Australia Pacific LNG Project

Volume 2: Gas Fields

Chapter 21: Economic Assessment

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21. Economic impact assessment

21.1 Introduction

21.1.1 Purpose

This environmental impact statement (EIS) chapter forms the economic impact assessment of the gas fields element of the Australia Pacific LNG Project (the Project). It assesses the economic impacts associated with the development, construction and operation of the gas fields. It also assesses the Project's impact as a whole to regional, State and national economies.

It identifies the nature, magnitude and significance of economic impacts and identifies appropriate measures for impact management and mitigation, designed to reduce detrimental impacts and enhance the positive benefits. There are three steps in the economic impact assessment process:

1. Baseline assessment of the existing economic environment
2. Identification and assessment of potential impacts
3. Identification of mitigation measures and opportunities for enhancement.

The mitigation measures are detailed in Volume 2 Chapter 24 – Social impact assessment.

Development of the gas fields has the potential to impact on the existing economic environment of the local and regional economies within the study area. Of Australia Pacific LNG's 12 sustainability principles, a relevant subset (detailed below) will be applied to the planning, design, construction and operation of the gas fields' infrastructure to ensure that such impacts are avoided or reduced.

In the context of the existing economic environment, Australia Pacific LNG will contribute to sustainable development by:

- Fostering the health and wellbeing of its workforce
- Respecting the rights, interests and diverse cultures of the communities in which it operates
- Creating and maintaining a rewarding workplace for employees and contractors by encouraging personal development, recognising good performance, valuing teamwork and fostering equality of opportunity and inclusivity
- Identifying, assessing, managing, monitoring and reviewing risks to its workforce, its property, the environment and the communities affected by its activities
- Ensuring that all employees and contractors work consistently with its sustainability principles, commitments, values and systems
- Engaging regularly, openly and transparently with people and communities affected by its activities, considering their views in its decision-making and striving for positive social outcomes
- Working cooperatively with communities, governments and other stakeholders to achieve positive social and environmental outcomes, seeking partnership approaches where appropriate.

Guided by these principles, Australia Pacific LNG will work with and through communities to build their capacities to enhance the benefits flowing from the Project, and to adjust to the changes in the economic environment. Mechanisms to achieve this are outlined in this assessment. Identifying

opportunities for local and regional businesses, adopting strategies to reduce stress on housing and the local labour pool, and acting on these early through participatory mechanisms, will play a key role in contributing to sustainable community development.

A key focus of the EIS is to identify strategies for enhancing employment opportunities for local and regional residents, while seeking to mitigate disruptive impacts of project workforce requirements on the existing local and regional labour pool. Training programs will be designed so that they support the development of the Project while simultaneously providing diverse transferable skills that provide employees with long-term career paths.

A key element of sustainability is partnerships. As such, strategies identified in this assessment adopt a collaborative approach with industry, government and community stakeholders to increase the likelihood of success and enhance the contribution towards sustainable economic development.

21.1.2 Scope of works

This economic impact assessment has been completed according to the terms of reference for the Australia Pacific LNG Project, as set by the Coordinator-General (December 2009). The terms of reference require Australia Pacific LNG to describe the existing economic environment, assess identified and associated economic impacts and present appropriate mitigation strategies. In particular, the Project is required to assess:

- The relative significance of this proposal in the local, regional, state and national economic context
- The extent to which local and other Australian goods and services will be used
- The short and long 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 need for any additional infrastructure provision by government to support the Project
- Implications for future development in the locality, including constraints on surrounding land uses and existing industry
- The impact of living standards at the local, regional and state level.

The terms of reference also require Australia Pacific LNG to identify any new skills and training to be introduced in relation to the Project, and indicate the occupational skill groups required and potential skill shortages anticipated.

21.1.3 EIS terminology

The economic impacts on the economy, consumers and other industries associated with the construction and operational scenarios of the Project are explained through a number of indicators using specific economic terminology. Terminology used extensively through this chapter includes:

- **Gross regional output:** the gross value of business turnover
- **Value added:** the difference between the gross value of business turnover and the costs of raw materials and other factors of production brought in to produce the output
- **Household income:** the wages paid to employees including the imputed wages paid to self-employed contractors and business operators
- **Employment:** the number of people employed, including full time and part time

- **Initial stimulus:** this represents the contribution made by the Project specifically to the economy
- **Direct impacts:** this represents the direct flow-on effects that the Project has into the business sector through the purchase of goods and services from other sectors in the economy
- **Indirect impacts:** this represents the sum of two types of 'trickle down' effects. The first are the induced effects on other businesses as a consequence of the direct effects. The second are the induced impacts on final household demand, as a consequence of higher employment across all sectors
- **Standard of living:** in the context of the economic assessment, increases to standards of living are calculated based on the increased consumption by households on non-essential goods and services. This does not take into account environmental and social factors.

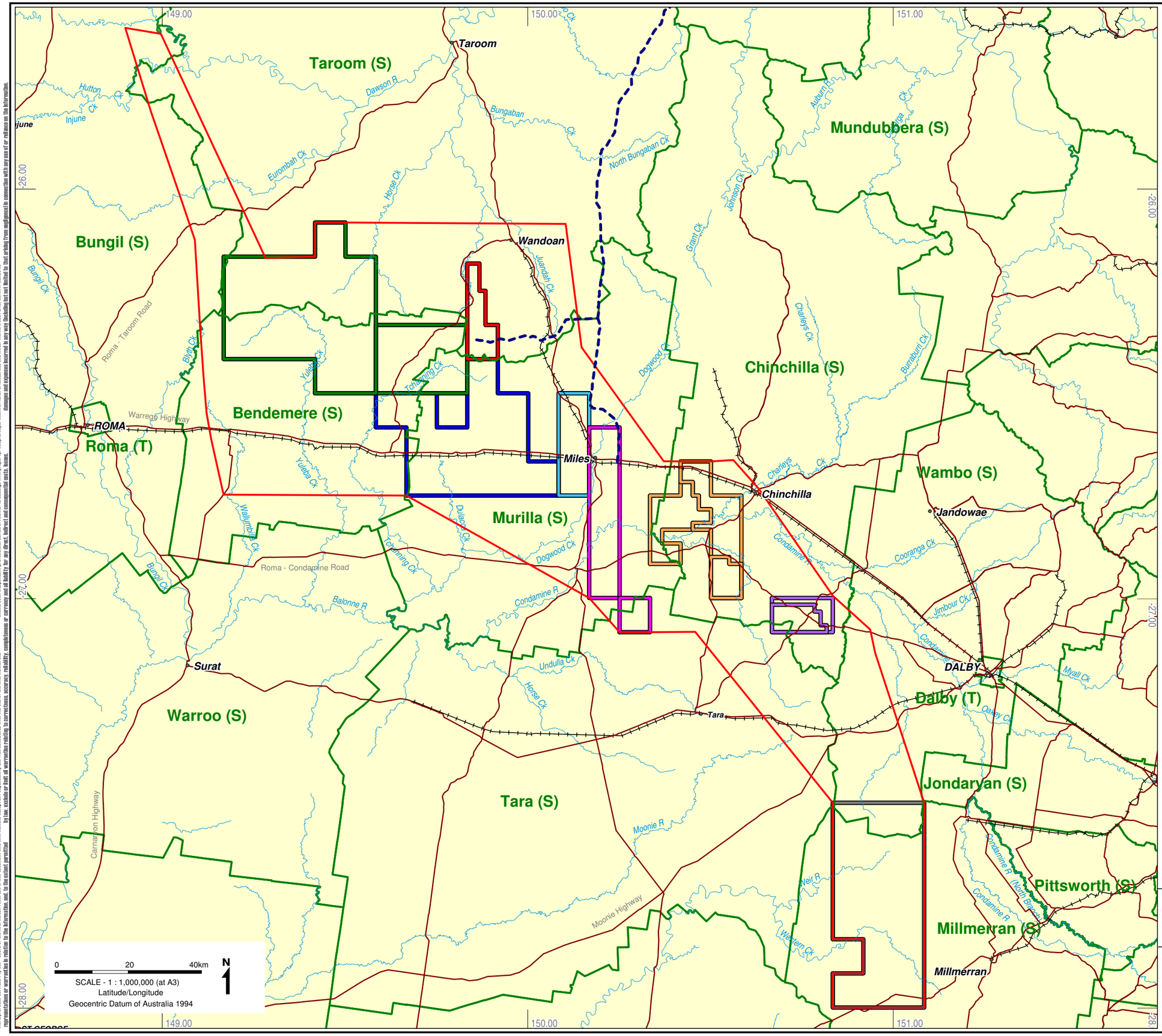
21.1.4 The study area

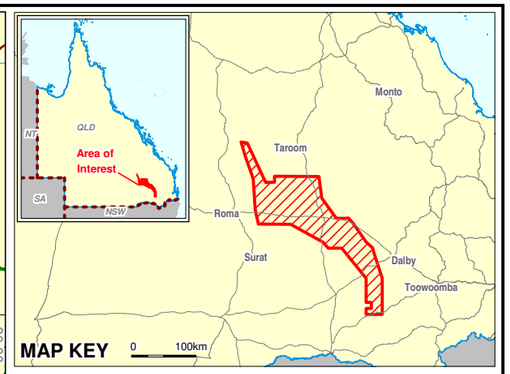
The gas fields are located in the Bowen Basin and Surat Basin in south-west Queensland, covering an area of approximately 570,000 hectares extending from Wallumbilla to Millmerran within the Darling Downs. The economic impact assessment study area for the gas fields' local economic environment has been defined geographically according to the following statistical local areas (SLAs), as classified by the Australian Bureau of Statistics (ABS) (2007a) and shown in Figure 21.1:

- Chinchilla
- Murilla
- Tara
- Wambo
- Bendemere
- Millmerran.

However, the economic impact and contribution of the Project is anticipated to extend to the regional, state and national economies. As a result, the direct and indirect economic impacts at three geographic levels have been modelled, including:

- The national economy of Australia
- Queensland's economy
- The regional economy of the Darling Downs-South West region where the gas fields are situated.





LEGEND

- Major towns
- Major Drainage
- Railway
- Gas fields study area
- Road
- Gas pipeline route
- SLA Boundary

Statistical Local Area boundaries - the letters in parenthesis following the name of individual SLAs refers to the ABS classification of SLAs as either town (T), shire (S) or city (C).

Walloons Gas Fields Development Areas

- Talinga / Orana
- Dalwogan
- Kainama
- Gilbert Gully
- Combabula / Ramyard
- Woleebee
- Carinya
- Condabri

Source Information

Statistical Local Area Digital Boundaries (ASGC 2006) sourced from http://www.abs.gov.au on 29/08/2007.

AUSTRALIA PACIFIC LNG PROJECT

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Figure 21.1 Statistical local area - gas fields

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21.2 Methodology

21.2.1 Economic baseline

Data pertaining to the existing economic environment has been sourced from government agencies, such as the Australian Bureau of Statistics (ABS) and Department of Education, Employment and Workplace Relations (DEEWR). The most up-to-date data was used wherever possible, but many data sets (particularly the ABS Census where much information is sourced) have a time lag of several years between collection and publication.

In the context of this EIS, the baseline has a number of roles. First, the baseline report provides a general description of the economy in the area of interest, which leads to an understanding about the key drivers for the economy and the types of industry relationships that may exist. Second, the baseline report provides an overview of the key sectors or services in the economy that are likely to provide inputs to the Project, and this assists in identifying likely impacts on those sectors. Third, the baseline report describes other key sectors that may be subject to indirect or induced economic impacts of the Project. This has provided the basis for predicting the level of likely impact and the potential application of mitigation strategies.

21.2.2 Economic modelling

Australia Pacific LNG engaged KPMG Econtech to undertake economic modelling to identify the impact of the Project on the local, regional, state and national economies. The methodology used is discussed in this section and more information is provided in Volume 5 Attachment 44. It should be noted that the economic impacts are modelled for the whole Project, from the gas fields through to the LNG facility, so the impacts can be examined and mitigated in a holistic manner.

Project scenarios

To simulate the economic impacts of the Project, three project scenarios were modelled:

- Scenario 1 (baseline scenario): This scenario assumes the proposed additional LNG exports and natural gas production resulting from the Australia Pacific LNG Project does not proceed
- Scenario 2 (construction scenario): This scenario models the average annual economic impacts of constructing the Project over the ten year construction phase. The average annual impact in the four peak years has also been modelled. Scenario 2 was modelled with KPMG Econtech's MMR model
- Scenario 3 (operational scenario): This scenario assumes the Project's production of coal seam gas (CSG) and liquefied natural gas (LNG) increases by the amount expected from the Australia Pacific LNG Project. Scenario 3 was modelled with KPMG Econtech's MM600+ model.

The differences in economic outcomes between the construction and operational scenarios and the baseline scenario are calculated to determine the estimated economic impacts of each stage of the Project.

Scenario 2 – construction

For the construction stage of the Project, the impacts on the Australian economy were estimated using KPMG Econtech's MMR model. MMR is a computerised general equilibrium (CGE) model and has been used as it is designed to estimate the effects of policies or projects that are state or region

specific over the medium term. This allows the model to capture the construction impacts more effectively than a long-run model, as the impacts do not last long after the construction is completed. Importantly, the modelling simulates the average effect of the construction during the initial 10 years of the Project's construction. The MMR model divides Australia into 33 regions with 18 industries corresponding to the Australian and New Zealand Standard Industry Classifications (ANZSIC) used by the ABS. Each region is modelled individually but following a consistent approach.

The short to medium-term economic impacts of the Project's construction stage will arise from the direct stimulus provided to the economy through investment in the construction of the gas fields, gas pipeline and LNG facility. The economic impacts will mainly be evident in construction-related industries, as new buildings and infrastructure are erected. The extent to which these direct impacts are expected to flow through to the rest of the economy and cause second-round effects are identified and quantified by economic modelling. This happens as the supply chain of the construction industry is stimulated, and as business and consumer demand is encouraged within the regional economy.

The economic modelling uses assumptions regarding the expected construction workforce size and timing. Construction of the gas fields will be undertaken in a rolling process. It is expected to begin with some early project works in 2010, and be mainly completed by 2027. The peak workforce will be required between 2012 and 2017 where, on average, a workforce of 1,616 will be required per year. The workforce will peak in 2013-14 with up to an estimated 2,100 construction workers in the gas fields for that year. Ongoing construction will continue over the life of the Project as new wells are brought online.

Scenario 3 –operational

The operational scenario is used to examine the impacts of the Project during the operational phase, and these impacts have been estimated using KPMG Econtech's MM600+ model. The MM600+ is a long-term CGE model of the Australian economy that models a long-run equilibrium (approximately five to 10 years). The operational scenario is a long run scenario, which looks at the impact on the economy once the economy has taken account of the Project and achieved long run, steady state equilibrium. As such, there is no specific period over which the impact is modelled, but rather it represents the economy once it has fully adjusted to the Project.

The model distinguishes 108 industries that produce 672 products, importantly distinguishing LNG from natural gas and oil production. The MM600+ model is able to capture the operational impacts more effectively than a short to medium-run model, as it is not influenced by short run fluctuations. This provides a more accurate representation of the impacts of the Project once it is in normal operation mode.

The average operational effects of the Project to the regional economies of the Darling Downs-South West Queensland and Mackay-Fitzroy-Central West (which incorporates the project study area), and to the Queensland economy are also estimated using MM600+.

The economic modelling uses assumptions regarding the expected operational workforce size and timing. The operational workforce requirements for the gas fields will commence in 2011, with an average of 30 workers required for the first year. Operational workforce requirements will steadily increase between 2011 and 2027, when a total of 690 workers will be eventually required. Between 2011 and 2027, an average of 471 workers will be required. Workforce numbers beyond 2027 are anticipated to remain comparable to the 2027 level.

In addition to the gas fields' operational workforce, there will be requirements for workers in the logistics hubs in Brisbane, Miles and Roma. These requirements are summarised in Table 21.1.

Table 21.1 Operational workforce – logistics hubs

Year	Brisbane	Miles	Roma
2010–2012	25	25	25
2013–2019	50	50	50
2020–2027	67	67	67

Benefits of CGE models

CGE models like MM600+ and MMR provide better estimates than input-output (IO) models because they take into account: the fact that the structure of the economy will respond to changes in relative prices and so is not rigid; and that there are important long-run national economic constraints in the following areas – labour supply, budget balance, external balance and private savings.

This makes CGE modelling results more conservative but also more realistic. Further, MM600+ provides estimates of average effects over the operational phase. This is important because project changes should be judged against their overall impacts, not just their impacts in a particular year. The MM600+ model will also capture any substitution and flow on effects arising from a particular project.

Furthermore, the economic models used to assess the economic impacts of the Project (MMR and MM600+) are the same as those used in a report prepared for the Queensland Government into the viability and economic impact of the LNG Industry to Queensland's economy (MMA 2009), thus allowing for a comparison of data.

Cumulative impacts

In addition to the Australia Pacific LNG Project, there are a number of other major projects planned for the regions within which the Project is situated. It is important to understand how this group of projects (including the Project) will impact the economy as whole.

The cumulative impact modelling captures the impact on the national, state and regional economies if 30 major projects (including the Project) proceed to full operation. These 30 projects have been identified and agreed through consultation with the Department of Infrastructure and Planning in October 2009 for incorporation into the cumulative impact assessments. The projects are located in the regions incorporating the gas fields, gas pipeline and LNG facility elements of the Project,and include:

- Arrow Energy Gas Field Development
- Australia Pacific LNG
- Australian Inland Rail Expressway - Toowoomba to Gladstone Railway
- Boyne Smelters
- Cameby Downs (Coal) Expansion Project
- Central Queensland Pipeline
- Darling Downs Power Station
- Dawson Expansion Project
- East End No. 5 Mine
- Linc Energy Underground Coal Gasification
- Moura Link (Government Project)
- Nathan Dam and Associated Pipelines (Government Project)
- Queensland Curtis LNG Project
- Queensland Gas Pipeline Expansion
- Shell Australia LNG Project
- Surat Basin Railway
- Surat to Gladstone Pipeline
- Walloon Coal Seam Gas Field

- Fisherman's Landing Port Expansion
- Gladstone LNG (GLNG)
- Gladstone LNG Project—Fisherman's Landing
- Gladstone Pacific Nickel Refinery
- Gladstone Steel Making Facility
- Gladstone-Fitzroy Pipeline
- Wallumbilla-Darling Downs Power Station Gas Pipeline
- Wandoan Coal Project
- Western Basin Dredging
- Wiggins Island Coal Terminal
- Woori Coal Project
- Yarwun Alumina Refinery

As with operational scenario for the Project, the CGE MM600+ model was used to assess the economy-wide cumulative impact of the 30 projects identified. Due to the specific geographical nature of the projects, these impacts were then also examined at a state and regional level. In order to evaluate the maximum impact associated with the projects, it has been assumed that all projects will go ahead.

Data for other projects came from the respective project proponent's website and released information such as EISs. Data on total Australian production was sourced from the Australian Bureau of Agricultural and Resource Economics (ABARE).

21.2.3 Estimating the impact on property values

In addition to modelling the expected direct and indirect impacts of the Project on the economy, the economic impact assessment also assesses the potential impact of the Project on property values at a local and regional level.

In broad terms, the impacts on property values were estimated by combining quantitative analysis (where possible) and qualitative discussion. It should be noted that the methodology used to estimate changes in property values is conditional on a range of factors (such as zoning laws) and these factors are subject to change over time. Hence, this analysis provides an indicative estimate of the proposed changes to property values over the long term.

The impact of the gas fields' development on property values in the study area is assessed with respect to the construction and operational phases. The analysis is primarily qualitative in nature and focuses on the long run impacts in the operational scenario.

21.3 Existing economic environment

This section provides a summary of the existing economic environment within which the gas fields are located, including an overview of the regional and state economies and description of the local economy with respect to labour force, infrastructure, key industries and property values.

21.3.1 Regional and State economic overview

Contribution to Gross Regional Product (GRP) by industry

Gross regional product (GRP) estimates were prepared by Queensland Treasury for 2000-01 and 2005-06 for Statistical Divisions (SD) in Queensland. Estimation of GRP at the lower, more disaggregated SLA level does not provide robust statistics particularly for the smaller SLAs within the study area. As such, Queensland Treasury estimates at the SD level have been adopted for this

study. Queensland Treasury recommends the estimates be interpreted with extreme care given the lack of economic statistics available at a regional level.

The gas fields' study area is contained within the statistical divisions of Darling Downs and South West. GRP estimates for 2000-01 and 2005-06 are provided in Table 21.2. In 2005-06, the estimated GRP of the combined regions was $10.8 billion, accounting for 6% of GSP. The Darling Downs SD and South West SD both recorded positive GRP growth between 2000-01 and 2005-06 although growth was below the state average.

Table 21.2 Real gross regional product ($m) – 2000-01 and 2005-06

Region	2000-01	2005-06	Average annual growth rate
Darling Downs SD	6,124	9,119	8.3%
South West SD	1,324	1,663	4.4%
Queensland	114,684	183,983	9.9%

Note: Figures are chain volume measures and are expressed in 2005-06 dollars
Source: Office of Economic and Statistical Research (OESR) (2008)

A summary of the three best performing industries (as defined by the Australia Bureau of Statistics) for Darling Downs and South West SD is provided in Table 21.3. It is important to note that LNG production is defined as 'mining output' in both the ABS input output tables and the Australian and New Zealand Standard Industrial Classification (ANZSIC) industry definitions.

Table 21.3 Sector growth and contribution to total economic growth – 2000-01 to 2005-06

Region	2000-01 to 2005-06	
	Sector Growth	Contribution to total economic growth
Darling Downs SD	Mining (51.1%), electricity and gas (17.8%) and finance and insurance (14.7%)	Mining (0.6%), finance and insurance (0.6%) and agriculture, forestry and fishing (0.5%)[1]
South West SD	Health and community services (2.4%), agriculture, forestry and fishing (1.5%) and retail trade (1.3%)	Agriculture, forestry and fishing (0.4%), retail trade (0.1%) and health and community services (0.1%)
Queensland	Finance and insurance (9.4%), construction (8.8%) and property and business services (7.3%)	Construction (0.6%), property and business services (0.6%) and manufacturing (0.4%)

Source: OESR (2008)

Growth in the Darling Downs region has been driven by mining (including CSG-LNG) and power generation. The mining sector was the best performing industry across the Darling Downs SD, growing by 51.1% between 2000-01 and 2005-06. Since the statistics were compiled, the region has experienced a mix of significant economic impacts. Some sub sectors continue to prosper (e.g. coal seam gas) while others are contracting (e.g. thermal coal production).

The South West SD recorded a decline in real gross value added (GVA)[2] across most sectors, with the exception of agriculture, forestry and fishing, retail trade and health and community services.

[1] In the context of the gas fields study area, the Agriculture, Forestry and Fishing sector as defined by the ABS is predominantly comprised of agriculture and forestry.

Input costs faced by industry

To determine the major input costs faced by industry, three areas were considered:

- Changes in labour costs since the 2006 Census of Population and Housing (latest available data for the gas fields and gas pipeline areas)
- Changes in construction costs in the past ten years in Queensland and Australia, for both building construction and non building construction
- Changes in living costs, in terms of the regional price index

These changes are determined through analysis of price indices. Price indices such as the Labour Price Index enable prices for a common item or group of items to be compared at different points in time.

With the exception of the regional price index, most data is not available at a local level. Therefore, much of the analysis relates to data at state and national levels.

Labour price index

Since the 2006 Census of Population and Housing, Queensland's labour price index (excluding bonuses) grew by an average of 4.3% per annum, compared to 4.1% per annum for the national average, as shown in Table 21.4.

Table 21.4 Labour price index for total hourly rates of pay (excluding bonuses) – Queensland and Australia

	Queensland		Australia	
	Index	**Annual growth %**	**Index**	**Annual growth %**
2005-06	108.4	N/A	108.1	N/A
2006-07	113.3	4.5%	112.4	4.0%
2007-08	118.1	4.2%	117.1	4.2%
2008-09	123.0	4.1%	121.8	4.0%
Average, 2006-07 to 2008-09	N/A	4.3%	N/A	4.1%

Source: ABS (2009a)
Note: 2003-04=100

Key industry sectors identified in the gas fields' study area include:

- Agriculture, forestry and fishing
- Construction
- Mining (including CSG-LNG)
- Manufacturing

[2] Gross Value Added (GVA) measures the contribution to the economy of each individual producer, industry or sector.

- Retail trade

The labour price index is available for all above listed industries at the national level, with the exception of agriculture, forestry and fishing.

The average annual growth rate in total hourly rates of pay (excluding bonuses) was highest for the mining and construction sectors. Growth in total hourly rates of pay in the manufacturing and retail trade sectors has fallen below the average for all sectors since the 2006 Census, as shown in Table 21.5.

Table 21.5 Labour price index, total hourly rates of pay (excluding bonuses) by industry sector – Australia

	Construction	Mining	Manufacturing	Retail Trade	Average
Labour price index					
2005-06	110.3	109.2	107.7	107.2	108.1
2006-07	115.5	115.9	111.7	110.3	112.4
2007-08	120.8	122.6	116.6	115.0	117.1
2008-09	126.2	129.3	120.7	119.3	121.8
% Increase in index					
2006-07	4.7%	6.1%	3.7%	2.9%	4.0%
2007-08	4.6%	5.8%	4.4%	4.3%	4.2%
2008-09	4.5%	5.5%	3.5%	3.7%	4.0%
Average, 2006-07 to 2008-09	4.6%	5.8%	3.9%	3.6%	4.1%

Note: 2003-04=100
Source: ABS (2009a)

Building Price Index

Building price indices for general construction in Queensland and Australia are shown in Figure 21.2. Other than in 2000-01, price indices rose in Queensland throughout the 1998-99 to 2008-09 period. Their average growth exceeded the national average, because of stronger growth since 2002-03. This is illustrated in Figure 21.3.

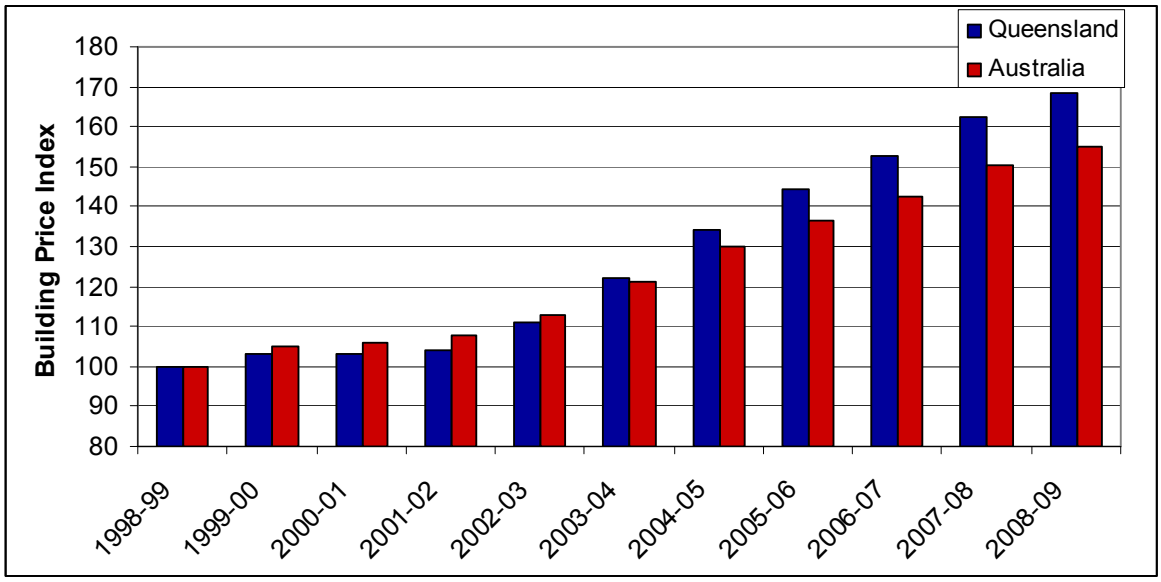

Figure 21.2 Building price index – general construction industry, Queensland and Australia

Note: 1998-99=100.
Source: ABS (2009b)

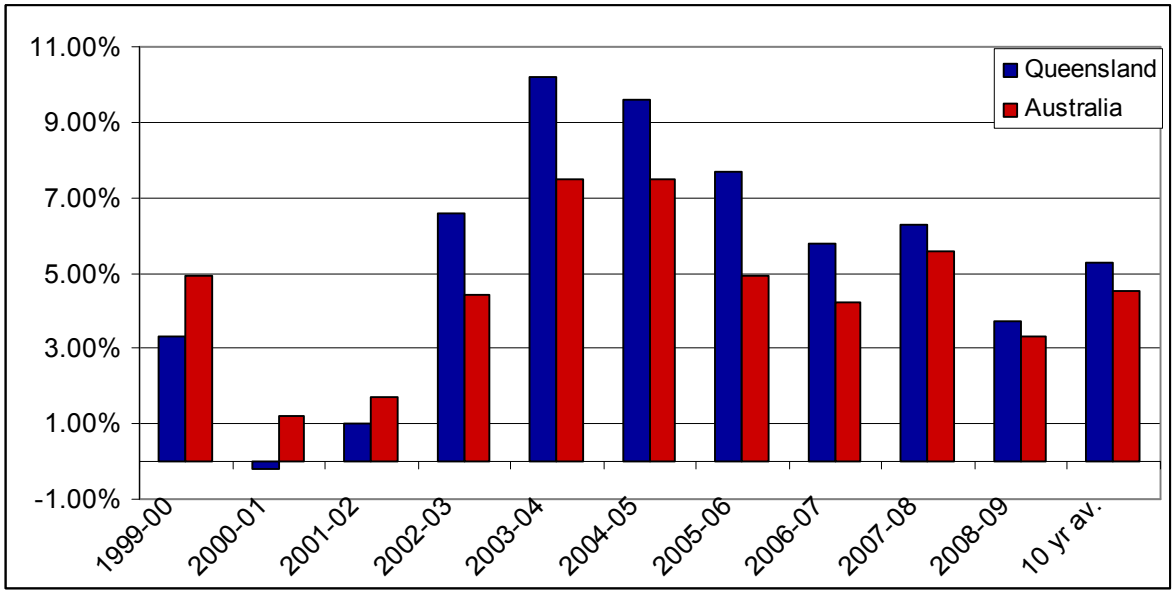

Figure 21.3 Annual change to building price index – general construction industry, Queensland and Australia

Source: ABS (2009b)

Building price indices for the building and non-building construction[3] sectors are shown in Figure 21.4. In the case of Queensland and Australia, the indices for non-building construction grew by average rates which were comparable with those for building construction. The average of all indices exceeded

[3] This refers to construction of engineering projects or infrastructure such as railways, dams, irrigation systems, harbour or river works, water or gas supply systems, oil refineries (except buildings), pipelines or construction projects not elsewhere classified, in the onsite assembly of boilers, furnaces or heavy electrical machinery from prefabricated components, or in the general repair of such structures, machinery or equipment.

average inflation of 3.4% per annum in Queensland and 3.2% per annum nationally across this period which is illustrated in Figure 21.5.

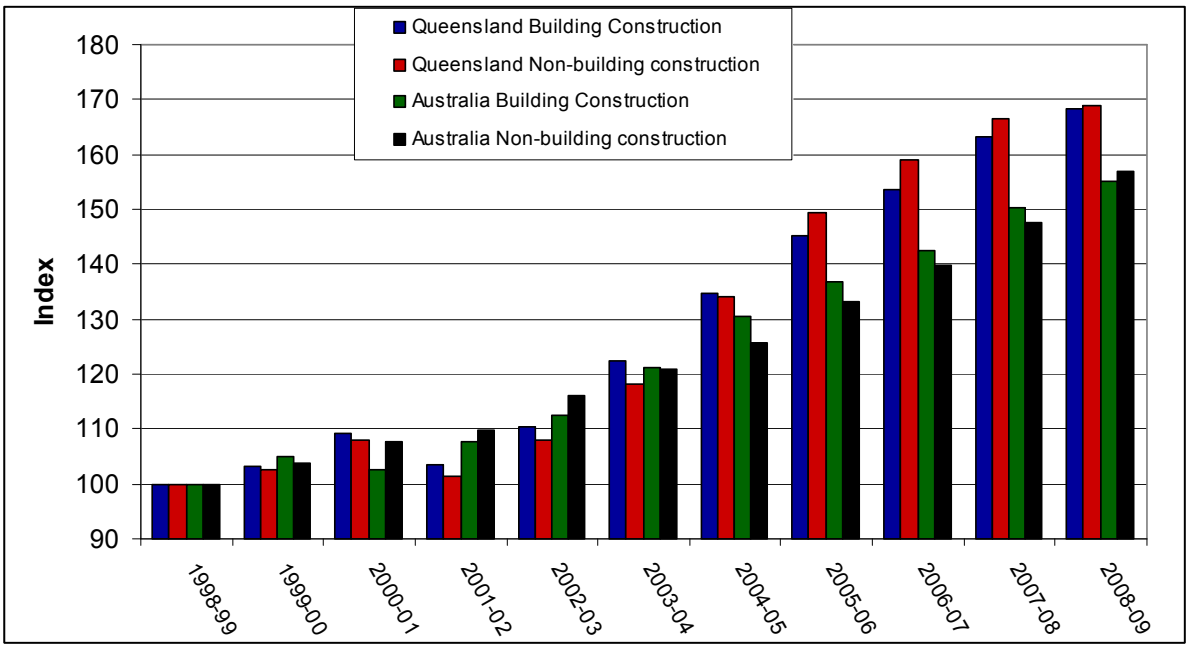

Figure 21.4 Building price index – building construction and non-building construction sectors, Queensland and Australia

Note: 1998-99=100,
Source: ABS (2009b)

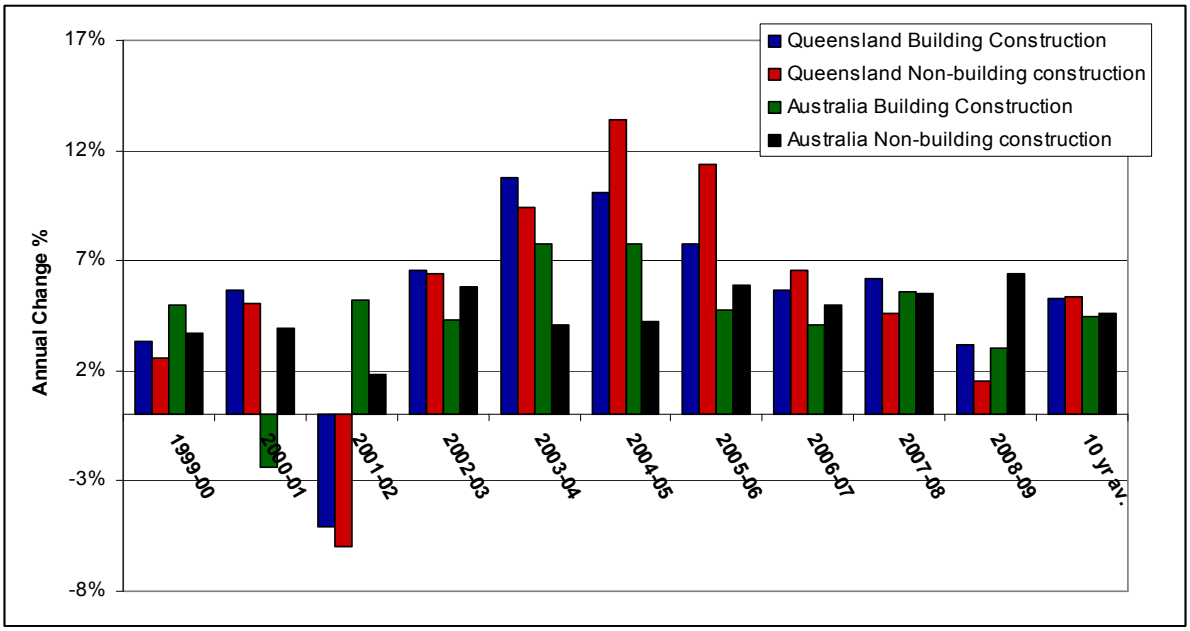

Figure 21.5 Average percentage change in the building price index – building construction and non-building construction sectors, Queensland and Australia

Source: ABS (2009b)

Summary

All industry sectors have recorded wage increases since the 2006 Census of Population and Housing, with wage growth in the construction and mining sectors exceeding the national average. ABS data also indicates wage increases were higher in Queensland than Australia.

Construction costs in Queensland and Australia have generally increased year on year above the rate of inflation over the past ten years. Since 2002-03, the growth in construction costs in Queensland has exceeded the national average.

Regional price index

Relativities can be gauged by comparing indices across centres in the study are against the Brisbane index of 100 in each case. The statistics show that the cost of living in the study area compared to Brisbane varies across categories and urban localities. Based on the 'all items' index, costs were lower than in Brisbane in all centres with the exception of Chinchilla, whose higher cost index was caused in large part by a comparatively high cost of housing in 2006. In the other centres, there were relatively low housing costs. The items included in the calculation of the housing index included rents for dwellings, electricity and other household fuels. House prices in Chinchilla in 2009 remain the highest in all gas fields' locations (refer to Section 21.3.2).

When housing costs are excluded from the index, costs are broadly comparable with those for the Brisbane index. Roma had a marginally higher index at 100.5, while the lowest index was at Dalby at 97.9. There were no centres which had indices for specific categories that were consistently higher or lower than those for the Brisbane index. Taking each centre in turn, the indices which varied by more than 5% from the Brisbane index were as follows:

- Chinchilla – Housing (106.0)
- Dalby – Food (108.7), Clothing and Footwear (90.4), Housing (78.7) and Transportation (90.9)
- Roma – Food (107.2) and Housing (76.6).

Food was generally more expensive in the study area, and health, education and communication were marginally more expensive in all centres. In contrast, housing (excluding Chinchilla), transportation (excluding Roma), and financial and insurance services were generally less expensive in the study area than in Brisbane. This is shown in Table 21.6.

Table 21.6 Regional price index, May 2006

Category	Chinchilla	Dalby	Roma	Brisbane
Food	104.0	108.7	107.2	100.0
Alcohol and tobacco	100.2	99.6	102.9	100.0
Clothing and footwear	n.a.	90.4	103.2	100.0
Housing	106.0	78.7	76.6	100.0
Household contents and services	99.8	98.0	97.4	100.0
Health, education and communication	101.4	100.0	101.4	100.0
Transportation	99.4	90.9	100.3	100.0
Recreation	98.4	95.9	96.1	100.0

Category	Chinchilla	Dalby	Roma	Brisbane
Financial and insurance services	95.8	96.4	96.2	100.0
All items	101.2	93.8	95.4	100.0
All items less housing	100.0	97.9	100.5	100.0

Source: OESR (2006)

21.3.2 Local economic overview

Labour market

Information regarding the labour market is able to be assessed using data at the statistical local area level, which provides information more specific to particular areas in the gas fields than the Statistical Division data. The extent of the available labour force depends upon a number of factors, including a range of demographic characteristics such as age and workforce participation rates.

Comparing the workforce size against the population aged between 15 and 64 years indicates that the workforce participation rate for the gas fields' area was 67.6% in 2006. This was marginally higher than the Queensland participation rate of 66.3%, which indicates that while it may be challenging to source labour from the local community, there may still be some opportunity for the Project to encourage people who are not in the labour force back into employment. These members of the community often include mothers with young children, people with a disability and early retirees.

In 2006, the agriculture, forestry and fishing sector was the largest employer in all gas fields' SLAs, with the exception of Chinchilla, where the construction sector (19.5%) accounted for the majority of employment. Employment in the agriculture, forestry and fishing sector in 2006 ranged from 31.7% in Murilla SLA to as high as 43.8% in Bendemere SLA, with an average of 31.8% across all SLAs in the gas fields' study area.

These figures are significantly higher than the Queensland rate of just 3.4%. The proportion of people employed in the agriculture, forestry and fishing sector as a percentage of all employment did however decline across all SLAs between 2001 and 2006 with the greatest decline in Millmerran SLA (14.9%). The construction sector recorded the greatest proportional increase of employment across the gas fields' SLAs (6.4%) between 1996 and 2006, with Chinchilla recording an increase from 4.5% to 19.5% of total employment.

The unemployment rates for gas fields' SLAs between the March 2001 and March 2009 are illustrated in Figure 21.6. The unemployment rate decreased in all SLAs for this period, with the largest decrease recorded in Tara SLA (9.4% to 3.4%). As at March 2009, the unemployment rate in all gas fields' SLAs was significantly lower than the Queensland (4.0%) and national (4.6%) rates. Such low levels of unemployment equate to a very tight labour market which may present challenges for Australia Pacific LNG when sourcing labour locally.

Key industries

The economy of the gas fields' study area is characterised by the dominance of the agriculture, forestry and fishing sector, with the electricity generation and coal seam gas industries becoming more prominent in recent years.

The agriculture industry in the region has been driven by the quality of soil available and the favourable climate. In the last two decades, crop production has increased significantly as has cattle

and sheep grazing. Major regional exports include wool, cereals, legumes, bird seeds, oil seeds, fruit, beef, grain, sorghum, wheat, barley and cotton. Roma Saleyards, the largest cattle selling centre in Australia with 409,169 cattle sold through the yards in 2008, plays a central role in the local economy.

Although not as significant as the agriculture or gas industries the logging and processing of cypress is a major contributor to some of the smaller communities in the gas fields' study area, including Mitchell and Injune. The Barakula State Forest is Queensland's largest cypress pine and hardwood forest and the largest pine forest in the southern hemisphere.

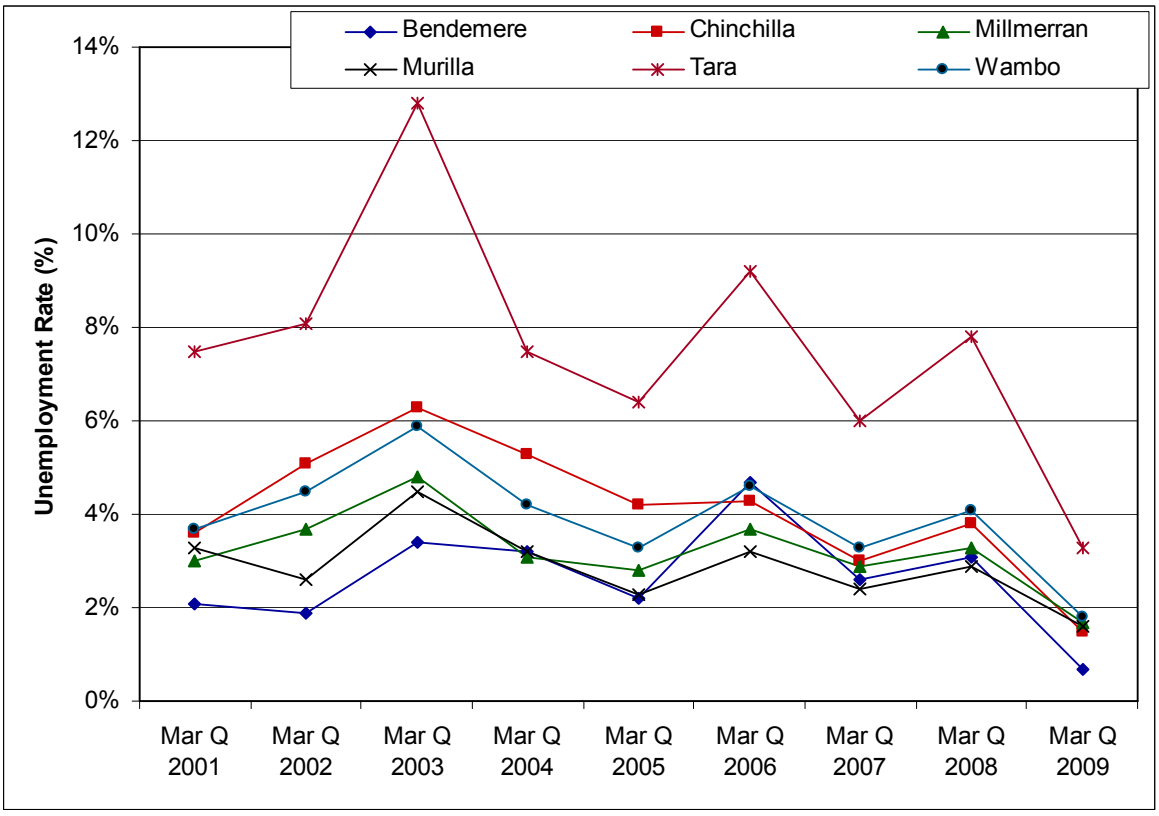

Figure 21.6 Unemployment rate, gas fields' SLAs – 2001 to 2009

Source: DEEWR (2009)

As evidenced by the projects proposed for the region, including the Australia Pacific LNG Project, the gas industry will become increasingly prominent in the region over the next decade. Numerous drilling and other contracting companies as well as major mining, gas and electricity companies have already established a presence in the region.

There are a large variety of major industrial developments proposed or planned for the gas fields' region over the next five years. The cumulative impacts of these projects on the economy, in addition to the impacts that current industries have, is expected to be significant. Whilst the projects are expected to have a positive cumulative impact on national Gross Domestic Product (GDP) and contribute significantly to the state and regional economies, they are also expected to place greater pressure on property prices and skills shortages. The cumulative impact of proposed projects is assessed in Sections 21.4.4 and 21.4.3.

Local businesses

The ABS collects data on the number and size of businesses located in every SLA in Australia. For this assessment, businesses have been classified according to economic sector and size. The business size ranges comprise: sole trader; small business (0 to 19 employees); medium sized business (20 to199 employees); and large businesses (200+ employees). The most recent statistics available are for June 2007 (ABS 2007b).

In the gas fields' area, there were approximately 3,822 businesses at June 2007. The majority of businesses were in the agriculture, forestry and fishing sector (61.3%). Almost two thirds (64.5%) were sole traders, and an additional third (32.9%) were small businesses. Within the gas fields' area, Chinchilla SLA and Wambo SLA had the largest number of businesses in the region, with 990 and 807 businesses respectively.

Key Infrastructure

Although the Surat Basin is a largely rural and agricultural based economy, there is a range of economic infrastructure which will play an important role in the development of the coal seam gas reserves into the future. Key infrastructure relevant to the Project and the existing economic environment can be assessed in three categories: natural assets, transport infrastructure and energy infrastructure. Details of the study area's infrastructure assets are provided below.

- Natural capital – the Surat Basin has an estimated 250 years' worth of viable coal resources. This coal is close to the surface which provides a competitive advantage to established power generation units as it means reduced extraction costs for cheaper electricity. The coal also has high hydrogen content, which is ideally suited to coal gasification and liquefaction technologies. As evidenced by the Australia Pacific LNG Project and a range of other projects in the gas field's area, the significant quantities of coal seam gas in the area are expected to drive further growth and mining activity in the region
- Transport infrastructure – the key elements of transport infrastructure which contribute to the Surat Basin's competitive advantage are the railway hub facilities providing access to Brisbane, Toowoomba and Charleville; the road network, connecting the region with industrial centres to the north and cities throughout south east Queensland; and the regional airport in Roma with daily connections to Brisbane and Charleville. Completion of the Surat Basin Rail project will result in the expansion of the region's freight infrastructure providing direct access to the Gladstone Port
- Energy infrastructure – the Surat Basin is one of the most important energy provinces in Queensland. Major power stations in the region include Kogan Creek Power Station, Origin Energy's 630MW gas-fired Darling Downs Power Station (which is undergoing commissioning) and the Tarong Power Station.

Relevant government policies and strategies

The Queensland Government, local councils, and government agencies have been active in planning for the expected growth in the Surat Basin region associated with the development of the CSG/LNG industry over the next decade. The various government bodies and state agencies have either recently produced, or are in the process of developing, a number of plans and strategic frameworks to ensure the development potential in the region is maximised. The strategies have been developed to ensure the Surat Basin region has the appropriate infrastructure, facilities and services in place to underpin and facilitate development.

These include:

- Queensland Government's Blueprint for Queensland's LNG Industry, which details how the Government will further work with the industry and local communities to ensure that development of an LNG industry is progressed in a way that benefits all Queenslanders
- Sustainable Resource Communities Policy, published by the Queensland Government, outlining the moves the Government is making to strengthen its coordination role, improve the linkages between social impact assessment and strategic regional planning, facilitate partnerships with local government, industry and community, and enhance the regulatory framework for social impact assessment
- Major Projects Housing Policy which is currently in development and is expected to detail strategies to improve the availability and supply of housing to support major projects and guide investment in the provision of housing
- Darling Downs South West Queensland Surat Energy Action Plan which is being developed by Department of Employment, Economic Development and Innovation in consultation with local industry groups, mines and mining services and other supply companies. The Action Plan will identify and market regional opportunities, grow supply chain capability and strengthen the foundations for growth through the promotion of infrastructure planning and investment.
- The Department of Mines and Energy (now part of the Department of Employment, Economic Development and Innovation) CSG Water Management Study, the purpose of which is to provide the government and industry recommendations into the potential impact on groundwater resource(s) due to water extraction on the Surat Basin as a result of the CSG developments.

Property values

Large projects can create significant demands for land for industrial and housing purposes. Projects that stimulate higher levels of demand through upstream and downstream supply chains are likely to have larger impacts on demands for industrial land, while projects that attract more population through direct, indirect and induced employment effects are likely to have more impacts on housing markets. These types of impacts can be minor in larger centres where there are ample stocks and development to cater for growth, but have the potential for more impact in regional centres and towns such as Chinchilla and Miles where land and dwelling stocks and changes in property stocks tend to be relatively smaller.

To determine the relative land value by use in the gas fields' study area, land was classified into four broad categories, these being:

- Agricultural uses
- Residential uses
- Commercial uses
- Industrial uses.

Sales data is presented for each of the former local government areas contained within the gas field and gas pipeline areas for the 2004-05 to 2008-09 period (these former local government areas have been used as the most recent property data available reports using these areas).

Agricultural uses

There were an estimated 695 agricultural land sales within the gas fields' area between 2004-05 and 2008-09. Most were located in Wambo (295 sales), Chinchilla (210 sales) and Tara (106 sales). Sales in the gas fields' area peaked in 2007-08 at 171 sales. Within the area, peak sales volumes occurred in Chinchilla, Murilla and Tara in 2004-05 and in Wambo in 2007-08.

Between 2004-05 and 2008-09, the median value of agricultural land sales per square metre averaged $0.21 per square metre. Values consistently declined between 2006-07 and 2008-09. Median values were highest in Wambo ($0.35/m^2) and Millmerran ($0.34/m^2). Median prices achieved per square metre between 2004-05 and 2008-09 are illustrated in Figure 21.7.

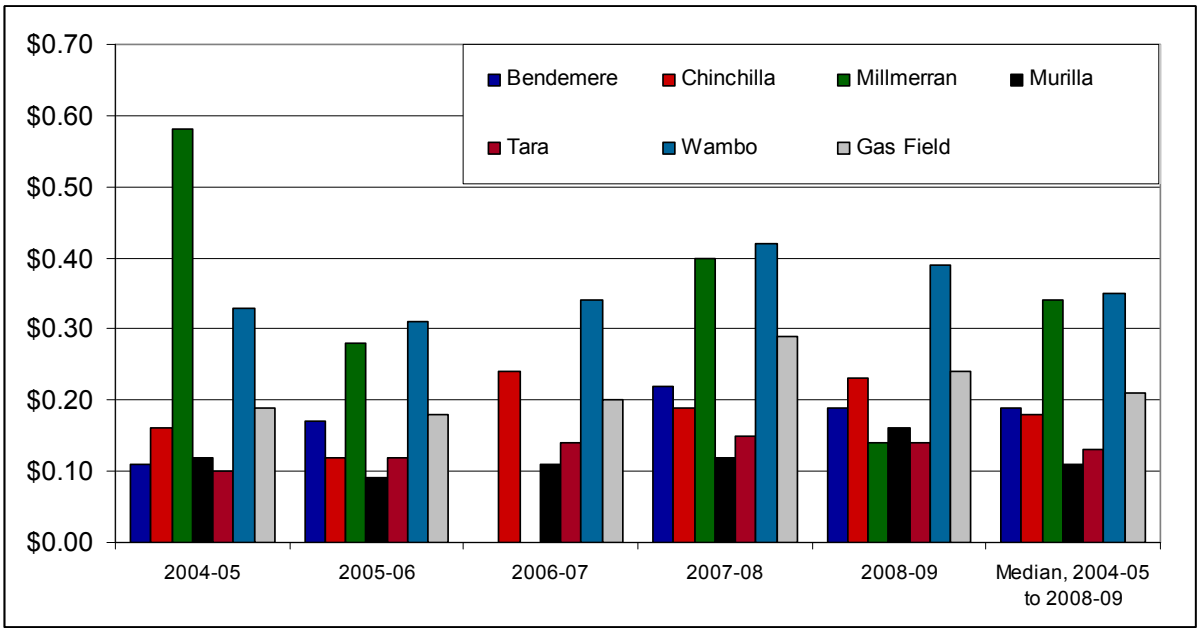

Figure 21.7 Median value of agricultural land sales per square metre – gas fields' SLAs

Note: Data was extracted in August 2009.
Source: Property Data Solutions (2009)

Residential uses

The table below shows median house prices for the 12 months to October 2009, as well as average growth rates for the key urban localities in the study area.

The median price of houses in the gas fields' urban centres has grown significantly during the last five years, with all centres except Roma experiencing considerable growth over the last year. The dampening of the housing market in Roma over the last 12 months could have been due to a number of factors, including the global financial situation.

As shown in Table 21.7, the reduction in median house price pales in comparison to the level of growth experienced in the region during the last five years. Although Tara has the lowest median house price for all centres in the gas fields, it has experienced significant growth during the last 12 months. A range of factors are believed to have contributed to the significant increase to house prices, including increased demand associated with the growth of the mining and construction sectors as well as it's perceived affordability in comparison to other areas such as the Bowen Basin and the speed at which new land for residential purposes is released and given development approval.

Table 21.7 Median house prices – gas fields' region, 2009

Urban locality	Median sales price (2009)	12-month growth to October 2009 (%)	Five-year growth to October 2009 (%)
Chinchilla	$270,000	14.1%	145.5%
Dalby	$265,000	13.3%	112.0%
Miles	$247,500	13.3%	209.4%
Roma	$255,000	-1-9%	131.8%
Tara	$140,000	18.6%	150.0%

Source: RP Data (2009)

Figure 21.8 shows the weekly median rent for 2006 and 2009. All centres in the region are experiencing high rental rates and these have increased by 55% in Chinchilla and 95% in Roma since the 2006 census. The upwards pressure on rent for the last decade has presented challenges for people sourcing affordable accommodation.

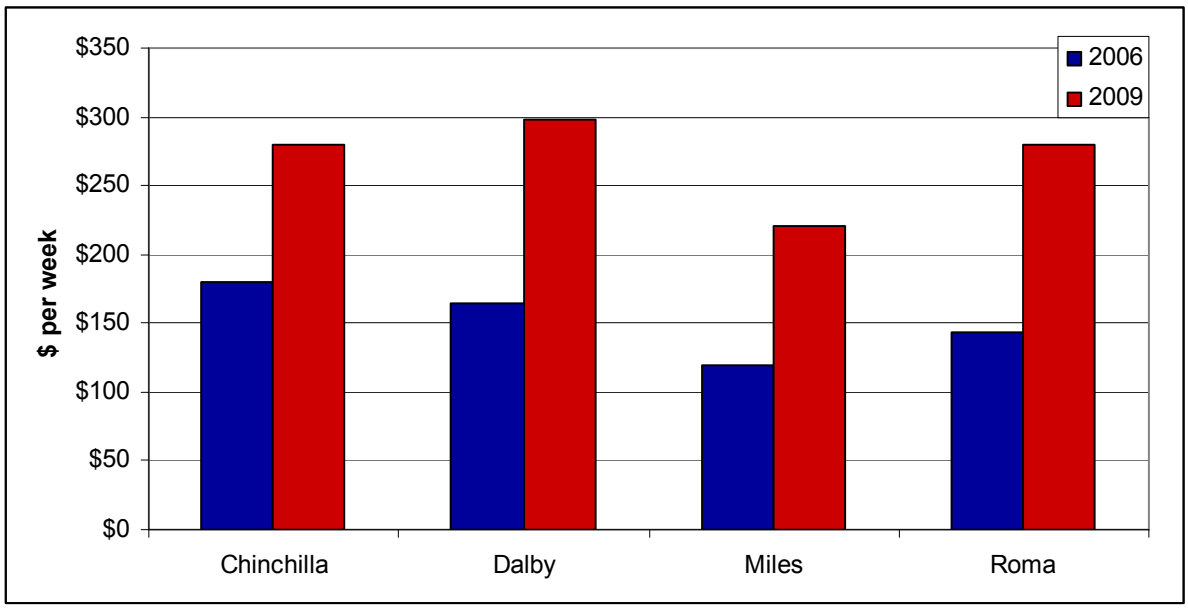

Figure 21.8 Average weekly rent – urban localities, 2006 and 2009

Source: ABS (2006) and RP Data (2009)

Commercial uses

Within the gas fields' area there were 90 commercial sales between 2004-05 and 2008-09, with Chinchilla (31 sales) and Wambo (24 sales) recording the highest sales volumes. No commercial sales were recorded in Bendemere or Millmerran in this period.

The average value of commercial sales per square metre was significantly higher than the value for agricultural and residential sales. Median sales values fluctuated and were variable within the gas fields' area. They peaked in 2008-09 at $305.40/m^2, with Chinchilla ($366.76/m^2) the only region to record a median value above the average in this year. Median prices achieved for commercial properties per square metre is shown in the figure below for the gas fields as a whole rather than for individual SLAs due to the low number of sales in the individual towns, which compromises the quality

of data at the local level. As shown in Figure 21.9, there has been a significant rise in the cost of commercial property in 2008-09 although it is important to note that this median is based on a lower number of sales than the previous years. This price increase may be indicative of increased demand and lack of available or appropriately sized commercial properties in the gas fields' area.

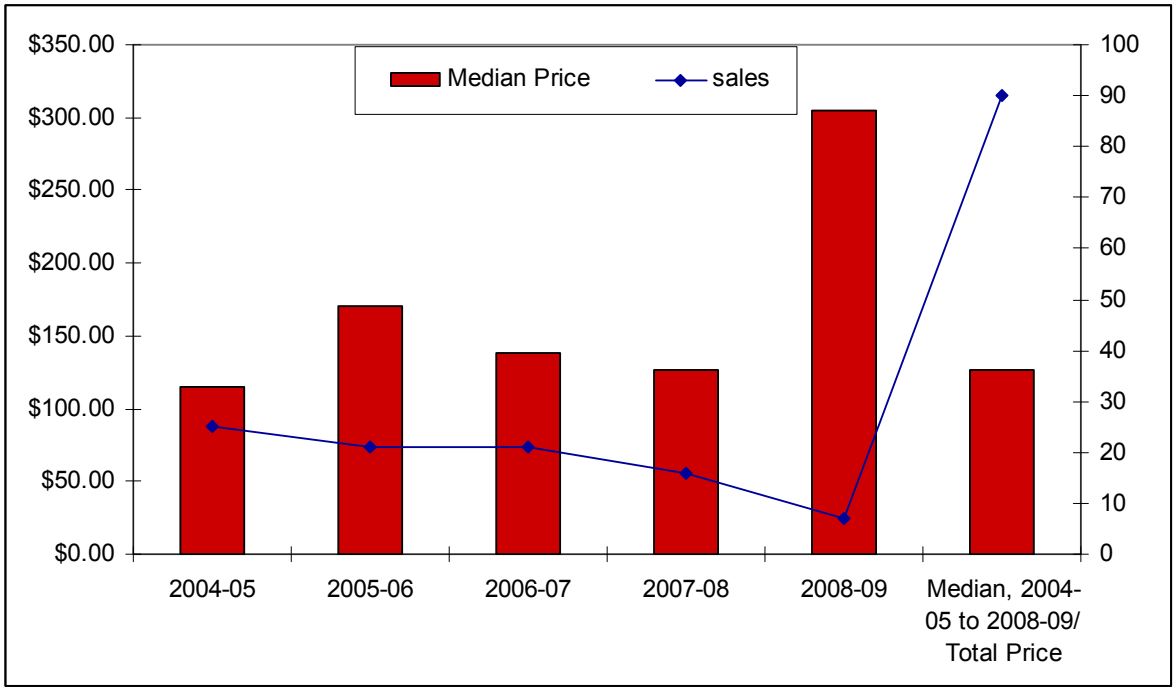

Figure 21.9 Median value of commercial sales per square metre – gas fields' study area

Note: Data was extracted in August 2009.
Source: Property Data Solutions (2009)

Industrial uses

There was a low number of industrial sales within the gas fields' area (44 sales) compared with agricultural, residential and commercial sales between 2004-05 and 2008-90. Over half of the industrial sales within the gas fields' area were in Chinchilla (23 sales), with a median sales price of $39.20/m^2. There were nine industrial sales in Murilla between 2004-05 and 2008-09 with an average of $66.78/m^2.

Tara and Wambo consistently recorded sales values per square metre below the gas fields' average in the 2005-06 to 2008-09 period. Figure 21.10 shows the median value of industrial sales in the years 2004-05 and 2008-09 for the gas fields' study area. This illustrates how significant the increase in the price of industrial land has been during the period.

Due to a lack of available industrial land in many of the gas fields' communities, it is anticipated that this price growth will continue. This will be somewhat mitigated through the development of a new industrial estate in Chinchilla. Stage 1 of the Surat Basin Industrial Park is currently in development and will ultimately provide 55ha of land for medium to heavy industrial uses.

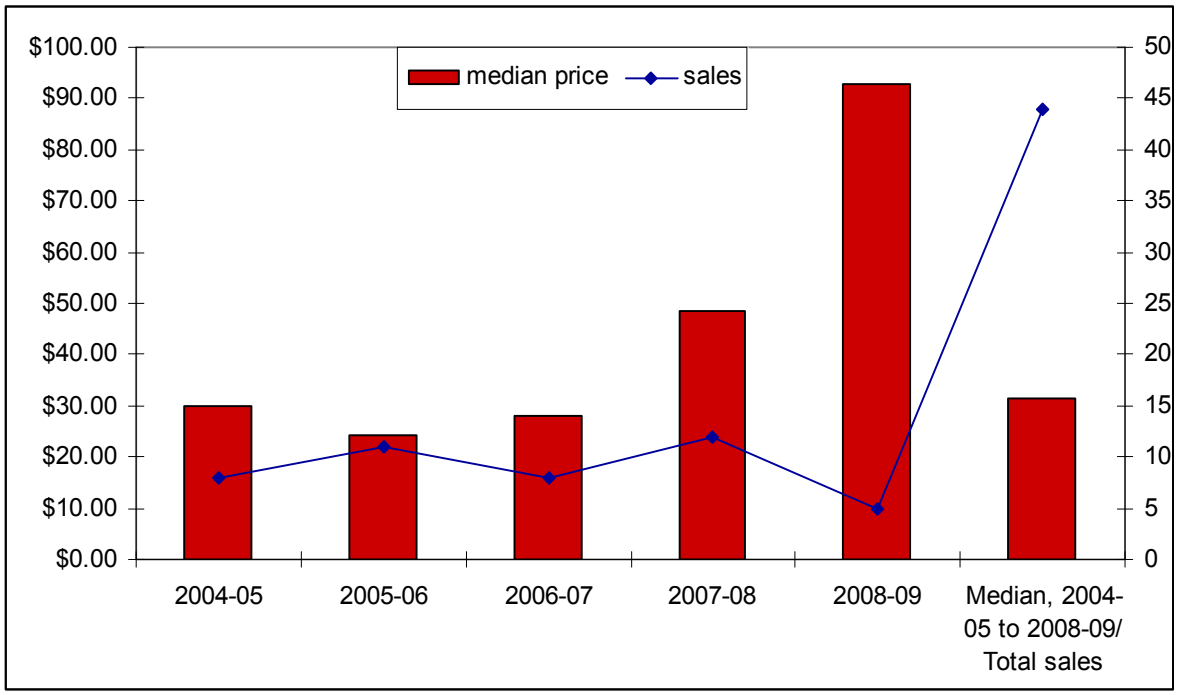

Figure 21.10 Number and median value of industrial sales per square metre – gas fields' study area

Note: Data was extracted in August 2009.
Source: Property Data Solutions (2009)

21.4 Economic impact assessment

This section of the report provides a detailed discussion of the assessment of potential economic impacts during the construction and operational phases of the Project. Impacts are discussed for each of the economic impact categories, including for cumulative effects resulting from other development projects. Mitigation measures for the identified impacts are in the social impact management plan in Volume 2 Chapter 24.

21.4.1 Identification of potential economic impact categories

Economic impacts have been classified according to the categories presented in Table 21.8. Each of the impact categories are explained in the context of potential implications of the Project on the economic environment.

Table 21.8 Impact categories

Impact category	Implication to economic environment
Economy wide impacts	
Project significance	The Project has the potential to contribute significantly to the economy through increasing regional, state and national gross product and employment.
Factor incomes	Implications for increases in wages at the national level and increased investment to Australia.

Impact category	Implication to economic environment
Use of local goods and services	Contribution to the economy through use of local goods and services rather than imports.
Standard of living	Implications for improved standard of living as a result of improved access to non-essential goods and services.
Local and regional level impacts	
Income and affordability	Potential upward pressure on the price of property (residential and commercial), increased pressures on cost of goods and services in the short to medium term and increased demand on infrastructure
Employment and training	Employment and training opportunities associated with increased economic diversification and increased jobs.
Business and industry	Increased opportunities for local businesses, implications for business employment and the capacity of businesses to retain workers. Implications associated with changes to land use and increases in dust, noise and transport.
Cumulative impacts	
Economic contribution	The development of multiple projects in the study area has the potential to contribute significantly to the economy through increasing regional, state and national gross product and employment.
Compound impact	The cumulative project scenario has the potential to compound the income and affordability, business and industry and employment and training impacts that result from the Australia Pacific LNG Project.

Potential economic impacts were identified through a phased approach. The first phase involved a desktop investigation of the baseline assessment findings, analysis of stakeholder consultation outcomes and review of relevant studies. The second phase involved the modelling of economic impacts using the methodology discussed in Section 21.2. The outcome of this was used to identify any further impacts which may come about as a result of changes to the economy.

21.4.2 Economy-wide impacts

This section details the economy-wide impact of the Project and the cumulative impact of projects planned for the region within which it will operate. The modelling takes into consideration the impact of the whole Project, from extraction of CSG in the gas fields to processing the LNG at the LNG facility. This acknowledges the relationship between the three elements. This is a summary of the estimated contribution of the Project to the economy. A more detailed analysis and discussion is provided in Volume 5 Attachment 44.

Project significance

A project of the size of the Australia Pacific LNG Project can be expected to have significant impacts on the local, regional, state and national economies. The Project represents a significant investment in value adding to coal seam gas resources, and will create a new export industry in Queensland, diversifying the state's economic base. The Project is important because it will contribute to the economy in a range of ways as outlined below.

- It will generate significant export income, which will flow through to local, regional, state and national economies. Royalties and taxes will make a significant contribution to government income, while other income will flow into the business and private sector
- It will increase expenditure, and stimulate the economy with benefits flowing through the supply chain supporting the Project helping to underpin the construction, business and professional services sectors of the economy, particularly at the local and regional levels
- It will increase employment, both through direct employment, and indirectly through jobs created in the supply chain supporting the Project. The increased employment will lead to demographic impacts, with increased net population migration to regional and state areas as a consequence.

A summary of the construction and operational scenario impacts of the Project to the regional, state and national economies is outlined below.

Construction scenario impact

The Project is expected to impact the Australian economy both directly and indirectly during the construction of its various elements. The direct effects relate to the additional employment and output in the construction industry that are expected to occur as a result of the construction of the Project. Figure 21.11 shows the direct employment associated with the three elements of the Project during the construction phase.

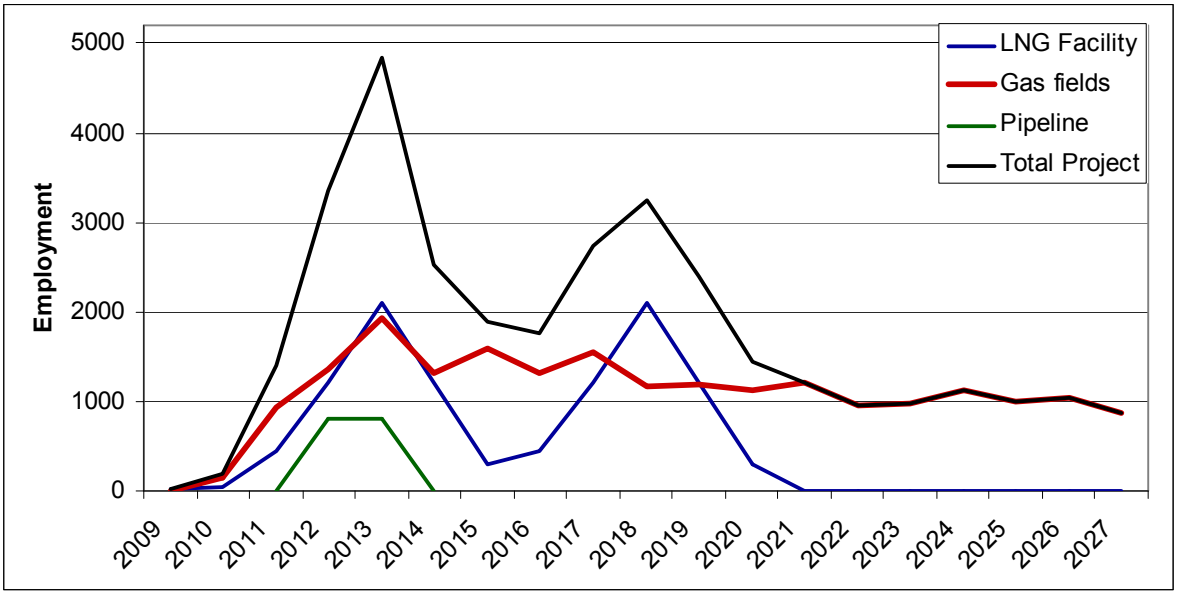

Figure 21.11 Project construction workforce – 2010 to 2027 (direct only)

Source: Australia Pacific LNG

The indirect effects are due to the additional demand for goods and services that the Project's construction sites and construction workers will stimulate. Overall, during the construction of the Project, activity across the economy is expected to be higher than it would have been without the Project.

Figure 21.12 shows how the construction of the Project would (directly and indirectly) contribute to the economy.

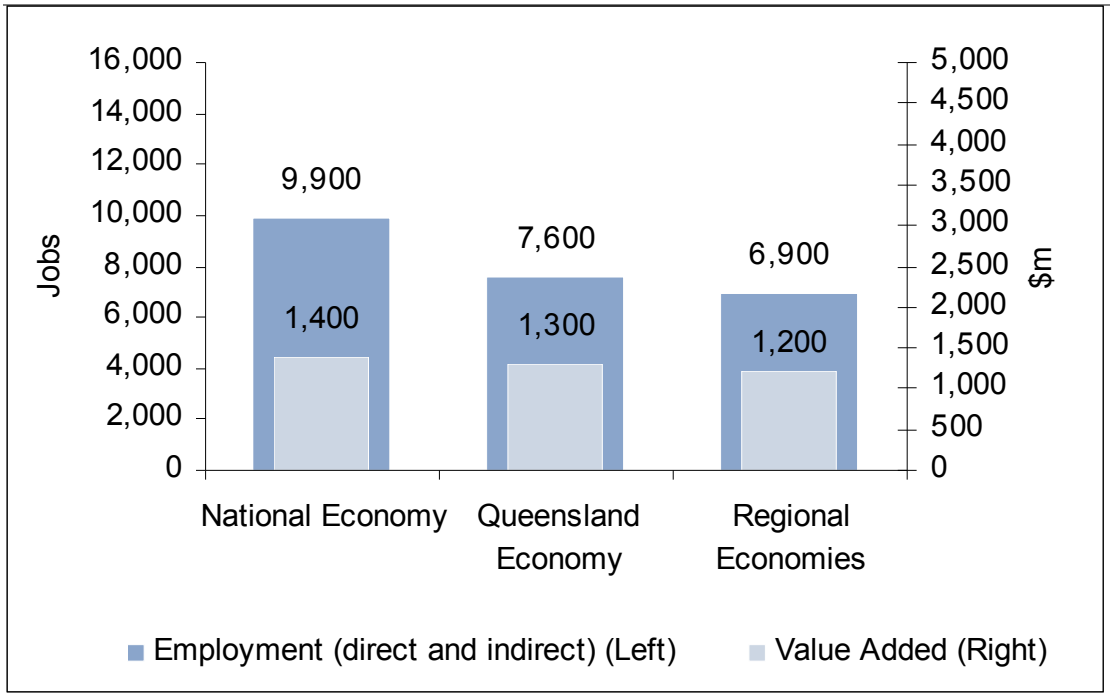

Figure 21.12 Average economic impacts of the construction phase of the Project

Source: KPMG Econtech (2010)

Of the estimated A$1.2 billion contribution to value added in the regional economies, approximately two-thirds, or $800 million is expected to be realised in the Mackay-Fitzroy-Central West region and $400 in the Darling Downs-South West Queensland region.

The construction industry is expected to be the key beneficiary of the Project. The construction phase of the Project is expected to directly contribute an average of approximately A$1.02 billion annually to construction industry value-added in Australia. Value added refers to the contribution to the economy of each individual producer, industry or sector.

This is equivalent to boosting the contribution of the industry to the economy above what it would have been without the Project, by:

- 1.2% in the national construction industry
- 5.0% in the Queensland construction industry
- 33.6% in the construction industry of the combined regional economies of Mackay-Fitzroy-Central West and Darling Downs-South West.

The additional contribution will be divided between increased profits for the construction companies and wage payments to the additional construction industry workers in each of the geographical areas being considered.

In addition to directly increasing the construction industry value added, the construction of the Project is expected to also indirectly impact on the value added of other industries. This reflects the stimulus to the construction industry supply chain and consumer spending by additional construction industry workers.

Operational scenario impact

The Project is expected to also impact the Australian economy both directly and indirectly once it is fully operational. The results presented below focus on the long-term effects of the change, after the economy has fully responded. This allows the Project to be assessed against its overall impact on the economy and not just the direct effects in the first few years. Thus, the operational impacts presented here are an estimate of the average annual impacts the Project is anticipated to have on the economy over the life of the Project.

National impact

At the national level, real GDP is expected to be approximately A$1.3 billion (0.1%) higher annually than it would have been without the Project. These estimates include both the direct and indirect contribution from increased activity in industries that supply inputs to the Project, and purchase output from the Project.

The expected increase in real GDP will also facilitate higher real national income as a result of the Project. The higher real income would be expected to result in both higher consumption and investment. Consumers would adjust to the higher real income by spending more on goods and services, while higher incomes would also enable industries to invest in new capital stock to take advantage of profit opportunities.

This anticipated increase in private consumption and investment is also shown in Figure 21.13. This illustrates during operation of the Project, private consumption is estimated to be higher by approximately A$600 million on average in each year and annual investment would be approximately A$535 million higher.

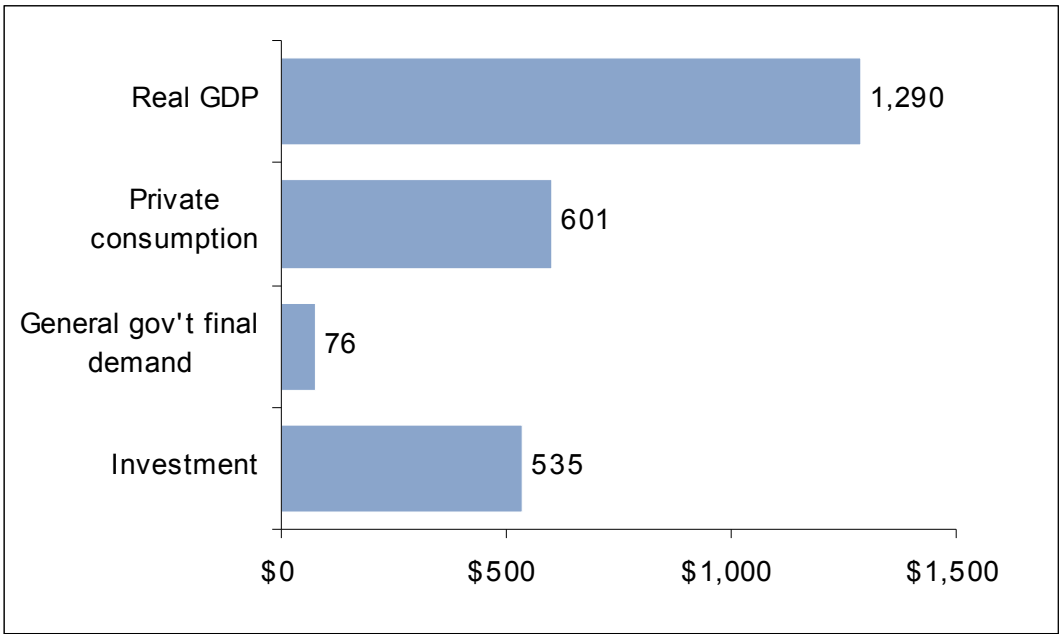

Figure 21.13 Annual operation scenario national macroeconomic effects (A$m, 2006-07 prices)

Source: KPMG Econtech (2010)

For industries that are trade-exposed, prices are determined on world markets and the exchange rate plays a vital role in determining activity in those industries. Higher real national income (stemming from the increased activity in the oil and gas production sector) would lead to a higher value of the

Australian dollar. A higher Australian dollar, in turn, lowers demand for other Australian exports. Therefore, the production gains in the consumer-oriented industries and the industries upstream to the oil and gas sector would be somewhat offset by losses in production in other trade-exposed industries.

For example, manufacturing and agriculture are trade-exposed industries. Hence, these industries are expected to experience lower production levels following the appreciation of the Australian dollar. Tourism is another exchange-rate exposed industry. In general, production in tourism-related industries (such as accommodation, cafes and restaurants and transport) is lower than otherwise would be the case. Although there may be a reduction in demand for exports in some industries associated with an appreciating Australian dollar, the overall export impact associated with the Project will be positive.

State impact

Once the Project is fully operational, it is expected to contribute an increase of $2 billion (0.9%) in Queensland's GSP on average each year. This is a significant increase and is expected to lead to the creation of an average of 9,000 jobs (directly and indirectly) each year in Queensland, including 5,000 jobs (directly and indirectly) each year in the Queensland mining sector (which includes CSG extraction and LNG production). The contribution to the Queensland economy is greater than for the Australian economy because of the location of the Project in Queensland. This will mean that a higher proportion of inputs (labour, goods and services) would be sourced from within Queensland than elsewhere in Australia.

In addition to contributing to increases in Queensland's GSP and employment, the Project will also contribute to Queensland state revenue through royalties and taxes. The Queensland Government (Department of Infrastructure and Planning 2009) has estimated that royalty receipts associated with a 28Mtpa LNG industry would reach A$850 million by 2021. Using this rationale, at peak production the Project could generate royalty revenues for Queensland of up to A$485 million per annum.

Regional impact

The operational phase of the Project is expected to contribute significantly to regional employment and contribute to the local economy through an increase in value added. As outlined earlier, value added measures the contribution to the economy of each individual producer, industry or sector. The Project is expected to lead to:

- An increase in overall value added by A$450 million in the Mackay-Fitzroy-Central West Queensland region and by over A$900 million in the Darling Downs-South West Queensland region annually
- An increase in overall employment (both direct and indirect) of approximately 3,000 jobs in the Mackay-Fitzroy-Central West Queensland region and nearly 6,000 jobs in the Darling Downs-South West Queensland region annually

Figure 21.14 presents the estimated production effects on the regional economies of Mackay-Fitzroy-Central West and Darling Downs South West regions in Queensland. It presents the percent increase in industry output contributable to the Project. This figure represents the average annual impacts the Project has on the economy over its lifetime.

This figure shows that the Project is expected to provide positive impacts to the production of most industries in the Mackay-Fitzroy-Central West and Darling Downs South West regions. Specifically,

the Project is expected to have a significant direct positive contribution to the mining industry[4]. This will boost revenue in the Mackay-Fitzroy-Central West and Darling Downs South West economies. Higher revenue will then flow through to extra spending in consumer driven industries, such as retail trade, accommodation, café and restaurants, health and community services and cultural and recreational services.

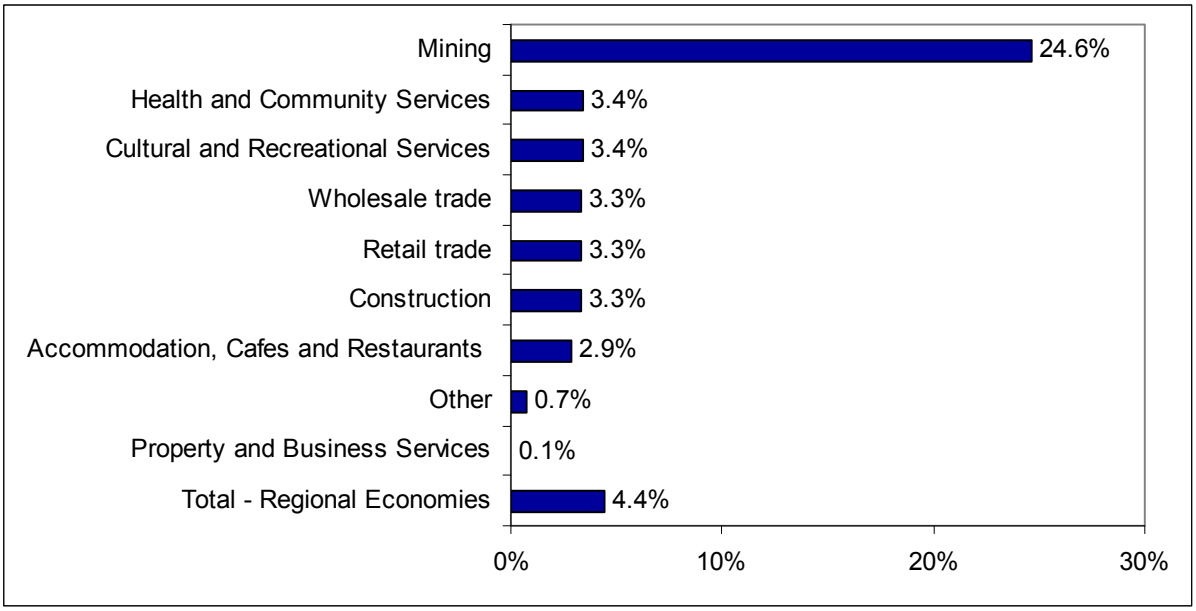

Figure 21.14 Regional industry production effects during operation (% deviations from baseline)

Source: KPMG Econtech (2010)

As these figures demonstrate, the Project is anticipated to provide significant economic benefits and make a substantial contribution to the Australian economy, as well as the regional economies of the Mackay-Fitzroy-Central West and Darling Downs South West regions.

Use of local and other Australian goods and services

The capital value of the Project is approximately A$35 billion (nominal dollars) to be carried out over 10 years of main construction between 2010 and 2020. Australia Pacific LNG is committed, to the extent that it is reasonably practicable, to source goods and services locally and elsewhere in the Australian economy for the construction of the Project.

For the purposes of the economic modelling, it has been assumed that of the A$35 billion investment, approximately 65% will be sourced from goods and services from Australia. The overseas component (approximately 35%) has not been included in the modelling, as this expenditure does not have an impact on the Australian economy during the construction phase. This anticipated ratio of Australian versus overseas expenditure may change in line with final project design.

Cost of building materials

The Project has the potential to contribute to an increase in price of building materials due to strong demand particularly in local areas in the short term, potentially reducing the willingness of developers

[4] CSG-LNG production is defined in both the ABS input output tables and the ANZSIC industry definitions as mining output.

to build new and upgrade existing residential, commercial and industrial developments in the area, and/or increases in the cost of these developments to the consumer.

Despite the expected short term local cost increases, modelling for this assessment shows that in the long term, at a national level, the Project is expected to contribute to a 0.3% decline in the CPI relative to the base case, while the cumulative effect of the projects in the region is estimated to contribute a CPI growth rate that is 0.8% lower than in the base case.

As a result, goods and services are expected to be cheaper in the long term once supply and demand issues at the local and regional level have balanced. This is due to a range of factors including an expected appreciation of the Australian dollar which will lead to lower import costs.

Factor incomes

Wages

In the long run, Australia-wide real after tax wages are estimated to be 0.1 % (0.3% increase in pre-tax wages) higher as a result of the Project. This is the overall wage increase across all industries. There is likely to be short-term differences in the wage impact across industries and regions due to varying levels of skills shortages and the ability of different industries and employers to respond to these employment demands.

This increase is the result of two effects. First, the significant injection of capital generated by the Project will mean that the labour force will be more productive. The increased labour productivity is rewarded with an increase in wages. Second, the Project will generate increased competition in the labour market. The increased competition will be particularly prominent in the Queensland regions that the Project will operate. The increased competition will add to real wage pressures, leading to a rise in real wages.

Gross operating surplus (returns to capital)

In the long run, assuming capital markets return to normal liquidity levels, the Project is likely to attract increased investment into Australia. Gas related industries such as the coal, oil and gas industry group, mining group and the basic non-ferrous metal and metal products industry group are expected to experience increases in gross operating surplus due to the capital injection in those industries, as a result of the Project. In contrast, industries that are not gas-related may experience a small loss in gross operating surplus because capital from non-gas industries would be moved away from these industries, into the gas industry for the Project. When all industries are considered, the total impact will be small and positive, with gross operating surplus of all industries 0.03 % higher with the Project in operation.

Standard of living

The direct and indirect contribution of the Project to the national economy, the Queensland economy, and the regional economies feeds through to contribute to living standards. Living standards are generally measured by looking at the quality and quantity of goods and services available to people and the way these goods and services are distributed within a population.

The economic modelling undertaken for the Project indicates that the operational phase is anticipated to result in a net annual improvement of A$573 million (2006-07 prices) in standard of living above what it would be if the Project does not proceed.

The impact of the Project to household standard of living is derived from changes in non-essential consumption (consumption that is above the level required to survive). Thus, the A$573 million (2006-07 prices) is the change in total non-essential consumption for all Australian households because of the positive economic contribution of the Project.

The modelling predicts that per capita increase in living standards in Queensland will not be significantly different to the national figure due to assumed flexibility within the model. However, it is acknowledged that in practice, labour does not always move as fluidly between states as the model predicts due to a range of social, economic and personal reasons.

As such it is anticipated that there is the potential for a small Queensland wage premium to develop from the Project due to increased demand for labour within Queensland and a greater number of high skilled jobs which attract higher levels of remuneration, thus increasing disposable income to a greater degree. Therefore it is expected that the level of improvement to standard of living in Queensland will probably exceed the national impact.

21.4.3 Local and regional impacts

The assessment of the impact of the Project on the gas field's local and regional economies takes into consideration the potential impact of the Project to the gas fields' study area and wider region. This assesses localised impacts associated with the increase in population as a result of the Project as well as other gas fields-specific impacts.

Income and affordability

Cost pressures

As discussed in Section 21.3.1, in 2006, the all items regional price index for Dalby and Roma was lower than in Brisbane, while prices were 1.2% higher than Brisbane in Chinchilla (Figure 21.15).

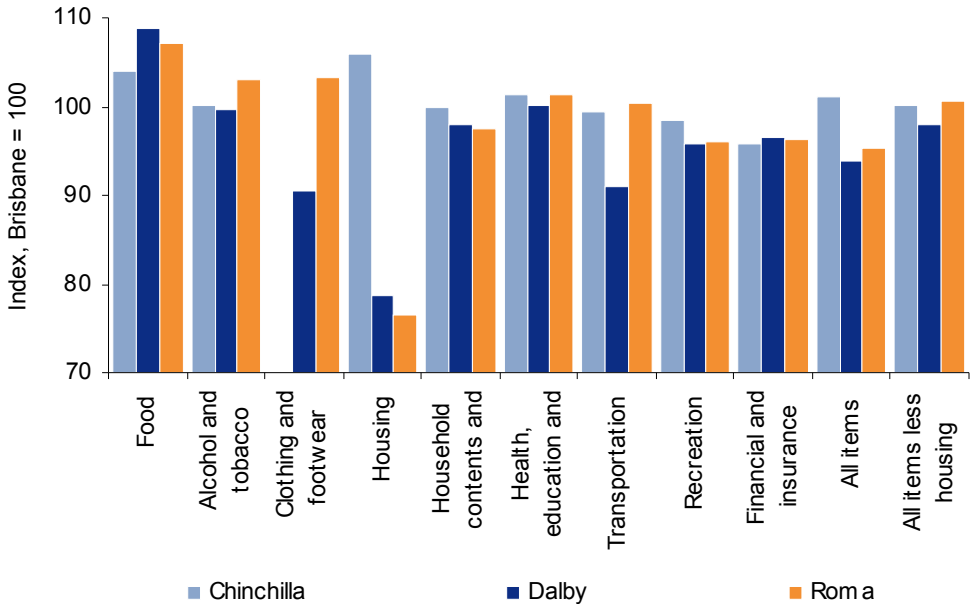

Figure 21.15 Regional price index, May 2006, Brisbane = 100

Source: OESR (2006)

When the subcategories are analysed, it shows that in all areas the price of food was higher than in Brisbane, by between 4% and 9%. Clothing and footwear prices were 3% higher than Brisbane in Roma, and in all areas the price of health, education and communication services were in line with or above the price in Brisbane. Housing was somewhat cheaper in all regions with the exception of Chinchilla, where housing prices were 6% above Brisbane. Since 2006, the cost of housing in Dalby and Roma has increased to a level almost consistent with Chinchilla.

At a local and regional level, the Project has the potential to contribute to a short term increase in both costs to business, in terms of higher wages and input costs, and the cost of living for households due to inflationary pressures from higher wages and increased demand for goods and services in the region. In addition, increased demand for infrastructure and social services may place further upward pressure on prices in the region, in the short term.

The overall impact on prices in the region is likely to be larger when the cumulative effects of the other projects are taken into account (see Section 21.4.4 for a detailed discussion of the cumulative impact scenario on the region, state and national economy).

Property Prices

The impact on property prices associated with the Project will differ during the construction and operational phase due to the different strategies used to house employees. The impact of the Project on residential property prices during the construction and operational scenarios of the gas fields' development has not been quantified for a number of reasons.

Firstly, there are a wide variety of factors, outside the control of Australia Pacific LNG which make forecasting the change to house prices difficult to do with confidence. Secondly, there have been no projects of a similar scale undertaken in the gas fields' region (unlike the LNG facility's study area) which could be used as a proxy to help determine the potential impact of the Project on the communities in the study area. As such, the analysis of the impact associated with the Project has been provided through a qualitative assessment.

Construction Scenario

The gas fields will undergo a staged development over a period of at least 20 years, requiring a workforce of up to 2,100 people in the region at its peak. Multiple construction temporary accommodation facilities will be established in the region to service the various gas field developments and to provide accommodation for the construction teams, with each temporary accommodation facility accommodating approximately 50 to 800 personnel.

Where possible, the Project will source these construction workers locally. However, given the tight labour market it is anticipated the majority of workers will be fly-in/fly-out or drive-in/drive-out and be accommodated in temporary accommodation facilities. To the extent that the Project attracts construction workers to migrate into the region and seek permanent local housing, this will increase demand for housing in the region, particularly in towns such as Roma and Miles, which are located close to the gas fields' infrastructure.

The component of the construction workers accommodated in temporary accommodation facilities will not interact directly with the region's housing market and as such not directly impact house prices. However, as in the other project areas, the Australia Pacific LNG Project will create stimuli to the local economies in the form of demand from the Project's supply chain and spending via the construction workforce in the local economies. This stimulus is likely to contribute to indirect increases in housing prices in the region.

Miles, Roma and Chinchilla respectively experienced a 28.6 %, 21.3 % and 18.3 % average annual increase in housing prices from 2004 to 2008. This increase was significantly higher than the average annual increase of 11.7 % for Australia as a whole. This suggests these areas are already facing significant demand pressures. While the upward pressure on housing prices in these towns is expected to be relatively small at the project level, the Project could contribute to a significant cumulative impact on housing prices. This impact will occur if the multiple projects proposed in the region all contribute to demand for housing in the region over the next decade.

Operational scenario

The operation of the gas fields will be a major development in the region, requiring an operational workforce of around 470 people in 2016 (increasing to 690 people by 2027). It is expected that initially most of the operational workers will be housed in permanent accommodation facilities that will be set up by Australia Pacific LNG in the vicinity of key infrastructure within the fields. It is also expected that some of these workers will be housed in Roma (50 people in 2016) and Miles (50 people in 2016), as they will act as logistics hubs.

Australia Pacific LNG aims to encourage its workforce, where practicable, to move permanently to the surrounding towns. This transition will be a gradual process and the take-up rate of this migration is uncertain. Research undertaken for this assessment indicates that other mining operations in regional Queensland with similar workforce structures have around 30% of their workforce residing locally. Australia Pacific LNG will transition those staff whose role allows them to live off site into local housing once the market is able to respond to demand.

Evidence from the three towns close to the gas fields' development – Miles, Wandoan and Taroom – reveals that all have vacant land zoned for residential development. While this land may still need to be subdivided before beginning development of suitable new accommodation, the availability of residential land could facilitate residential development, reducing the long term pressure on housing prices. The development of land depends on receiving development approvals from local governments.

One limiting factor to the development of additional housing for operational staff will be the skill shortage of construction workers in the area, as the major developments in the region will create skill shortages for other development activities. This shortage could increase the cost of building housing in the region, making home ownership less affordable and discouraging permanent migration out of the accommodation facilities and into towns.

Although an increase in average house prices can be viewed as beneficial to home owners and investors, it places significant pressure on those households who do not own their own home, in particular those in the private rental market. Increased house prices and the expected resulting increase in rental prices has the potential to increase the proportion of families in housing stress and place greater demand on the public and community housing sectors. This is particularly the case for those people working in occupations such as nurses, teachers, cleaners and retail sales persons who may not realise increases to their income consistent with the increases anticipated in other sectors.

Cumulative impact to property prices

The anticipated impact on house prices through both the construction and operational phases of the Project is likely to be compounded by the cumulative increase in construction and operational workers migrating to the gas fields' study area to work on other proposed major developments. The construction impact will be minimal due to the high proportion of workers to be accommodated in temporary accommodation facilities. However, it is anticipated that many of the operational workforce

from the cumulative projects assessed will reside within the local housing market, thus placing further pressure on availability and costs.

The level of cumulative impacts on housing markets can be separated into demand and supply factors. On the demand side, the key factors that will determine pressures on the housing market will include:

- The actual pattern and timing of major developments, and the subsequent cumulative demands for housing supplies
- The extent of development in the local supply chain and contracting firms, with subsequent requirements for additional labour and housing
- The takeup of construction and operational jobs by the existing labour force
- The rate of workforce migration to the area compared to the use of a non-resident workforce
- The preferences of the non-resident workforce for different housing options, particularly over longer time frames.

On the supply side, the key factors that will determine pressures on the housing market will include:

- The number of temporary accommodation facilities that can be used, particularly in periods of peak housing demand
- The extent to which some of the temporary accommodation facilities can be used for flexible, on-going housing demands
- The availability of different housing options to suit a variety of housing needs by the non-resident and semi-permanent workforces
- The provision of suitable land supplies, infrastructure development and planning and approval systems to underpin future housing development
- The ability of local housing markets to adjust to increased demands for housing.

The Major Projects Housing Policy being prepared by the Department of Communities (refer to Section 21.3.2) will play a pivotal role in addressing these supply and demand factors.

Residential rental costs

The Project has the potential to contribute to an increase in demand for rental accommodation, given that there may be higher demand for housing and a supply that is limited in the short to medium term (given the timeframes required to increase the housing stock). This could lead to low income families being unable to rent through the private rental market, and contribute to higher rates of housing stress. The impact during the construction period is anticipated to be minimal in the gas fields' study area given that the majority of workers will be housed in temporary accommodation facilities.

The size of this impact is difficult to quantify, though is likely to be broadly similar, in terms of direction and relative scale, to the impact on house prices as detailed above, and will likely occur to the greatest extent during the operational phase. As rental vacancy rates are quite low in the gas fields' study area, the Project could compound the impact on the cost and availability of rental properties. The fact that the operational phase is spread out over a considerable period of time, will allow for the management of impacts more effectively through anticipation of demand.

Commercial and industrial property prices

The Project has the potential to contribute to an increase in commercial and industrial property prices due to higher demand for commercial and industrial property. This demand is likely to come from new businesses being established in the Project regions, in response to higher demand for goods and services associated with an increased workforce, and higher incomes. In addition, it is likely to come from established businesses expanding for the same reasons.

As discussed in Section 21.3.2, there are a number of industrial parks being developed in the gas fields' study area. The Surat Basin Industrial Park in Chinchilla has recently received development approval, with Stage 1 of the 55.4 hectare master planned development expected to be complete in mid 2010. This development will cater for medium to heavy industries and is expected to respond to demand for industrial land in the area, thus dampening further upward pressure on prices. The availability of industrial land in other towns in the study region such as Dalby and Roma is however more limited although the Roma East Industrial Estate which currently has lots for sale has increased availability of industrial sites in Roma.

The likely impact on commercial and industrial property prices has not been quantified, partly due to the difficulties associated with doing so due to the volatility of prices for commercial and industrial property in the regions, and data constraints including the lack of availability of information on commercial and industrial property vacancy rates.

Demand on infrastructure

With the influx of population to the region, the Project may contribute to increased pressure on health services, recreational and cultural facilities and services, childcare places, educational places, and policing and emergency services from increased demand. This has the potential to have an impact on welfare and living standards if the increased demand is not met. More detailed analysis of the Project's anticipated impact on local social infrastructure is provided in Volume 2 Chapter 20. In addition to the demand on social infrastructure discussed in this section, the impact of the Project on other infrastructure such as water, waste and transport are discussed in Volume 2 Chapter 11, Volume 2 Chapter 16 and Volume 2 Chapter 17. The current infrastructure facilities and services available in the regions are detailed in the following Table 21.9.

Table 21.9 Infrastructure facilities and services available

Type of infrastructure	Region
Hospitals	Roma Hospital
Health care services[(a)]	Chinchilla Health Services
	Dalby Health Services[(b)]
	Miles Health Services[(b)]
Childcare	Chinchilla – 1.7
(Childcare places per 100 children aged 0-4)	Dalby – 0.8
	Miles – 3.4
	Roma – 0.8
Police	Six police stations within the region

Type of infrastructure	Region
Emergency services	Three ambulance service offices
	Six fire and rescue service facilities
	Six SES offices

a) Includes ambulance centre, community health services, dental, child health services, drug and alcohol services, mental health services, nursing home and long stay and respite care unless otherwise stated.
b) Does not provide drug and alcohol services

One way to understand the scale of the economic impact is to look at the indicators of future demand, including the change in employment and industry value add within the region for the education, and health and community services sector. The economic impact of the Project on various sectors, discussed in Section 21.4.2 and shown in Table 21.10, highlight that there may be an increase in the demand for both health and education services.

Table 21.10 Regional demand increase indicators for education, health and community services in Project regions, due to Project's operational scenario

Measure	Education	Health and community services
Change in employment (percent deviation from base case)	3.1%	3.4%
Change in industry value-add (percent deviation from base case)	3.1%	3.4%

Source: KPMG Econtech (2010)

The greatest impact is expected to be associated with the indirect effects of the Project. Indirect impacts include a growth in local businesses supplying the Project which require additional staff that would be expected to move to the region with their families as temporary accommodation may not be available to them. This is expected in lead to a growth in population which will place greater demand on infrastructure and services.

It is anticipated that increased demand on infrastructure and services as a result of the Project will be responded to, and managed by, the appropriate government agencies. When the Blueprint for Queensland's LNG Industry[5] was released in 2009, the Queensland Premier noted that royalties received from the CSG to LNG industry would be used to provide for and support infrastructure such as hospitals and schools. The cumulative impact of multiple projects on the regions which the Project is located is shown in Table 21.11. These estimates indicate there will be a significant increase in the demand for employment in both the education and health and community services sectors due to the large number of projects in the region, which likely indicates sizeable pressure on current services.

Table 21.11 Regional demand increase indicators for education, health and community services in Project regions, due to cumulative impact of multiple projects' operational phases

Measure	Education	Health and community services
Change in employment (percent deviation from base case)		
Cumulative impact during operations	16.2%	17.6%
Change in industry value-add (percent deviation from base case)		

[5] See http://www.dme.qld.gov.au/media_centre.cfm?item=791.0 for further information

Cumulative impact during operations	16.2%	17.7%

Source: KPMG Econtech (2010)

The Darling Downs South West Queensland Surat Energy Action Plan and the Sustainable Resource Communities Policy will play pivotal roles in identifying and planning for increased demand for services and infrastructure in the Surat Basin.

Employment and training

Skills demand during construction of the gas fields

During its construction phase, the Project will increase the demand for employment in the gas fields' study area, both directly and indirectly. Forecasts prepared for this assessment indicate that the sectors which are expected to experience the largest increases in demand for employment in the Darling Downs-South West Queensland region will be the construction, cultural and recreational services, finance and insurance, retail trade, wholesale trade, health and community services, and accommodation, café's and restaurants sectors. This is shown in Table 21.12.

Table 21.12 Largest potential increase in employment by industry during construction phase – Darling Downs-South West Queensland region

Industry sector	Change in employment inconstruction phase	
	Number*	Percentage
Construction	1,300	10.7%
Cultural and recreational services	100	5.6%
Finance and insurance	300	5.2%
Retail trade	500	5.1%
Health and community services	600	4.7%
Accommodation, café's and restaurants	100	4.7%
Wholesale trade	300	4.6%
Personal and other services	200	4.6%
Education	500	4.5%
Communication services	100	3.1%

* Rounded to the nearest one hundred employees

Source: KPMG Econtech (2010)

Because of the very high employment and labour force participation rates in the study area, the construction of the gas fields could contribute to skill shortages in industry sectors which experience high demand for additional labour.

This is particularly the case given that there will be a number of major projects in the region. This creates an estimated increase in demand for labour of 19% in the Darling Downs-South West Queensland area. The cumulative effect of this (which has not been modelled) will be to compound the skill shortages.

During the construction phase of the gas fields element of the Project, the construction workforce will average around 1,200 staff over the next two decades (given that there will be a number of different locations at which the wells will be situated), with the workforce peaking at up to 2,100 in 2013.

Energy Skills Queensland has recently undertaken a skills audit with the aim of identifying the areas in which critical skill shortages are likely to emerge with the expansion of the LNG industry. These are provided in Table 21.13.

Table 21.13 Occupations with expected critical skill shortages

Occupation category	Occupation	Required qualifications
Vocational	Drilling assistants	Certificate II in Drilling and Gas Onshore
	Production technicians	HSC Senior/Certificate III in Process Plant Operations
	Maintenance technicians	Certificate III in Engineering – Mechanical Trade (Maintenance – Diesel Fitting and vendor training)
	Electrical and instrumentation technicians	Certificate III in Electrotechnology (Maintenance Systems and Instrumentation)
	Logistics technicians/administrators	Certificate III in Transport and Logistics
Professional and paraprofessional	Petroleum engineers	Bachelor of Engineering
	Geologists and geophysicists	Bachelor of Science/Geology

Source: Energy Skills Queensland (2009)

Skills demand during operational phase of the gas fields

The Project will increase the demand for labour, both directly and indirectly, during the operational phase. Forecasts prepared for this assessment indicate that the sectors which are expected to experience the greatest increases in demand for employment are the mining, construction and wholesale trade sectors. Table 21.14 shows the projected change in employment in different industry sectors in the operation phase, in the Darling Downs-South West Queensland region.

Table 21.14 Industries expected to experience a rise in regional employment during the operational phase

Industry sector	Change in employment in Darling Downs-South West Queensland area during operation phase (%)
Mining	53.6%
Construction	5.3%
Wholesale trade	5.3%
Retail trade	5.2%
Health and community services	5.2%

Industry sector	Change in employment in Darling Downs-South West Queensland area during operation phase (%)
Personal and other services	5.2%
Accommodation, café's and restaurants	5.1%
Communication services	5.1%
Finance and insurance	5.1%
Education	5.1%
Cultural and recreational services	5.1%

Source: KPMG Econtech (2010)

As with the construction phase, skills shortages are expected to be exacerbated as a result of high employment and labour force participation rates, thus restricting the local pool of labour available. This is particularly the case given the likelihood that there will be a number of major projects in the region, the cumulative effect being to compound the skill shortages. During the operational phase of the gas fields element of the Project, the workforce will average around 600 (including logistic hubs) staff over the next three decades. The share of workers by profession is detailed in Figure 21.16. The professional services most in demand are production and maintenance technicians (mechanical), electrical and instrument technicians, and logistics technicians.

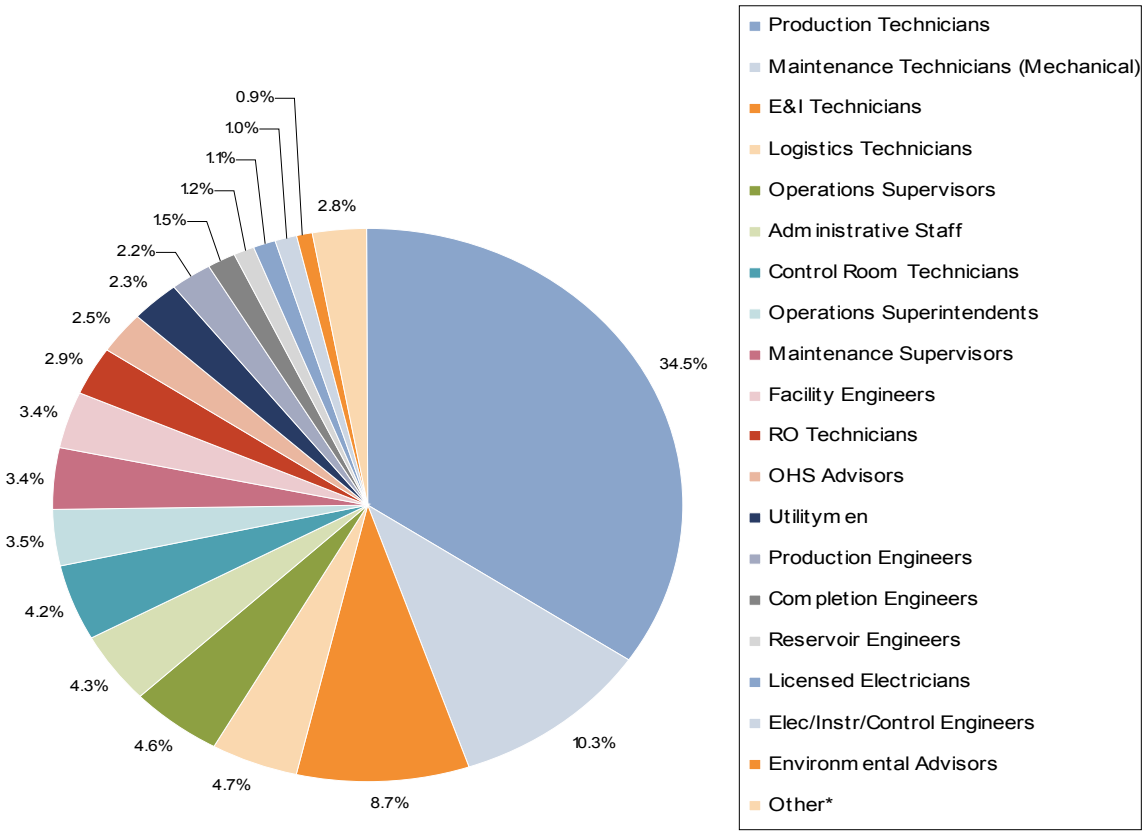

Figure 21.16 Workers, by profession, required during operation phase of gas fields – share of total required, 2011 to 2020

* Other includes maintenance planners, logistics supervisors, maintenance superintendents, area managers, cultural heritage coordinators, and RO supervisors

Source: Australia Pacific LNG

Cumulative Impact of skills demand during the operational phase

The cumulative effect of multiple projects in the gas fields' study area is expected to be an exacerbation of skills shortages. It is anticipated that the operational phases of the various projects will directly and indirectly lead to an additional 39,000 workers in the Darling Downs and South West Queensland region.

Table 21.15 shows the anticipated number and percentage cumulative increase in employment during the operation phase in both regions, by industry sector. The largest increase in employment is forecast to be in the mining sector (which includes CSG extraction), with approximately 13,000 more workers required. In addition, the retail trade, education and health and community services sectors are also likely to see large increases in demand for labour.

Table 21.15 Industries expected to experience a rise in employment due to the cumulative effects during the operation phase

Industry sector	Cumulative change in employment in Darling Downs-South West Queensland region	
	Number*	Per cent
Mining	13,000	526.9%
Construction	2,800	31.4%
Electricity, gas and water	200	30.9%
Wholesale trade	1,700	30.8%
Personal and other services	700	30.8%
Government administration and defence	1,600	30.7%
Finance and insurance	700	30.6%
Retail trade	2,800	30.5%
Health and community services	2,800	30.5%
Cultural and recreational services	500	30.5%
Communication services	500	30.1%
Education	3,100	29.9%
Accommodation, café's and restaurants	900	29.6%
Transport	1,400	22.8%
Property and business services	1,000	15.9%
Manufacturing	100	0.8%

* Rounded to the nearest one hundred employees
Source: KPMG Econtech (2010)

Local business employment

The Project has the potential to contribute to increased pressure on local employment. With extremely low unemployment rates in the gas fields' study area, there is some concern that the Project may attract workers who are currently employed by local businesses, and so place pressure on local businesses to retain staff.

However, one of the potential positive impacts from the Project is the potential to encourage individuals not currently employed in the labour force to return to work. By doing so, the Project has the potential to increase labour force participation and increase employment. This is estimated to be an increase in total direct and indirect employment in the region of around 3,000 jobs during the construction phase and 6,000 jobs during operations.

Cumulative impacts on local business employment

The pressures on local employment will be magnified by the fact that there will be a number of new projects in the region. Estimates of the cumulative impact of the projects in the region during the operational phase indicate that the total increase in direct and indirect employment in the Darling Downs-South West Queensland region will be 39,000 above the baseline case

The pressures on employment arising from the cumulative impact of multiple projects in the region will be particularly strong due to the tight labour market conditions in the regions.

Workers entering traditional rural industries

The Project may contribute to a possible fall in the number of students interested in entering traditional rural employment roles, partly due to the increased availability of jobs in other industry sectors, in particular mining (which includes CSG-LNG industries), and partly due to potentially more attractive salaries available in other industry sectors.

Modelling undertaken for this assessment indicates the agricultural, forestry and fishing industry sector may see a fall in employment of around 130 persons (0.6%) in the construction phase (spread over 10 years of main construction) and around 180 persons (0.8%) during the operational phase (spread over 30 years). A small proportion of this will be due to changes in land use, whilst the majority will likely be due to structural adjustment associated with changes in the exchange rate (as described in Section 21.4.4).

During the operational phase, the cumulative scenario impact of multiple projects will likely be larger, potentially reducing agriculture, forestry and fishing sector employment by around 490 workers (2.2%) in the Darling Downs-Central West Queensland region (spread over 30 years).

Australia Pacific LNG understands the key role that rural industries plays in the regional economy. The Queensland government is developing the Surat Basin Regional Development Plan which, in conjunction with the Blueprint for Queensland's LNG Industry will work towards minimising any unintended consequences associated with rapid growth. Australia Pacific LNG is committed to working with the government and other CSG industry proponents to reduce the impact of the CSG-LNG industry on the rural sector.

Business and Industry

Opportunities for local businesses

The Project is likely to provide the opportunity for local and regional businesses to supply goods and services to Australia Pacific LNG contractors, staff and families. As such it is anticipated that there will be increased demand for goods and services both directly (e.g. bread provided to temporary accommodation facilities, and services such as hairdressing to project staff) and indirectly (e.g. childcare places for families of project staff in the operational phase). The overall effect is likely to be an increase in consumption of 0.1% (note that consumption data is only available at the national, not regional level).

Cumulative impact of opportunities for local businesses

The demand for goods and services is also projected to increase due to the cumulative effect of multiple projects in the region. Modelling prepared for this assessment indicates that the total employment in the gas fields' region will likely rise by 39,000 jobs. The direct and indirect effect of the cumulative projects is projected to increase real private consumption in Australia by 0.2%.

Capacity of local businesses to attract and retain workers

The Project is expected to have an impact on the capacity for local businesses to attract and retain workers, particularly as a result of upward pressure on wages which may occur if appropriate mitigation strategies are not implemented (i.e. workers may be able to obtain jobs with Australia Pacific LNG which may pay a higher rate than local businesses). Modelling undertaken for this assessment indicates that real after tax wages overall will increase by 0.1%. This is an overall increase, and may mask differences between different businesses and industry sectors.

Cost of building materials

The Project has the potential to contribute to an increase in price of building materials due to strong demand particularly in local areas, potentially reducing the willingness of developers to build new and upgrade existing residential, commercial and industrial developments in the area and/or increasing the cost of these developments to the consumer.

For the gas fields' study area, it is likely that the Project will contribute to an increase in prices of building materials in the short to medium term, as the supply side in local areas adjust to the increase in demand associated with the Project. This is particularly the case given the multiple projects in the region, which will further increase demand for building materials, and drive up prices.

Costs associated with traffic infrastructure

The Project will contribute to increased traffic movements. Heavy vehicles and movement of equipment may also lead to temporary, localised damage to road surfaces during the construction phase. This may lead to an increase in travel times to work, and in particular travel between towns in or near the gas fields, which may in turn increase the cost of living for households.

Traffic will be generated by the transportation of personnel, and trucks carrying construction materials during the construction phase of the Project. The impact of this will likely be largest in the gas pipeline region, as the construction activities will be relatively concentrated in a region and will be undertaken over an 18 month to two-year period. By contrast the gas fields' construction will have less impact on traffic, given that the construction activities will be spread over a large area and over a more lengthy period.

Further analysis and mitigation strategies regarding the impacts on traffic and transport infrastructure are provided in Volume 2 Chapter 17.

Economic impact of changes in land use

Forecasts prepared for this assessment indicate that the agriculture, forestry and fishing industry value added for the Darling Downs-South West Queensland region will be $5.7 million lower than the base case during the construction phase, which is equivalent to a 0.3% decline. During the operational phase, industry output is projected to be $9.9 million lower, or 0.5%.

The expected reduction in industry output for the agriculture, forestry and fishing industry is due to a range of factors, most importantly, structural adjustments associated with changes to the exchange rate which impact export industries such as agriculture to a greater extent than other industries (refer to Section 21.4.2).

In addition to structural adjustment, the Project has the potential to impact industry output through the reduction of the quantity of agricultural land available for production purposes. This will occur during both the construction phase, as land is taken out of production while the gas wells are drilled and gas facilities are being built, and during the operation phase.

It is estimated that the full development of the proposed gas fields' facilities may initially disturb some 23,726ha of good quality agricultural land as a result of initial construction activity. This equates to approximately 4.14% of the gas fields' study area. Following the completion of construction and associated rehabilitation activities, it is estimated that the ultimate development of the gas fields will remove from potential agricultural production in the order of 4,319ha of good quality agricultural land for the operational life of the facilities concerned. This equates to approximately 0.76% of the total gas fields' development area. Given that the much of land impacted by the gas fields' infrastructure will revert mostly to its original use once operational, the economic impact associated with the change in land use is anticipated to be minimal.

The cumulative impact of multiple projects in the region would be to decrease the available agricultural land by somewhat more than the above estimates. This in turn would potentially have a larger negative impact on agricultural employment and production in the region. Forecasts indicate that during the operation phase, the cumulative impact of the projects will be to reduce agriculture, forestry and fishing sector employment by 2.2% in the Darling Downs-South West region, and to reduce output by 2.1% in the region.

The impact of the Project on farming activities will depend on the amount of land, the location of project infrastructure relative to farming activities, the area and duration of the disruption or disturbance, the capacity to modify farming practice to accommodate Project infrastructure and the type of farming activities in the specific location.

Volume 2 Chapter 6 discusses this in more detail and outlines strategies to mitigate impacts. However, it is possible to say that fragmentation of agricultural land is expected to be a short-term effect associated with the construction of the gas fields. In the long term, the Project's impact on agricultural land will be minimal.

Removal of millable timber

The location for the gas fields' infrastructure has been chosen to reduce disruption to farming and forestry activities, but the Project may potentially contribute to millable timber being removed during construction activities. This could result in a decline in timber industry output.

The magnitude of this impact is anticipated to be small, as the Project is not in an area with a substantial forestry industry, as evidenced by the low proportion of employment in the area. The forestry industry employed just 2.2% of the total labour force in the gas fields' region in 2006 (with the Millmerran SLA having the highest share at 4.9%).

Further analysis of the impacts associated with the removal of millable timber and strategies to mitigate these are provided in Volume 2 Chapter 6.

Impacts associated with other environmental factors

The Project could impact on local businesses during the construction phase of the gas fields due a number of environmental factors such as noise and air quality, but this impact is expected to be minimal.

Site clearance, access road construction, CSG well and associated infrastructure and vehicle movements are likely to have a localised impact on both noise levels and air quality due to dust generation through the construction phase. This is discussed in Volume 2 Chapter 13 and Volume 2 Chapter15. From an economic perspective, high dust levels have the potential to reduce agricultural output and hence land productivity, but the mitigation strategies discussed in these chapters are anticipated to reduce and adverse impacts associated with environmental factors such as dust and noise.

21.4.4 Cumulative impacts of major projects

The Australia Pacific LNG Project is the largest CSG to LNG project currently under consideration in Queensland. There are also a number of other major projects proposed in the same region. Therefore, an important aspect of the economic assessment is to also examine the cumulative impacts of proposed major projects (including the Australia Pacific LNG Project) on the regional, state and national economies. This section provides the results of modelling the ongoing economic impacts of the 'cumulative impact scenario'.

The projects modelled in the cumulative impact scenario can generally be listed under three broad categories:

- Mining and energy projects
- Manufacturing projects
- Infrastructure and transport projects.

The cumulative impact scenario has assumed that each project impacts the economy independently, with no sharing of resources. The following results represent the deviation from the 'baseline scenario', where no projects proceed. This captures the effects on the economy of all 30 proposed projects as detailed in 21.2.2.

National economy

Once all of the 30 proposed projects are fully operational, the national economy will benefit from:

- Higher real GDP on average, by A$6.1 billion annually
- Increased real national income, driving both higher consumption and investment
- Higher consumer welfare (standard of living) of around A$1.1 billion annually, on average.

With respect to improved household living standards as a result of the cumulative impact scenario, the modelling predicts that per capita increase in living standards in Queensland will not be significantly different to the national figure due to assumed flexibility within the model.

However, it is acknowledged that, in practice, labour does not also move as fluidly between states as the model predicts due to a range of social, economic and personal reasons. Therefore, it is anticipated that there may be a small Queensland wage premium to develop as a result of multiple projects going ahead, due to increased demand for labour within Queensland and a greater number of high skilled jobs which attract higher levels of remuneration, thus increasing disposable income to a greater degree. It is expected that the level of improvement to standard of living in Queensland will probably exceed the national impact

Because of the anticipated increase to Australian real national income, the price of non-tradeables relative to tradeables – the real exchange rate – is expected to be higher. Modelling illustrates that in the cumulative impact scenario, the Australian dollar would appreciate by 2.1%.

The change in the real value of the Australian dollar would impact on both export and import levels in Australia. Specifically, with an appreciation of the exchange rate, Australia's international competitiveness on global markets would be marginally lower, leading to lower demand for Australian exports. However, this will not be the case for LNG exports which will continue to increase.

Trade exposed industries such as manufacturing and agriculture are expected to experience lower production levels following the appreciation of the Australian dollar. Although an appreciating Australian dollar poses a number of challenges to export dominated industries, there are also a number of positive benefits including a reduction in the cost of imported goods and services thus reducing living costs for households.

State economy

At the State level, once the 30 projects are fully operational:

- The projects are estimated to lead to higher employment in Queensland by an average of 55,000 jobs (both direct and indirect)
- Queensland's GSP is expected to be A$6.9 billion higher on average each year (or 3.6 %).

As with the impact of the Project in isolation, the contribution to the Queensland economy is greater than for the Australian economy because of the location of the 30 projects in Queensland. This will mean that a higher proportion of inputs (labour, goods and services) would be sourced from within Queensland than elsewhere in Australia.

Regional economy

At full operation, the 30 projects are estimated to have the following impacts on the regional economy within which the gas fields are situated:

- In the Darling Downs-South West region, the projects are estimated to lead to higher employment by an average of 39,300 jobs.
- Darling Downs-South West's GRP is expected to be $5.2 billion higher on average each year (or 41.4 %) with the projects at full operation.

The primary cumulative economic impacts of the projects will be positive, leading to increased incomes, expenditure and employment. The Western Downs and Maranoa Regional Council areas will be key beneficiaries of the impacts on the Darling Downs-South West region.

These impacts will create substantial employment opportunities in communities such as Miles, Chinchilla, Dalby and Roma, specifically in the mining, electricity, gas, water and construction industries.

As well as directly stimulating output, if all 30 proposed projects included in the cumulative impact scenario proceed, there will be a range of indirect flow on benefits. This will occur through an increase in demand from the projects' supply chains, and increased demand by project workers. This, in turn, would boost revenue in the Darling Downs-South West economies. This higher revenue will then flow through to extra spending in the regions' consumer-oriented industries, such as retail trade, health and community services and cultural and recreational services.

21.5 Conclusion

21.5.1 Assessment outcomes

The Australia Pacific LNG Project is expected to have significant impacts on the local, regional, state and national economies. The Project represents a significant investment in value adding to CSG resources, and will help create a new export industry in Queensland, diversifying the State's economic base.

The Project is estimated to stimulate an increase in Queensland's GSP of approximately $2 billion per annum, creating of an average of 9,000 jobs (directly and indirectly) each year in Queensland. Australia Pacific LNG is committed to sourcing inputs (labour, goods and services) from the local and regional economy where practicable. For the region within which the gas fields' study area is located (Darling Downs-South West Queensland), the Project is anticipated to contribute to:

- An increase in value added annually by $441 million in the construction phase, and by $900 million under the operational scenario annually
- An increase in employment (both direct and indirect) by around 2,900 jobs in the construction phase and nearly 6,000 jobs during the operation phase.

Through the economic impact assessment process, a variety of economic impacts associated with the construction and operation of the Project have been identified. Mitigation strategies have been developed to enhance benefits and reduce adverse economic impacts from the Project, including supporting local business, reducing unsustainable upward pressure on the housing market, and collaborating with stakeholders to improve the capacity of the local workforce.

Full details of mitigation strategies and commitments are provided in the social impact management plan in Volume 2 Chapter 24.

21.5.2 Commitments

To manage potential impacts of the Project on the local and regional economic environments, Australia Pacific LNG has committed to a range of strategies. Those which are most relevant to the economic environment are detailed below, with a full range of social and economic commitments detailed in Volume 2 Chapter 20.

Income and affordability

Australia Pacific LNG will:

- Provide temporary accommodation facilities for non-local construction staff and contractors, and consult with stakeholders during the site selection process for these facilities
- Mitigate pressure on housing affordability during gas fields' operations, temporary accommodation will be provided for personnel wishing to relocate until such time as housing stock becomes available
- Work through committees established under the Queensland's Sustainable Resource Communities Policy to identify housing market issues, forecasts and possible responses
- Mitigate potential impacts on housing affordability and availability, through community programs that involve working with government and agencies that provide housing to people in distress.

Employment and business

Australia Pacific LNG will:

- Continue to use existing methods or develop new methods to attract people to the workforce who are local to the region, as well as those from under-represented groups
- Implement a local content strategy, to participate in or establish programs to assist qualified local and regional businesses with tendering opportunities for providing goods and services for the Project
- Aim to build collaborative partnerships with government and community organisations, to enhance the capacity for employers to provide jobs and for local people to develop skills and obtain employment (e.g. through the Community Skills Scholarship program)
- Work with government, the community and industry to plan for potential cumulative impacts and to share information about potential impacts and mitigation measures
- Ensure contracts with suppliers and contractors are aligned with Australia Pacific LNG's sustainability principles and objectives
- Work closely with EnergySkills Queensland's CSG/LNG Skills Taskforce to help meet the growing skills demand by:
  - Creating community awareness about the industry and opportunities
  - Enhancing vocational training
  - Facilitating career advice and work readiness programs for new entrants and mature entrants from related industries.

Education and training

Australia Pacific LNG will:

- Implement CSG/LNG gateway programs with high schools in the region, in partnership with providers such as the Queensland Minerals and Energy Academy, to promote career opportunities and facilitate employment in the CSG/LNG industry
- Expand competency based training and skills development programs for production and process plant operators, including further development of the dedicated training facilities at the Peat gas processing facility near Wandoan
- Continue to collaborate on programs with government, training and educational groups that build the local skills base, to meet the specific needs of the industry and other impacted sectors.

This includes ongoing development of apprenticeship, traineeship, scholarship and higher education programs.

References

Australian Bureau of Statistics (ABS) 2006, *Census Data*, Commonwealth Government of Australia, Canberra.

Australian Bureau of Statistics (ABS) 2007a, *Australian Standard Geographical Classification (ASGC), July 2007*, catalogue number 1216.0, viewed 5 December 2008, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1216.0Jul%202007?OpenDocument>

Australian Bureau of Statistics (ABS) 2007b, *Counts of Australian Businesses, including Entries and Exits, Jun 2003 to Jun 2007*, cat. no. 8165.0, Commonwealth Government of Australia, Canberra.

Australian Bureau of Statistics (ABS) 2009a, *Labour Price Index, Australia*, cat. no. 6345.0, Australian Bureau of Statistics, Canberra.

Australian Bureau of Statistics (ABS) 2009b, *Producer Price Indexes, Australia*, cat. no. 6427.0, Australian Bureau of Statistics, Canberra.

Department of Education, Employment and Workplace Relations (DEEWR) 2009, *Small Area Labour Markets*, March 2009, Australian Government, Canberra.

Energy Skills Queensland 2009, *Part A – Workforce Planning Report to inform the Workforce & Competency Development Strategy Plan for the Queensland Coal Seam Gas / Liquefied Natural Gas Industry*, Confidential Draft Report, p. 18.

KPMG Econtech 2010, *Australia Pacific LNG Project: Economic Impact Assessment,* report prepared for Australia Pacific LNG.

MMA 2009, *Queensland LNG Industry Viability and Economic Impact Study,* Department of Infrastructure and Planning, Brisbane.

Office of Economic and Statistical Research (OESR) 2006, *Index of Retail Prices in Regional Centres*, Queensland Health, Queensland Government, Brisbane.

Office of Economic and Statistical Research (OESR) 2008, *Experimental Estimates of Gross Regional Product,* Queensland Office of the Government Statistician, Queensland Government, Brisbane.

Property Data Solutions 2009, *PDS Live online database*, available by subscription.

RP Data 2009, *Suburb Profiles*, viewed 20 December 2009, <http://reports.rpdata.com.au/cgi-bin/vgmsg/RP_Reports/subprofile/rprephome.p?type=1>