**64**	**45**	**33**
Employment (fte)					
Direct	0	0	0	0	0
Flow-on	7	163	448	315	233
Total	**7**	**163**	**448**	**315**	**233**

Source: EconSearch analysis

The employment estimates presented in Table 4-7 show that total (direct plus flow-on) employment in the rest of the Eyre and Western region is expected to increase by 7 fte jobs in year 1, 163 fte jobs in year 2, 448 fte jobs in year 3 and 315 fte jobs in year 4. The direct plus flow-on employment in year 1 is less than 1 per cent of the estimated employment (fte) for the Eyre and Western region for 2012/13 (25,056 fte), 1 per cent in year 2, 2 per cent in year 3 and 1 per cent in year 4.

4.1.7 South Australia and Australia

The economic impact of the construction phase of the project on the Eyre and Western region, South Australia and Australia is reported in Table 4-8.

For SA as a whole, expenditure during the construction phase of the project is expected to generate GSP of around $27 million in year 1, peaking at almost $980 million in year 3 and averaging $518 million per annum over years 1-4. In the context of SA's GSP in 2012/13 ($94.2 billion) (ABS 2013), the estimated GSP average impact in years 1-4 would represent an increase of 0.6 per cent over that period.

Direct and indirect employment in SA as a whole is expected to be 113 fte in year 1, peaking at around 5,800 fte in year 3 and averaging more than 3,000 fte jobs over the four year period (Table 4-8). This would represent a 0.8 per cent increase in employment over 2012/13 levels (704,981 fte) (ABS 2014) in the peak year (year 3) and an average increase of 0.4 per cent over the four years.

For Australia, the project is expected to generate GDP of around $66 million in year 1, peaking at $2.2 billion in year 3 and averaging almost $1.2 billion per annum over years 1-4 (Table 4-8). In the context of Australia's GDP in 2012/13 ($1,521.5 billion) (ABS 2013), the estimated GDP average impact in years 1-4 would represent an increase of 0.08 per cent over that period.

Table 4-8 Economic impact of the CEIP, construction phase, Eyre and Western region, South Australia and Australia

	Yr 1 2014/15	Yr 2 2015/16	Yr 3 2016/17	Yr 4 2017/18	Yrs 1-4 Average
Total Eyre and Western Region					
Gross State Product ($m)	4	82	217	145	112
Employment (fte)	31	1,016	2,867	1,919	1,458
Rest of South Australia					
Gross State Product ($m)	24	285	762	555	406
Employment (fte)	82	1,127	3,002	2,064	1,569
Total South Australia					
Gross State Product ($m)	27	367	979	699	518
Employment (fte)	113	2,143	5,869	3,983	3,027
Rest of Australia					
Gross Domestic Product ($m)	39	458	1,223	891	653
Employment (fte)	132	1,765	4,688	3,219	2,451
Total Australia					
Gross Domestic Product ($m)	66	825	2,202	1,591	1,171
Employment (fte)	245	3,909	10,558	7,202	5,478

Source: EconSearch analysis

Direct and indirect employment in Australia as a whole is expected to be almost 250 fte in year 1, peaking at more than 10,000 fte in year 3 and averaging 5,478 fte jobs over the four year period (Table 4-8). This would represent an increase of 0.11 per cent over national employment over 2012/13 levels (9,718,000 fte) in the peak year (year 3) and an average increase of 0.06 per cent over the four years.

4.2 Operating Phase

As noted earlier, the construction phase of the CEIP is expected to be completed by mid-2018. The economic impact analysis of the operational phase of the project was conducted by using the operational expenditure, wages and salaries, revenue, gross operating surplus (GOS), royalties and employment detailed in Table 4-9.

Over the operation phase, there will be an average of 794 fte jobs created directly by the operation of the CEIP with associated wages and salaries of $82 million per annum (Table 4-9). Average revenue over the operation phase will be almost $3.5b and gross operating surplus (GOS) will average $2.3b.

The operating phase will be characterised by the additional expenditure on mine, rail and port operation of $1.1b, which will begin in the second half of 2018. During the operation phase, 13 per cent of the operating expenditure will occur in Wudinna, less than 1 per cent in Kimba, 1 per cent in Cleve, 1 per cent in Tumby Bay, less than 1 per cent in Elliston, 2 per cent in the rest of the Eyre and Western region, 40 per cent in the rest of SA, 9 per cent in the rest of Australia and the remainder (33 per cent) overseas.

Table 4-9 CEIP direct operational expenditure, revenue, GOS and employment [a]

	Yr 5 18/19	Yr 6 19/20	Yr 7 20/21	Yr 8 21/22	Yr 9 22/23	Yr 10 23/24	Yr 11 24/25	Yr 12 25/26	Yr 13 26/27	Yr 14 27/28	Yr 15 28/29	Yr 16 29/30	Yr 17 30/31	Yr 18 31/32	Yr 19 32/33	Yr 20 33/34	Yr 21 34/35	Yr 22 35/36	Yr 23 36/37	Yr 24 37/38	Yr 25 38/39	Yr 26 39/40	Yr 27 40/41	Yr 28 41/42	Yr 29 42/43	Avg
Revenue ($m)	1,334	2,186	2,524	2,776	2,847	2,918	2,989	3,064	3,141	3,221	3,301	3,382	3,467	3,553	3,643	3,733	3,827	3,923	4,021	4,122	4,225	4,331	4,439	4,667	4,841	3,459
Wages & Salaries ($m)	38	77	74	79	79	81	80	78	69	76	82	83	87	80	88	81	82	91	91	91	91	91	91	91	91	82
Gross Operating Surplus ($m)	852	1,112	1,465	1,672	1,743	1,795	1,877	1,964	2,117	2,136	2,169	2,241	2,288	2,436	2,465	2,610	2,700	2,717	2,815	2,916	3,019	3,125	3,233	3,462	3,635	2,343
Employment (fte)	408	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	794
Expenditure ($m)																										
Wudinna	69	139	139	144	144	146	145	144	134	142	147	149	153	146	154	147	147	157	157	157	157	157	157	157	157	146
Kimba	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Cleve	4	8	8	8	8	9	9	8	8	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Tumby Bay	7	14	14	14	14	14	14	14	13	14	14	15	15	14	15	14	14	15	15	15	15	15	15	15	15	14
Elliston	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Eyre and Western	11	25	25	26	26	26	26	26	24	26	27	27	28	26	28	26	26	28	28	28	28	28	28	28	28	26
Elsewhere in SA	185	428	422	441	441	447	444	440	413	434	450	454	467	445	463	444	445	472	472	472	472	472	472	472	472	442
Elsewhere in Australia	42	98	97	101	101	103	102	101	94	100	104	105	109	103	109	104	104	112	112	112	112	112	112	112	112	103
Outside SA	162	357	348	363	364	371	367	362	333	357	374	378	393	369	395	374	375	405	406	405	405	405	405	405	405	371
Total Expenditure	**481**	**1,074**	**1,059**	**1,103**	**1,104**	**1,122**	**1,112**	**1,100**	**1,025**	**1,085**	**1,131**	**1,142**	**1,179**	**1,118**	**1,178**	**1,124**	**1,127**	**1,206**	**1,206**	**1,206**	**1,206**	**1,206**	**1,206**	**1,206**	**1,206**	**1,116**

[a] No production or operational expenditure during the construction phase (years 1 to 4).

Source: Derived from information supplied by Iron Road Limited.

As noted in Section 3.1 the regional indirect (flow-on) impacts (local government areas and the Eyre and Western region) were estimated using the RISE models adapted for this project. In addition to the assumptions embodied in the RISE model itself, it was necessary to make a number of other general assumptions. These assumptions are detailed in Section 4.1. However, the proportion of new jobs that are likely to be filled by previously unemployed locals was estimated to be 40 per cent for the local regions and broader region (Eyre and Western region).

4.2.1 Wudinna

Economic impact estimates for the operation period for Wudinna are provided in Table 4-10. During the operation phase, the direct and flow-on GRP in the Wudinna region is expected to be on average $2.4 billion per annum. In 2012/13 the GRP in the Wudinna region was approximately $93 million. On this basis, the projected GRP total impact would be a significant boost the region's total. Although the GRP estimate comprises significant household income, the vast majority is gross operating surplus that is expected to be generated by the project, which will be impacted by production levels, operating costs and commodity price. Although this gross operating surplus is attributed to the Wudinna region, as that is where the economic activity takes place, it likely that much of it will leave the region as it is distributed to the owners of the mine and to government in the form of taxes and royalties. However, for the Wudinna economy and the community living in the region, the more tangible consideration is the household income component of GRP (average value of $33m per annum) and the flow-on GRP (average value of $26m per annum) (Table 4-11). These two components together will add, on average, $59m per annum to the local economy, a 63 per cent increase in the size of the Wudinna economy (as estimated for 2012/13).

The employment estimates presented in Table 4-10 show that direct employment in the Wudinna region is expected to average 654 fte jobs per annum over the operational life of the project. This is comprised of 392 fte jobs of fly-in fly-out (FIFO) workers and 261 fte jobs where the project workers would be living locally. The flow-on jobs (for local suppliers and service industries) are estimated to average 196 fte per annum. These jobs, together with the direct jobs held by workers living locally, sum to 457 fte jobs per annum. The direct (residents) plus flow-on employment is 64 per cent of the estimated employment (fte) for the Wudinna region for 2012/13 (711 fte). If the FIFO workforce of around 400 fte is included, the project will more than double current employment numbers in the Wudinna region. Clearly the project will be transformative for the local economy.

The flow-on employment estimates in Table 4-10 are categorised as either *production-induced* (average of 142 fte per annum) or *consumption-induced* (average of 54 fte jobs per annum). As the names suggest, production-induced jobs are those stimulated by the first round of expenditures on material and service suppliers to the mine and second and subsequent rounds of business expenditure. The consumption-induced jobs are those created from the local spending of wages by mine workers, by employees of material and service suppliers and by the spending of wages in the second and subsequent round effects.

Table 4-10 Economic Impact of the CEIP, operating phase, Wudinna [a]

	Yr 5 18/19	Yr 6 19/20	Yr 7 20/21	Yr 8 21/22	Yr 9 22/23	Yr 10 23/24	Yr 11 24/25	Yr 12 25/26	Yr 13 26/27	Yr 14 27/28	Yr 15 28/29	Yr 16 29/30	Yr 17 30/31	Yr 18 31/32	Yr 19 32/33	Yr 20 33/34	Yr 21 34/35	Yr 22 35/36	Yr 23 36/37	Yr 24 37/38	Yr 25 38/39	Yr 26 39/40	Yr 27 40/41	Yr 28 41/42	Yr 29 42/43	Avg
Wudinna DC																										
Gross Regional Product ($m)																										
Direct	867	1,143	1,495	1,704	1,775	1,828	1,909	1,996	2,145	2,167	2,202	2,274	2,323	2,468	2,500	2,642	2,733	2,754	2,852	2,953	3,056	3,162	3,270	3,498	3,672	2,376
Flow-on	12	23	25	26	26	26	26	26	24	25	26	27	27	26	27	26	26	28	28	28	28	28	28	28	28	26
Total	**879**	**1,166**	**1,520**	**1,730**	**1,800**	**1,854**	**1,935**	**2,021**	**2,168**	**2,192**	**2,229**	**2,301**	**2,351**	**2,494**	**2,528**	**2,669**	**2,759**	**2,782**	**2,880**	**2,981**	**3,084**	**3,190**	**3,298**	**3,527**	**3,700**	**2,401**
Employment (fte)																										
Direct:																										
FIFO	189	400	401	401	401	401	401	401	401	401	401	401	401	401	401	401	401	401	401	401	401	401	401	401	401	392
Reside in Wudinna DC	126	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	261
Total Direct	*314*	*667*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*668*	*654*
Flow-on:																										
Production-induced	77	146	156	157	156	156	154	151	143	146	147	147	149	143	146	141	139	144	143	142	137	135	134	132	131	142
Consumption-induced	28	56	54	57	56	57	56	54	48	52	54	55	57	52	56	51	51	56	56	55	60	59	58	58	57	54
Total Flow-on	*105*	*202*	*210*	*214*	*212*	*213*	*210*	*206*	*191*	*198*	*202*	*202*	*206*	*194*	*202*	*192*	*190*	*200*	*199*	*197*	*196*	*194*	*192*	*190*	*188*	*196*
Total	**420**	**869**	**878**	**882**	**880**	**881**	**878**	**873**	**859**	**866**	**870**	**870**	**873**	**862**	**870**	**860**	**858**	**868**	**866**	**864**	**864**	**862**	**860**	**858**	**856**	**850**

[a] No production or operational expenditure during the construction phase (years 1 to 4).

Source: EconSearch analysis

Table 4-11 Economic Impact of the CEIP **excluding direct profits**, operating phase, Wudinna [a]

	Yr 5 18/19	Yr 6 19/20	Yr 7 20/21	Yr 8 21/22	Yr 9 22/23	Yr 10 23/24	Yr 11 24/25	Yr 12 25/26	Yr 13 26/27	Yr 14 27/28	Yr 15 28/29	Yr 16 29/30	Yr 17 30/31	Yr 18 31/32	Yr 19 32/33	Yr 20 33/34	Yr 21 34/35	Yr 22 35/36	Yr 23 36/37	Yr 24 37/38	Yr 25 38/39	Yr 26 39/40	Yr 27 40/41	Yr 28 41/42	Yr 29 42/43	Avg
Gross Regional Product ($m)																										
Direct	15	31	30	32	32	33	32	32	28	31	33	33	35	32	36	33	33	37	37	37	37	37	37	37	37	33
Flow-on	12	23	25	26	26	26	26	26	24	25	26	27	27	26	27	26	26	28	28	28	28	28	28	28	28	26
Total	**27**	**55**	**55**	**57**	**57**	**59**	**58**	**57**	**52**	**56**	**59**	**60**	**63**	**58**	**63**	**59**	**59**	**65**	**65**	**65**	**65**	**65**	**65**	**65**	**65**	**59**

[a] No production or operational expenditure during the construction phase (years 1 to 4).

Source: EconSearch analysis

4.2.2 Kimba

Economic impact estimates for the operation period for Kimba are provided in Table 4-12. During the operation phase, the direct and flow-on GRP in the Kimba region is expected to be on average around $2 million per annum. In 2012/13 the GRP in the Kimba region was approximately $96 million. On this basis, the projected GRP total impact would be a 2 per cent boost the region's total.

The employment estimates presented in Table 4-12 show that total (direct plus flow-on) employment in the Kimba region is expected to increase to 11 fte jobs on average per annum. The direct plus flow-on employment is 2 per cent of the estimated employment (fte) for the Kimba region for 2012/13 (604 fte).

4.2.3 Cleve

Economic impact estimates for the operation period for Cleve are provided in Table 4-13. During the operation phase, the direct and flow-on GRP in the Cleve region is expected to be on average around $4 million per annum. In 2012/13 the GRP in the Cleve region was approximately $125 million. On this basis, the projected GRP total impact would represent a 3 per cent increase to the region's total.

The employment estimates presented in Table 4-13 show that total (direct plus flow-on) employment in the Cleve region is expected to increase by 46 fte jobs on average per annum. The direct plus flow-on employment is 5 per cent of the estimated employment (fte) for the Cleve region for 2012/13 (941 fte).

4.2.4 Tumby Bay

Economic impact estimates for the operation period for Tumby Bay are provided in Table 4-14. During the operation phase, the direct and flow-on GRP in the Tumby Bay region is expected to be on average around $4 million per annum. In 2012/13 the GRP in the Tumby Bay region was approximately $154 million. On this basis, the projected GRP total impact would be a 3 per cent boost to the region's total.

The employment estimates presented in Table 4-14 show that total (direct plus flow-on) employment in the Tumby Bay region is expected to increase by 38 fte jobs on average per annum. The direct plus flow-on employment is 4 per cent of the estimated employment (fte) for the Tumby Bay region for 2012/13 (971 fte).

4.2.5 Elliston

Economic impact estimates for the operation period for Elliston are provided in Table 4-15. During the operation phase, the direct and flow-on GRP in the Elliston region is expected to be, on average, around $1 million per annum. In 2012/13 the GRP in the Elliston region was approximately $85 million. On this basis, the projected GRP total impact would represent a more than 1 per cent increase to the region's total.

Table 4-12 Economic Impact of the CEIP, operating phase, Kimba [a]

	Yr 5 18/19	Yr 6 19/20	Yr 7 20/21	Yr 8 21/22	Yr 9 22/23	Yr 10 23/24	Yr 11 24/25	Yr 12 25/26	Yr 13 26/27	Yr 14 27/28	Yr 15 28/29	Yr 16 29/30	Yr 17 30/31	Yr 18 31/32	Yr 19 32/33	Yr 20 33/34	Yr 21 34/35	Yr 22 35/36	Yr 23 36/37	Yr 24 37/38	Yr 25 38/39	Yr 26 39/40	Yr 27 40/41	Yr 28 41/42	Yr 29 42/43	Avg
Kimba																										
Gross Regional Product ($m)																										
Direct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow-on	1	1	1	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total	**1**	**1**	**1**	**2**	**2**	**2**	**2**	**2**	**1**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
Employment (fte)																										
Direct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow-on	5	12	12	13	12	12	12	12	11	12	12	12	12	11	12	11	11	12	12	12	11	11	11	11	11	11
Total	**5**	**12**	**12**	**13**	**12**	**12**	**12**	**12**	**11**	**12**	**12**	**12**	**12**	**11**	**12**	**11**	**11**	**12**	**12**	**12**	**11**	**11**	**11**	**11**	**11**	**11**

[a] No production or operational expenditure during the construction phase (years 1 to 4).

Source: EconSearch analysis

Table 4-13 Economic Impact of the CEIP, operating phase, Cleve [a]

	Yr 5 18/19	Yr 6 19/20	Yr 7 20/21	Yr 8 21/22	Yr 9 22/23	Yr 10 23/24	Yr 11 24/25	Yr 12 25/26	Yr 13 26/27	Yr 14 27/28	Yr 15 28/29	Yr 16 29/30	Yr 17 30/31	Yr 18 31/32	Yr 19 32/33	Yr 20 33/34	Yr 21 34/35	Yr 22 35/36	Yr 23 36/37	Yr 24 37/38	Yr 25 38/39	Yr 26 39/40	Yr 27 40/41	Yr 28 41/42	Yr 29 42/43	Avg
Cleve																										
Gross Regional Product ($m)																										
Direct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Flow-on	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Total	**2**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
Employment (fte)																										
Direct	12	28	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26
Flow-on	10	20	21	22	21	22	21	21	19	20	20	20	21	20	20	19	19	20	20	20	19	19	19	19	19	20
Total	**22**	**48**	**48**	**48**	**48**	**48**	**48**	**47**	**46**	**47**	**47**	**47**	**48**	**46**	**47**	**46**	**46**	**47**	**47**	**47**	**46**	**46**	**46**	**45**	**45**	**46**

[a] No production or operational expenditure during the construction phase (years 1 to 4).

Source: EconSearch analysis

Table 4-14 Economic Impact of the CEIP, operating phase, Tumby Bay [a]

	Yr 5 18/19	Yr 6 19/20	Yr 7 20/21	Yr 8 21/22	Yr 9 22/23	Yr 10 23/24	Yr 11 24/25	Yr 12 25/26	Yr 13 26/27	Yr 14 27/28	Yr 15 28/29	Yr 16 29/30	Yr 17 30/31	Yr 18 31/32	Yr 19 32/33	Yr 20 33/34	Yr 21 34/35	Yr 22 35/36	Yr 23 36/37	Yr 24 37/38	Yr 25 38/39	Yr 26 39/40	Yr 27 40/41	Yr 28 41/42	Yr 29 42/43	Avg
Tumby Bay																										
Gross Regional Product ($m)																										
Direct	1	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	2	3	3	3	3	3	3	3	3	2
Flow-on	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total	**2**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**5**	**4**	**5**	**4**	**4**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**4**
Employment (fte)																										
Direct	20	23	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25
Flow-on	6	13	13	14	14	14	13	13	12	13	13	13	13	13	13	12	12	13	13	13	12	12	12	12	12	13
Total	**26**	**36**	**39**	**39**	**39**	**39**	**39**	**39**	**38**	**38**	**39**	**39**	**39**	**38**	**39**	**38**	**38**	**39**	**39**	**39**	**38**	**38**	**38**	**38**	**38**	**38**

[a] No production or operational expenditure during the construction phase (years 1 to 4).

Source: EconSearch analysis

Table 4-15 Economic Impact of the CEIP, operating phase, Elliston [a]

	Yr 5 18/19	Yr 6 19/20	Yr 7 20/21	Yr 8 21/22	Yr 9 22/23	Yr 10 23/24	Yr 11 24/25	Yr 12 25/26	Yr 13 26/27	Yr 14 27/28	Yr 15 28/29	Yr 16 29/30	Yr 17 30/31	Yr 18 31/32	Yr 19 32/33	Yr 20 33/34	Yr 21 34/35	Yr 22 35/36	Yr 23 36/37	Yr 24 37/38	Yr 25 38/39	Yr 26 39/40	Yr 27 40/41	Yr 28 41/42	Yr 29 42/43	Avg
Elliston																										
Gross Regional Product ($m)																										
Direct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow-on	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Employment (fte)																										
Direct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow-on	3	7	8	8	8	8	8	8	7	8	8	8	8	7	8	7	7	8	8	8	7	7	7	7	7	7
Total	**3**	**7**	**8**	**8**	**8**	**8**	**8**	**8**	**7**	**8**	**8**	**8**	**8**	**7**	**8**	**7**	**7**	**8**	**8**	**8**	**7**	**7**	**7**	**7**	**7**	**7**

[a] No production or operational expenditure during the construction phase (years 1 to 4).

Source: EconSearch analysis

The employment estimates presented in Table 4-15 show that total (direct plus flow-on) employment in the Elliston region is expected to increase by 7 fte jobs on average per annum. The direct plus flow-on employment is just over 1 per cent of the estimated employment (fte) for the Elliston region for 2012/13 (559 fte).

4.2.6 Rest of Eyre and Western Region

Economic impact estimates for the operation period for the rest of the Eyre and Western region are provided in Table 4-16. During the operation phase, the direct and flow-on GRP in the Eyre and Western region is expected to be on average $19m per annum. In 2012/13 the GRP in the Eyre and Western region was almost $3.5 billion. On this basis, the projected GRP total impact would be a 0.5 per cent boost to the region's total.

The employment estimates presented in Table 4-16 show that total (direct plus flow-on) employment in the Eyre and Western region is expected to increase by 88 fte jobs on average per annum. The direct plus flow-on employment is 0.4 per cent of the estimated employment (fte) for the Eyre and Western region for 2012/13 (25,056 fte).

4.2.7 South Australia and Australia

For SA, the project is expected to generate an average annual increase to GSP of around $2.7 billion over the 25 operational years of the project (Table 4-17). In the context of SA's GSP in 2012/13 ($94.2 billion) (ABS 2013), the estimated average GSP impact would represent an increase of 2.9 per cent over 25 year period.

Direct and indirect employment in SA as a whole is expected to be over 990 fte in year 5 (first year of operation), peaking at 2,128 fte in year 8 and averaging around 1,985 fte jobs over the 25 operational years of the project (Table 4-17). This would represent an average 0.3 per cent increase in employment above 2012/13 levels (704,981 fte) (ABS 2014) for the 25 years.

For Australia, the project is expected to generate GDP of around $2.8 billion per annum over years 5-29 (Table 4-17). In the context of Australia's GDP in 2012/13 ($1,521.5 billion) (ABS 2013), the estimated average annual GDP impact in years 5-29 would represent an increase of 0.2 per cent over that period.

Direct and indirect employment in Australia as a whole is expected to increase just over 1,100 fte in year 1, peaking at 2,395 fte in year 8 and averaging 2,228 fte jobs over the 25 year period (Table 4-17). This would represent an average 0.02 per cent increase in national employment above 2012/13 levels (9,718,000 fte) over the 25 years.

Table 4-16 Economic impact of the CEIP, operating phase, rest of Eyre and Western region [a]

	Yr 5 18/19	Yr 6 19/20	Yr 7 20/21	Yr 8 21/22	Yr 9 22/23	Yr 10 23/24	Yr 11 24/25	Yr 12 25/26	Yr 13 26/27	Yr 14 27/28	Yr 15 28/29	Yr 16 29/30	Yr 17 30/31	Yr 18 31/32	Yr 19 32/33	Yr 20 33/34	Yr 21 34/35	Yr 22 35/36	Yr 23 36/37	Yr 24 37/38	Yr 25 38/39	Yr 26 39/40	Yr 27 40/41	Yr 28 41/42	Yr 29 42/43	Avg
Rest of Eyre and Western																										
Gross Regional Product ($m)																										
Direct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow-on	8	18	18	19	19	19	19	19	17	18	19	19	20	19	20	19	19	20	20	20	20	20	20	20	20	19
Total	**8**	**18**	**18**	**19**	**19**	**19**	**19**	**19**	**17**	**18**	**19**	**19**	**20**	**19**	**20**	**19**	**19**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**19**
Employment (fte)																										
Direct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow-on	41	100	95	97	96	97	95	93	86	89	91	92	93	88	91	87	86	91	90	90	86	85	85	84	83	88
Total	**41**	**100**	**95**	**97**	**96**	**97**	**95**	**93**	**86**	**89**	**91**	**92**	**93**	**88**	**91**	**87**	**86**	**91**	**90**	**90**	**86**	**85**	**85**	**84**	**83**	**88**

[a] No production or operational expenditure during the construction phase (years 1 to 4).

Source: EconSearch analysis

Table 4-17 Economic impact of the CEIP, operating phase, Eyre and Western, South Australia and Australia [a]

	Yr 5 18/19	Yr 6 19/20	Yr 7 20/21	Yr 8 21/22	Yr 9 22/23	Yr 10 23/24	Yr 11 24/25	Yr 12 25/26	Yr 13 26/27	Yr 14 27/28	Yr 15 28/29	Yr 16 29/30	Yr 17 30/31	Yr 18 31/32	Yr 19 32/33	Yr 20 33/34	Yr 21 34/35	Yr 22 35/36	Yr 23 36/37	Yr 24 37/38	Yr 25 38/39	Yr 26 39/40	Yr 27 40/41	Yr 28 41/42	Yr 29 42/43	Avg
Total Eyre and Western Region																										
Gross Regional Product ($m)	892	1,195	1,548	1,760	1,830	1,884	1,965	2,051	2,196	2,221	2,259	2,331	2,382	2,524	2,559	2,699	2,789	2,815	2,912	3,013	3,116	3,222	3,330	3,559	3,732	2,431
Employment (fte)	518	1,073	1,079	1,087	1,084	1,086	1,080	1,073	1,047	1,060	1,066	1,067	1,073	1,054	1,067	1,050	1,047	1,064	1,062	1,058	1,046	1,043	1,040	1,037	1,033	1,040
Rest of South Australia																										
Gross State Product ($m)	120	277	274	291	291	296	293	290	267	285	299	302	313	294	311	294	295	319	319	319	319	319	319	319	319	294
Employment (fte)	474	1,011	1,011	1,041	1,032	1,036	1,020	1,001	939	969	983	982	998	950	970	930	921	962	955	947	915	906	898	889	881	945
Total South Australia																										
Gross State Product ($m)	1,012	1,472	1,823	2,050	2,121	2,181	2,258	2,340	2,462	2,506	2,558	2,633	2,695	2,818	2,870	2,993	3,085	3,134	3,231	3,332	3,435	3,541	3,649	3,877	4,051	2,725
Employment (fte)	992	2,084	2,090	2,128	2,117	2,122	2,100	2,074	1,986	2,029	2,049	2,049	2,071	2,004	2,037	1,980	1,968	2,026	2,017	2,005	1,961	1,949	1,937	1,926	1,914	1,985
Rest of Australia																										
Gross Domestic Product ($m)	39	91	90	96	96	98	97	95	87	94	99	100	104	97	105	99	99	108	108	108	108	108	108	108	108	98
Employment (fte)	112	257	259	267	264	266	261	256	236	247	253	253	259	243	254	241	239	253	251	249	240	237	235	233	230	244
Total Australia																										
Gross Domestic Product ($m)	1,051	1,563	1,913	2,146	2,217	2,279	2,355	2,436	2,549	2,600	2,657	2,733	2,800	2,916	2,975	3,092	3,184	3,242	3,339	3,440	3,543	3,649	3,757	3,986	4,159	2,823
Employment (fte)	1,104	2,341	2,349	2,395	2,381	2,388	2,361	2,330	2,222	2,276	2,302	2,302	2,330	2,247	2,291	2,221	2,207	2,279	2,269	2,254	2,201	2,186	2,172	2,158	2,144	2,228

[a] No production or operational expenditure during the construction phase (years 1 to 4).

Source: EconSearch analysis

4.3 Flow-on Sectors

As described in Section 2.1, the **flow-on** (or indirect) economic impact is the combination of first round economic impact (i.e. employment in firms that supply inputs and services to the 'direct impact' businesses), industrial-support economic impact (i.e. 'second and subsequent round' economic impacts as successive waves of output increases occur in the economy to provide industrial support, as a response to the original construction industry supply chain expenditure) and consumption-induced economic impact (i.e. the economic activity induced by increased household income associated with the original construction industry supply chain expenditure).

The flow-on GRP impacts by industry and region are shown in Table 4-18 for the construction phase (average of years 1-4) and in Table 4-19 for the operation phase (year 7 representing a "steady state" year of operation). The flow-on employment (fte) impacts by industry and region are shown in Table 4-20 for the construction phase and in Table 4-21 for the operation phase.

Table 4-18 Flow-on GRP from the CEIP, construction phase, average years 1-4 ($m)

	Wudinna	Kimba	Cleve	Tumby Bay	Elliston	Rest of E&W	**Total Eyre & Western**
Agric, Forestry & Fishing	0	0	0	0	0	0	**0**
Mining	0	0	0	0	0	4	**4**
Manufacturing	0	0	0	0	0	1	**1**
Electricity, gas, water and waste services	0	0	0	0	0	0	**0**
Construction	0	0	0	0	0	14	**14**
Wholesale Trade	0	0	0	0	0	1	**2**
Retail Trade	0	0	0	0	0	1	**2**
Accommodation and food services	9	0	3	4	0	1	**16**
Transport, postal and warehousing	0	0	0	0	0	1	**1**
Information media and telecommunications	0	0	0	0	0	0	**0**
Financial and insurance services	0	0	0	0	0	1	**2**
Ownership of Dwellings	1	0	0	1	0	2	**4**
Rental, hiring and real estate services	0	0	0	0	0	0	**0**
Professional, scientific and technical services	0	1	0	0	0	4	**4**
Administrative and support services	0	0	0	0	0	1	**1**
Public administration and safety	0	0	0	0	0	0	**0**
Education and training	0	0	0	0	0	0	**1**
Health care and social assistance	0	0	0	0	0	1	**1**
Arts and recreation services	0	0	0	0	0	0	**0**
Other services	0	0	0	0	0	0	**0**
Total Impacts	**12**	**1**	**4**	**6**	**0**	**33**	**55**

Source: EconSearch analysis

Table 4-19 Flow-on GRP from the CEIP, operation phase, year 7 ($m)

	Wudinna	Kimba	Cleve	Tumby Bay	Elliston	Rest of E&W	**Total Eyre & Western**
Agric, Forestry & Fishing	0	0	0	0	0	0	**0**
Mining	0	0	0	0	0	0	**0**
Manufacturing	0	0	0	0	0	0	**0**
Electricity, gas, water and waste services	0	0	0	0	0	5	**5**
Construction	0	0	0	0	0	0	**0**
Wholesale Trade	9	1	1	1	1	6	**18**
Retail Trade	2	0	0	0	0	2	**4**
Accommodation and food services	5	0	0	1	0	0	**6**
Transport, postal and warehousing	1	0	0	0	0	1	**2**
Information media and telecommunications	0	0	0	0	0	0	**0**
Financial and insurance services	0	0	0	0	0	1	**1**
Ownership of Dwellings	5	0	0	0	0	1	**7**
Rental, hiring and real estate services	0	0	0	0	0	0	**0**
Professional, scientific and technical services	0	0	0	0	0	0	**0**
Administrative and support services	0	0	0	0	0	0	**0**
Public administration and safety	0	0	0	0	0	0	**0**
Education and training	0	0	0	0	0	0	**1**
Health care and social assistance	1	0	0	0	0	0	**1**
Arts and recreation services	0	0	0	0	0	0	**0**
Other services	2	0	0	0	0	2	**4**
Total Impacts	**25**	**1**	**3**	**3**	**1**	**18**	**50**

Source: EconSearch analysis

Table 4-20 Flow-on employment (fte) from the CEIP, construction phase, average years 1-4

	Wudinna	Kimba	Cleve	Tumby Bay	Elliston	Rest of E&W	**Total Eyre & Western**
Agric, Forestry & Fishing	0	0	0	0	0	1	**1**
Mining	0	0	0	0	0	15	**15**
Manufacturing	1	0	0	0	0	7	**9**
Electricity, gas, water and waste services	0	0	0	0	0	2	**3**
Construction	3	0	0	0	0	109	**113**
Wholesale Trade	4	0	1	0	0	5	**11**
Retail Trade	6	0	2	2	0	17	**27**
Accommodation and food services	111	0	30	48	0	7	**197**
Transport, postal and warehousing	2	0	1	1	0	5	**9**
Information media and telecommunications	0	0	0	0	0	1	**1**
Financial and insurance services	0	0	1	0	0	3	**3**
Ownership of Dwellings	0	0	0	0	0	0	**0**
Rental, hiring and real estate services	0	0	0	0	0	2	**2**
Professional, scientific and technical services	0	5	0	0	0	34	**39**
Administrative and support services	1	0	0	0	0	6	**8**
Public administration and safety	0	0	0	0	0	2	**2**
Education and training	3	0	0	1	0	5	**10**
Health care and social assistance	4	0	1	2	0	7	**15**
Arts and recreation services	0	0	0	0	0	0	**0**
Other services	1	0	0	1	0	5	**6**
Total Impacts	**135**	**7**	**37**	**57**	**1**	**233**	**471**

Source: EconSearch analysis

Table 4-21 Flow-on employment (fte) from the CEIP, operation phase, year 7

	Wudinna	Kimba	Cleve	Tumby Bay	Elliston	Rest of E&W	**Total Eyre & Western**
Agric, Forestry & Fishing	0	0	0	0	0	0	**1**
Mining	0	0	0	0	0	0	**0**
Manufacturing	2	0	0	0	0	1	**3**
Electricity, gas, water and waste services	0	0	0	0	0	13	**13**
Construction	1	0	0	0	0	2	**3**
Wholesale Trade	66	7	9	4	6	23	**115**
Retail Trade	27	1	3	3	1	18	**53**
Accommodation and food services	56	0	2	6	0	3	**68**
Transport, postal and warehousing	8	0	1	1	0	3	**13**
Information media and telecommunications	0	0	0	0	0	1	**1**
Financial and insurance services	0	0	0	0	0	1	**1**
Ownership of Dwellings	0	0	0	0	0	0	**0**
Rental, hiring and real estate services	0	0	0	0	0	1	**1**
Professional, scientific and technical services	0	0	0	0	0	2	**2**
Administrative and support services	1	0	0	0	0	2	**3**
Public administration and safety	-1	0	0	0	0	-1	**-2**
Education and training	7	0	0	1	0	1	**8**
Health care and social assistance	11	0	0	1	0	1	**13**
Arts and recreation services	0	0	0	0	0	0	**0**
Other services	32	3	5	5	0	23	**69**
Total Impacts	**210**	**12**	**21**	**20**	**8**	**95**	**365**

Source: EconSearch analysis

4.4 Government Revenue

One component of the GRP/GSP impact is government revenue in the form of taxes and royalties. Government revenue attributed to the CEIP project by region is detailed in Table 4-22 for the construction phase and in Table 4-23 for the operation phase.

Table 4-22 Estimated Government revenue from the CEIP, construction phase, $m

	Yr 1 2014/15	Yr 2 2015/16	Yr 3 2016/17	Yr 4 2017/18	Yrs 1-4 Average
Local Government [a]	0.1	0.3	0.3	0.3	0.3
State Government [b]	0.9	4.9	6.1	3.9	4.0
Commonwealth Government [c]	0.3	9.6	25.7	16.5	13.0
Total Government Revenue	1.4	14.8	32.2	20.8	17.3

[a] Council rates and natural resource management levy.

[b] Stamp duty and payroll tax.

[c] Income tax.

Source: EconSearch analysis

Table 4-23 Estimated Government revenue from the CEIP, operation phase, $m

	Yr 5 18/19	Yr 6 19/20	Yr 7 20/21	Yr 8 21/22	Yr 9 22/23	Yr 10 23/24	Yr 11 24/25	Yr 12 25/26	Yr 13 26/27	Yr 14 27/28	Yr 15 28/29	Yr 16 29/30	Yr 17 30/31	Yr 18 31/32	Yr 19 32/33	Yr 20 33/34	Yr 21 34/35	Yr 22 35/36	Yr 23 36/37	Yr 24 37/38	Yr 25 38/39	Yr 26 39/40	Yr 27 40/41	Yr 28 41/42	Yr 29 42/43	Avg
Local Government [a]	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
State Government [b]	29.9	50.3	56.9	62.3	63.7	152.7	156.2	159.9	163.2	167.6	171.9	176.1	180.6	184.5	189.4	193.5	198.2	203.6	208.5	213.6	218.7	224.0	229.4	240.8	249.5	165.8
Commonwealth Government [c]	19.3	39.9	94.0	326.7	374.6	398.4	418.0	443.5	485.2	504.8	512.7	526.1	534.7	561.1	563.9	588.6	620.7	619.1	628.1	646.0	660.0	678.0	698.0	724.0	755.0	496.8
Total Government Revenue	49.5	90.6	151.2	389.3	438.6	551.5	574.5	603.7	648.8	672.8	685.0	702.5	715.6	745.9	753.6	782.4	819.3	823.0	836.9	859.9	879.1	902.4	927.8	965.2	1,004.9	663.0

[a] Council rates and natural resource management levy.

[b] Includes royalties, stamp duty and payroll tax. SA royalties for mineral ores and concentrates (includes iron ore) were calculated at a reduced rate for new mines of 2%/pa for first 5yrs and then 5%/pa thereafter.

[c] Company tax and income tax.

Source: EconSearch analysis

REFERENCES

ABS 2013, *2012/13, Australian National Accounts, State Accounts*, ABS Cat No. 5220.0, Canberra.

ABS 2014, *Labour Force 2014*, ABS Cat No. 6202.0, Canberra.

EconSearch 2013a, *Input-Output Tables for South Australia and its Regions 2012/13 Update: Technical Report,* report prepared for Department of the Premier and Cabinet, November.

EconSearch 2013b, *Local Input-Output Modelling of Victorian Primary Industries – Update: Technical Report,* report prepared for the Department of Environment and Primary Industries (Victoria), June.

Horridge, M., Madden, J. and Wittwer, G. 2004, *Using a highly disaggregated multi-regional single-country model to analyse the impacts of the 2002-03 drought on Australia*, Centre of Policy Studies, Monash University, Australia.

Rose Bowey and Associates 2014, *Social Baseline and Social Impact Assessment Technical Report,* report prepared for Iron Road Limited, June.

Disclaimer

We have prepared the above report exclusively for the use and benefit of our client. Neither the firm nor any employee of the firm undertakes responsibility in any way whatsoever to any

person (other than to the above mentioned client) in respect of the report including any errors or omissions therein however caused.

APPENDIX 1 AN OVERVIEW OF ECONOMIC IMPACT ANALYSIS USING THE INPUT-OUTPUT METHOD

Economic impact analysis based on an input-output (I-O) model provides a comprehensive economic framework that is extremely useful in the resource planning process. Broadly, there are two ways in which the I-O method can be used.

First, the I-O model provides a numerical picture of the size and shape of an economy and its essential features. The I-O model can be used to describe some of the important features of an economy, the interrelationships between sectors and the relative importance of the individual sectors.

Second, I-O analysis provides a standard approach for the estimation of the economic impact of a particular activity. The I-O model is used to calculate industry multipliers that can then be applied to various development or change scenarios.

The input-output database

Input-output analysis, as an accounting system of inter-industry transactions, is based on the notion that no industry exists in isolation. This assumes, within any economy, each firm depends on the existence of other firms to purchase inputs from, or sell products to, for further processing. The firms also depend on final consumers of the product and labour inputs to production. An I-O database is a convenient way to illustrate the purchases and sales of goods and services taking place in an economy at a given point in time.

As noted above, I-O models provide a numerical picture of the size and shape of the economy. Products produced in the economy are aggregated into a number of groups of industries and the transactions between them recorded in the transactions table. The rows and columns of the I-O table can be interpreted in the following way:

- The rows of the I-O table illustrate sales for intermediate usage (i.e. to other firms in the region) and for final demand (e.g. household consumption, exports or capital formation).
- The columns of the I-O table illustrate purchases of intermediate inputs (i.e. from other firms in the region), imported goods and services and purchases of primary inputs (i.e. labour, land and capital).
- Each item is shown as a purchase by one sector and a sale by another, thus constructing two sides of a double accounting schedule.

In summary, the I-O model can be used to describe some of the important features of a state or regional economy, the interrelationships between sectors and the relative importance of

the individual sectors. The model is also used for the calculation of sector multipliers and the estimation of economic impacts arising from some change in the economy.

Using input-output analysis for estimation of economic impacts

The I-O model conceives the economy of the region as being divided up into a number of sectors and this allows the analyst to trace expenditure flows. To illustrate this, consider the example of a vineyard that, in the course of its operation, purchases goods and services from other sectors. These goods and services would include fertiliser, chemicals, transport services, and, of course, labour. The direct employment created by the vineyard is regarded in the model as an expenditure flow into the household sector, which is one of several non-industrial sectors recognised in the I-O model.

Upon receiving expenditure by the vineyard, the other sectors in the regional economy engage in their own expenditures. For example, as a consequence of winning a contract for work with vineyard, a spraying contractor buys materials from its suppliers and labour from its own employees. Suppliers and employees in turn engage in further expenditure, and so on. These indirect and induced (or flow-on) effects4, as they are called, are part of the impact of the vineyard on the regional economy. They must be added to the direct effects (which are expenditures made in immediate support of the vineyard itself) in order to arrive at a measure of the total impact of the vineyard.

It may be thought that these flow-on effects (or impacts) go on indefinitely and that their amount adds up without limit. The presence of leakages, however, prevents this from occurring. In the context of the impact on a regional economy, an important leakage is expenditure on imports, that is, products or services that originate from outside the region, state or country (e.g. machinery).

Thus, some of the expenditure by the vineyard (i.e. expenditure on imports to the region) is lost to the regional economy. Consequently, the flow-on effects get smaller and smaller in successive expenditure rounds due to this and other leakages. Hence the total expenditure created in the regional economy is limited in amount, and so (in principle) it can be measured.

Using I-O analysis for estimation of regional economic impacts requires a great deal of information. The analyst needs to know the magnitude of various expenditures and where they occur. Also needed is information on how the sectors receiving this expenditure share their expenditures among the various sectors from whom they buy, and so on, for the further expenditure rounds.

In applying the I-O model to economic impact analysis, the standard procedure is to determine the direct or first-round expenditures only. No attempt is made to pursue such inquiries on expenditure in subsequent rounds, not even, for example, to trace the effects in the regional

[4] A glossary of I-O terminology is provided in Appendix 5.

economy on household expenditures by vineyard employees on food, clothing, entertainment, and so on, as it is impracticable to measure these effects for an individual case, here the vineyard.

The I-O model is instead based on a set of assumptions about constant and uniform proportions of expenditure. If households in general in the regional economy spend, for example, 13.3 per cent of their income on food and non-alcoholic beverages, it is assumed that those working in vineyards do likewise. Indeed, the effects of all expenditure rounds after the first are calculated by using such standard proportions (i.e. multiplier calculations). Once a transactions table has been compiled, simple mathematical procedures can be applied to derive multipliers for each sector in the economy.

Input-output multipliers

Input-output multipliers are an indication of the strength of the linkages between a particular sector and the rest of the state or regional economy. As well, they can be used to estimate the impact of a change in that particular sector on the rest of the economy.

Detailed explanations on calculating I-O multipliers, including the underlying assumptions, are provided in any regional economics or I-O analysis textbook (see, for example, Jensen and West (1986)). They are calculated through a routine set of mathematical operations based on coefficients derived from the I-O transactions model, as outlined below.

The transactions table may be represented by a series of equations thus:

$$X_1 = X_{11} + X_{12} + \ldots\ldots\ldots\ldots\ldots + X_{1n} + Y_1$$
$$X_2 = X_{21} + X_{22} + \ldots\ldots\ldots\ldots\ldots + X_{2n} + Y_2$$
$$X_n = X_{n1} + X_{n2} + \ldots\ldots\ldots\ldots\ldots + X_{nn} + Y_n$$

where X_i = total output of intermediate sector *i* (row totals);

X_{ij} = output of sector *i* purchased by sector *j* (elements of the intermediate quadrant); and

Y_j = total final demand for the output of sector *i*.

It is possible, by dividing the elements of the columns of the transactions table by the respective column totals to derive coefficients, which represent more clearly the purchasing pattern of each sector. These coefficients, termed 'direct' or 'I-O' coefficients, are normally denoted as aij, and represent the direct or first round requirements from the output of each sector following an increase in output of any sector.

In equation terms the model becomes:

$$X_1 = a_{11}X_1 + a_{12}X_2 + \ldots\ldots\ldots\ldots\ldots + a_{1n}X_n + Y_1$$
$$X_2 = a_{21}X_1 + a_{22}X_2 + \ldots\ldots\ldots\ldots\ldots + a_{2n}X_n + Y_2$$
$$X_n = a_{n1}X_{11} + a_{n2}X_2 + \ldots\ldots\ldots\ldots\ldots + a_{nn}X_n + Y_n$$

where a_{ij} (the direct coefficient) = X_{ij}/X_j. This may be represented in matrix terms:

$X = AX + Y$

where A = $[a_{ij}]$, the matrix of direct coefficients.

The previous equation can be extended to:

$(I\text{-}A)X = Y$

where (I-A) is termed the Leontief matrix,

or $X = (I\text{-}A)^{-1}Y$

where $(I\text{-}A)^{-1}$ is termed the 'general solution', the 'Leontief inverse' or simply the inverse of the open model.

The general solution is often represented by:

$Z = (I\text{-}A)^{-1} = [z_{ij}]$

The I-O table can be 'closed' with respect to certain elements of the table. Closure involves the transfer of items from the exogenous portions of the table (final demand and primary input quadrants) to the endogenous section of the table (intermediate quadrant). This implies that the analyst considers that the transferred item is related more to the level of local activity than to external influences. Closure of I-O tables with respect to households is common and has been adopted in this project.

The 'closed' direct coefficients matrix may be referred to as A*. The inverse of the Leontief matrix formed from A* is given by:
$Z^* = (I\text{-}A^*)^{-1} = [z^*_{ij}]$

Z^* is referred to as the 'closed inverse' matrix.

A multiplier is essentially a measurement of the impact of an economic stimulus. In the case of I-O multipliers the stimulus is normally assumed to be an increase of one dollar in sales to final demand by a sector. The impact in terms of output, contribution to gross regional product, household income and employment can be identified in the categories discussed below.

(i) The initial impact: refers to the assumed dollar increase in sales. It is the stimulus or the cause of the impacts. It is the unity base of the output multiplier and provides the identity matrix of the Leontief matrix. Associated directly with this dollar increase in output is an own-sector increase in household income (wages and salaries, drawings by owner operators etc.) used in the production of that dollar. This is the household income coefficient h_j. Household income, together with other value added (OVA), provide the

total gross regional product from the production of that dollar of output. The gross regional product coefficient is denoted v_j. Associated also will be an own-sector increase in employment, represented by the size of the employment coefficient. This employment coefficient e_j represents an employment/output ratio and is usually calculated as 'employment per million dollars of output'.

(ii) The first round impact: refers to the effect of the first round of purchases by the sector providing the additional dollar of output. In the case of the output multiplier this is shown by the direct coefficients matrix [a_{ij}]. The disaggregated effects are given by individual a_{ij} coefficients and the total first-round effect by Σa_{ij}. First-round household income effects are calculated by multiplying the first-round output effects by the appropriate household income coefficient (h_j). Similarly, the first-round gross regional product and employment effects are calculated by multiplying the first-round output effects by the appropriate gross regional product (v_j) and employment (e_j) coefficients.

(iii) Industrial-support impacts. This term is applied to 'second and subsequent round' effects as successive waves of output increases occur in the economy to provide industrial support, as a response to the original dollar increase in sales to final demand. The term excludes any increases caused by increased household consumption. Output effects are calculated from the open Z inverse, as a measure of industrial response to the first-round effects. The industrial-support output requirements are calculated as the elements of the columns of the Z inverse, less the initial dollar stimulus and the first-round effects. The industrial support household income, gross regional product and employment effects are defined as the output effects multiplied by the respective household income, gross regional product and employment coefficients. The first-round and industrial-support impacts are together termed the production-induced impacts.

(iv) Consumption-induced impacts: are defined as those induced by increased household income associated with the original dollar stimulus in output. The consumption-induced output effects are calculated in disaggregated form as the difference between the corresponding elements in the open and closed inverse (i.e. $z^*_{ij} - z_{ij}$, and in total as $\Sigma(z^*_{ij} - z_{ij})$. The consumption-induced household income, gross regional product and employment effects are simply the output effects multiplied by the respective household income, gross regional product and employment coefficients.

(v) Flow-on impacts: are calculated as total impact less the initial impact. This allows for the separation of 'cause and effect' factors in the multipliers. The cause of the impact is given by the initial impact (the original dollar increase in sales to final demand), and the effect is represented by the first-round, industrial-support and consumption-induced effects, which together constitute the flow-on effects.

Each of the five impacts are summarised in Appendix Table 2.1. It should be noted that household income, gross regional product and employment multipliers are parallel concepts, differing only by their respective coefficients hj, vj and ej.

The output multipliers are calculated on a 'per unit of initial effect' basis (i.e. output responses to a one dollar change in output). Household income, gross regional product and employment multipliers, as described above, refer to changes in household income per initial change in

output, changes to gross regional product per initial change in output and changes in employment per initial change in output. These multipliers are conventionally converted to ratios, expressing a 'per unit' measurement, and described as Type I and Type II ratios. For example, with respect to employment:

Type I employment ratio = [initial + first round + industrial support]/initial

and

Type II employment ratio= [initial + production induced5 + consumption induced]/initial

Model assumptions

There are a number of important assumptions in the I-O model that are relevant in interpreting the analytical results.

- Industries in the model have a linear production function, which implies constant returns to scale and fixed input proportions.
- Another model assumption is that firms within a sector are homogeneous, which implies they produce a fixed set of products that are not produced by any other sector and that the input structure of the firms are the same. Thus it is preferable to have as many sectors as possible specified in the models and the standard models for this study were compiled with 66 sectors (see Appendix 1 for further detail).
- The model is a static model that does not take account of the dynamic processes involved in the adjustment to an external change, such as a permanent change in natural resources management.

[5] Where (first round + industrial support) = production induced.

1. Appendix Table 4-1 The structure of input-output multipliers for sector *i* [a]

Impacts	General formula
Output multipliers ($)	
Initial	1
First-round	$\Sigma_i a_{ij}$
Industrial-support	$\Sigma_i z_{ij}$-1-$\Sigma_i a_{ij}$
Consumption-induced	$\Sigma_i z^*_{ij}$-$\Sigma_i z_{ij}$
Total	$\Sigma_i z^*_{ij}$
Flow-on	$\Sigma_i z^*_{ij}$-1
Household Income multipliers ($)	
Initial	h_j
First-round	$\Sigma_i a_{ij} h_i$
Industrial-support	$\Sigma_i z_{ij} h_i$- h_j-$\Sigma_i a_{ij} h_i$
Consumption-induced	$\Sigma_i z^*_{ij} h_i$-$\Sigma_i z_{ij} h_i$
Total	$\Sigma_i z^*_{ij} h_i$
Flow-on	$\Sigma_i z^*_{ij} h_i$-h_j
Gross regional product multipliers ($)	
Initial	v_j
First-round	$\Sigma_i a_{ij} v_i$
Industrial-support	$\Sigma_i z_{ij} v_i$- v_j-$\Sigma_i a_{ij} v_i$
Consumption-induced	$\Sigma_i z^*_{ij} v_i$-$\Sigma_i z_{ij} v_i$
Total	$\Sigma_i z^*_{ij} v_i$
Flow-on	$\Sigma_i z^*_{ij} v_i$-v_j
Employment multipliers (full time equivalents)	
Initial	e_j
First-round	$\Sigma_i a_{ij} e_i$
Industrial-support	$\Sigma_i z_{ij} e_i$- e_j-$\Sigma_i a_{ij} e_i$
Consumption-induced	$\Sigma_i z^*_{ij} e_i$-$\Sigma_i z_{ij} e_i$
Total	$\Sigma_i z^*_{ij} e_i$
Flow-on	$\Sigma_i z^*_{ij} e_i$-e_j

[a] In a DECON model, Z^* (the 'closed inverse' matrix), includes a population and an unemployed row and column (see below for details).

Extending the standard economic impact model as a DECON model

Based on work undertaken by EconSearch (2009 and 2010a) and consistent with Mangan and Phibbs (1989), the I-O model developed for this project was extended as demographic-economic (DECON) model. The two key characteristics of the DECON model, when compared with a standard economic model, are as follows.

1. The introduction of a population 'sector' (or row and column in the model) makes it possible to estimate the impact on local population levels of employment growth or decline.
2. The introduction of an unemployed 'sector' makes it possible to account for the consumption-induced impact of the unemployed in response to economic growth or decline.

The population 'sector'

The introduction of a population 'sector' to the standard I-O model allows for the calculation of population multipliers. These multipliers measure the flow-on population impact resulting from an initial population change attributable to employment growth or decline in a particular sector of the regional economy.

Calculation of population multipliers is made possible by inclusion of a population row and column in the 'closed' direct coefficients matrix of the I-O model.

Population row: the population coefficient (pj) for sector j of the DECON model is represented as:

$p_j = -rho_j * e_j * family\ size_j$

where rho_j = the proportion of employees in sector *j* who remain in the region after they lose their job (negative employment impact) or the proportion of new jobs in sector *j* filled by previously unemployed locals (positive employment impact);

e_j = the employment coefficient for sector *j*; and

$family\ size_j$ = average family size for sector *j.*

Population column: the population column of the DECON model is designed to account for growth or decline in those sectors of the economy that are primarily population-driven (i.e. influenced by the size of the population) rather than market-driven (i.e. dependent upon monetary transactions). Clearly, many of the services provided by the public sector fit this description and, for the purpose of this analysis, it was assumed that the following intermediate sectors were primarily population-driven:

- public administration and defence;
- education;
- health and community services; and
- cultural and recreational services.

Thus, the non-market coefficient for sector j of the DECON model is represented as expenditure on that non-market service (by governments) in $million per head of population.

The population multiplier for sector *j* is represented as: z^*_{pj} / p_{pj}

where z^*_{pj} = coefficient of the 'closed inverse' matrix in the population row for sector *j*; and

p_{pj} = coefficient of the direct coefficients matrix in the population row for sector *j.*

Sources of local data for the population sector of the DECON models used in this project included the following.

- rho: little or no published data are available to assist with estimation of this variable, particularly at a regional level. The DECON models have been constructed to enable the analyst to estimate this variable on the basis of the availability superior data or assumptions.
- Family size: in order to estimate average family size by industry, relevant data were extracted from the Australian Bureau of Statistics 2006 Census of Population and Housing using the TableBuilder database. These data were modified by the consultants in order to ensure consistency with the specification and conventions of the I-O models.

The unemployed 'sector'

As outlined above, the introduction of an unemployed 'sector' to the standard I-O model makes it possible to account for the consumption-induced impact of the unemployed in response to economic growth or decline.

Through the inclusion of an unemployed row and column in the 'closed' direct coefficients matrix of the standard I-O model it is possible to calculate Type III multipliers (for output, gross regional product, household income and employment).

The key point to note is that, in the situation where at least some of the unemployed remain in a region after losing their job (negative employment impact) or some of the new jobs in a region are filled by previously unemployed locals (positive employment impact), Type III multipliers will be smaller than the more frequently used Type II multipliers.

Unemployed row: the unemployed coefficient (u_j) for sector *j* of the DECON model is represented as:

$u_j = -\text{rho}_j * (1-ess_j) * e_j$

where rho_j = the proportion of employees in sector *j* who remain in the region after they lose their job (negative employment impact) or the proportion of new jobs in sector *j* filled by previously unemployed locals (positive employment impact);

ess_j = the proportion of employed in sector *j* who are not eligible for welfare benefits when they lose their job*; and*

e_j = the employment coefficient for sector *j*.

Unemployed column: the unemployed column of the DECON model is an approximation of total consumption expenditure and the consumption pattern of the unemployed. It is represented as dollars per unemployed person rather than $million for the region as a whole, as is the case for the household expenditure column in a standard I-O model.

Sources of local (i.e. state and regional) data for the unemployed sector of the DECON models used in this study included the following.

- ess: in order to estimate the proportion of employed by industry who are not eligible for welfare benefits when they lose their job, relevant data were were extracted from the Australian Bureau of Statistics 2006 Census of Population and Housing using the TableBuilder database. These data were modified by the consultants in order to ensure consistency with the specification and conventions of the I-O models.
- Unemployed consumption: total consumption expenditure by the unemployed was based on an estimate of the Newstart Allowance whilst the pattern of consumption expenditure was derived from household income quintiles in the 2003/04 Household Expenditure Survey (ABS 2006).

Incorporating a tourism demand profile in the I-O model

Tourism expenditure is a measure of the value of sales of goods and services to visitors to the state or region. The following method and data sources were used to estimate tourism expenditure by industry sector for the region.

- The primary data were sourced from Tourism Research Australia (TRA).
- Base datasets included total tourism expenditure by TRA tourism region and average expenditure profiles, by region, across a range of goods and services (e.g. food and drink, fuel, shopping, etc.).
- Estimates were available for domestic day, domestic overnight and international visitor expenditure.
- The first adjustment to the base data was the development of a concordance between the TRA tourism regions and I-O model regions and the allocation of these base data to the relevant I-O model region. These allocations were based, in turn, on an ABS concordance between TRA tourism regions and SLAs.
- The second adjustment to the base data was the application of a more detailed expenditure breakdown from the ABS Australian National Accounts: Tourism Satellite Account for both domestic and international visitor expenditure (ABS 2010d).
- The third adjustment to the base data was the conversion of tourism expenditure estimates from purchasers' to basic prices (i.e. reallocation of net taxes (taxes minus subsidies) and marketing and transport margins) to make the data consistent with accounting conventions used in the national, state and regional I-O models. Purchasers' to basic price ratios for tourism expenditure categories were derived from ABS data.
- The final adjustment to the base data was the allocation of the tourism expenditure data in basic prices to the relevant input-output sectors (intermediate sectors, taxes less subsidies or imports) in which the expenditure occurred, thus compiling a profile of sales to final demand. This process was undertaken for each type of tourism expenditure (domestic day, domestic overnight and international visitor) and the

results aggregated to form a single tourism demand profile. Profiles were developed at the state and regional levels.

Constructing a RISE v3.0 economic impact model

In the final model construction stage the data described above were incorporated into a Microsoft Excel® spreadsheet based economic impact model for the region and state (i.e. RISE v3.0)6. This model allows for description of the structure of the economy. It can also be used for the estimation of economic impacts over time in response to the introduction of a new industry or a change in the final demand for the output of one or many sectors. Model assumptions can be modified to account for:

- price changes between the model construction year (2009/10) and the base year for the analysis;
- labour productivity change over time (as above and for the subsequent years);
- the level of regional migration (e.g. for a positive employment impact, the proportion of new jobs filled by previously unemployed locals).

6 For further details on the use and application of this type of model see EconSearch (2010b).