Appendix I

Economic Impact Assessment

Northern Energy Corporation Limited

AustralAsian Resource Consultants

Synergies
ECONOMIC CONSULTING

AARC – Elimatta

Economic Impacts – Final Report

March 2012

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Executive Summary

The character and basis of the Regional Economy

The Project is located approximately 35km west of the township of Wandoan in the Western Downs local government ('Western Downs') and approximately 380km northwest of Brisbane. The major towns in the Western Downs include Chinchilla, Dalby, Miles, Tara and Wandoan. The Western Downs Regional Council is among the top 20 largest councils in Queensland. It spans an area of 38,039 square kilometres and services a population 30,018.

The project is located within the resource-rich Surat Basin, which is predicted to be one of the main drivers of Queensland's economy through the development of its energy resources.

The immediate impacts of the project will fall in the Western Downs. However, the direct economic impacts also extend to the Wide-Bay Burnett region. This is because a significant part of the workforce will be drawn from the Wide Bay-Burnett region. Therefore the impact of the employment and income in the Wide-Bay region will also need to be considered.

Western Downs is a long-established agricultural area, and the economy has traditionally been based on agriculture. Murilla and Wambo are the regional centres for cotton, sorghum, wheat, barley cultivation, timber production, cattle and sheep grazing, etc. Dalby has historically been a strategic regional centre for receiving and marketing a large proportion of Queensland's agricultural and livestock production. Tara was established on three of the strongest traditional rural industries in Australia—wool, grain and beef. Chinchilla developed diary industry, taking advantage of its position as a regional butter production centre.

The Western Downs is also a resource-rich region. Coal reserves in the Surat Basin cover a large area from Taroom to Dalby. In addition to coal extraction, the Western Downs has coal bed methane and underground coal gasification operations. Oil, gas and coal exploration and exploitation will be a key driver for economic growth and development in this region for the next decade and beyond.

Wandoan is located a few hundred metres off the Leichhardt Highway 66km north of Miles and 405 km west of Brisbane. The establishment of the town was based on the establishment of Juandah Station in 1853. The township grew significantly after World War II when large tracts of brigalow country were opened up to soldier settlers.

Today, Wandoan is a small settlement serving the surrounding cattle and wheat industries. It produces some of the best Prime Hard wheat in Australia. Wandoan is also a major cattle trucking centre.

With the recent resource development in the Surat Basin Energy Province, Wandoan is playing an increasingly important role in the emerging energy industry in the Western Downs.

In September quarter 2011, the unemployment rate in the Western Downs was 4.4%, with 756 people aged over 15 years unemployed, and 17,241 people in the labour force. This rate of unemployment is consistent with the economy being at full employment.

The skill level of the labour force is below the State average. 39.5% of persons aged 15 years and over have a post-school qualification, well below the State average of 50.4%. The occupation in which residents are employed is also an indicator of the skills base of the region. The most common occupations in Western Downs are Manager (which in the context of this region relates to farm mangers) followed by Labourers, Technicians and Trades Workers. This type of skill profile if often observed in agricultural regions.

The index of Relative Socio-Economic Disadvantage compiled by the Australian Bureau of Statistics shows that the region has a higher level of disadvantage compared to Queensland as a whole. All areas within the study area (Taroom, Chinchilla, Dalby, Bendemere and Tara) have a lower score than the Queensland benchmark of 1,000. Although the index score was based on the 2006 census and mining and energy developments have increased the size of the regional economy since 2006.

The significance of the project to the local and regional economy

The project involves an open-cut pit mining thermal coal at up to 8 Mtpa run-of-mine (ROM) coal to produce 5 Mtpa of product coal for export. The project will develop of a rail line to connect the Elimatta project to the Surat Basin Rail, north of Wandoan. The development of the rail line will facilitate the development of coal reserves located to the west of the Elimatta deposit.

Coal reserves in the Surat Basin cover a large area from Taroom to Dalby. In addition to coal extraction, the Western Downs has coal bed methane and underground coal gasification operations. With over 47 projects being proposed, including open cut mines, coal seam gas (CSG) and power stations, the economy is experiencing increased investment in mining and energy. The main planned and proposed resource production projects in the Western Downs region are provided in Table 1.

Table 1 Planned and Proposed Resources Production in Western Downs

Project	Company	Project Description
Wandoan Coal Project (Proposed)	Xstrata	The Wandoan Coal Project has been established to investigate the possibility of opening an open-cut thermal coal mine immediately west of the Wandoan township.
Elimatta (Proposed)	Taroom Coal	The Elimatta Project has been established by Taroom Coal to investigate the possibility of developing an open-cut thermal coal mine 35km west of the Wandoan township. It is planned to produce 5Mt of export product coal per annum.
Chinchilla UCG Projects (Completed)	Linc Energy	The project gasified 35,000 tonnes of coal at Chinchilla, by far the largest and the longest even in the Western world. The UCG process was operated without uncontrolled impacts on groundwater.
Spring Gully Power Station (Proposed)	Origin Energy	Origin Energy proposes to develop a 1000 MW combined cycle gas fired power station at Spring Gully, 80 kilometres northeast of Roma. The power station will be constructed in two 500MW stages. Fuel for the power station would be provided from the adjacent Spring Gully CSG gas plant. Cooling water would be source from the saline water produced by the CSG process.
Cameby Downs Project (Stage 1)	Syntech	The Queensland Government granted a thirty years mining lease for the Cameby Downs site (Chinchilla) on 31 July 2008 for Stage 1 mining operation. The capacity will be extended in 2011 to produce product coal at an annual rate of the order of 15 Mtpa from 2013 onwards.
Surat Gas Project (Proposed)	Arrow Energy	The proposed project is expected to meet the growing demand for gas supplies to both domestic and potential export markets. Areas covered by the Project include Arrow's 300 existing gas production wells at Tipton West, Daandine, Stratheden and Kogan North near Dalby, and a broader area extending from Wandoan to Dalby and south to Millmerran and Goondiwindi, in which Arrow holds petroleum tenure and environmental approvals for exploration.

Source: http://www.wandoancoalproject.com.au/about_business.cfm. Powering the Future, Parsons Brinckerhoff Notes, June 2009. http://www.dip.qld.gov.au/resources/project/linc/linc_energy_ias.pdf. http://www.originenergy.com.au/about/files/InitialAdviceSmentv5.pdf. http://www.derm.qld.gov.au/register/p03029aa.pdf. http://www.arrowenergy.com.au/page/Projects/Surat_Gas_Project/.

The major project proposed for Wandoan is the Wandoan Coal Project, a 30Mtpa thermal coal mine to be developed by Xstrata Coal. It has been estimated that this project will employ between 500 and 600 people during operations. The project is to have a construction period of two to three years with the start date to be determined once the project receives all necessary approvals. The project obtained environmental approval from the Queensland Government in accordance with the conditions in the Coordinator General's Report which was released on 12 November 2010.[1]

However, despite having obtained environmental approval, the Wandoan Coal Project, and any future coal projects in the region, is contingent upon the establishment of the

[1] *Wandoan Coal Project*. Xstrata Coal, 12 Nov. 2010. Web. 7 Dec. 2010. <http://www.wandoancoalproject.com.au/>.

Surat Basin Rail connection and the Wiggin Island Coal Export Terminal (WICET). These infrastructure projects are necessary due to constraints within the Western corridor via Brisbane.

The Elimatta project is a smaller scale coal project but is one of a large number of resource developments occurring in the Western Downs. Nevertheless, its economic impact is significant and contributes to the economic development of the region.

The project will add $725 million to Gross State Product (GSP) during the construction of the mine facilities and the railway. It is estimated that around one-third of impact will be generated in the region.

During the life of the mine the average annual impact on GSP will be $564 million of which 42% will be generated in the region. The project will support and sustain over 687 full-time equivalent jobs, including nearly 500 in the Western Downs and Wide-Bay region.

The short-term and long-term beneficial and adverse impacts

The project increases economic activity in the region and our impact analysis shows a significant proportion of the value added from the project will originate in the region. The project will increase population in the region and this will increase consumption demand in the region, whether the population increase is domiciled or fly-in fly-out. Regional incomes will increase by $150 million during the construction phase and by an average $230 million per year during the operation of the mine.

The increase in regional economic activity will create and support employment in and beyond the region. With the region arguably at full employment the proposed strategy of sourcing labour from Wide-Bay will reduce regional wage pressures to some degree and create employment opportunities and increased demand in a less performing region of the State.

The location of the project and its development of rail infrastructure is a positive factor for the future development of deposits west of Elimatta.

The project will have a number of impacts on the local environment. However, the environmental assessments have not revealed any critical environmental impacts. Mitigation is planned for several impacts, particularly the impact of disturbing Horse Creek. The cost benefit analysis assessed the value of all environmental impacts to be $245 million in present value terms. The areas of impact are flora, fauna, visual amenity, aquatic ecosystems and greenhouse gas release. The largest environmental impact is the value of the greenhouse gases released by the project.

The project will also disturb 2,500 hectares of grazing land, although much of this land will be rehabilitated. The cost benefit analysis has included the foregone income from grazing as a cost of the project.

After balancing the social, environmental and economic benefits and costs the project is assessed to have a positive impact on the Queensland economy. In net present value terms the project will deliver $1.92 billion in net benefits or if expressed as a ratio of benefits to cost the project has a Benefit Cost Ratio (BCR) of 1.19. A project with a BCR of greater than 1 is considered to increase economic well-being.

Potential for direct equity in the project of local businesses or community

The proponent is a listed public company and the local community is able to purchase shares of the company. Beyond purchasing equities here is little scope for local businesses or the community to take a direct equity interest in the project.

Manufacturing, retail, wholesale and transport businesses in the Western Downs are potential service providers to the project.

Cost to governments of infrastructure

Upgrades to regional infrastructure are regional rather than project issues. It is expected that upgraded export infrastructure will be paid for by users over the life of the project. No significant impact on regional road infrastructure from the project is expected.

Implications for future development in the locality

The objectives of the regional development plans are to build the region's economic strength and enhance the business opportunities for the Western Downs. The proposed project will contribute significantly to these objectives by generating employment and income in the region.

The project is consistent with the development of the region with a competitive advantage in the development of coal and energy exports. The analysis shows that moving from grazing to coal mining produces a significant increase in the value of economic output.

Potential impact of major hazards

There are no major hazards identified with the project which would impact the regional economy.

Distributional impacts and mitigation

The table below identifies major stakeholder groups that may be affected by the Elimatta project and whether the impact of the project is anticipated to be positive or negative.

Table 2 Stakeholder impact matrix

Stakeholder	Description of impact	Net Impact	
		Positive	Negative
Shareholders of Taroom Coal Pty Ltd	Shareholders will benefit from the project by the value of the expected net revenues	✓	
Wandoan and Taroom community	The Wandoan and Taroom local community will benefit from employment opportunities, economic growth, improved infrastructure, enhanced opportunities for existing businesses to supply the project, new businesses for the local community. Adverse impacts identified by the community concern the impact of the project on traditional lifestyle and environment.	✓	
Existing land users (graziers)	The main land use is cattle grazing with some fodder cropping to supplement grazing on native and introduced pastures.		✓
Other regional industries	Opportunities exist for other industries to supply inputs to the project. For example, fly-in fly-out services will be provided by a regionally based aviation operator, engineering services, mechanical repair, catering, professional services, fuel etc are likely to be sourced locally.	✓	
South West Queensland economy	A reasonably high proportion of the total economic impacts will be retained in the South West Queensland economy. However, the project is not so large compared to the size of the regional economy to be likely to create supply constraints and therefore significant upward pressure on wages and input prices for other existing industries.	✓	
Wide-Bay economy	Provides additional employment in an area of above average unemployment and long term unemployment.	✓	
Port and rail infrastructure providers	Providers of port and rail infrastructure in the region will benefit as a result of the additional revenue associated with the increased tonnages of coal that will be transported in the region.	✓	
Queensland Government	The Queensland Government will benefit directly from the revenue generated from the scheme and by the contribution of the scheme to its development objectives for the region.	✓	
Commonwealth Government	The Commonwealth government benefits through increased taxation revenue.	✓	

For the stakeholders directly impacted by the development the net impacts have been quantified in Table 3.

Table 3 Net impact by stakeholder group

Stakeholder group	NPV (million)
Resource developer	$952
Commonwealth Govt	$503
Qld Government	$712
Existing Land Users	-$0.74
Non-market impacts	-$246
Total Net Impact	$1,921

Lost or gained economic opportunities of the project

The project will expand the regional economy and provide employment throughout the State. The lost economic opportunity is the loss of grazing land in the region during the project and for those areas that are no longer suitable for grazing after remediation.

Impact on local property prices

The housing markets in the Western Downs have become tighter over recent years, due to increased demand driven by the energy sector. From 2003 to 2011, median house value in Western Downs has increased by 253.3%to $265,000 in June 2011. This compares to the median house price of $407,499 for Queensland, as of June 2011. Indicative gross rental yields are recorded at 5.6%.

The project is unlikely to have a significant long-run impact on local property prices in Western Downs because a significant proportion of the workforce is not expected to live in the region. In any case it would be difficult to isolate the affect of this project from other projects in the Western Downs.

The project will have a small, positive impact on property prices in the Wide-Bay region through the increase of employment opportunities and income.

Mitigation and enhancement strategies and monitoring regimes

The results of our analysis do not indicate the need for separate mitigation or enhancement strategies as the project impacts are market driven.

Significant environmental issues will be addressed through existing environmental regulation.

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Introduction

Synergies Economic Consulting Pty Ltd (Synergies) was engaged by AustralAsian Resource Consultants (AARC), on behalf of Taroom Coal Pty Ltd to prepare a report addressing the Terms of Reference (ToR) relating to the economic impact of the Elimatta project as part of the Environmental Impact Statement (EIS).

The Final ToR issued by the Environmental Protection Agency requires the assessment of economic impact to incorporate:

> *Description of environmental values*
>
> Describe the existing economic environment that may be affected by the proposal. The character and basis of the local and regional economies should be described including:
>
> - economic viability (including economic base and economic activity, future economic opportunities, current local and regional economic trends, in particular drought and rural downturn etc); and
> - historical descriptions of large-scale resource developments and their effects in the region.
>
> The economic impact statement should include estimates of the opportunity cost of the project and the value of ecosystem services provided by natural or modified ecosystems to be disturbed or removed during development.
>
> *Potential impacts and mitigation measures*
>
> Define and describe the objectives and practical measures for protecting or enhancing economic values, to describe how nominated quantitative standards and indicators may be achieved for economic management, and how the achievement of the objectives will be monitored, audited and managed.
>
> An economic analysis, including a cost-benefit analysis, should be presented from national, state, regional and local perspectives as appropriate to the scale of the project. The general economic benefits from the project should be described.
>
> At a level of detail appropriate to the scale of the project, the analysis is to consider:
>
> - the significance of this proposal on the local and regional economic context;

- the long and short-term beneficial (e.g. job creation) and adverse (e.g. competition with local small business) impacts that are likely to result from the development;
- the potential, if any, for direct equity investment in the project by local businesses or communities;
- the cost to all levels of government of any additional infrastructure provision;
- implications for future development in the locality (including constraints on surrounding land uses and existing industry);
- the potential economic impact of any major hazard identified in section 4.13;
- the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups;
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future; and
- impacts on local property values.

Consideration of the impacts of the project in relation to energy self-sufficiency, security of supply and balance of payments benefits may be discussed. Attention should be directed to the long and short-term effects of the project on the land-use of the surrounding area and existing industries, regional income and employment and the state economy. The scope of any studies should be referred to the government for input before undertaking the studies.

For identified impacts to economic values, suggest mitigation and enhancement strategies and facilitate initial negotiations towards acceptance of these strategies. Practical monitoring regimes should also be recommended.

To address the ToR three related streams of economic analysis were undertaken:

- regional economic analysis, which studied the economic history and characteristics of the region relevant to the impacts of the Elimatta project;
- cost benefit analysis of the project to assess its impact on economic welfare; and
- economic impact analysis to identify the major local, state and national economic impacts from the project.

The results of this analysis were used to respond to the questions posed in the ToR.

The analysis was based on publicly available economic data and information provided by AARC and Taroom Coal.

The remainder of this report is structured as follows:

- the regional economic analysis is in Section 2;
- the cost benefit analysis is in Section 3; and
- the impact analysis is in Section 4.

1 Regional Economy

1.1 Regional location of the project

The Elimatta Project (the Project) is an initiative of Taroom Coal Proprietary Limited (Taroom Coal), a wholly owned subsidiary of Northern Energy Corporation. The Project site is situated within the Surat Basin coal province in Queensland.[2] Figure 1 shows the location of the project.

The Project involves an open-cut pit mining thermal coal at up to 8 Mtpa run-of-mine (ROM) coal to produce 5 Mtpa of product coal for export. Major elements of the project include:

- open-cut mining over approximately 2,500 hectares;
- construction and operation of a coal handling and preparation plant (CHPP) and associated mine infrastructure over approximately 100 hectares;
- transportation of ROM coal from the pit to the CHPP via haul trucks on a dedicated haul road or by conveyor within the Elimatta lease;
- development of a rail line to connect the Elimatta project to the Surat Basin Rail, north of Wandoan; and
- rail loading at the project site and transportation of product coal to the Port of Gladstone.

[2] See, http://www.derm.qld.gov.au/environmental_management/impact_assessment/eis-processes/ellimatta_project.html and "Elimatta Project Feasibility Study-Preliminary Information, Taroom Coal Pty Ltd, 7th September 2010 and ACIL-Tasman (2009) Fly in Fly Out Regional Impact Assessment.

Figure 1 Location of the Project

Data source: Northern Energy Corporation Limited, Feasibility Study Report, Volume 1 Development, July 2010.

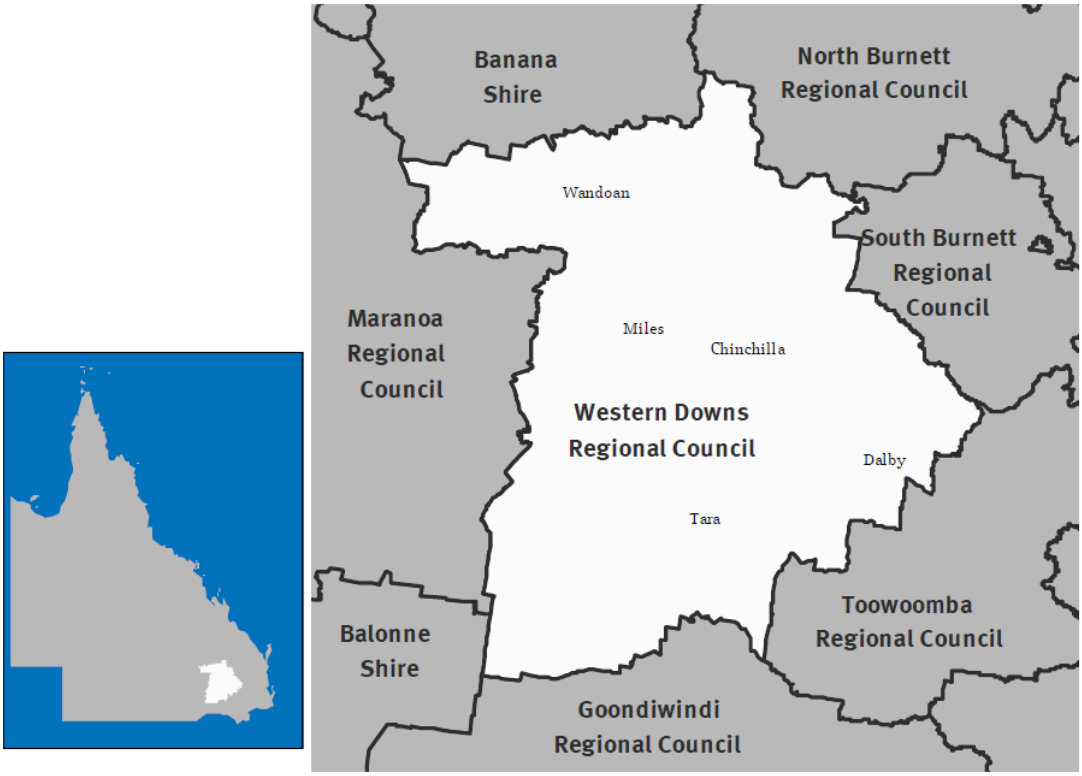
The Project is located approximately 35km west of the township of Wandoan in the Western Downs Regional Local Government Area (Western Downs)[3] and

[3] ABS, Australia Standard Geographical Classification (ASGC), July 2010. (cat. No. 1216.0)

approximately 380km northwest of Brisbane. The Western Downs is among the top 20 largest councils in Queensland. It spans an area of 38,039 square kilometres and services a population 30,018.[4]

The major towns in the Western Downs include Chinchilla, Dalby, Miles, Tara and Wandoan. Figure 2 shows the regional map of Western Downs.

Figure 2 Map of the regional economy



Data source: OESR (2011), Residential land development activity profile: Western Downs Regional Council (June 2011), Queensland Treasury

While this report is based on the most recent data available, it should be noted that data prior to 2008 are based on the pre-amalgamation Local Government Areas.

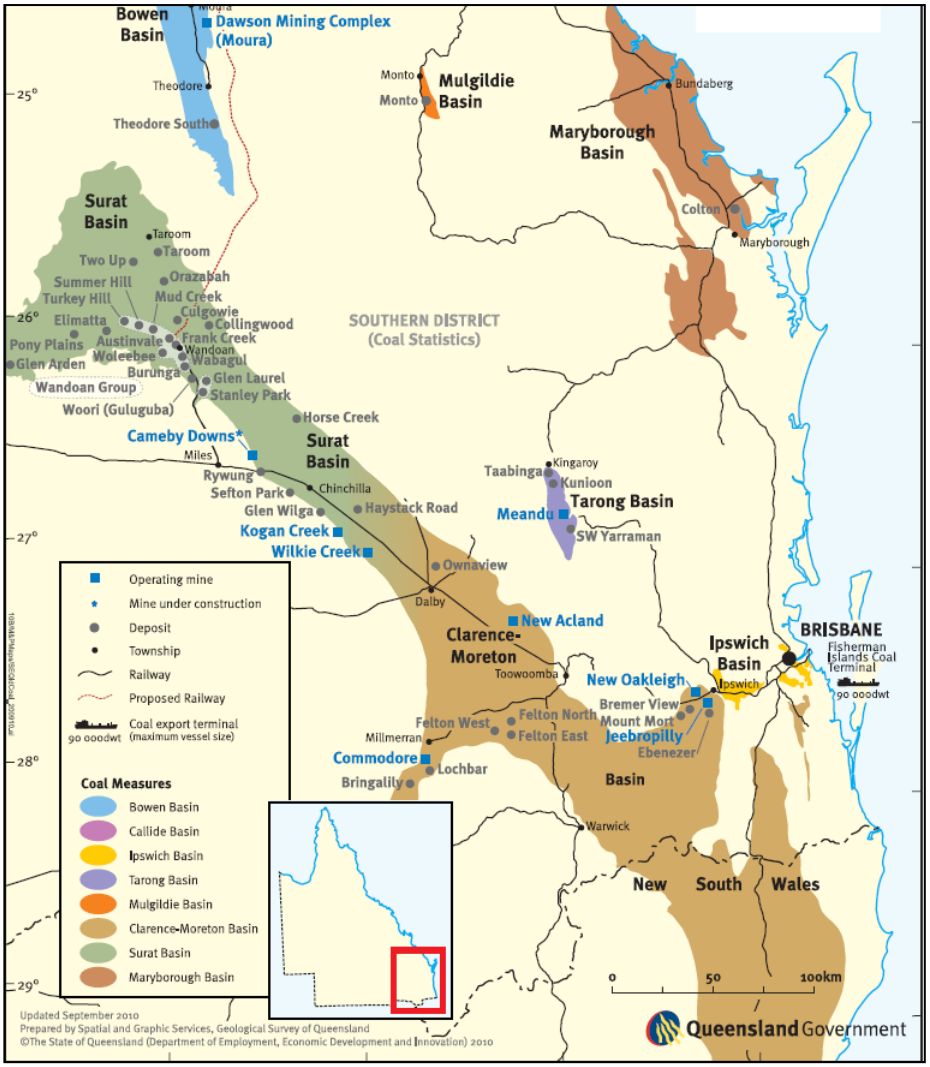
The Projected is located in the resource-rich Surat Basin[5], an area predicted to be one of the main drivers of the Queensland economy through the development of its energy resources. The Surat Basin region is administered by three regional councils –

[4] http://www.wdrc.qld.gov.au/council/about_council.shtml

[5] The Surat Basin region covers a large area of 122,655 km^2 and as of 2006 was inhabited by 195,296 people, less than 5% of Queensland's total population.

Toowoomba Regional Council, Western Downs Regional Council and Maranoa Regional Council.[6] A map of the Surat Basin is provided in Figure 3.

Figure 3 The Surat Basin region



Data source: Queensland Government, Department of Mines and Energy http://mines.industry.qld.gov.au/assets/coal-pdf/se_qld_coal_map_10.pdf

The immediate impacts of the Project are projected to fall within the Western Downs area. On the other hand, as a significant part of the workforce required for the Project will be sourced from the Wide Bay Burnett region, the direct economic impacts

[6] CSIRO. Surat Basin Scoping Study—enhancing regional and community capacity for mining and energy driven regional economic development. June 2008.

induced by the project will also flow-on to the Wide Bay Burnett region in the form of increase employment and income. Accordingly, economic impact assessment of the Project also needs to consider the likely economic impacts of the Project upon the Wide Bay Burnett region. A profile of employment and income, as well as the social disadvantage of the Wide Bay-Burnett region is discussed in section 1.5.

1.2 Regional economic development

1.2.1 Surat Basin region

The economic base of the region is primarily agriculture and mining. From the latest available regional data (2004-05) agriculture accounted for 13.3% of Surat Basin's Gross Regional Product (GRP) and accounted for 18.2% of the total value of agricultural production in Queensland. Mining accounted for 9.9% of GRP. The contribution of mining is likely to exceed that of agriculture in the future.

The Surat Basin region contains substantial, but currently largely undeveloped, natural resources. A summary of the available resources and the resources identified as having significant increase in value adding activity over the short to medium term are summarised in Table 4 below.

Table 4 Resources in Surat Basin Region

Type of Resource	Details
Coal	Estimates indicate there are approximately 6.3 billion tonnes of raw coal (*in situ*) in the Surat Energy Resource Province.
Oil	Initial reserves of oil in the Surat Energy Province have been estimated at approximately 6,092 ML, with approximately 1,123 ML estimated to be remaining.
Water (from oil wells)	Water production from oil wells was relatively steady between 1996/97 and 2003-04, with between 1,500 ML and 2,000 ML produced each year.
Condensate	Production of condensate in the Surat Basin Energy Resources Province has declined markedly from the levels recorded in the early to mid 1990s, from approximately 40ML in 1996/97 to around 10 to 20 ML per year. This has likely been influenced by the near depletion of identified initial reserves, with approximately 35 ML of condensate estimated to be remaining after the 2004/05 financial year.
LPG	LPG production in this region has declined at a similar rate to condensate production, with production levels declining from around 80 ML in the mid 1990s to between 10 and 25 ML each year since 1999/00. Approximately half of the initial 2,600 ML of LGP reserves in the Surat Energy Resources Province remain.
Gas	Conventional natural gas production in the Surat Energy Resources Province has remained relatively steady over the past 10 years at approximately 15 to 20 PJ per annum.
Coal seam gas (CSG)	CSG in the Surat Energy Resources Province has increase significantly since 1997-98, at an annual average growth of 59.1%. There is currently 18,000 PJ of proven and probable (2P) coal seam gas reserves in the region, accounting for approximately 65% of Queensland's known reserves.

Source: AECgroup. Creating Regional Economic Development by Value Adding to the Surat Energy Resources Province Scenarios, Findings and Strategy, Findings and Strategy. Chapter 2. Surat Energy Resources Province Overview.

The per capita income level in the Surat Basin region is lower than the Queensland average, however there is the potential for economic activity relating to coal mining, coal export, and coal seam gas to increase per capita income levels in the future.[7]

1.2.2 Western Downs

Western Downs is a long-established agricultural area, and the economy has traditionally been based on agriculture. Murilla and Wambo are the regional centres for cotton, sorghum, wheat, barley cultivation, timber production, cattle and sheep grazing, etc. Dalby has historically been a strategic regional centre for receiving and marketing a large proportion of Queensland's agricultural and livestock production. Tara was established on three of the strongest traditional rural industries in Australia—wool, grain and beef. Chinchilla has a developed diary industry – taking advantage of its position as a regional butter production centre.

The Western Downs is also a resource-rich region with a $100 billion energy industry expected to develop. Gross Regional Product (GRP) was $1.875 billion in 2008-09. Mining is the largest contributor to GRP followed by Agriculture, Fishing & Forestry.[8]

Coal reserves in the Surat Basin cover a large area from Taroom to Dalby. In addition to coal extraction, the Western Downs has coal bed methane and underground coal gasification operations. With over 47 projects being proposed, including open cut mines, coal seam gas (CSG) and power stations, the economy is experiencing increased investment in mining and energy. This creates the potential to alter the character of the regional areas from purely agricultural towns into towns with much broader economies and increasing involvement with the resources sector. Oil, gas and coal exploration and exploitation will be a key driver for economic growth and development in this region for the next decade and beyond. The main planned and proposed resource production projects in the Western Downs region are provided in Table 5.

[7] Schandl, H. & Darbas, T. (2008). Surat Basin Scoping Study: Enhancing regional and community capacity for mining and energy driven regional economic development.

[8] Western Downs Regional Council. (2012). Western Downs Regional Council Business Profile. Available from: http://www.wdrc.qld.gov.au/wdrc-profile [Accessed 3 February 2012].

Table 5 Resources Production in Western Downs

Project	Company	Project Description
Wandoan Coal Project	Xstrata	The Wandoan Coal Project has been established to investigate the possibility of opening an open-cut thermal coal mine immediately west of the Wandoan township.
Elimatta	Taroom Coal	The Elimatta Project has been established by Taroom Coal to investigate the possibility of developing an open-cut thermal coal mine 35km west of the Wandoan township. It is planned to produce 5Mt of export product coal per annum.
Chinchilla UCG Projects	Linc Energy	The project gasified 35,000 tonnes of coal at Chinchilla, by far the largest and the longest even in the Western world. The UCG process was operated without uncontrolled impacts on groundwater.
Spring Gully Power Station	Origin Energy	Origin Energy proposes to develop a 1000 MW combined cycle gas fired power station at Spring Gully, 80 kilometres northeast of Roma. The power station will be constructed in two 500MW stages. Fuel for the power station would be provided from the adjacent Spring Gully CSG gas plant. Cooling water would be source from the saline water produced by the CSG process.
Cameby Downs Project (Stage 1)	Syntech	The Queensland Government granted a thirty years mining lease for the Cameby Downs site (Chinchilla) on 31 July 2008 for Stage 1 mining operation. The capacity will be extended in 2011 to produce product coal at an annual rate of the order of 15 Mtpa from 2013 onwards.
Surat Gas Project	Arrow Energy	The proposed project is expected to meet the growing demand for gas supplies to both domestic and potential export markets. Areas covered by the Project include Arrow's 300 existing gas production wells at Tipton West, Daandine, Stratheden and Kogan North near Dalby, and a broader area extending from Wandoan to Dalby and south to Millmerran and Goondiwindi, in which Arrow holds petroleum tenure and environmental approvals for exploration.

Source: http://www.wandoancoalproject.com.au/about_business.cfm. Powering the Future, Parsons Brinckerhoff Notes, June 2009. http://www.dip.qld.gov.au/resources/project/linc/linc_energy_ias.pdf. http://www.originenergy.com.au/about/files/InitialAdviceSmentv5.pdf. http://www.derm.qld.gov.au/register/p03029aa.pdf. http://www.arrowenergy.com.au/page/Projects/Surat_Gas_Project/.

Also, industries providing components, parts and services for the energy sector are growing in the region. Key infrastructure service provider projects include the Surat Basin Railway, Wiggins Island Coal Terminal and the Nathan Dam. This is significant given predictions that the energy resources sector has the potential to more than triple the GRP.[9]

1.2.3 Wandoan

Wandoan is located a few hundred metres off the Leichhardt Highway 66km north of Miles and 405 km west of Brisbane. The establishment of the town was based on the

[9] *Surat Basin*. Blue Horizons Property. Web. 11 Nov. 2010 <http://www.bluehorizonsproperty.com/file/Hotspotting-the-Surat-Basin.pdf>.

establishment of Juandah Station in 1853. The township grew significantly after World War II when large tracts of brigalow country were opened up to soldier settlers.

Today, Wandoan is a small settlement serving the surrounding cattle and wheat industries. It produces some of the best Prime Hard wheat in Australia. Wandoan is also a major cattle trucking centre.

With the recent resource development in the Surat Basin Energy Province, Wandoan is playing an increasingly important role in the emerging energy industry in the Western Downs. The major project proposed for Wandoan is the Wandoan Coal Project, a 30Mtpa thermal coal mine to be developed by Xstrata Coal. It has been estimated that this project will employ between 500 and 600 people during operations. The project is to have a construction period of two to three years with the start date to be determined once the project receives all necessary approvals. The project obtained environmental approval from the Queensland Government in accordance with the conditions in the Coordinator General's Report which was released on 12 November 2010.[10]

However, despite having obtained environmental approval, the Wandoan Coal Project, and any future coal projects in the region is contingent upon the establishment of the Surat Basin Rail connection and the Wiggin Island Coal Export Terminal (WICET). These infrastructure projects are necessary due to constraints within the Western corridor via Brisbane.

The economic feasibility of the Surat Basin Rail connection is currently being investigated while the approval process for the WICET is more advanced, with the terminal operator announced in September 2010 that it has secured capacity commitments totalling 27Mtpa from eight coal producers.

1.3 Regional economic strategy and development plans

A number of economic strategies and development plans have been developed for the Western Downs. The strategies and plans relevant to the project are described in Table 6.

[10] *Wandoan Coal Project*. Xstrata Coal, 12 Nov. 2010. Web. 7 Dec. 2010. <http://www.wandoancoalproject.com.au/>.

Table 6 Economic Strategy and Development Plans

Plan	Administering Body	Objectives
Western Downs Regional Council Town Planning Schemes (or land use planning)	The previous Councils that amalgamated to form Western Downs Regional Council—Chinchilla, Murilla, Taroom, Dalby, Tara, Wambo.	It aims to achieve important social, cultural and environment management goals. It is to make living and working environments safe, healthy, efficient and aesthetically pleasing through the arrangement of land uses. It also provides certainty for people by outlining to them what can be expected to occur in their local communities.
Business Growth Task Group 2010-2011 Action Plan	Western Downs Regional Council in partnership with six Chambers[1] of Commerce from within the Western Downs Regional Council.	The Action Plan aims to develop a business climate in Western Downs that is "conductive to business". Some of the key elements focused on are: Reasonably priced lands; Adequate Infrastructure; A well-trained workforce; relevant workforce skills.
Queensland Skill Plan 2008-Skill Formation Strategy	Western Downs Regional Council, under the initiative of Queensland Government—the Department of Education and Training.	The skill formation strategy approach seeks to gain an understanding of workforce issues holistically, recognising that effective skilling can only occur when planned as part of the broader workforce context and the future of the industry or community. It also focus on identifying issues common to an industry or community that are best addressed by their combined efforts or that cannot be addressed as an individual enterprise.
South East Queensland Country—Tourism Opportunity plan 2009-2019	South East Queensland Country [2]	Identify new and upgraded tourism product that meets future visitor expectations and demands; Identify the need for new investment in infrastructure that supports the ongoing development of tourism; Provide relevant research based information on tourism supply and demand; and provide an agreed focus and mechanisms for engagement with the tourism industry, infrastructure and private investors.
Rural Economic Development and Infrastructure Plan—Centres of Enterprise Initiative	The Queensland government has named six Queensland regions as Centres of Enterprise.	The initiative works to build the economic strength of Queensland's regions. It takes advantage of the region's unique strengths and key opportunities to make the region known worldwide for their innovation and expertise.
2009-2013 Corporate Plan	Western Downs Regional Council	It aims to shape the future direction of the region and services as a roadmap in the five years for broad strategic priorities. Theses priorities include People and Communities; Planning for Liveability; Utility Services; Empowering the team; Growth and Opportunity; Environment; Infrastructure; Business Systems and Technology.
Regional and Local Community Infrastructure Program (RLCIP)	The Federal Government	The program is part of the Nation Building Economic Stimulus Plan since 18 November 2008. $2.144 million Federal Government grant was allocated for 28 projects across the region selected by Western Downs Regional Council.
Western Downs 2050 Community Plan	Western Downs regional council	It will be a guide for the future planning of the Council area. In particular those matters important to the quality of life—like how to

Plan	Administering Body	Objectives
		get the best results for the communities from resource development activity and how to ensure that community services and facilities, health, education, sport and recreation continue to meet residents' needs.

Note: [1]Chinchilla Community, Commerce and Industry Inc; Dalby Chamber of Commerce & Industry Inc; Jandowae Heritage & progress Association; Miles & District Chamber of Commerce; Tara Business & Industry Group/Tara Futures Group; and Wandoan Chamber of Commerce. [2] South East Queensland Country is a partnership between five Regional Tourism Organisations to promote and develop "country" short-break holidays for consumers in SEQ and NSW. The region offers non-coastal, country experience around Brisbane and includes the distinctive sub-destinations of Queensland's Southern Downs and Granite Belt, Toowoomba and the Darling Downs, South Burnett including the Bunya Mountains, Sunshine Coast Hinterland and Greater Brisbane Country.

Sources: http://www.wdrc.qld.gov.au/services/town_planning_schemes_regional.shtml;

Dalby Regional Council, Draft 2009-2013 Corporate Plan (Final Version 8/12/08);
http://www.wdrc.qld.gov.au/news/2010/news_mr_rlcip_official_openings_chinchilla_miles_tara.shtml

The objectives of these plans are to build the region's economic strength and enhance the business opportunities for the Western Downs. The proposed project will contribute significantly to these objectives by generating employment, training and business development opportunities for local communities and surrounding areas.

1.4 Industry structure

The total value of agricultural production in Western Downs in 2005-06 was $622.0 million, 7.1% of the Queensland total. Crops accounted for $204.5 million or 32.9% of the region's total value of agricultural production, livestock slaughtering accounted for $410.5 million (66.0%) and livestock products were valued at $7.0 million (1.1% of the total). The region produced 4.9% of the total value of crops in Queensland, and 10.0% and 1.7% of the total value of Queensland livestock slaughtering and livestock products respectively.[11]

The manufacturing sector accounted for 6.1% of the GRP of the Western Downs in 2008-09 (which totalled $1,875.3 million)[12].The main manufactured products include white goods, air seeders, engines, Clark tanks and Bushman tanks.[13]

With an increasing number of energy projects being proposed and built, the energy sector has the potential to more than triple its gross regional product. Strong growth prospect is also evident in the electricity, gas and water supply sector, with 30.3% growth rate having been achieved in 2008-09.

[11] Australian Bureau of Statistics, Agricultural Commodities, Australia, 2005-06, (Cat. no. 7125.0).

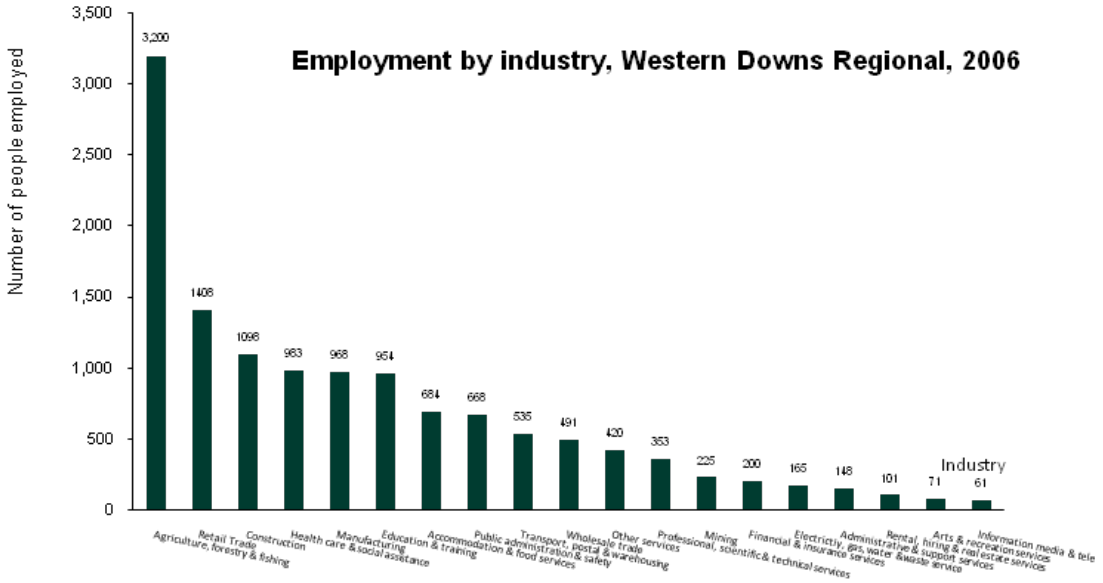
[12] Lawrence Consulting (2009). Western Downs Regional LGA Economic and Demographic Profile 2009.

[13] Dalby 2013 Strategy—The Prospectus for Dalby and District. December 2003.

Professional services, transport and manufacturing also experienced greater than 15% annual growth.[14] Service sectors and tourism industry are also important industries in the Western Downs.

The industry sectors in which residents of the region are employed are illustrated in Figure 4. The figure shows that the major industries in Western Downs are agriculture, forestry and fishing in terms of the number of people employed.

Figure 4 Industry of employment



Data source: ABS, Census of Population and Housing, 2006, Basic Community Profile – B42.

1.5 Socio-economic profile

This section of the report provides an economic profile of the Western Downs, which includes regional employment, labour force profile, income level and industry structure. A significant portion of the data is sourced from the 2006 ABS Census, as this is the most recent and comprehensive data source for the regional economy.

[14] Western Downs Regional Council Annual Report, 15 March 2008 to 30 June 2009 (Post-changeover period).

1.5.1 Population

As at 30 June 2010, the estimated resident population of Western Downs was 32,071 persons (0.7% of Queensland population)[15]. Major population centres in Western Downs include Dalby, Chinchilla, Miles, Jandowae, Tara, Wandoan and Bell (see Table 7).

Table 7 Estimated resident population by population centres, Western Downs Regional Council, 30 June 2010

Population centres	Estimated resident population
Dalby	11097
Chinchilla	4445
Miles	1259
Jandowae	837
Tara	807
Wandoan	420
Bell	301
Western Downs	32071

Source: ABS, Regional Population Growth, 2009-10, (cat no. 3218.0) and unpublished data. Data obtained using QLD OESR's Queensland Regional Profile systems.

For the past 5 years from 2005 to 2010, the region's population has been growing at an average annual growth rate of 1.5%, which is lower than Queensland's growth rate of 2.5%. The estimated resident population by age of Western Downs is shown in Table 8.

Table 8 Estimated resident population by age, by local government area, Western Downs Regional Council, 30 June 2010

Population by age	Western Downs		Queensland	
	Number	%	Number	%
0-14	7308	22.8	901542	20.0
15-24	3898	12.2	644985	14.3
25-44	8338	26.0	1278876	28.3
45-64	8195	25.6	1121066	24.8
65+	4332	13.5	567381	12.6

Source: ABS, Population by Age and Sex, Regions of Australia, 2010, cat no. 3235.0.

[15] ABS, Regional Population Growth, Australia, 2009-10, cat no. 3218.0 and unpublished data. Data obtained using QLD OESR's Queensland Regional Profile systems.

The distribution of the region's population by age is generally consistent with that for Queensland as a whole. In particular, about half of the people living in Western Downs are aged between 25-64 years.

In addition to the estimated resident population in Western Downs, the resource industry in the region attracts many non-resident production, construction and maintenance workers directly employed by the industry, as well as the non-resident construction workforces of major infrastructure projects. Some 1,250 of the 2,540 non-resident workers of the Surat Basin total stayed in Western Downs in June 2010. Together, the urban centres of Chinchilla (360 workers) and Dalby (290 workers) accounted for just over half (51%) of the non-resident worker population in Western Downs[16].

1.5.2 Labour force

The Department of Education, Employment and Workplace Relations (DEEWR) releases quarterly data on Small Area Labour Markets. Based on this data for the September quarter 2011, the unemployment rate in the Western Downs was 4.4%, with 756 people aged over 15 years unemployed, and 17,241 people in the labour force. In comparison, Queensland had a smoothed unemployment rate of 5.5%.[17] The Western Downs residents have a lower level of education attainment compared to Queensland average. At the time of the 2006 Census, there were 7,776 persons in the region aged 15 years and over with year 11 or 12 (or equivalent) stated as their highest level of educational attainment (that is 35.6 percent of all persons aged 15 years and over). This compares with 49.5% in the whole of Queensland.[18]

For post-school qualification, there were 8,632 persons aged 15 years and over with a qualification, 39.5% of the population in this age group, less than the whole of Queensland rate of 50.4%.[19]

The occupation in which residents are employed is an indicator of the skills base of the region. Figure 5 below shows that the most common occupations in Western Downs are Manager (which in the context of this region relates to farm mangers)[20] followed by

[16] Queensland Treasury, Office of Economic and Statistical Research, Demography and Planning. (2010). Surat Basin Population Report, 2010. June 2010, pp. v.

[17] DEEWR, Australian Government Department of Education, Employment and Workplace Relations, Small Area Labour Markets Australia.

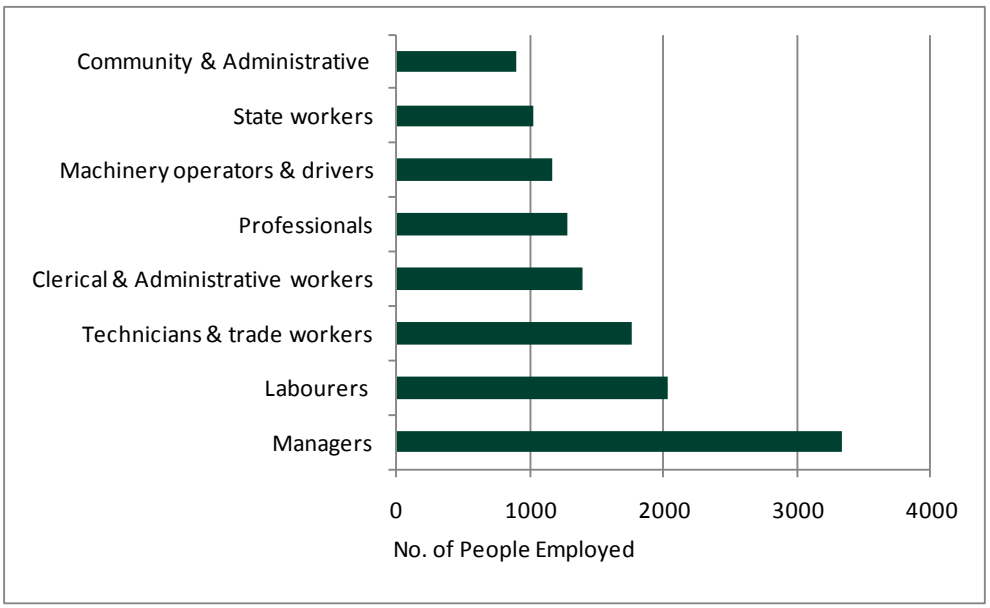
[18] ABS, Census of Population and Housing, 2006, Basic Community Profile, B05

[19] ABS, Census of Population and Housing, 2006, Basic Community Profile, B39.

[20] The managers here mainly consist of farm managers.

Labourers, Technicians and Trades Workers. This type of skill profile if often observed in agricultural regions.

Figure 5 Employment by occupation, Western Downs, 2006



Data source: ABS, Census of Population and Housing, 2006, Basic Community Profile-B44.

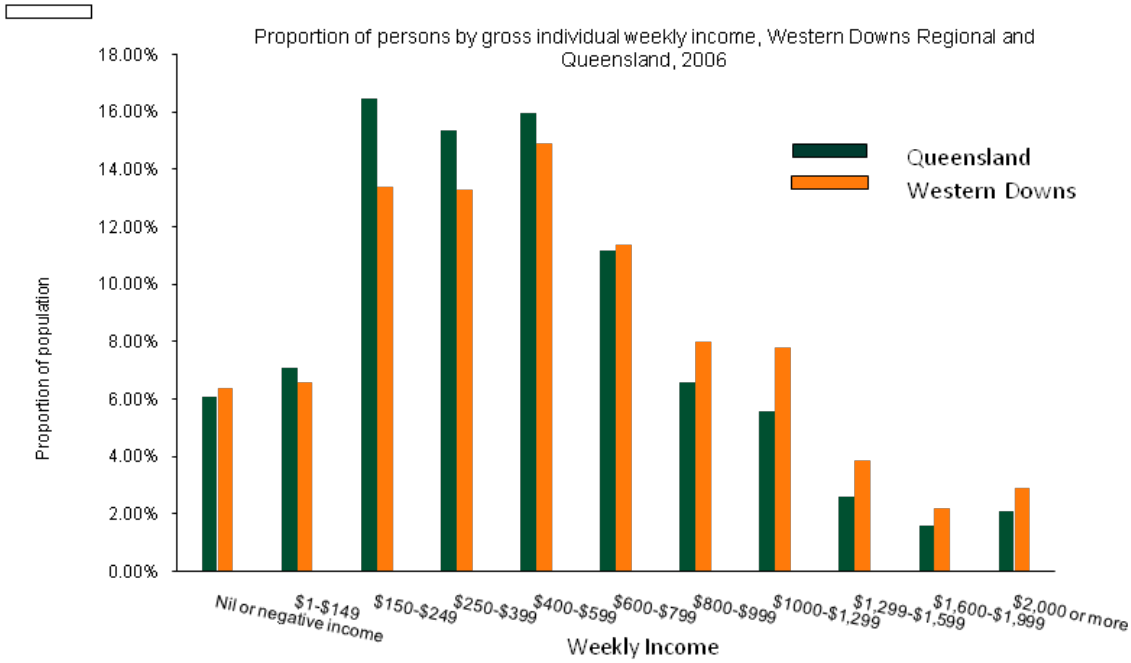
1.5.3 Income

At the time of the 2006 Census, there were 9,840 persons aged 15 years and over in the Western Downs region who stated their gross individual weekly income was less than $400. This represented 45.1% of all persons aged 15 years and over, higher than the 39.7% recorded in Queensland.

In comparison, there were 452 persons aged 15 years and over in the Western Downs who stated their gross individual weekly income was more than $2,000 (2.1% of all persons aged 15 years and over, which is lower than the 2.9% average of Queensland).

The distribution of income is shown in Figure 6.

Figure 6 Gross Individual Weekly Income



Note: The data is based on persons aged 15 years and over. And the government division is based on ASGC 2010.
Data source: Australian Bureau of Statistics, Census of Population and Housing, 2006, Basic Community Profile—B16.

1.5.4 Socio-economic index of disadvantage[21]

Socio-Economic Indexes for Areas (SEIFA)[22] is a summary measure of the social and economic conditions of geographic areas across Australia. SEIFA includes several indexes, which are generated at the time of the ABS Census of Population and Housing. In 2006, a Socio-Economic Index of Disadvantage was produced, ranking geographical regions to reflect disadvantage of social and economic conditions. The index focuses on:

- low-income earners;
- relatively lower education attainment;
- high unemployment;
- dwellings without motor vehicles.

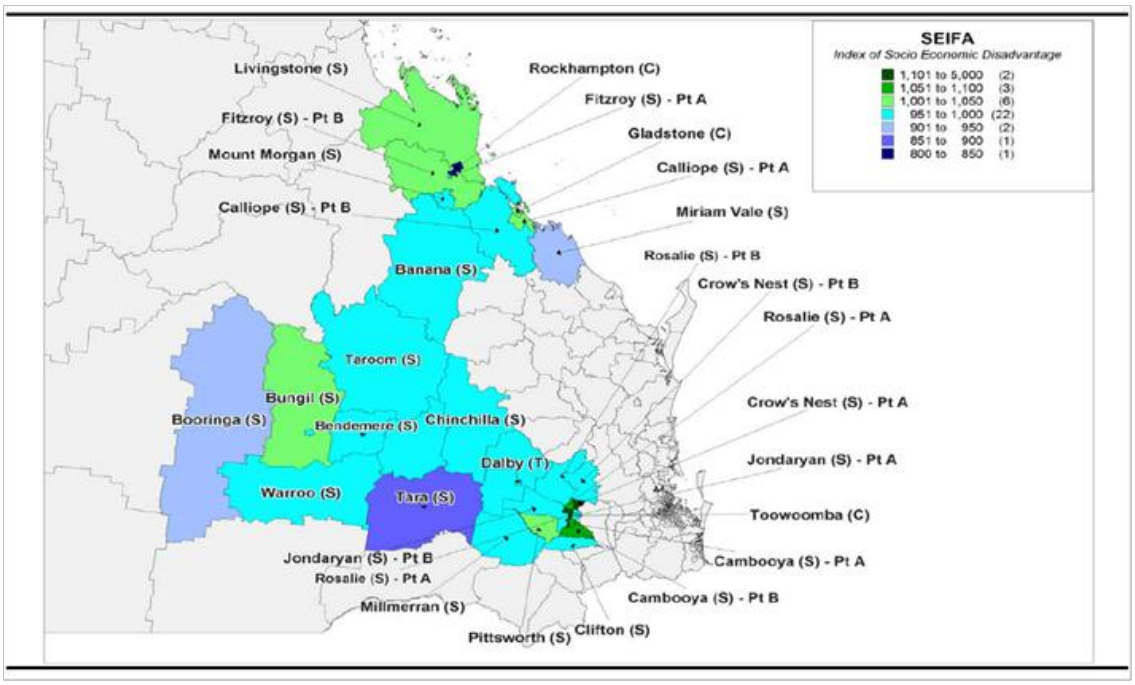
[21] All material in this section is sourced from OESR, 'Queensland Regional Profiles, Far North Statistical Division,' 21 January 2010 http://www.oesr.qld.gov.au/ p.38.

[22] OESR, Queensland Regional Profile, Western Downs Regional-based on local government area (2010), 10 September 2010.

Lower SEIFA scores indicate a higher level of socio-economic disadvantage. A SEIFA score below 1,000 indicates a higher level of disadvantage than the Queensland benchmark while a score above 1,000 indicates a lower level of disadvantage than the benchmark level.

Figure 7 shows the index of Relative Socio-Economic Disadvantage based on 2006 Census. This region has a higher level of disadvantage compared to Queensland as a whole. All areas within the study area (Taroom, Chinchilla, Dalby, Bendemere and Tara) have a lower score than the Queensland benchmark of 1,000. Tara has a greater level of socio-economic disadvantage with a score under 900.

Figure 7 SEIFA Index of Socio-Economic Disadvantage



Data source: ABS (2007a), 2006 Census of Population and Housing. Cat No. 2068.0, ABS, Canberra. Taken from Queensland Curtis LNG Baseline Communities Assessment prepared by AEC Group.

1.5.5 Infrastructure

The infrastructure of the Western Downs is typical of that found in traditional rural regions and towns in Australia. Both industrial and community infrastructure has been developed and maintained to service rural industries and communities. Table 9 lists the existing key infrastructure in the Western Downs region.

Table 9 Western Downs Existing Infrastructure

Asset	Infrastructure	Details
Transport	Warrego Highway	A high-speed 2-lane sealed road capable of accommodating freight vehicles up to Road Train Type 1 (2-trailers).The major highway connecting east and west.
	Jackson-Wandoan Road[1]	It is an 81km long state-controlled road that connects Leichhardt Highway and Warrego Highway. It is a two-way two-lane bitumen-sealed road with predominantly unsealed shoulders.
	Leichhardt Highway	A high-speed sealed road, which bypasses the mountainous terrain of the Great Dividing Range. It connects north and south.
	Western Line from Brisbane to Charleville	This rail departs twice weekly from Brisbane and Charleville, connecting east and west.
Electricity Transmission and Generation	Roma gas-fired power station,	The system incorporates high-voltage links to dispersed mining and energy projects and substations associated with population centres.
Gas and oil transmission	Pipeline	An oil pipeline in the region's south connecting South West Queensland oil fields to Brisbane.
Water supply	SunWater schemes	SunWater Schemes at Mitchell and St George, centred on the Neil Turner Weir and Beardmore Dam, respectively, and related water supply infrastructure. The proposed Nathan Dam is currently in approval phase.
Flood Mitigation	Myall Creek to Dalby ALERT Flood Warning Network[2]	The system was completed in the mid 1990's as a co-operative project between the Bureau of Meteorology and the Dalby Town Council.
Industry	Surat Basin Industrial Park	It is a 55.4 hectare master planned development located two kilometres west of the Chinchilla CBD and 300 metres from the Warrego Highway. It provides an opportunity to encourage business establishment at the forefront of Australia's booming gas, coal and energy industries.

Sources: [1] http://www.pb.com.au/columboolawandoansouth/files/Report1B/Chapter%2014_Transport%20infrastructure%20traffic%20and%20amenity.pdf
[2] http://www.bom.gov.au/hydro/flood/qld/brochures/condamine_myall_creek/condamine_myall_creek.shtml#MyallCreekALERTSystem;

Although some infrastructure has already been developed to accommodate the recent industrial development and population growth as indicated in the table above, it is still unlikely that the existing infrastructure will be adequate to support the region's long-term growth underpinned by the energy sector.

In particular, several infrastructure improvements have been identified as necessary in order for the proposed Wandoan Coal Project to proceed. The Western Downs is addressing the current constraints by building new and upgrading existing infrastructure. Proposed works include upgrading water and sewerage treatment facilities, building multi-user weed wash-down facility, upgrading airport facilities, electricity supply lines and relocating local and state roads, intersections and bridges to meet the traffic management needs of the project and the community.[23] Table 10 lists the key infrastructure being proposed in this region.

[23] Xstrata, About the mine and supporting infrastructure—Wandoan Coal Project—Supplementary EIS Fact Sheet.

Table 10 Western Downs proposed infrastructure

Asset	Infrastructure	Details
Transport	Surat Basin Railway (Southern Missing Link)[1]	The proposed Surat Basin Rail project connects Banana and Wandoan, and is approximately 210 kilometres in length and will connect the Western Railway system near Wandoan—230 kilometres north west of Toowoomba—with the Moura Railway system near Banana, 130 kilometres west of Gladstone
Electricity Transmission and Generation	Columboola to Wandoan South 275Kv Transmission Line and Wandoan South Substation Project[2]	It is the first stage of a broader plan to extend the existing high voltage electricity transmission network into the Surat Basin to meet the long term needs of existing and emerging electricity customers in the region. The construction of substation is expected to commence from late 2010.
Dams and pipelines	Nathan Dam and Pipelines	The proposed dam is located on the Dawson River about 315 km adopted middle thread distance near Nathan Gorge in Banana Shire about 35 km north east of Taroom. Depending on the final dam design, it is expected to have a capacity of up to 888,000 megalitres. The Nathan Pipeline will run from Nathan Dam through the Surat Basin, potentially extending as far as Dalby. This represents a total length of over 260 km.

Sources: [1] http://www.dip.qld.gov.au/projects/transport/rail/surat-basin-rail.html;
[2]http://www.powerlink.com.au/asp/index.asp?sid=5056&page=Projects/southern&cid=5276&qid=608&id=1288;

The adequacy of community infrastructure to support future economic growth in the region was noted in a report on Surat Energy Resources Province:[24]

> In general, most community facilities will require approximately an additional 1/3 to ½ of the current recommended level of community facility provision.
>
> Constructive measures are being taken from both a federal and regional level to accommodate the increasing demand for community infrastructure. The $2,144 million[25] Federal Government grant allocated under the Regional and Local Community Infrastructure Program (RLCIP) has facilitated the proposal and construction of 28 projects selected by Western Downs.

[24] AECgroup, Surat Energy Resources Province Report, QLD Dept State Dev't, 2007.

[25] The total RLCIP funding is $250 million. The $2.144 million grant for the Western Downs regional council is the second largest received in Queensland and the fourth largest in Australia.

Table 11 provides an overview of the projects under construction.

Table 11 Community Infrastructure Projects under construction in Western Downs

Projects	Location
Kennedy Street bus shelter, Condamine bell to bridge footpath	Condamine
Toilets	Dulacca
Chinaman Lagoon walkway, Moraby Park Toilets, Centenary Oval fence and Carinya Kitchen	Miles
O'Sullivan Park to Waterloo Plain walkway, Pool fencing, O'Sullivan Park shade	Wandoan
Town Hall upgrade	Brigalow
Charley's Creek walkway and two stages of streetscape	Chinchilla
Myall Park grid	Glenmorgan
HACC centre car parking	Meandarra
Community and Sports Centre repair	Westmar
Streetscape and Lagoon walkway	Tara

Source: http://www.wdrc.qld.gov.au/news/2010/news_mr_rlcip_official_openings_chinchilla_miles_tara.shtml.

1.5.6 Housing markets and housing prices

The housing markets in the Western Downs have become tighter over recent years, due to increased demand driven by the energy sector. From 2003 to 2011, median house value in Western Downs has increased by 253.3%, reaching $265,000 in June 2011.[26] This compares to the median house price of $407,499 for Queensland, as of June 2011.[27] Indicative gross rental yields are recorded at 5.6%.

1.5.7 Land endowment and land values

As a result of the coal and gas exploration in the Surat Basin and the movement of new population into the Western Downs region, there has been a considerable upward trend in property values within the urban sector.

The Department of Environment and Resource Management (DERM) released its annual valuations for Western Downs on 3rd May 2011. The valuation reflected the overall change in the market between 1st October 2009 and 1st October 2010, taking into account the adverse extreme weather conditions experienced by the region. In contrast to previous valuations in which all land values were calculated using the 'unimproved value' methodology based on changes in the local property market, 2011 non-rural land valuations were calculated using a 'site valuation' methodology. Site value is

[26] Office of Economic & Statistical Research (2011). Residential land development activity profile: Western Downs Regional Council (June 2011). Queensland Treasury

[27] Department of Communities (2011). Queensland housing market report June Quarter 2011. Queensland Government.

considered to achieve a closer reflection of the land's current value and is used by most Australian states and has the full support of the property industry, local government and other stakeholders.

All land that is zoned rural or equivalent under local government planning schemes continues to be valued using the unimproved value methodology.

Table 12 provides a summary of new values for locations in Western Downs.

Table 12 Residential land values

Location	No. of residential lands valued	Range of new values	Movement (%)	Median new value
All of Western Downs Regional Council	6,153	$1,200-$360,000	20%	$87,000
Chinchilla	1,406	$59,000-$360,000	30%	$104,000
Dalby	3,109	$23,000-$320,000	13%	$84,000
Jandowae	313	$13,200-$78,000	10%	$20,000
Miles	428	$37,000-$143,000	39%	$84,000
Tara	287	$22,500-$97,000	10%	$32,500

Source: Queensland Government, Environment and Resource Management, 2011 valuation report—Western Downs Regional Council.

Every real estate market segment had increased since the last valuation, leading to an overall increase of 5% in the Western Downs region since the last valuation was issued in 2010.

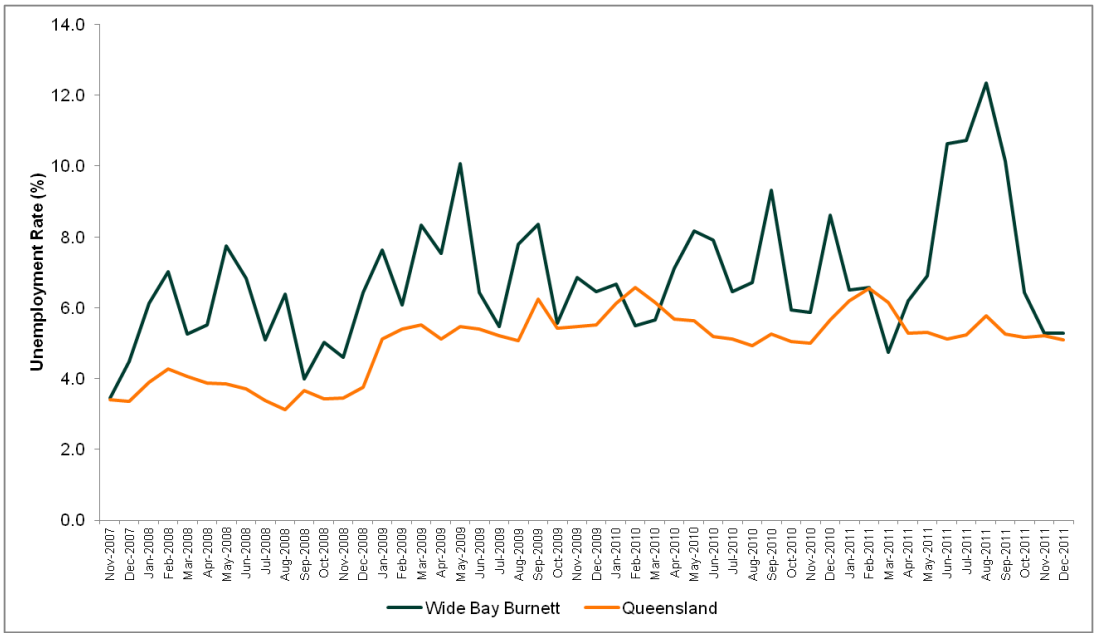
Property markets in Chinchilla and Miles is largely driven by the rapidly expanding mining industry, in addition to small towns such as Wandoan where the Xstrata coal mine precinct had a significant impact on urban land values (an increase of 101% in the 2009-10 period).

1.5.8 Regional profile of Wide Bay Burnett Region

Employment

Based on the ABS National Regional Profile data, the unemployment rate for Wide Bay Burnett Statistical Division (Wide Bay Burnett) has been significantly higher and more volatile compared to Queensland average. Figure 8 provides a comparison of the unemployment rate between the Wide Bay Burnett and Queensland for the period 2007-2011.

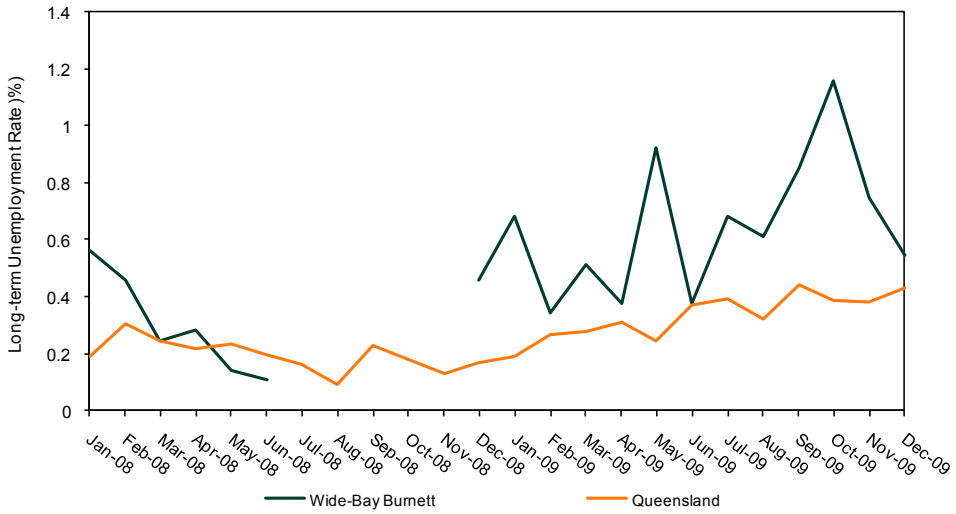
Figure 8 Unemployment Rate Wide Bay Burnett and Queensland 2007-11.



Data source: ABS, Labour Force, Australia, Detailed-Electronic Delivery Table 16. Labour force status by Regions and Sex. (Cat. no. 6291.0.55.001)

Figure 9 shows the Wide Bay Burnett experienced a higher rate of long term unemployment than the Queensland average in 2008-09. Employment created by the Project in the Wide Bay Burnett could provide an opportunity to reduce the level of long term unemployment.

Figure 9 Long term unemployment rate Wide Bay Burnett region and Queensland 2008-09

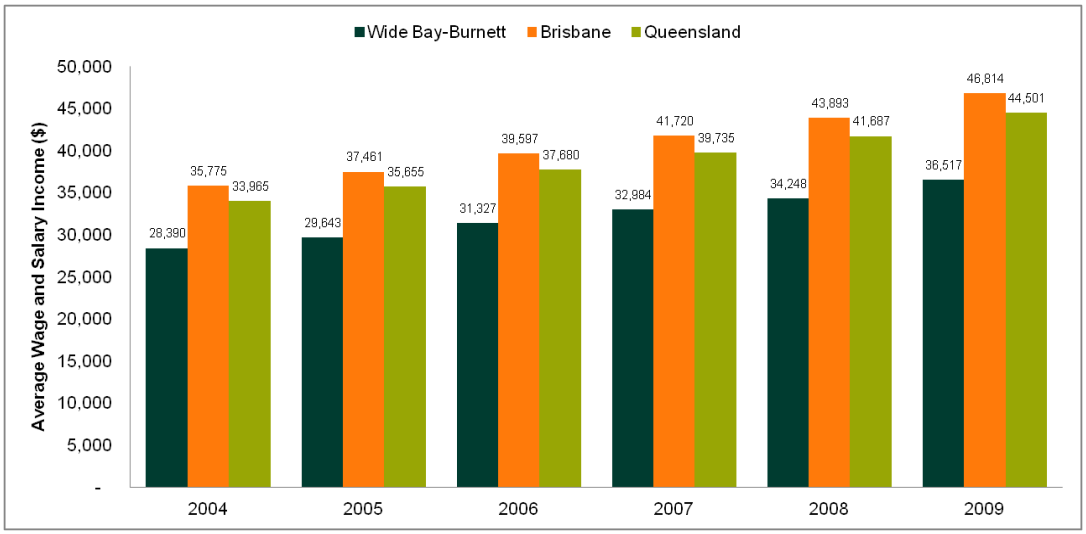


Note: The incomplete trend for Wide-Bay Burnett Region is due to missing original data.
Data source: ABS, Labour Force, Australia, Detailed - Electronic Delivery, Table 15A., OESR National Regional Profile.

Income

Average wage and salary income in the Wide Bay Burnett region is below Queensland average. Although it has increased by 28.62% from 2004 to 2009, as of 2009, its level was still 17.94% below Queensland and 22% below Brisbane levels. Figure 10 compares average wage and salary income among Wide Bay Burnett Region, Brisbane and Queensland from 2004 to 2009.

Figure 10 Wage and salary income comparison – Wide Bay Burnett Region, Brisbane and QLD



Data source: ABS, National Regional Profile for Wide Bay-Burnett, Brisbane and Queensland, 2004-09. (Cat. No.1379.0.55.001).

Socio-economic index of disadvantage

The Wide Bay Burnett is one of the most disadvantaged statistical divisions in Queensland in distributional terms.[28] According to the 2006 Census results, 50.7% of the usual resident population were in the most disadvantaged quintile and 2.5% of the population of Wide Bay Burnett were in the least disadvantaged quintile.[29]

[28] OESR, Queensland Regional Profiles, Wide Bay-Burnett Statistical Division 2010.

[29] As Queensland is the benchmark of the quintile division and five quintiles are adopted in this index, Queensland has 20% of the population in each quintile.

The Wide Bay Burnett recorded a SEIFA score of 940 in the 2006 census. This was the lowest score of any region in Queensland and compares to an average score of 1,005 for the whole of Queensland.[30]

Summary

The project site is located approximately 35km west of the township of Wandoan in the Western Downs Regional Council. This local government area contains a population of over 30,000 with the major towns including Chinchilla, Dalby, Miles, Tara and Wandoan.

The wider study area for the Project is the Surat Basin region which, as of the 2006 Census, contained a population of over 195,000. The Surat Basin region contains substantial, but currently largely undeveloped, natural resources. While per capital income in the region is lower than the Queensland average, there is the potential for a significant increase in economic activity in the region in the medium term.

In terms of the indirect impacts of the Project, the Wide Bay Burnett region will also be impacted because the Project will source a significant part of the workforce for the project from this region.

While traditionally a region based on agricultural production, the character of the Western Downs is changing as a result of significant development in the resources sector. Oil, gas and coal exploration and exploitation will be a key driver of economic growth and development in this region for the next decade and beyond. This is evidenced by the potential for the region's energy sector to triple its gross regional product.

[30] Uniting Care (2010). Fact Sheet 1: 2006 SEIFA Index of Relative Socioeconomic Disadvantage (IRSD) for Queensland.

2 Cost Benefit Analysis

2.1 Assessment approach

Cost Benefit Analysis (CBA) is a tool which provides information to decision makers on the net impact of a project on the economic welfare of a population impacted by a project. CBA considers a broad range of impacts on economic welfare, which are often broader than those assessed in commercial or financial analysis.

In general terms, CBA involves first identifying and evaluating both the costs and benefits of a proposed project, and then deciding whether the project should be implemented according to a particular decision rule. CBA supports a project when the gains (benefits) resulting from the change exceed the losses (costs); that is, when there is a 'positive net benefit'. In this case, the project is said to improve economic efficiency as it increases the overall level of economic welfare of the affected population.

To assess the benefits and costs of the proposed project, its impacts are assessed 'with' and 'without' the project. The 'without' case is also referred to as the base case because it provides a baseline against which all direct impacts of the project are measured. For example, the base case in this study is no mine development, with continuation of the current land use in the study area. This requires a range of assumptions to be made which are detailed later in the report.

The quantitative assessment identifies the gross impact of the changes. Many aspects of the project can simultaneously benefit some stakeholders and impose costs on others. While it is important to know the type and value of impacts on stakeholders; it is the net impact of the change that demonstrates the impact of the project on the community as a whole.

The most challenging aspect of CBA is to assign dollar values to the benefits and costs. The main reason for this is that the changes usually considered by governments typically involve impacts for which there are no market prices to indicate the values individuals place on particular goods or where market values do not reflect the full economic value of consumption or production of those goods.

2.2 Base case

The base case employed in this analysis involves the continuation of the existing land use in the areas identified for mining activities. As has been previously stated, livestock

production and slaughtering is the main agricultural activity in the Western Downs, accounting for 66% of the area's agricultural production, with cropping activity accounting for just under one-third of agricultural production.

The assumptions used to estimate the future cash flows associated with this possible base case are shown in Tables 13 -17.

2.3 Alternative case

The 'with' case in this analysis involves only one alternative, which is the development of the project.

The cash flow model used in this analysis has been developed using nominal values with the application of a real pre-tax discount rate of 2.5%. The cash flows for the alternative or 'with' case have been modelled over a 35-year timeframe to 2045, with the mine projected to continue production through to 2044.

The key assumptions used in the estimation of future cash flows are provided in the tables below.

Table 13 Key assumptions

Parameter	Value
Discount Rate (pre-tax real)	2.5%
Timeframe for analysis (years)	35
USD/AUD exchange rate	0.95USD
Corporate tax rate	30%
State Government Royalties	10%

Table 14 Thermal coal prices

Parameter	Value
Contract market (US$/t)	$US120.00/t
Contract market price trend (% pa)	0%

Table 15 Output parameters

Parameter	Value
First year of full operation	30 Jun 2015
Output in first year ('000 tonnes)	3,704t
Maximum annual output ('000 tonnes)	5,013t
Total mine life output ('000 tonnes)	140,253t
Max. mine life	31 yrs

Table 16 Operating costs per tonne of output ($/tonne)

Parameter	$/t
Mining	$29.80
Fuel (un-rebated)	$7.25
CHPP	$7.60
Misc. & contractor charges	$5.31
Rail	$21.05
Port handling & IC	$9.99
Other port charges	$2.37
Base year for Opex values (financial year ending)	2011
Opex Cost Contingency	0%

Table 17 Construction costs

Parameter	('000) 2011 AUD	Life
Land purchase	$75,000	31 yrs
CHPP	$138,700	31 yrs
Water management	$11,089	31 yrs
Waste management	$0	31 yrs
Other mine development costs	$740,798	31 yrs
Materials Handling	$100,392	31 yrs
Rail infrastructure	$177,622	31 yrs
Sustaining capital	$30,000	31 yrs
Capital Cost Contingency	0%	31 yrs

2.4 Stakeholders

Table 18 identifies major stakeholder groups that may be affected by the Elimatta project and whether the impact of the project is anticipated to be positive or negative.

Table 18 Stakeholder impact matrix

Stakeholder	Description of impact	Net Impact	
		Positive	Negative
Shareholders of Taroom Coal Pty Ltd	Shareholders will benefit from the project by the value of the expected net revenues	✓	
Wandoan and Taroom community	The Wandoan and Taroom local community will benefit from employment opportunities, economic growth, improved infrastructure, enhanced opportunities for existing businesses to supply the project, new businesses for the local community and payment of royalties to the community. Adverse impacts identified by the community concern the impact of the project on traditional lifestyle and environment.	✓	
Existing land users (graziers)	The main land use is cattle grazing with some fodder cropping to supplement grazing on native and introduced pastures.		✓
Other regional industries	Opportunities exist for other industries to supply inputs to the project. For example, fly-in fly-out services will be provided by a regionally based aviation operator, engineering services, mechanical repair, catering, professional services, fuel etc are likely to be sourced locally.	✓	
South West Queensland economy	A reasonably high proportion of the total economic impacts will be retained in the South West Queensland economy. However, the project is not so large compared to the size of the regional economy to be likely to create supply constraints and therefore significant upward pressure on wages and input prices for other existing industries.	✓	
Wide-Bay economy	Provides additional employment in an area of above average unemployment and long term unemployment	✓	
Port and rail infrastructure providers	Providers of port and rail infrastructure in the region will benefit as a result of the additional revenue associated with the increased tonnages of coal that will be transported in the region.	✓	
Queensland Government	The Queensland Government will benefit directly from the revenue generated from the scheme and by the contribution of the scheme to its development objectives for the region.	✓	
Commonwealth Government	The Commonwealth government benefits through increased taxation revenue.	✓	

2.5 Identification and assessment of benefits and costs

The proposal to develop the Elimatta Project is associated with both benefits and costs that have been assessed quantitatively to the greatest extent possible. These benefits and costs are outlined below.

2.6 Benefits

2.6.1 Thermal coal sales

The forecast sale volumes and prices were based on information provided by Taroom Coal Pty Ltd. Assuming the average contract price over the life of the mine is $120 US a tonne and US/AUD exchange rate of 0.95, the present value of the project production is $10.7 billion.

2.6.2 Reduction in unemployment in the Wide Bay region

The project will create additional employment in the Wide Bay region. When in full operation the mine will require 300 full time employees. This benefit is valued as the difference between the market wage for the position and the opportunity cost of unemployment.

To value the shadow price of labour we will adjust labour costs down to reflect their social value but only for a proportion of the jobs. We will assume that the opportunity provided for long term unemployed to get a job is direct proportion to the ratio of long term unemployed to total unemployed. The shadow price wage adjustment is the difference between the average wage rate and the unemployment benefit.

We have not estimated this benefit because data on the proportion of long-term unemployed is not available at the regional level. However, given that the benefit only applies to a proportion of the employees the annual benefit is not likely to be large compared to other benefits. For example, assume the proportion of long term unemployed was 10% and the difference between the annual wage rate and unemployment benefit is $80,000 the annual benefit would be $2.4 million.

2.7 Costs

2.7.1 Mine construction costs

Table 17 provides a detailed breakdown of the estimated construction costs associated with the Elimatta project. Total construction costs (with capital sustaining expenditure included) are estimated to be approximately $1.03 billion in present value terms, with 60%of the expenditure to be incurred between 2012 and 2016.

2.7.2 Operating costs

Table 16 contains unit operating costs by major cost component. These unit costs are 'averaged' over the life of the mine. The present value of operating costs is $7.48 billion.

2.8 Non-market impacts

Similar to other resources, the costs and benefits of environmental resources should be accounted for in project appraisals. Estimation of the Total Economic Value (TEV) environmental effects should address both the use and non-use values of the environmental asset. Accordingly, any project that depletes or depreciates an environmental asset needs to include in it its costs the TEV of the lost asset, and similarly, in any project that enhances an environmental asset, the change in the TEV of the asset needs to be counted as a benefit.

However, because most ecosystem services and environmental assets cannot be traded through market transactions because no one is the owner, valuing the costs is difficult. Below we describe the major environmental, cultural and land use impacts identified in the environmental impact assessments.

The present value of our estimate of the value of environmental, cultural and land use impacts is $245 million in 2011 dollars.

2.8.1 Greenhouse gas emissions

The Australian Government has a commitment to reduce Australia's greenhouse gas emissions. The Multi-Party Climate Change Committee (the Committee) was established in recognition that Australia needs to reduce its carbon pollution as part of global efforts to combat climate change. On 10 July 2011, the Committee released a Clean Energy Agreement (CEA) to reduce carbon pollution and introduced a broad based carbon price in Australia that will commence from 1 July 2012.[31]

Synergies considers that the annual cost of greenhouse gas emissions expected to be generated by the Project can be estimated using the carbon price set out in the Clean Energy Agreement. That is, a cost of $23 for each tonne of pollution beginning on 1 July 2012. According to the CEA, the price will then rise by 2.5% a year in real terms during a three-year fixed price period until 1 July 2015. The carbon price mechanism will then

[31] Australian Government (2011). Department of Climate Change and Energy Efficiency. 'Multi-Party Climate Change Committee'. Available http://climatechange.gov.au/en/government/initiatives/mpccc.aspx [Accessed 15 February 2012].

transition to an emissions trading scheme where the price will be determined by the market. [32] Commonwealth Treasury has projected the nominal world carbon price for 2015-16 to commence at $AUD 29[33] per tonne.[34]

Deloitte Access Economics was commissioned by Queensland Treasury to undertake a range of quantitative modelling of the economic impacts of the main aspects of the Clean Energy Future plan on the Queensland economy in August 2011. Their model suggests that carbon prices beyond 2015-16 are likely to be of the following:

- year 2020 – real global price of $USD 33/tonne ($AUD 29/tonne) based on 2010 prices and assuming 2.5% inflation from 2010; and
- year 2050 – real global price of $USD 100/tonne ($AUD 131/tonne) based on 2010 prices and assuming 2.5% inflation from 2010. [35]

Synergies considers that the above prices and its associated assumptions are appropriate for modelling the economic costs of greenhouse gas emissions throughout the life of the Project.

2.8.2 Air quality

The environmental assessments state that the air quality for the study area would be reasonably good with acceptable levels of pollutants for the majority of the time. Synergies considers that the impact of the Project to air quality is not significant enough to warrant estimation.

2.8.3 Noise and vibration

Noise and blasting on site has the potential to impact on sensitive receptors such as nearby residences and buildings. The proposed Project is expected to have noise

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[32] Australian Government (2011). Department of Climate Change and Energy Efficiency. 'Putting a price on carbon pollution. Available: http://www.climatechange.gov.au/media/whats-new/putting-a-price-on-carbon-pollution.aspx [Accessed 14 February 2012].

[33] The nominal world price for 2015-16 of $29 was modelled by the Commonwealth Treasury based on the assumption that Australia participates in the medium global action (all international regions apart from Australia undertake to stabilise concentrations of greenhouse gases at 550 ppm CO_2-e by around 2100, and all international regions will join the global trading scheme by 2025). As different international regions enter the scheme their carbon price is set to the global price. The higher bound of the nominal world price for 2015-16 is $61 which is based on the assumption that all other international regions apart from Australia undertake a more ambitious greenhouse gas reduction action.

[34] Australian Government (2011). The Treasury. 'Strong Growth, Low Pollution, Modelling a carbon price'. Available: http://www.treasury.gov.au/carbonpricemodelling/content/report/11appendixb.asp [Accessed 16 February 2012].

[35] Deloitte Access Economics (2011). 'The economic impacts of the Clean Energy Future on Queensland'. 22 August 2011.

impacts on Location 7, Location 6, Location 1, Location 4, and Location 3. The external cost of noise on Location 1 and Location 4 pose more significant costs because these two locations are not within the Elimatta Mining Lease area. Therefore, the costs of noise and vibration for these two locations are expected to be higher than that for the other locations.

Some of the external costs are internalised by the existing environmental regulation. We have been unable to find any previous studies which are relevant to the current case. We are unable to form an estimate of the cost but not the costs should not be significant as there is potentially only one property affected and any noise impact on ecosystems are already considered in the flora and fauna impacts.

2.8.4 Visual amenity

If the areas that are likely to be exposed to the most significant impacts are residences located in close proximity to the Project and receivers on Perretts Road, knowledge on the number of residences within these areas is required to evaluate the significance of the impact of the mining project to visual amenity.

The cost of visual amenity can be measured by assuming that an affected party is no worse off if the impacts are not visible. The costs can be assessed by:

(a) the cost of screening out-of-pit spoil dumps with vegetation buffers; and

(b) the cost of managing the existing vegetation surrounding the Project.

The former is typically a one-off cost and the latter will require annual management costs. It has been estimated that the cost of developing vegetation buffers within the Project area and on Perrets Road is around $1,900 per hectare. Multiplying this cost by the areas that are most likely to be significantly impacted yields a total localised screening cost of $6,175.[36] This estimate is an approximation of the amount parties affected by the change in the visual amenity of the landscape would be willing to pay to prevent the change in visual amenity.

[36] Visual Amenity Assessments identified 9 sensitive receivers from which the MLA developments may be visible (there are 2 others on the MLA area that will be occupied by Taroom Coal). To screen these 9 with vegetation buffers around each residence is $4275 (each residence is afforded a 0.25 ha of buffer). This cost estimate does not include reimbursement for the loss of productive land/foregone grazing.

Screening along roadways assumes approximately 30 km of road to screen. Assuming a screen width of 3 metres the total area to screen is approximately 1 ha which will cost $1900.

2.8.5 Non-Indigenous cultural heritage

The eighteen cultural heritage sites within the Project area are assessed to have low to no cultural heritage significance and the costs are manageable. Accordingly, the economic costs of the Project on these cultural heritage sites are unlikely to be locally significant. Whilst assigned a low level of significance, AARC has recommended that disturbance to Sites 4, 10 and 15 be best avoided. In particular, Sites 4 and 10 are likely to require removal for project development.

The non-use values of the Non-Indigenous cultural heritage sites identified can be inferred from the on-going cost to preserve the Project area for posterity according to an appropriate Cultural Heritage Management Plan. Three sites identified in the Non-Indigenous Cultural Heritage Assessment of sufficient cultural heritage value to warrant additional comprehensive recording prior to initial ground disturbance. The total cost of preserving the information from these sites is equal to $3900 (the fee to engage an archaeologist to record the details of the site).

2.8.6 Aquatic ecology

The cost to the surrounding aquatic ecology due to the Project can be inferred as the mitigation cost to divert, relocate species and control sediment. In order to measure the cost of mitigation, an understanding of existing significance level of the ecological habitat and how much of the riparian habitat will be lost is crucial to the cost analysis.

The capital cost to divert has been estimated to be around $11.3 million which comprises of the cost to perform bulk earthworks, trimming, lining (topsoil/clay), and re-vegetation. This cost will incur from year 1 (development for parts of the diversion in undisturbed land) to year 4 (allowing 3 years for the parts to settle before water is diverted) of the Project. As the precise timing of when each component of the capital cost will realise is difficult to measure, equalised annual cost of diversion is assumed to occur between these years.

It is noted that diversion of the Horse Creek may not be able to replicate the prior riparian vegetation surrounding the Project and as such unable to fully estimate the external cost of the Project to the surrounding aquatic ecology. That is, a diverted stream may not have the same value to local residences as the original stream. Under this situation, the cost of diversion will be indicative of the lower bound of the external cost of the Project.

2.8.7 Soil and land suitability

The dominant land use in the region of the Project is cattle grazing. Within the Project area, several isolated areas have been cropped for fodder species to supplement grazing on native and introduced pastures. According to AARC's pre-mining land use suitability assessments, the soils of the Project Site were determined to be suitable with moderate limitations to marginally suitable for beef cattle grazing and marginally suitable to unsuitable for broadacre cropping.

Instead of conducting a non-market valuation on the value of the soil and land use opportunities of the Project Site, the foregone cost of beef cattle grazing and broadacre cropping is considered to be appropriate for incorporating into the cost of the Project. That is, the economic cost of the Project on soil and land use can be considered in terms of the opportunity cost of using the Project area for mining rather than for its best alternative uses.

2.8.8 Flora

No flora species of conservational significance were recorded within the Project Site. However, the Project Site is considered to represent potential habitat for 12 flora species of conservation significance known to occur in the region.

All of the remnant vegetation within the southern Project area and a large majority within the northern Project area will be disturbed as a result of mining operations and the development of associated infrastructure. Land clearing for the Project will reduce the current extent of vegetation communities and associated faunal habitats.

AARC has assessed that all of the remnant vegetation within the southern Project area and a large majority within the northern Project area will be disturbed as a result of mining operations and the development of associated infrastructure. The cost to flora due to the Project can be inferred from the cost of establishing offsetting vegetation communities elsewhere to resemble the original local topography as far as possible. The cost of rehabilitating the 3,000 hectares of land disturbed from the mining is estimated to be around $30 million.

2.8.9 Fauna

Three fauna species of conservation significance were recorded within the Project Site, the Little Pied Bat, which is listed as Near Threatened under the National Conservation (Wildlife) Regulation 1994 , and the Sacred Kingfisher and the Whistling Kite, which are both listed as Marine under the *Environment Protection and Biodiversity Act 1999* (EPBC Act).

Because the Sacred Kingfisher and the Whistling Kite are both highly mobile bird species common throughout Queensland and much of Australia, the local populations on the Project Site are unlikely to constitute an 'ecologically significant proportion' of the total population of these species.

The cost of reduced habitat for the Little Pied Bats is difficult to estimate. The task of inferring a value for moving specie from threatened to near threatened is difficult to measure. In this instance, estimating the marginal willingness to pay for the number of Little Pied Bats that will potentially be reduced requires an in-depth understanding of the ecosystem and a well-structured contingent valuation survey to ask people how much they would be willing to pay to avoid the potentially reduced numbers of Little Pied Bats.

Alternatively, the cost of reduced habitat for the Little Pied Bats can be inferred from the cost to re-instate habitat, particularly the vegetation around Horse Creek.

2.9 Net impacts

Table 19 summarises the net impact of the project on the Australian economy generally and the disaggregation of that impact by major stakeholder grouping. A real pre-tax discount rate of 2.5 % (10 year Commonwealth bond rate) was used to calculate net present values in this table.

Table 19 Net impact by stakeholder group ($'000)

Stakeholder group	NPV (million)
Resource developer	$951
Commonwealth Govt	$504
Qld Government	$712
Existing Land Users	-$0.74
Non-market impacts	-$245
Total Net Impact	$1,920

This analysis demonstrated the proposed project will result in a net increase in social welfare in the order of $1.92 billion in NPV terms.

The Benefit Cost Ratio (the ratio of the benefits and costs identified) of the project is 1.19 and the internal rate of return (the discount rate that returns a net value of the project of zero) is 15.6%.

2.10 Sensitivity analysis

The sensitivity analysis was undertaken in relation to the following parameters:

- Discount rate
- Thermal coal prices
- Total mine life output (±10%)
- Mine operating costs (±10%).

The results of the sensitivity analysis are provided in Table 20. The average price of thermal coal will be a major determinant of the overall economic impact of the project, while total mine output and mine operating costs will also have a material impact on the increase in net societal welfare expected from the project.

Table 20 Results of sensitivity analysis

Parameter	Base Rate	-10%	% Δ	+10%	% Δ
Discount rate	2.5%	$2,024 million	5.4	$1,823 million	-5.08
Thermal coal prices	$A126/t	$1,031 million ($A150/t)	-46	$2,811 million ($A225/t)	46
Total mine life output	140Mt	$1,233 million	-36	$2,609 million	36
Mine operating costs	$8.8 billion	$2,669 million	39	$1,173 million	-39

3 Indirect Economic Impacts

3.1 Introduction

The purpose of economic impact modelling is to provide estimates of the impact of a change in economic activity. In this report we are estimating the change in several economic parameters from developing the Elimatta mine and associated infrastructure.

It is well known that exogenous expenditure (direct investment) into an economy should produce impacts greater than the original injection through the so-called multiplier effect. This effect is produced because increased final investment is measured in final demand terms, which require proportional increases in intermediate goods (raw materials). The extent of this added effect depends on the level of capacity operating in the economy at the time of the injection. For example, the net effect of autonomous investment in a depressed economy is greater than the same level of investment in a resources-constrained economy where other projects are competing for scarce resources.

3.2 Model selection

In conducting impact assessments there is a choice of model with which to estimate the economic impacts. For this type of project either a traditional Input-Output model or a non-linear Input-Output model is used.

Traditional (linear) Input-Output modelling remains a popular method of undertaking economic impact analysis because of its flexibility, widespread recognition and relative data frugality. Against these advantages are an inability of traditional IO models to allow for changes in the production technology, an implicit assumption that all economic stimulus is expansionary (exogenous) rather than displacing, an inability to incorporate price effects or allow for large scale structural change. For these reasons, traditional IO modelling is best suited to situations of new investment, on a relatively small scale and where short term (1-5 years) estimation is required.

For this report we have used non-linear Input-Output analysis. A Non-Linear Input-Output Model (NLIO) addresses two of the major limitations of standard input-output analysis; the assumption of linear coefficients for the household sector and allowing marginal income coefficients adjustment. There are several implications arising from the use of this type of model, compared to the conventional IO model. Firstly, while the output multipliers and impacts should not be significantly different between the two

models, we would expect the income and employment impacts to be smaller in the marginal coefficient model. This is because many industries, especially those which are more capital intensive and can implement further productivity gains, can increase output, particularly in the short run,[37] without corresponding proportional increases in employment and hence income payments.

Secondly, unlike the conventional IO model in which the multiplier value is the same for all multiples of the initial shock, the multiplier values from the marginal coefficient model vary with the size of the initial impact. Thus larger changes in final demand will not be proportional, and the differential impacts of the marginal coefficient model are not additive. A non-linear model improves the overall accuracy of the factor income and employment impact projections.

3.3 Treatment of workforce impacts

In the now well-established pattern for mining development in Queensland, the construction and operational workforce will be largely external to the region, with many FIFO and DIDO workers (and families) being based in Coastal areas. In this particular case the preferred locations will lie within the Wide Bay-Burnett region.

These labour hiring arrangements produce methodological issues in estimating regional impacts.[38] Economic impacts from exogenous private investment are derived from two main sources. The first are the impacts resulting from production and involve the margins derived from the production and the margins attached to the purchase and sale of intermediate goods required for that production. In remote areas, the main margins attach to retail and wholesale trade, transport, power, communications and services that are needed to localise imported capital equipment. Financial and business services and manufacturing goods are imported.

These impacts are often called industrial impacts. The second form of impact derives from the consumption activities of the beneficiaries of production (wages for directly employed workers and those workers in companies supplying the operation, profits, and transfer payments), and are referred to as consumption impacts.

[37] The term 'short run' here does not refer to any specific time period; rather it will vary from industry to industry. It is used here in the controversial economic sense to mean that the full adjustment from any shock has not had time to occur, i.e. the system has not yet returned to full, long run equilibrium.

[38] It might be argued that the economic impact should be calculated for the State as a whole, thereby largely removing the problem of spatial distribution. However, this would detract from the regional significance of the project and blur its important contribution in some areas.

In all regional projects, there is a significant amount of leakage of economic benefits due to the need to import capital and other factors of production and these leakages are normally allowed for in multi-regional models which trace the pattern of inter-regional trade flows.

In the case of the Elimatta project, the extent of leakages is increased due to the projected (known) pattern of labour force migration. In other words, not only are the normal production based leakages going to occur but also a greater than expected leakage of consumption through labour hiring practices such as Fly in Fly out. The Surat Basin Population Report identified that non-resident workforces play a significant role in the Surat Basin's current resources boom and that non-resident workers tend to stay in on-site worker villages (termed single person quarters, SPQs).[39]

In such situations the consumption patterns, especially with local enterprises, is significantly less than what is assumed in standard impact models. On the other hand, the repatriation of income to other regions is far higher. In other words, much of the traditional consumption effects are transported from the region of project location to the region of labour force domicile. In essence, there is acceleration in intra-regional flows in income with the empirical question relating to how this added income leakage may be quantified and assigned to the benefiting region?

Therefore the issue under debate is how much of the project generated consumption spending is leaked from the production region to the dormitory region? Several recent studies have investigated this issue. Story (2010) found that for FIFO operations in Canada and Australia, upwards of 60% of generated consumption is exported from the host region.[40] The Commonwealth Bank Survey "Economic Vitality" noted that in the Western Australian mining areas of Karratha, Kununwella and Port Hedland, approximately 80% of earned income was repatriated from the region, whereas in Central Queensland, the level was at 39%.[41] The differences in repatriation levels were explained by differences in the extent of the FIFO workforce. The significance of the level of mobility amongst the labour force as an explanatory variable in income repatriation rates was also acknowledged by ACIL-Tasman (2009).[42]

[39] Surat Basin Population Report. (2008). Full-time equivalent population estimates at 30 June 2008.

[40] Story, K (2010) "Fly in Fly Out, implications for Community Stability" **Sustainability** (2), 1161-1181

[41] Commonwealth Bank (2010)"Economic Vitality" (2)

[42] ACIL-Tasman (2009) Fly-In, Fly-Out Regional Impact Assessment", Canberra , January.

Based on the evidence from the literature, a repatriation rate of between 70% and 80% would seem in keeping with empirical evidence. For this study, the lower estimate of 70% was adopted.[43]

3.4 The South West and Wide Bay-Burnett Non-Linear Models

All impact assessment models are based on Input-Output tables. IO tables for the South West region and The Wide Bay-Burnett region were used in the analysis. These tables were originally compiled by Mangan (2006), updated by Synergies (2010) and given non-linear properties by the use of the IO-8 (alpha) software developed by the Centre of Economic Policy Modelling at the University of Queensland. Patterns of inter-regional trade were originally taken from the OESR estimates for 1996-97 and updated using the method designed by Guild.[44]

The development of the Input-Output table (see Table 21) allows up to date regional accounts of both regions to be calculated.

Table 21 Regional accounts for the South West and Wide Bay-Burnett regions, 2011, $million

Indicator	South West	Wide Bay-Burnett
Household expenditure	258.19	7585.38
Government expenditure	220.44	7112.32
Gross Fixed capital investment	142.83	3647.57
Inventories	370.44	460.37
Inter-regional exports	1035.78	7147.05
International exports	1406.18	12752.19
Net Indirect Taxes	-95.28	-696.07
Imports	-1634.77	-25996.60
Total	3408.52	10752.51

Source: Estimated from South West and Wide-Bay Burnett Marginal Coefficients tables constrained to GRP estimates in OESR (2008).

The results indicate the significant difference in the size of the regional economies, with the Wide Bay-Burnett region having a regional economy three times the size of the South West. This creates some difficulties in estimating the direction of economic

[43] In some ways, the level adopted is crucial to the analysis because it determines the extent of repatriation. On the other hand, unless consumption patterns by region differ markedly, the impacts on the Queensland economy as a whole are smaller.

[44] Guild, R. (1998). Development Policy Simulation Using Multi-Regional Input-Output; A case study of Sri Lanka, Australasian Journal of Regional Studies, 4 (2), p 35-45.

flows. The other main feature of the regional accounts is the large volumes of inter-regional and international trade that pass through both regions.

The economic impacts are reported as a change to a number of key aggregate economic variables, for example employment. The definition of the impact measures reported in this report as provided in Box 1.

Box 1 Economic impact measures

The primary economic impact measures derived from the model are:

- gross output/regional turnover - refers to the value of increased production from an additional economic activity. Within this gross value is included the value of raw materials that, in most cases, have already been counted as part of gross output from earlier production. Therefore there is a tendency for gross output figures to include some double counting. As a result, more concentration is placed upon incremental (additional output created) or value added. Nevertheless, the concept of gross output should not be abandoned because it is a good indicator of the level of turnover in the economy and hence a good measure of the total level of economic activity;
- value added - refers to added or net output. Value added is equivalent to the Gross State Regional Product as used by the Australian Bureau of Statistics. It is the measure usually preferred when measuring economic impact. It measures the added value placed on intermediate products (raw materials) from the productive process. It is made up of margins, wages, profits and transfers;
- factor income - relates to the share of value added (and gross output) which is directly paid to individuals or firms in the form of wages and or profits. By definition it is a percentage of value added and cannot exceed value added;
- jobs - relates (usually) to the amount of labour required for the level of production. Depending upon the type of activity, job numbers measure either the use of existing labour (continuing jobs) or hiring new staff. Full Time Equivalent (FTE) employment refers to the number of full time person-years of employment generated by a particular project or event. This alleviates the overstating of the level of job growth due to the stimulus. Note that employment outcomes relate to the whole period of the project and are not annual impacts; and
- revenue impacts – this is a derived output from the table and is obtained by closing the model to the taxes and transfers sector. For example, in the estimation of the impacts of additional royalties on state revenues.

3.5 Construction and infrastructure impacts

The model assesses the economic impacts associated with two categories of construction and infrastructure expenditure resulting from the Elimatta project – mine development/ construction[45] and the capital works associated with the rail upgrade. A four stage methodology has been applied to estimate the impacts from this expenditure:

- stage 1 – the exogenous investment in the project over the 18 month period is applied to the South West Non-linear I-O model and economic impacts calculated;

[45] Note that due to their ongoing nature, mine reclamation and capital repairs are included in a discounted form in operating costs.

- stage 2 – the bulk (70%) of the consumption impacts estimated for the South West are removed from the results and applied as exogenous investment to the Wide Bay-Burnett Non-linear I-O model;
- stage 3 – the inter-regional transfers defined within the Queensland Non-Linear Regional Model (QNLRM) are used to spatially distribute total impact estimates; and
- stage 4 – the results from both models are aggregated to form the total economic impact results, spatially distributed across the six regions of the QNLRM and the rest of Australia.

The economic impacts are centred on two distinct regions and the level of interaction between the South West and Wide Bay-Burnett regions far exceeded the inter-regional trade flows between the two assumed within the QNLRM.[46]

The impacts by region are shown below in Table 22. The expected total impacts are:

- a turnover/gross output impact of $1064 million;
- a value adding impact of $502million;
- additions to factor income over the 18 month period of $380 million; and
- employment supported/created of 1005 positions in construction and supplying industries.[47]

Note that these impacts are defined over 18 months rather than annually.[48]

As might be expected, the bulk of the impacts were contained within the South West and Wide Bay-Burnett regions with 46%, 49%, 52% and 57% of the turnover, value added, factor income and employment respectively being located in these two regions. However, there were also considerable leakages to Brisbane-Moreton and to the rest of Australia, especially from the South West region. The spatial distribution, by percentage, is shown in Table 23.

[46] Spatially and economically, both regions are more attached to the Darling Downs than to each other, except for this particular case, and for this reason the existing model would not have given a true indication of the level of interaction that will characterise this project.

[47] The planned construction workforce over the construction phase is 500.

[48] Exact timing of economic impact is difficult to estimate and depends upon both how long the project actually took to complete and how the money was spent. The total impacts are probably spread over an 18 month – 24 month period. The important point is that, unless supplemented by additional spending the effects are temporary.

By way of comparison, Brisbane-Moreton picked up 17%, 15%, 14% and 14% respectively across the four indicators and the rest of Australia received 18%, 21%, 16% and 13%. This level of outflow inter-state is higher than normal and reflects the narrow economic base of the South West region.

Table 22 Economic impacts from mine-related construction

Region	Turnover	Value added	Factor income	Employment(FTE)
Brisbane-Moreton	181.03	75.42	54.27	135
Southern[a]	308.82	155.87	144.40	432
Wide bay	181.03	90.51	79.80	231
Central	106.49	40.23	22.80	41
Northern & NW	63.89	20.11	11.40	20
Far North	31.95	15.08	7.60	20
Rest of Australia	191.68	105.59	59.73	126
Total	**1064.89**	**502.81**	**380.00**	**1005**

a An amalgamation of South West and Darling Downs.

Source: Derived from South West & Wide Bay Burnett marginal coefficient tables plus the spatial allocation of the QNLRM.

Table 23 Distribution of economic impacts from mine-related construction (%)

Region	Turnover	Value added	Factor income	Employment(FTE)
Brisbane-Moreton	17	15	14	13
Southern	29	31	38	43
Wide bay	17	18	21	23
Central	10	8	6	4
Northern & NW	6	4	3	2
Far North	3	3	2	1
Rest of Australia	18	21	16	13
Total	**100**	**100**	**100**	**100**

Source: Derived from data in **Error! Reference source not found.**.

The project also involves rail investment of $177 million. The rail infrastructure impacts the economy differently from mine construction as it sources different inputs, the project was estimated separately. The same four stage methodology was used and the results and percentage spatial distribution of the results are shown Table 24 and Table 25 respectively.

The total impacts are:

- a turnover/gross output impact of $354 million;
- a value adding impact of $223 million;
- additions to factor income over the 18 month period of $163 million; and

- employment supported/created of 353 positions in construction and supplying industries.

Table 24 Rail infrastructure impacts

Region	Turnover ($ m)	Value added ($ m)	Income ($ m)	Emp. (FTE)
Brisbane-Moreton	56.07	33.29	24.42	55
Southern	90.33	72.46	56.02	136
Wide Bay	59.18	39.17	33.04	75
Central	31.15	13.71	8.62	24
Northern & NW	18.69	7.84	4.31	14
Far North	9.35	3.91	1.43	7
Rest of Australia	46.72	25.46	15.80	35
Total	311.49	195.84	143.64	346

Source: Derived from South West & Wide Bay Burnett marginal coefficient tables plus the spatial allocation of the QNLRM.

Once again the impacts are substantial and spatially concentrated in the Southern and Wide Bay-Burnett regions, slightly more so than for the mine-related construction, a reflection of the significant manufacturing sector in the Southern region. Specifically, 48% of turnover, 57% of value adding, 62% of factor income and 61% of employment impacts stay within the impacting regions.

Once again substantial leakages occur to the Brisbane-Moreton region and to the rest of Australia.

Table 25 Distribution of rail infrastructure impacts (%)

Region	Turnover	Value added	Factor income	Employment(FTE)
Brisbane-Moreton	18	17	17	16
Southern	29	37	39	39
Wide bay	19	20	23	22
Central	10	7	6	7
Northern & NW	6	4	3	4
Far North	3	2	1	2
Rest of Australia	15	13	11	10
Total	100	100	100	100

Source: Derived from data in **Error! Reference source not found.**.

3.6 Operational impacts

The mine will take two years to reach a production level of 8 Mtpa.

The regional economic impact is based on average cost of production for the 8Mt required to secure 5Mtpa exports.

Below in Table 26 we estimate the annual average returns (2010 prices) when running at a capacity of 8Mtpa. Data reflecting the value of output plus annual allowances for mine refitting and capital maintenance are used to supplement estimates of costs of production however royalty payments are considered later in the analysis.[49] We estimate the total annual economic impacts over the 28-30 year period. In comparison with construction and infrastructure impacts, it would be expected that the impacts for operations would be greater as there is less reliance on imported capital and the impacts are cumulative over time (albeit expressed in annual average values). Direct employment is constrained to those estimates provided by the company.[50] Once again the four stage methodology used to derive the construction impacts is applied.

Table 26 indicates annual average impacts of:

- total annual average economic turnover/gross output impact of $1194million;
- a value adding impact of $564million;
- additions to factor income annually $355million; and
- employment supported/created of 687 of which approximately 500 will be contained within the Southern and Wide Bay regions.[51]

Table 26 Annual average operational economic impacts ($ million)

Region	Turnover	Value added	Factor income	Employment(FTE)
Brisbane-Moreton	203.07	89.35	58.74	99
Southern	370.31	230.72	154.49	313
Wide bay	226.96	103.34	71.12	178
Central	107.51	38.08	21.34	21
Northern & NW	71.67	21.75	10.67	9

[49] These could be include in the indirect tax/ primary inputs section but based on established practice (Synergies, 2010) they are calculated externally.

[50] These employment estimates are lower than would have been provided by the model on the basis of expected level and value of output and in comparison to construction related employment. This no doubt reflects technical change that has occurred in the industry. It does however, in comparison with other studies, make the employment estimates appear conservative. It also should be remembered that construction related employment is for a limited duration

[51] The planned operational workforce is 300.

Region	Turnover	Value added	Factor income	Employment(FTE)
Far North	36.17	10.88	3.55	5
Rest of Australia	179.18	70.71	35.56	62
Total	1194.87	564.82	355.47	687

Note: Based on total production of 8Mtpa to allow export of 5Mtpa.
Source: Derived from South West & Wide Bay Burnett marginal coefficient tables plus the spatial allocation of the QNLRM.

Spatially, the percentage distribution of the impacts is shown in Table 27. In terms of turnover/output, 50% is contained with the two impacting regions, in addition to 62% of value added, 60% of factor income and 60% of employment impacts. Brisbane-Moreton and the rest of Australia also benefit significantly. The impacts in Brisbane-Moreton are evenly spread across the four indicators but declining in the rest of Australia in terms of factor income and employment.[52]

Table 27 Spatial distribution of operational impacts (%)

Region	Turnover	Value added	Factor income	Employment(FTE)
Brisbane-Moreton	17	16	17	15
Southern	31	42	43	45
Wide bay	19	19	20	25
Central	9	7	6	3
Northern & NW	6	4	3	2
Far North	3	2	1	1
Rest of Australia	15	13	10	9
Total	**100**	**100**	**100**	**100**

Source: Derived from data in **Error! Reference source not found.**.

3.7 Revenue impacts

The Elimatta project will represent a source of State Government revenue through mineral royalties and payroll tax. Royalty payments were reported in the previous section. Employees of the project will also contribute to Commonwealth income tax and GST.

Table 28 provides an estimate of the change in payroll tax receipts. The default values in the QNLRM suggest that most factor income will be in wages and salaries,[53] however, it is not fully known what proportion of these wages will be paid by companies, other than those involved in the Elimatta project, who received industry and consumption flow-on benefits and who are large enough to be subject to payroll tax.

[52] This is the normal result.

[53] Approximately 61-65%.

On the other hand, the number of direct jobs created by Elimatta is known and wages paid would be liable for payroll tax.[54] The report assumes payroll tax (paid by all eligible companies) is estimated to be 75% of wages produced through the project.[55] The principle advantage of this method is that the factor income estimates made here are comparable and benchmarked against a range of other mining projects. It also removes the need to make assumptions about the average wages paid in direct and indirect jobs associated with the project.

GST is a tax on value added. Exports are GST free, which means the direct value created by the project would be untaxed. To estimate the GST liability we have applied the GST rate to the additional coal (some 3Mt) mined but not exported. This coal is valued at its cost of production for GST.

Income tax was estimated by applying an average tax rate to the model's estimate of factor income. An average rate of 22% was applied to labour income and 30% to gross operating surplus. The shares of labour income and gross operating surplus were estimated from the tables on the basis of the Queensland average proportions for the mining industry for Queensland as a whole.[56] Note these estimates differ from those reported in the previous section as they include both direct and indirect income.

Table 28 shows the State would increase payroll tax receipts by $11.5 million per annum in payroll tax.[57] Similarly, the Commonwealth benefits with additional income tax of $35.6 million per annum and $23.9 million per annum in GST.[58]

Table 28 Revenue from the project ($ million per annum) at various output levels

Source of revenue	8Mtpa production (5Mtpa export)
State taxes	
Payroll tax	11.53
Commonwealth taxes	
Income tax[a]	35.58
GST[b]	23.90[c]

[54] That is those firms whose annual wage bill exceeds $1 million per annum.

[55] See Synergies (2010) p.62. This may be an over estimate for firms within the South West.

[56] This was prefer to averaging out the coefficients in the two regions as, Wide Bay in particular is not a mine intensive region and is probably atypical in that respect.

[57] Levied at 4.75%.

[58] Additional Company Tax was not calculated.

a Income tax was calculated by applying an average rate of 22 % to the estimates of income. Commonwealth Treasury noted in its 2006 international comparison of taxes that Australia's average income tax rate was 22% and this rate has been stable for the past 40 years. Calculated assuming 50% of jobs created are taken up by those already employed

b GST liability is calculated as one-tenth of the value added generated by the project. An adjustment was made for the fact that exports are GST exempt. Therefore only the indirect value added was used to calculate the potential GST revenue generated by the project. Calculated based only on usable tonnes (5Mtpa).

c Based on value of 3 MTPA valued at cost price.

Source: Synergies.

These tax receipts continue for the life of the project. However, revenue benefits will also flow from the construction of the mine and rail infrastructure. While these will accrue only for the life of the construction phase of the projects they are substantial as shown in table 29.

Table 29 Short term Revenue from construction and infrastructure projects

Source of revenue	Mine-related	Rail-related
State taxes		
Payroll tax	12.69	3.22[59]
Commonwealth taxes		
Income tax[a]	37.93	9.63
GST[b]	13.26	3.95

a Income tax was calculated by applying an average rate of 22 % to the estimates of income. Commonwealth Treasury noted in its 2006 international comparison of taxes that Australia's average income tax rate was 22% and this rate has been stable for the past 40 years. Calculated assuming 50% of jobs created are taken up by those already employed

b GST liability is calculated as one-tenth of the value added generated by the project. In this particular case, to avoid double counting only the consumption based components of value added were used.

[59] Wages to Rest of Australia not included in calculation.