3. PROJECT NEED

The proposed project development area contains significant coal seam gas resources suited for domestic supply and conversion to liquefied natural gas (LNG) for export. The global demand for gas presents an opportunity to develop these resources for export, with resources still available for the existing domestic market.

The project will benefit Queensland through long-term royalty contributions to the state economy, and also provide direct benefits to areas surrounding the project through the creation of employment and small business opportunities.

This chapter describes the need for the project to develop coal seam gas for domestic use and for export once converted to LNG. The chapter discusses:

• Projected Australian and worldwide demand for gas and energy (Section 3.1).

• The extent of Australia's natural gas resources and production capacity of the project (Section 3.2).

• Australian and Queensland government policy supporting the domestic use of gas and the conversion of gas to LNG for export (Section 3.3).

• Environmental, economic and social impacts of not proceeding with the project (Section 3.4).

3.1 Gas and Energy Demand

The following sections discuss international (Section 3.1.1) and Australian (Section 3.1.2) gas and energy demand.

3.1.1 International Demand

Gas is an established energy source that presently meets 22% of the world's energy needs. Compared to other fossil fuels, gas offers a number of advantages as a fuel: relatively lower greenhouse gas emissions, greater energy efficiency, ease of extraction, ease of transport through pipelines and ease of export once converted to LNG (IEA, 2009).

Unlike worldwide oil markets, gas has typically been considered a regional resource because of limitations on transport. LNG overcomes those limitations, as it is readily transported, and with sales now representing around 7% of global gas sales, LNG is becoming an important global commodity (IEA, 2008). Worldwide LNG sales are predicted to rise from 165 Mt in 2007 to between 245 and 340 Mt per year by 2015 (IEA, 2009). By 2035, predictions show a global increase in the gas trade of around 80%, of which more than half takes the form of LNG (IEA, 2010).

Historically, there have been two LNG import markets: the Asia-Pacific, which includes China, Taiwan, Japan and the Republic of Korea, and the Atlantic, which includes Europe and North America. The growth of Middle East imports in 2010 signals the rise of regions of demand (ABARES, 2010a).

In 2008/09, LNG accounted for A$10.3 billion of Australia's export income. In 2009/10, the value decreased to A$7.8 billion, though exports increased by 16% to 18 Mt. The global economic downturn, and the increased strength of the Australian dollar relative to the US dollar, contributed to lower LNG prices during the latter period (ABARES, 2011a). In 2010/11, Australian LNG production reached a record 20.8 Mt (Energy Quest, 2011).

ABARES predicted LNG exports to grow by 4% in 2010/11 to 19 Mt, and thereafter at an average rate of 19% per annum to 2015/16, reaching around 41 Mt. Current construction projects underpinning this growth include the Woodside's Pluto LNG Project and Chevron Gorgon Gas Project in Western Australia, and the QGC and BG Group Queensland Curtis LNG Project and Santos, Petronas, Total and Kogas Gladstone LNG Project in Queensland. Given the number of projects undergoing feasibility and design, ABARES foresees the potential for Australian LNG exports to continue growing beyond 2015/16 (ABARES, 2011a). Presently, Australia's major LNG trading partners include Japan, China and the Republic of Korea. While strong growth in these markets is expected to continue, opportunities are arising in India, Thailand, Singapore and Chinese Taipei (ABARES, 2010a). With sufficient gas resources to meet domestic demand, Australia has an opportunity to strengthen its position as a key participant in global LNG markets.

Worldwide energy demand in 2007 and projected demand in 2030 is shown in Figure 3.1. The International Energy Agency estimates that over 20% of the global population still lacks access to electricity. In general, the International Energy Agency expects world primary energy demand to increase by 36% to 40% between 2008 and 2035, at an annual average rate of 1.2% to 1.4% (IEA, 2010). Emerging economies led by China and India, and, to a lesser extent, growth in the Middle East, are considered the main drivers for increased demand. Demand in China alone contributes to 36% of this growth.

These projections assume that governments take a cautious approach to implementing greenhouse gas reduction measures. The International Energy Agency notes that natural gas, in particular, is set to play a central role in meeting the world's energy needs for the next two-and-a-half decades, as governments place greater focus on policies aimed at maintaining economic growth while embracing less carbon-intensive energy technologies. Table 3.1 compares the greenhouse gas emissions of the world's primary fossil fuels (expressed as kg CO_2-e). Gas estimates are given according to the different methods by which gas is supplied for the consumption of natural gas and solid fuels, not taking into account lifecycle factors such as methods of processing and transportation.

Table 3.1   Greenhouse gas emissions per GJ of fuel combusted

Fuel	Emissions (kg CO_2-e/GJ)
Coal seam methane that is captured for combustion	51.1
Natural gas distributed in a pipeline	51.2
Liquefied natural gas	51.2
Black coal (other than that used to produce coke)	88.4
Brown coal	92.7

Source: DCCEE (2010a).

3.1.2   Australian Demand

Australia's gas consumption has increased by an average of 3.1% per annum over the five years ending 2008/09. In the period 2011 to 2030, the Australian Energy Market Operator (AEMO) expects growth to continue at a rate of between 3.0% and 4.8%, with gas-fired power generation in Queensland, Victoria and New South Wales being a key driver of demand (AEMO, 2010).
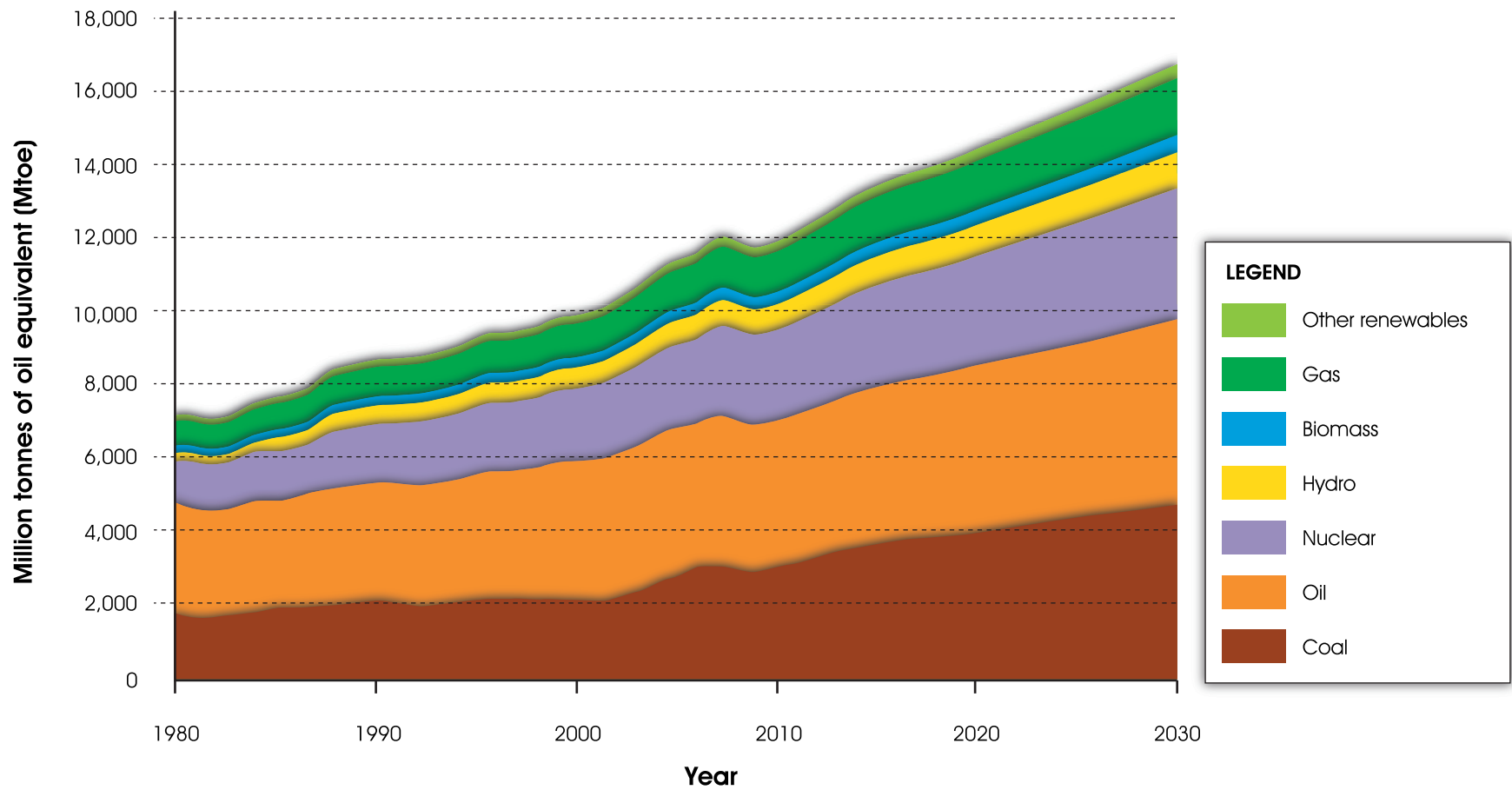
Projected worldwide energy demand 2007 to 2030

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Projected worldwide energy demand 2007 to 2030

Figure No: 3.1

ABARES forecasts Australia's primary energy consumption to increase by 1.4% per year, from around 5,772 PJ in 2007/2008 to 7,715 PJ by 2029-2030 as shown in Figure 3.2 (GA & ABARES, 2010). While this represents an overall increase of around 35%, ABARES predicts Australia's long-term trend will weaken the move towards greater energy efficiency and the use of less carbon-intensive energy sources. ABARES predicts Australia's primary fuel mix will change, aided by policies that encourage the development of gas and renewable energy sources to reduce dependency on coal.

3.2   Gas Resource

The following sections discuss the availability of gas resources in Australia (Section 3.2.1) and the production capacity of the project (Section 3.2.2).

3.2.1   Australian Gas Resources

In the past two years, the Australian Government has commissioned several reports, which examine the availability of Australia's gas resources to meet projected domestic energy demand. Reports include:
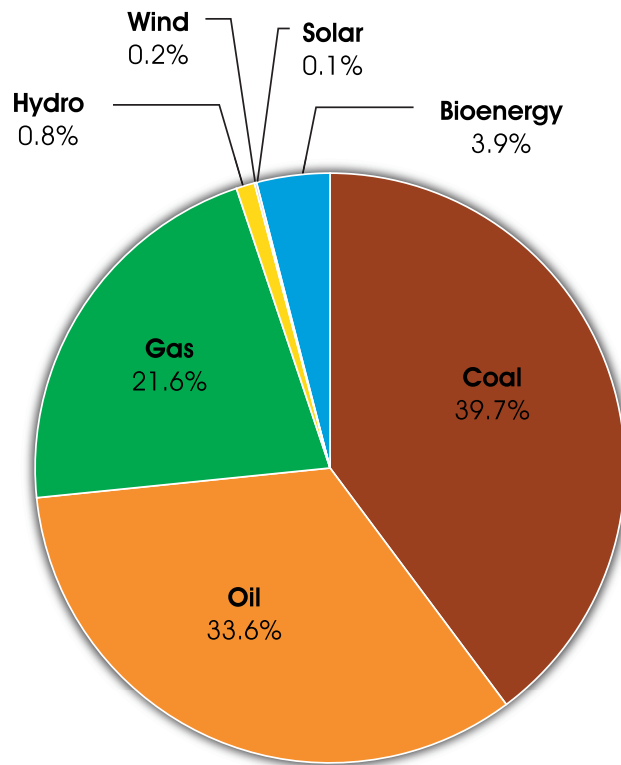
- The **Gas Statement of Opportunities (GSOO)**, first published by the AEMO in 2009 (AEMO, 2009) and updated in 2010 (AEMO, 2010). The GSOO provides 20-year outlooks on the potential balance of gas supply and demand in Australia, under low-, medium- and high-growth scenarios. Forecasts to 2030 prepared by McLennan Magasanik Associates inform the GSOO; these forecasts consider the availability of proven, probable and possible, as well as contingent gas reserves within Australia, and market demand in Queensland, New South Wales, South Australia, Tasmania, Victoria and the Australian Capital Territory.

- The **Australian Energy Resource Assessment,** published by Geoscience Australia and ABARES in 2010 (GA & ABARES, 2010). The report presented reserves estimates as at December 2008 and considered factors likely to influence the use and availability of resources during the period to 2030, including new technology development.

- The **Australian Energy Projections to 2029-30,** published by ABARES in 2010 (ABARES, 2010b). The report provides long-term projections of Australian energy consumption, production and trade for the period 2007/08 to 2029/30 and also reports on all proponents gas reserves.

- The **Energy Quest** annual and quarterly reports, published by Energy Quest in 2011 (Energy Quest, 2011).

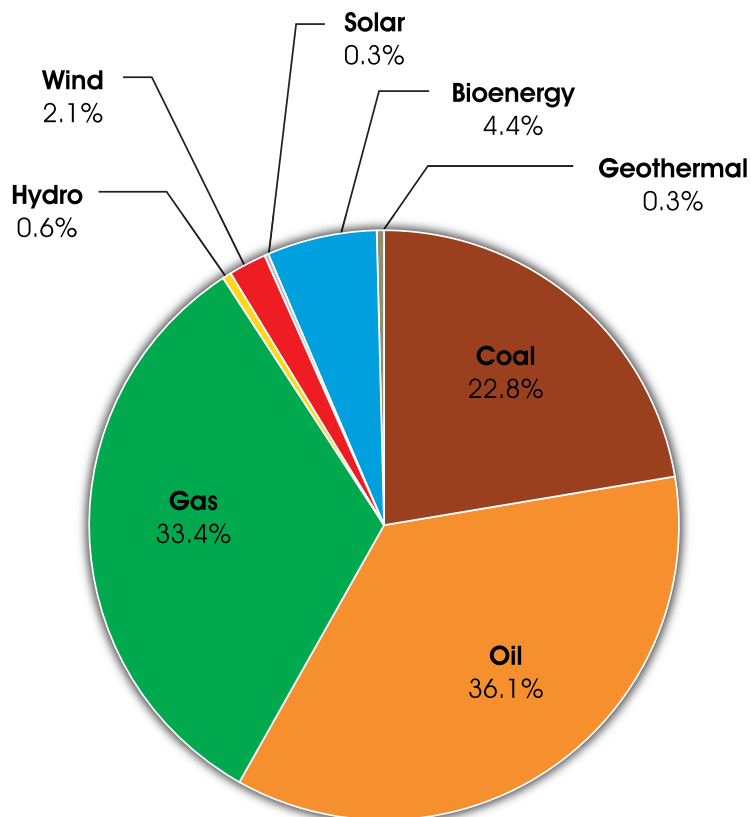Further details are provided below.

Reporting Method for Reserves

Two systems are used to report gas reserves internationally. The most widely used international standard is the 2007 Petroleum Resources Management System, approved by the Society of Petroleum Engineers, World Petroleum Council, American Association of Petroleum Geologists and the Society of Petroleum Evaluation Engineers in 2007, and updated in 2008 to state the correct conversion ratio for LNG, which is about 1/614 the volume of natural gas (SPE et al., 2007). The system is used within Australia and allowable under the Australian Stock Exchange.

In the United States, the Securities and Exchange Commission (SEC) defined a separate system, which is mandatory. From 2010, the SEC adopted the Petroleum Resources Management System principles in its regulatory framework.

Wind
0.2%

Solar
0.1%

Hydro
0.8%

Bioenergy
3.9%

Gas
21.6%

Coal
39.7%

Oil
33.6%

a) 2007-08 (5,772 PJ)

Solar
0.3%

Wind
2.1%

Bioenergy
4.4%

Hydro
0.6%

Geothermal
0.3%

Gas
33.4%

Coal
22.8%

Oil
36.1%

Source:
Geoscience Australia and ABARE. 2010. Australian Energy Resources Assessment.
Report prepared by Geoscience Australia and ABARE, Canberra, ACT.

b) 2029-30 (7,715 PJ)

Under Petroleum Resources Management System, **proven (1P)** gas reserves are reserves that, to a high degree of certainty (90% confidence), are recoverable from known reservoirs, using current technology and under current economic and operating conditions.

Proven and probable (2P) gas reserves are proven reserves plus those reserves that analysis of geological and engineering data suggests are more likely than not (50% confidence) recoverable.

Proven, probable and possible (3P) gas reserves are proven plus probable reserves plus those reserves that, to a low degree of certainty (10% confidence), are recoverable. Relatively high risk is associated with these reserves.

Contingent reserves are those quantities of hydrocarbons that are estimated, on a given date, to be potentially recoverable from known reservoirs but are not currently considered commercially recoverable. Although contingent reserves may be significant, they have constraints to development.

From a commercial perspective, the 2P reserves are important, because the establishment of long-term sales gas agreements generally require this level of confidence.
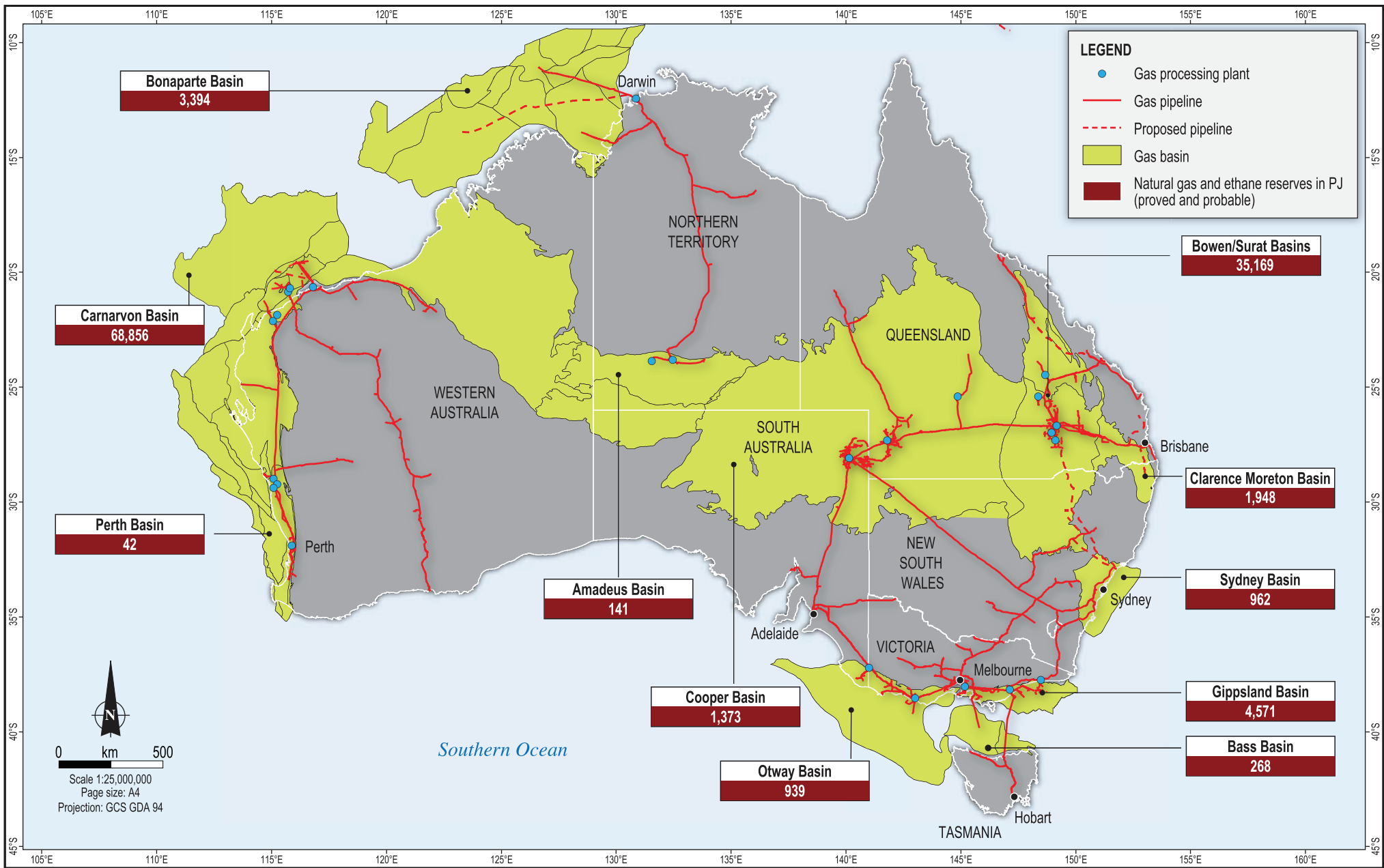
Gas Resources and Reserves Growth

Studies show Australia has 60 sedimentary basins and subbasins that potentially contain accumulations of oil and gas. Of these, 31 lie in eastern Australia. To date, gas production has focused on a small number of basins, which McLennan Magasanik Associates (MMA, 2010) believe is attributable to both economic and geological factors, such as proximity to market and basin structure.

Around 90% of Australia's conventional gas resources are located in the Carnarvon, Browse and Bonaparte basins off the Northern Territory and Western Australia coasts. For conventional gas reserves in eastern Australia, McLennan Magasanik Associates (MMA, 2010) note that 2P reserves have increased steadily since initial discoveries. While production recently commenced from the Bass and Otway basins, production from older gas fields, such as those in the Cooper/Eromanga Basin, has started to decline.

For coal seam gas resources, large deposits exist in the coal basins of Queensland and New South Wales. McLennan Magasanik Associates note that growth in 1P, 2P and 3P reserves has grown exponentially since 2003. McLennan Magasanik Associates identify 2007 and 2008 as particularly strong years, due to the major gas producers accelerating the proving up of reserves to back proposed LNG export projects (MMA, 2010). Presently, the Surat and Bowen basins, respectively, account for 61% and 34% of current 1P and 2P coal seam gas reserves, with small amounts also discovered in the Clarence-Moreton, Gunnedah, Gloucester and Sydney basins (GA & ABARES, 2010).

The annual coal seam gas review by Energy Quest reported Australian gas reserves in the Australian Coal Seam Gas 2011: From Well to Wharf Report (Energy Quest, 2011). The report stated that 2P gas reserves in Queensland were rising steadily since the reporting period began in 2000. Australian 2P gas resources by basin as reported by Energy Quest in the latest Energy Quarterly Report (August 2011) are shown in Figure 3.3.

Figure 3.3 — Australian gas resources by basin May 2011

LEGEND

- Gas processing plant
- Gas pipeline
- Proposed pipeline
- Gas basin
- Natural gas and ethane reserves in PJ (proved and probable)

Bonaparte Basin
3,394

Carnarvon Basin
68,856

Perth Basin
42

Amadeus Basin
141

Cooper Basin
1,373

Otway Basin
939

Bowen/Surat Basins
35,169

Clarence Moreton Basin
1,948

Sydney Basin
962

Gippsland Basin
4,571

Bass Basin
268

NORTHERN TERRITORY

WESTERN AUSTRALIA

SOUTH AUSTRALIA

QUEENSLAND

NEW SOUTH WALES

VICTORIA

TASMANIA

Darwin

Perth

Adelaide

Sydney

Brisbane

Melbourne

Hobart

Southern Ocean

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Australian gas resources by basin May 2011

Figure No:
3.3

Coal seam gas exploration has progressed in the Surat Basin since 2000, when it was realised that commercial quantities of gas could be economically extracted from the Walloon Coal Measures (Qld Govt., 2009). Surat Basin 2P reserves at the time of the most recent Queensland Government estimates were 23,354 PJ (Energy Quest, 2011). Operating coal seam gas projects and major projects proposed for future development using coal seam gas reserves are detailed in Table 3.2.

Table 3.2   Coal seam gas projects in the Surat Basin

Operator/Proponent	Project	Status
Arrow Energy	Daandine Project	Operating
	Kogan North Project	Operating
	Tipton West Project	Operating
	Stratheden Project	Operating
	Dalby Expansion Project	Government approval 2011
	Surat Gas Project	Proposed
Origin Energy/Conoco Phillips	Australia Pacific LNG Project	Operating
Queensland Gas Company (BG Group)	Berwyndale South Gasfield	Operating
	Argyle-Kenya Gasfield	Operating
	Queensland Curtis LNG Project	Operating
Santos/Petronas	Gladstone LNG Project	Operating

Source: QME (2009).

Eastern Australia Gas Consumption

AEMO categorises gas consumers into four main groups and, through the GSOO, projects gas demand for the years 2011 to 2030 across eastern Australia. The groups, which each have different demand drivers, include:

- The mass market, which includes residential, commercial and small industrial users. Demand is influenced by population, new dwelling construction and activity in the manufacturing sector, as well as the variability of climate (peak winter and summer demand), technological development and government policy initiatives.

- Power generation, which relates to contractual supply to gas-fired power station operators. Influences on this use include demand for new electricity market participants and therefore economic and commercial factors, such as fuel costs, new entry costs for generators, and renewable energy and greenhouse gas abatement schemes.

- Large industrial users, most of which relate to the smelting, refining or processing of minerals. Other customers may include chemical and petrochemical industries. These projects are small in number and demand drivers (such as pricing information) are often confidential.

- LNG exports, such as projects already operating out of Western Australia and the Northern Territory, and proposed for Queensland. Influences on demand for gas for LNG include the global demand for LNG, present supply capacity, the availability of gas resources and LNG pricing and costs associated with resource development.

The various demand drivers for each group were used to develop high-, medium- and low-growth scenarios for the period 2011 to 2030. The GSOO found that, for all scenarios modelled, gas reserves in eastern Australia are sufficient to meet the projected growth in domestic gas and export consumption over the forecast period to 2030 (AEMO, 2010). These findings are consistent with the Australian Energy Projections to 2029/30 (ABARES, 2010b) and the Australian

Resources Assessment Report (GA & ABARES, 2010). Geoscience Australia and ABARES note that combined identified gas resources in 2008 were in the order of 393,000 PJ, the equivalent to 180 years of gas at 2010 production rates and that, traditionally, reserve estimates increase as exploration in new areas is undertaken.

3.2.2   Production Capacity of the Project Development Area

Arrow's investment in the Surat Basin began in March 2000 with the grant of authority to prospect (ATP) 683P, followed in October 2000 by the grant of ATP 676. Arrow conducted its first exploration program in June 2001 and sold its first gas from the Kogan North Project in January 2006. Gas sales from the Daandine Project and Tipton West Project soon followed in September 2006 and February 2007, respectively. In July 2009, production at the Stratheden gas field commenced. Most of the gas produced from these fields is sold for power generation under long-term gas sales agreements or long-term gas tolling and power purchase agreements (Table 3.3). Key events in Arrow's Surat Basin exploration and development history are presented in Figure 3.4.

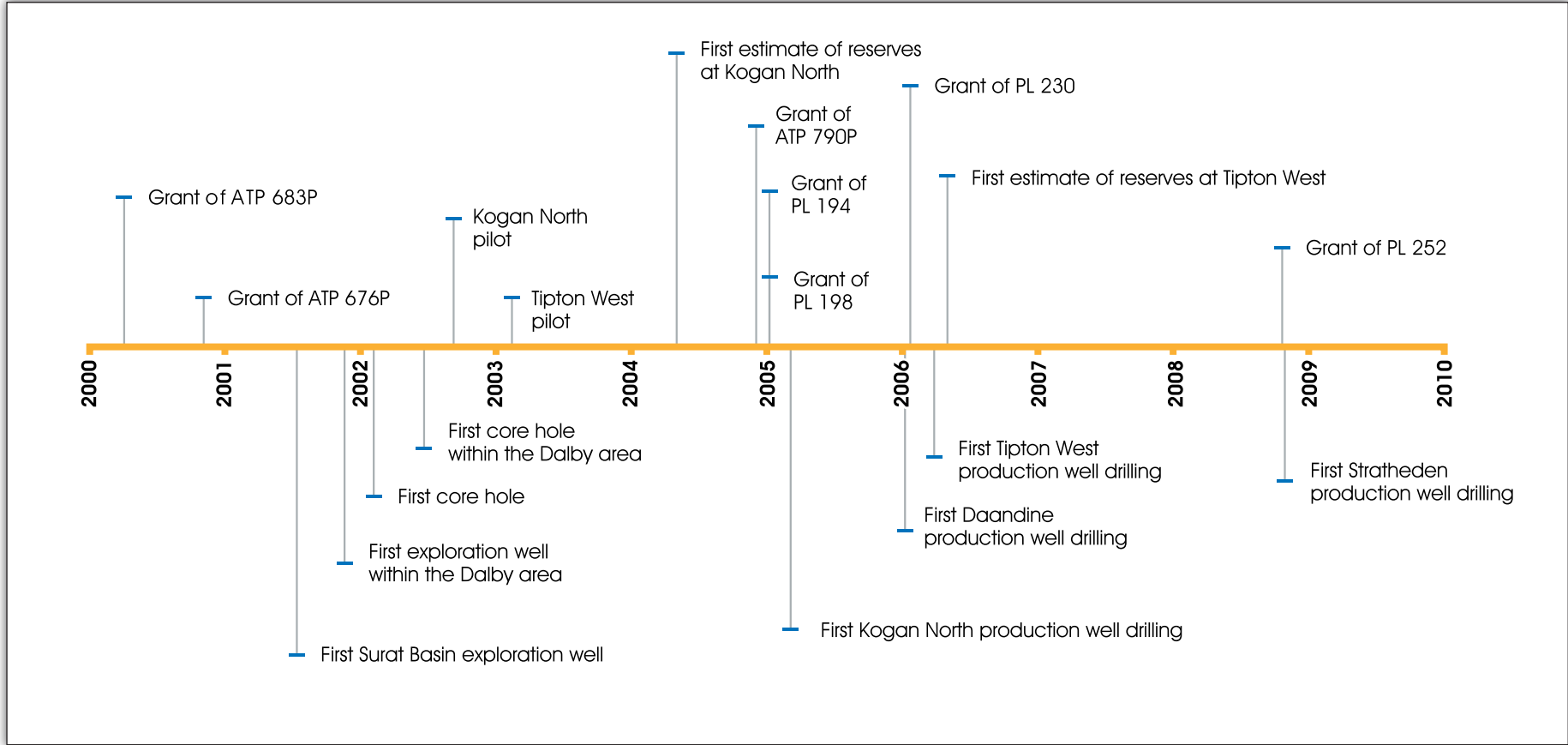**Table 3.3   Arrow's existing gas projects in the Surat Basin**

Gas Field	PL	Description
Kogan North	PL 194	Long-term domestic gas sales agreements: CS Energy.
Tipton West	PL 198	Long-term domestic gas sales agreement: Braemar Power Station, Braemar 2 Power Station.
Daandine	PL 230	Long-term domestic gas tolling agreement with APA Group and power purchase agreement with Country Energy for Daandine Power Station.* Long-term domestic gas sales agreement: Braemar 2 Power Station.
Stratheden	PL 252	Long-term domestic gas sales agreement: Braemar 2 Power Station.

*   A gas tolling agreement involves a gas producer sending gas to a gas-fired power station, which the gas producer uses to generate electricity in return for a pre-established tolling charge. Arrow's agreement with the APA Group allows Arrow to offtake electricity for sale to the New South Wales government-owned retailer, Country Energy, under a long-term power purchase agreement.

Arrow has undertaken and continues to undertake basin-wide modelling to estimate the quantity of gas available in the project development area. This modelling produces simulations to estimate Arrow's total recoverable gas reserves. The growth of Arrow's gross reserves is shown in Figure 3.5, alongside the whole of Surat Basin reserves growth estimated by the Queensland Government.

Arrow's knowledge of project development area gas reserves is limited to the extent of its exploration and production activities to date. Data available for Arrow's gas reservoir model is clustered around the company's existing field development.

Arrow's gross gas reserves in or adjacent to the project development area as at 31 December 2010 are presented according to petroleum tenure in Table 3.4.

Timeline: 2000 – 2010

- Grant of ATP 683P
- Grant of ATP 676P
- Kogan North pilot
- Tipton West pilot
- First estimate of reserves at Kogan North
- Grant of ATP 790P
- Grant of PL 194
- Grant of PL 198
- Grant of PL 230
- First estimate of reserves at Tipton West
- Grant of PL 252
- First core hole within the Dalby area
- First core hole
- First exploration well within the Dalby area
- First Surat Basin exploration well
- First Kogan North production well drilling
- First Daandine production well drilling
- First Tipton West production well drilling
- First Stratheden production well drilling

| | Job No: 7040 | Arrow Energy | | Arrow Energy Surat Basin exploration and development history | Figure No: 3.4 |
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Surat Basin 2P Reserves history
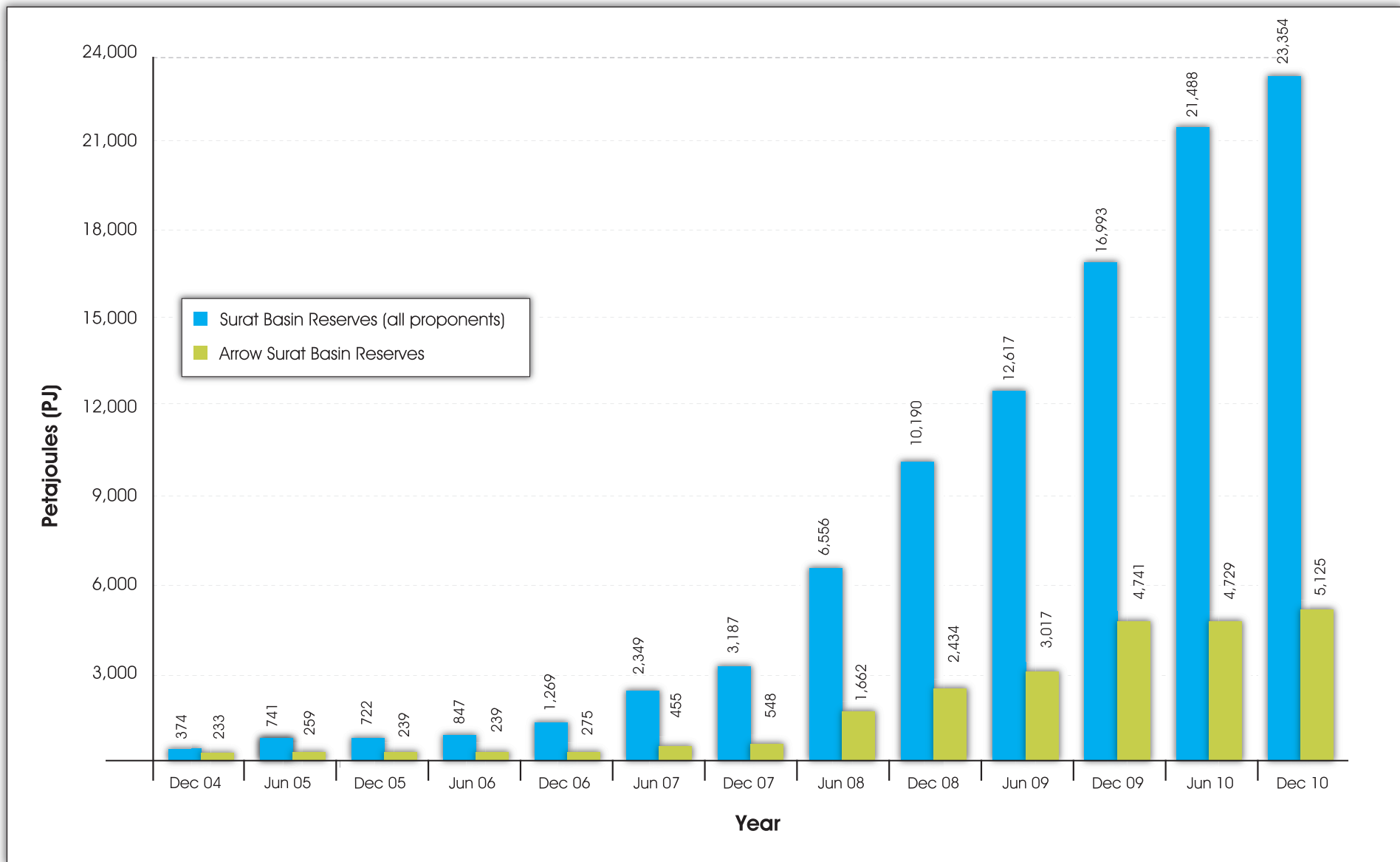
Job No: **7040**	**Arrow Energy**
File Name: **7040_04_F03.05_GL**	**Surat Gas Project**

Figure No: **3.5**

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Table 3.4   Certified project development area reserves as at 31 December 2009

Tenure	Gross 1P (PJ)	Gross 2P (PJ)	Gross 3P (PJ)
PL 194 Kogan North	46	164	306
PL 198 Tipton West	309	667	689
PL 230 Daandine	73	317	319
PL 252 Stratheden	7	259	259
PL 238 Plainview	12	597	597
PL 258 Meenawarra	3	295	333
PL 260 Longswamp	21	438	445
ATP 683P Bowenville	0	818	973
ATP 683P Dalby South	1	128	284
ATP 683P Millmerran	0	106	382
Subtotal	**472**	**3,789**	**4,587**

Source: NSAI (2009).

Ongoing exploration throughout the project development area will continue to build Arrow's confidence of total reserves. Expected exploration and appraisal activities are discussed in Chapter 5, Project Description.

3.2.3   Use of the Project Development Area Resource

Modelling for the Surat Gas Project suggests the project development area has the potential to produce close to 7,160 PJ of gas over the life of the project, with an estimated peak production of 388 PJ per year under current export scenarios. (This equates to an estimated average sustained production of 1,050 TJ/d.) In comparison, Queensland's gas consumption in the year 2007 was 148 PJ (Qld Govt., 2008).

As set out in Section 3.2.1, there are four major gas consumer groups in Australia. These include the mass market, power generators, large domestic projects and LNG exporters. Arrow's gas is currently directed to the mass market or power generators under long-term gas sales agreements.

AEMO (2010) has noted mass market and large domestic project consumption in eastern Australia will increase in the period to 2030; however, compared to international demand, the increase in mass market and large industrial consumption is predicted to be very small. Meanwhile, global demand will continue to grow with secure, less-emissions-intensive energy sources preferred. Therefore, the most likely requirement for gas to cater for Australian and global energy demand during the period involves the use of gas to displace sources of more intensive greenhouse gas emissions, such as:

• New-entrant baseload and intermediate power generation in Queensland.
• Offshore energy demand, including heavy transport industry fuels.

The suitability of these options is discussed further below.

Power Generation in Queensland

A range of generators operate in the NEM to meet the daily, weekly and seasonal demand for electricity. Generators are typically described in three classes:

- Baseload generators, which operate for the majority of the year to supply constant power needs, such as those generated by industry, commercial developments, public facilities and typical household activities.

- Peaking generators, which meet short-term power needs. This may occur on very cold or very hot days when consumers switch on heating or air-conditioning, and when baseload generators are unavailable as a result of plant failure, forced outages, or planned maintenance outages that coincide with other unforeseen events, such extreme weather conditions.

- Intermediate generators, which operate in-between the extremes of baseload and peaking generators. Often, intermediate generators will run in the morning when consumers rise and prepare for work or school, or in the evening when they return for their evening meal and entertainment. Intermediate generators often shut down or curtail output during the night when demand for power is the lowest.

Coal-fired generators, due to their low running costs, are the predominate supplier of baseload and intermediate power in the NEM. Comparatively, significant greenhouse gas emissions reductions can be achieved using gas for this purpose. As baseload and intermediate demand grows, government energy policy initiatives such as the Queensland Gas Scheme are creating opportunities for new entrant gas-fired generators.

Arrow supplies 20% of the gas required to fuel Queensland's existing gas-fired plants and, through Braemar 2 Power Station, owns generation capacity in its own right. The Townsville Power Station is a peaking plant, while Braemar and Braemar 2 power stations currently operate in peak and intermediate roles, they can also provide baseload generation. The 33-MW Daandine Power Station, located near the existing Daandine central gas processing facility, provides baseload generation.

Offshore Energy Demand

Forecasts show global demand for energy increasing in the period 2007 to 2029. Australia's natural gas resources are significant and are less emissions intensive than other fossil fuels. Conversion of gas to LNG enables transportation of this resource to markets unable to be technically or economically reached by pipeline. LNG can be used to meet the growing demand for less emissions-intensive fuel for power generation, industry and domestic heating and cooling, particularly in Asia.

The Surat Gas Project, together with the proposed Arrow LNG Plant, provides an opportunity to export gas as LNG to cater for global energy demand. Importantly, Arrow's shareholders, Royal Dutch Shell plc and Petrochina Company Limited (PetroChina), have through their extensive commercial interests a confirmed market for all LNG produced. Notably, PetroChina, whose sole sponsor and controlling shareholder is the state-owned enterprise, China National Petroleum Corporation, is the largest oil and gas producer and distributer in China.

The International Energy Agency 2010 forecasts are for China to contribute to 36% of the growth of global gas demand to 2035.

Key Influencing Factors

Both the rate and extent of development would ultimately depend on market variables, such as energy market demand, electricity and gas prices, contract quantities, the location of customers and other factors. These other factors include the need for supporting infrastructure and the prevailing regulatory environment.

Since Australia's gas resources are sufficient to sustain both a domestic and export industry, the Surat Gas Project will contribute to ensuring a sufficient supply of gas for the domestic market while still developing Australia's LNG export industry. Should LNG export not proceed, Arrow's gas field developments in the Surat Basin would progress but on a smaller scale, at a slower rate, and with a reduced level of investment and economic output.

3.3   Policy Framework

Australian and Queensland government energy policy is driven by the need to:

- Grow a diverse economy at regional, state and national levels.
- Reduce greenhouse gas emissions from the stationary energy sector.
- Support Australian industry and ensure Australia's security of energy supply.

This position, discussed below at national and state level, supports the development of Australia as a global energy producer including growth through the export of LNG.

3.3.1   Australian Government Energy White Paper

In 2008, the Australian Government commenced an Energy White Paper process, with the objective of identifying a comprehensive policy framework durable to 2030 and beyond. The National Energy Policy Framework 2030 Directions Paper (DRET, 2009a) was released in March 2009, followed by the discussion paper, Realising Australia's Energy Resource Potential, in April 2009 (DRET, 2009b). The discussion paper noted that Australia's large energy resources and educated population provide a strong platform from which to further develop the nation's energy resource sector while maintaining long-term energy security, and that Australia's extensive gas reserves and expected long-term growth of the LNG market provide significant export opportunities to the Asia-Pacific region.

In February 2011, the Australian Government issued an update on the Energy White Paper process. The draft Energy White Paper is expected to be released for comment within 12 months and finalised in 2012. The White Paper will seek to deliver a whole-of-government policy framework, focused on providing certainty for investors and reliable and secure energy supply for the Australian community (DRET, 2011).

3.3.2   Queensland Climate Change Strategy and the Queensland Government Gas Scheme

The Queensland Government considers gas to be a key transitional fuel source to reduce the greenhouse gas emissions intensity from electricity generation. The Queensland Gas Scheme is one of the state's key energy initiatives under the state's ClimateSmart 2050 strategy (Qld Govt., 2007).

The scheme was established in 2005 to diversify the sources from which the state draws its energy and is regulated under Chapter 5A of the *Electricity Act 1994* (Qld). The scheme sets a mandatory gas-fired electricity generation target for the state of 15% in 2010, which will increase to 18% by 2020.

Ensuring the Queensland Gas Scheme would remain sustainable in the advent of an LNG industry was one driver behind the domestic market security-of-supply study commissioned in 2009 by the Queensland Government, described below.

3.3.3   Domestic Gas Market Security of Supply

In 2009, McLennan Magasanik Associates was commissioned by the Queensland Government to assess the sustainability, costs and benefits of developing an LNG industry in Queensland. The Queensland LNG Industry Viability and Economic Impact Study (MMA, 2009a) assessed several scenarios, including 10 Mt/a, 28 Mt/a and 40 Mt/a industries (with 28 Mt/a considered the standard scenario) and a scenario where LNG is not developed.

The report found that the development of the LNG industry could have the following potential effects:

•   Increase gross domestic product, gross state product and Queensland Government royalties.

•   Generate a movement of labour resources from other states to Queensland for employment.

•   Increase domestic gas prices by around $2/GJ by 2015 due to higher export prices and flow-on effects on electricity prices. The highest impact would be felt by the electricity market, which competes for lowest cost generation.

As indicated in Section 3.1.2, a significant driver for forecast growth of gas demand in Queensland is increased gas-fired power generation. Due to concern over potential gas price increases affecting the affordability of gas for future electricity generation and large industrial customer needs, the Queensland Government released the Domestic Gas Market Security of Supply consultation paper in September 2009 (DEEDI, 2009a).

As a result of the paper, the Queensland Government announced the following policy position in November 2009:

•   A percentage of gas from all fields will not be required to go to domestic supply.

•   Should it be determined that domestic supply faces constraint, the Queensland Government will reserve future exploration areas for domestic gas supply (a Prospective Gas Production Land Reserve).

•   The Queensland Government will facilitate the development of a short-term gas trading market. This is a national initiative with a Brisbane hub proposed by 2011 (DEEDI, 2009a).

3.3.4   Blueprint for Queensland's LNG Industry

In September 2009, the Queensland Government released its Blueprint for Queensland's LNG Industry, which sets out the Queensland Government's support for coal seam gas and LNG industries (DEEDI, 2009b). The blueprint discusses the environmental benefits and economic strengths of gas, and considers the likely impacts and benefits of developing a local industry. The blueprint outlines the government's approach to working with industry and community to develop the state's LNG industry. Government support includes:

•   Preparing and implementing the Sustainable Resource Communities Policy.

•   Extending the Gladstone State Development Area to include part of Curtis Island as an LNG precinct. A benefit of the development of the Gladstone region as a LNG hub is its central location to both the Surat and Bowen basin's coal seam gas resources.

•   Developing a Surat Basin Regional Development Strategy to maximise economic and employment opportunities and minimise the social consequences of rapid regional growth.

- Establishing groups, including the Land Access Working Group and the Surat Basin Cumulative Impacts Working Group, to address land use conflicts, housing availability and other cumulative effects that may arise from multiple energy and resource projects.

In November 2010, the Queensland Government released the report, Queensland's LNG Industry – A once in a generation opportunity for a generation of employment, which builds upon the Blueprint for Queensland's LNG Industry by providing both a progress update on actions listed above, and setting out further areas of government support (Qld. Govt., 2010). These further areas include, but are not limited to:

- Finalising and implementing new land access laws.

- Preparing an industry-based CSG/LNG Skills Formation Strategy, as well as a A$10 million-CSG/LNG Industry Training Program, funded 50/50 by government and industry.

- Conditioning projects for local impacts.

- Implementing the strategic cropping land policy.

- Developing legislation to better protect against environmental groundwater impacts arising from the coal seam gas hydraulic fracturing (fraccing) process.

- Establishing a LNG Enforcement Unit and releasing compliance information.

- Reviewing the petroleum tenure framework to ensure certainty for investors in the coal seam gas and LNG industries.

3.4 Environmental and Social Impacts of Not Proceeding

The direct consequences of not proceeding with the Surat Gas Project comprise positive and negative environmental, economic and social impacts. In summary, should the project not proceed, positive impacts include:

- Potential environmental impacts of the project will be avoided. The impacts on land, water and air (and associated physical, biological and social impacts) arising from the development of the project will not occur.

- Potential draw of skilled workers from industries such as agriculture to the locally operated gas industry will be avoided.

- Aspects of the rural lifestyle can be maintained. While there are benefits to growing and diversifying the regional economy, this has the potential to change the rural atmosphere.

- Potential demand generated by the project on local and regional infrastructure and services will not occur. This includes the demand for childcare and educational facilities, health care facilities, policing and emergency services, and water and electricity utilities.

- Potential diversion of labour, land, capital expenditure and investment from other businesses will be avoided.

Should the project not proceed, negative impacts include:

- Economic benefits will not be realised. A cost-benefit analysis shows that the net present value of the project to the Queensland economy is estimated at $1.66 billion, assuming a discount rate of 15.0%. Arrow is committed to supporting local businesses for service support and delivery.

- Job opportunities will be lost. The direct creation of approximately 1,000 jobs during the project's construction phase and up to 400 long-term jobs created during the project's operational phase will not go ahead. Arrow's preference is to hire locally and train operational staff where possible, rather than import a workforce. Under a slower, domestic-only development scenario, Arrow would remain committed to training and creating jobs locally; however, the number and variability of opportunities would be more limited.

- Potential investment in local and regional infrastructure and services may not occur or may occur more gradually. While the project may generate demand on services, the occurrence of such will in turn encourage government and private investment. The expansion of services will be of social benefit to local and regional communities.

- An opportunity will exist to contribute to further growth of the Queensland Gas Scheme. The Queensland Government hopes to increase the mandatory gas-fired electricity generation target to 18% by 2020. Arrow already supplies approximately 20% of the gas used to fuel the state's existing gas-fired generators.

- Queensland will forego an opportunity to capitalise on forecast global demand for LNG. Australian and Queensland government policy supports the continued development of Australia's LNG industry and the country's potential as a global energy producer of less carbon-intensive energy resources.

3.5   Summary of Project Need

The Surat Gas Project has the potential to become an important gas supplier to the growing domestic market and Queensland's growing LNG export industry. Specifically, the proposed Surat Gas Project will:

- Use gas from Surat Basin reserves to cater for the growing demand of Queensland and the LNG export market, which are forecast to increase for the period 2011 to 2030.

- Provide an opportunity to increase the use of gas in electricity generation, thereby fulfilling key objectives of Queensland government policy that promote the use of gas as a transitional fuel.

- Contribute to diversifying the regional, state and national economies and advancing Queensland and Australia as a global energy producer.

- Provide training and employment opportunities for a long-term workforce with high levels of technical expertise.