Australia Pacific LNG Project

Volume 1: Overview

Chapter 1: Introduction

Contents

1. Introduction 1
1.1 The Project 1
1.2 Project proponent 1
1.2.1 Origin Energy 3
1.2.2 ConocoPhillips 6
1.3 Project description 10
1.4 Project rationale 12
1.4.1 Actions already undertaken within the Project area 13
1.4.2 Social and economic benefits and costs of the Project 13
1.4.3 Contribution of the Project to climate change solutions 14
1.5 Project timeframe 15
1.6 Relationship to other projects 15
1.7 Alternatives to the Project 17
1.7.1 No project 17
1.7.2 Alternative uses of CSG 18
1.7.3 Alternative gas sources 18
1.8 Co-location opportunities 18
1.9 The environmental impact assessment process 20
1.9.1 Methodology of the EIS 20
1.10 Objectives of the EIS 23
1.11 Submissions 24
References 25

Figures

Figure 1.1 Project overview 2
Figure 1.2 Origin's HSE policy 5
Figure 1.3 ConocoPhillips operated Darwin LNG facility 7
Figure 1.4 ConocoPhillips licensed LNG facilities 8
Figure 1.5 ConocoPhillips HSE policy 9
Figure 1.6 World power generation capacity in the '450 Scenario' 15
Figure 1.7 EIS process 22

1. Introduction

1.1 The Project

Australia Pacific LNG Pty Limited (Australia Pacific LNG) proposes a project which enables the creation of a world scale, long-term industry in Queensland, utilising Australia Pacific LNG's substantial coal seam gas (CSG) resources. This will generate jobs and further investment in Queensland. The Australia Pacific LNG Project (the Project) will contribute to reducing global greenhouse gas intensity by producing liquefied natural gas (LNG) which can substitute for higher greenhouse gas intensive fuels. The Project comprises the further development of CSG fields and the construction of a gas pipeline, an LNG facility and associated facilities to export the gas to international markets. It is the largest CSG to LNG project under consideration in Australia, with the LNG facility expected to produce approximately 18 million tonnes per annum (Mtpa) when all four LNG production trains ('trains') have been constructed.

Gas will be delivered to an LNG facility located on Curtis Island near Gladstone via a gas pipeline, where it will be liquefied prior to export in LNG tankers to international markets. Figure 1.1 illustrates the Project's development concept.

1.2 Project proponent

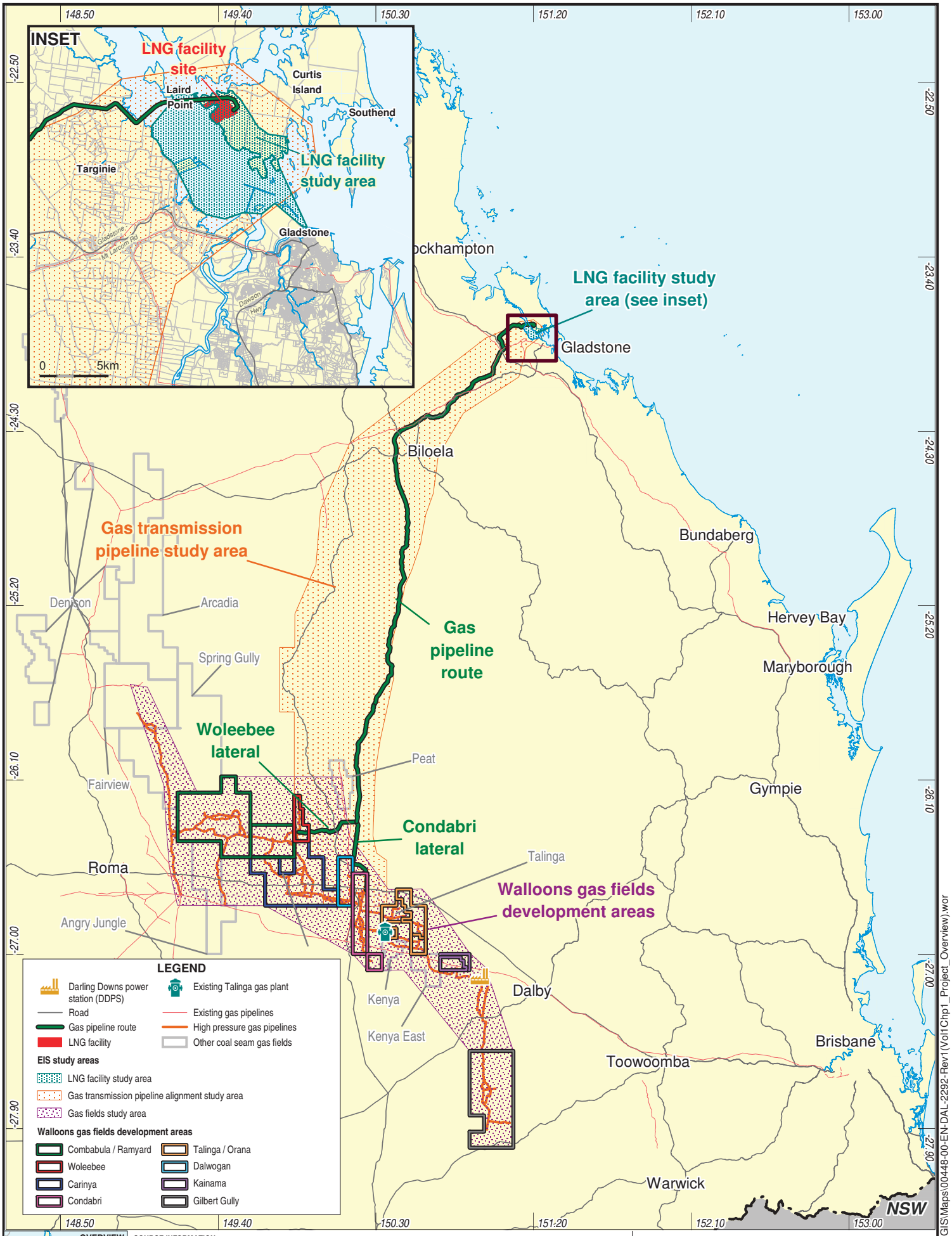
The Project is proposed by Australia Pacific LNG, a 50:50 CSG to LNG joint venture between Origin Energy Limited (Origin) and ConocoPhillips. The Project brings together two companies with extensive experience in coal seam gas production for commercial markets and draws on ConocoPhillips' proven track record in the delivery of LNG projects. These very real strengths will deliver a world class project and a new export industry to Queensland.

Australia Pacific LNG was previously known as Origin Energy CSG Limited and was a wholly-owned subsidiary within the Origin Group. In September 2008, Origin announced that it had selected ConocoPhillips to invest in the joint development of a CSG to LNG project using Origin's CSG reserves and resources in Queensland and ConocoPhillips' Optimized Cascade® Process technology.

With the largest portfolio of independently certified CSG reserves and resources in Australia, comprising 7,265 petajoules (PJ) of 2P[1] reserves, 12,627PJ of 3P reserves and 13,073PJ of contingent resources (independently certified by Netherland, Sewell & Associates Inc as of 30 June 2009), Australia Pacific LNG expects that its CSG interests will be adequate to deliver the Project over its development life.

The joint venture arrangement sees Origin responsible for the construction and management of the gas fields and associated infrastructure, and the gas pipeline to the LNG facility on behalf of Australia Pacific LNG. ConocoPhillips will be responsible for the construction and management of the LNG facility on behalf of Australia Pacific LNG.

[1] 2P is proved plus probable gas reserves; 3P is proved plus probable plus possible gas reserves



© Commonwealth of Australia (Geoscience Australia) 2010. © The State of Queensland (Department of Natural Resources and Water) 2010. © WorleyParsons Services Pty Ltd Users of the information recorded in this document (the Information) accept all responsibility and risk associated with the use of the Information and should seek independent professional advice in relation to dealings with property. Despite Department of Natural Resources and Water (NRW)'s best efforts, NRW makes no representations or warranties in relation to the Information, and, to the extent permitted by law, exclude or limit all warranties relating to correctness, accuracy, reliability, completeness or currency and all liability for any direct, indirect and consequential costs, losses, damages and expenses incurred in any way (including but not limited to that arising from negligence) in connection with any use of or reliance on the Information.

1.2.1 Origin Energy

Origin is the largest integrated energy company operating across Australia and New Zealand. Listed in the ASX top 20, the company has more than 4,000 employees. Origin is a leading producer of gas in eastern Australia, the largest owner and developer of gas-fired electricity generation in Australia and a leading wholesaler and retailer of energy. The company services more than three and a half million electricity, natural gas and liquefied petroleum gas customers across Australia, New Zealand and the Pacific.

Origin has a strong focus on ensuring the sustainability of its operations. Origin is the largest green energy retailer in Australia with more than to 500,000 green energy accounts. The company also has significant investments in renewable energy, including geothermal, wind and solar technologies.

Origin has been a leading developer of coal seam gas in Australia. The company acquired its first CSG interest over 13 years ago making Origin arguably the most experienced CSG producer in Australia. On behalf of Australia Pacific LNG, Origin operates the Spring Gully and Peat CSG fields in the Bowen Basin, and the Talinga CSG field in the Surat Basin. Origin also undertakes exploration on behalf of Australia Pacific LNG in the Bowen Basin, the Surat Basin (covering the Walloon Coal Measures) and the Gallilee Basin. Origin also owns and operates some CSG exploration acreage in the Surat Basin in its own right.

The company has a significant position in Queensland having already invested around A$5 billion in power generation, gas exploration and production and energy retailing. Origin currently retails natural gas, electricity and liquefied petroleum gas to more than one million customers in Queensland alone.

In addition to its interests in CSG, Origin has an extensive conventional gas exploration and production portfolio which includes acreage in the Otway, Bass, Cooper/Eromanga, Surat, Bowen, Perth and Bonaparte basins in Australia, the Taranaki, Northland and Canterbury basins of New Zealand, and various interests in South East Asia and Kenya.

As well as operating a number of onshore exploration and production areas, Origin has three major offshore developments being the BassGas development in the Bass Basin, the Otway Gas Project in the Otway Basin and the Kupe development in the Taranaki Basin, New Zealand.

Origin operates six power stations in Australia and has interests in a portfolio of co-generation plants which supply electricity and steam under long-term contracts. Origin is continuing to develop additional power plants that will see its total capacity increase to 2,800 megawatts (MW) by late 2010.

Environmental management

Origin operates under an established health, safety and environment (HSE) management system to minimise and manage the impacts on employees, contractors, the environment and the communities in which the company operates. The HSE management system has been developed in accordance with Australian/New Zealand Standard ISO 14001 Environmental Management Systems.

The framework for the HSE management system is based on the continual improvement methodology of 'commit-plan-do-check and review.' The elements of the continual improvement loop are executed through a set of standards which interpret, support and provide further details to the requirements of the HSE policy (Figure 1.2).

Origin strives towards an environmentally, socially and culturally acceptable business. Origin seeks to advance sustainable practices as a function of company purpose:

> *We will be the leading, most trusted and admired energy provider in Australia and New Zealand. We will find opportunities across the energy supply chain. We will create more value through realising the benefits of integration. We will be at the forefront of sustainable practices, contributing to a positive future for our customers, our communities, our investors and ourselves. Together we can make a difference.* ™

Origin's commitments, principles, values and objectives seek to advance this purpose. Origin expresses its commitments to key stakeholders as embracing the delivery of market leading performance across the energy supply chain, delivering value to customers, creating and maintaining a rewarding workplace and respecting the rights and interests of the communities in which it operates, being attentive to environmental and social impacts.

Origin's commitment, progress and leadership in sustainability were recognised when it received the Ethical Investor Magazine's 'Sustainable Company of the Year' award for 2007. Specifically, the success of Origin's commitment to the environment in CSG has been demonstrated publicly through Origin being awarded the Australian Petroleum Production & Exploration Association Environmental Award in 2007, for the design and implementation of a reverse osmosis associated water treatment facility at its Spring Gully Development. This project was also nominated as a finalist in the Queensland Environment Protection Agency's Sustainability Awards in 2008. Annually, Origin reports against the environmental performance of all operations and activities through sustainability and annual reporting (available at www.originenergy.com.au).

Australia Pacific LNG (formerly Origin Energy CSG Limited) and its subsidiaries hold the tenures for the relevant gas fields and in the past five years have not been fined or prosecuted for breaches of environmental legislative requirements.

origin

Policy

Health, Safety & Environment

At Origin Energy, we value the wellbeing of our employees, contractors, customers, the communities in which we operate and the environment. We are committed to responsible management practices that minimise any adverse health, safety or environmental impacts arising from our activities, products or services.

We have in place a Health, Safety and Environmental management system for all our activities that drives continual improvement. The HSE Management System outlines HSE accountabilities to implement this Policy and requires that we:

- Identify and manage risks to as low as reasonably practicable where they have the potential to cause an accident, injury or illness to people, or unacceptable impacts on the environment or the community;
- Provide safe work places and systems of work, empower employees and contractors to address unsafe or hazardous situations and carry out their work in a manner that does not present a risk to themselves, others or the environment;
- Support the recovery and rehabilitation of employees in the event of work related injury or illness;
- Set objectives and targets which promote the efficient use of energy and resources, the minimisation of wastes and emissions and the prevention of pollution;
- Ensure compliance with relevant HSE legal requirements and other commitments;
- Require Contractors to manage HSE using standards and practices that accord with this Policy;
- Regularly review and report HSE performance.

In implementing this Policy we will engage with our employees, contractors, suppliers, business partners, customers and Government and communicate expectations to all persons working with or on behalf of Origin Energy.

Accountabilities

The Board is responsible for establishing and overviewing the Company's commitment to manage HSE in accordance with this Policy and for monitoring the performance of the Company with respect to its implementation.

The Managing Director is responsible for the implementation of the HSE Management System to ensure the commitments made in this Policy are being met.

Grant King
Managing Director
September 2007

Review Date: September 2009

Health Safety and Environment
HSE ms
Management System

1.2.2 ConocoPhillips

ConocoPhillips is an international, integrated energy company. As of 30 September 2009, ConocoPhillips was:

- The third-largest integrated energy company in the United States based on market capitalisation, oil and natural gas reserves, and production. ConocoPhillips' current net production is 2.2 million barrels of oil equivalent (BOE) per day from an assets base valued at $152 billion dollars US
- The fourth-largest refiner in the world
- The seventh-largest worldwide reserves holder of non government-controlled companies with 10 billion BOE of reserves.

ConocoPhillips is known worldwide for its technological expertise in:

- Exploration and production
- Reservoir management and exploitation
- 3-D seismic technology
- High-grade petroleum coke
- E-Gas™ coal gasification process
- Optimized Cascade® Process to produce liquefied natural gas.

More than 30,000 ConocoPhillips employees work worldwide to consistently deliver top performance and value and to maintain the company's global market position. Employees' individual talents and strengths combine to create a diverse and resilient workforce within ConocoPhillips.

With operations in more than 30 countries, ConocoPhillips is committed to contributing to social, economic and environmental improvements in all the communities in which it operates. The company is currently funding numerous environmental, social, health and education programs around the world.

ConocoPhillips is determined to meet the highest legal and ethical standards, and to practice sound environmental stewardship and good corporate citizenship. The company believes in sustainable development, which it defines as operating in a manner that promotes ongoing economic growth, a healthy environment, and vibrant communities.

ConocoPhillips strives to improve the well-being of the communities in which it operates by making contributions that help support vital community services. During 2008, ConocoPhillips' philanthropic investments totalled US$70 million for education and youth services, health and social services, civic and arts initiatives, environmental and industrial safety programs, and emergency relief.

ConocoPhillips is working to produce hydrocarbon products in ever-cleaner forms while ensuring the long-term viability of energy production. A key component to achieve this is the investment in active research and development programs associated with traditional oil and gas, biofuels, non-fossil fuel alternatives and renewable energy.

ConocoPhillips Australasia, a subsidiary of ConocoPhillips, is an oil and gas exploration and production company, with assets and exploration activities in the Timor Sea, Northern Territory, Western Australia and Timor-Leste. Its major producing assets are the Bayu-Undan gas condensate field in the Timor Sea, the Darwin LNG facility in the Northern Territory and the 500km sub-sea

pipeline linking the two facilities. The Darwin LNG facility (Figure 1.3) is one of nine facilities developed worldwide using ConocoPhillips' Optimized Cascade® Process technology. It is the most recent LNG facility developed in Australia, and uses the same technology as is proposed for the Australia Pacific LNG Project. The Darwin LNG facility was successfully delivered on time and on budget.

ConocoPhillips has net daily production in excess of 2.2 million BOE per day, 50 billion BOE of existing resources and over 11 billion BOE of net proven reserves. Gross production and reserves for ConocoPhillips are much larger than these net numbers (multiples). Approximately 57% of its production was in North America and 43% was in other countries. ConocoPhillips has more than 25 years experience developing and producing coal seam gas and is one of the largest CSG producers in North America with assets in several CSG basins including a dominant position in the prolific San Juan Basin.

Figure 1.3 ConocoPhillips operated Darwin LNG facility

ConocoPhillips is committed to being a global leader in LNG. Spanning more than five decades of LNG innovation, ConocoPhillips has reliably developed key advances, from building the first LNG carrier for international trade to building one of the first successful commercial liquefaction facilities.

ConocoPhillips LNG technology and project management experience began over 40 years ago when it established the first Optimized Cascade® LNG facility in Kenai, Alaska with sales of LNG to Japan. This facility remains an industry model for safety, efficiency and reliability.

ConocoPhillips is the world's leading developer and operator of LNG projects using lean (low energy content) gas similar to CSG. Today, ConocoPhillips successfully operates facilities in Kenai, Alaska and Darwin, Australia, and has licensed its proprietary LNG liquefaction process to operators on three continents. Figure 1.4 shows many of these operating and licensed facilities. ConocoPhillips has maintained the same excellent safety and environmental record at the Darwin LNG facility, as experienced in Alaska since the 1960s.

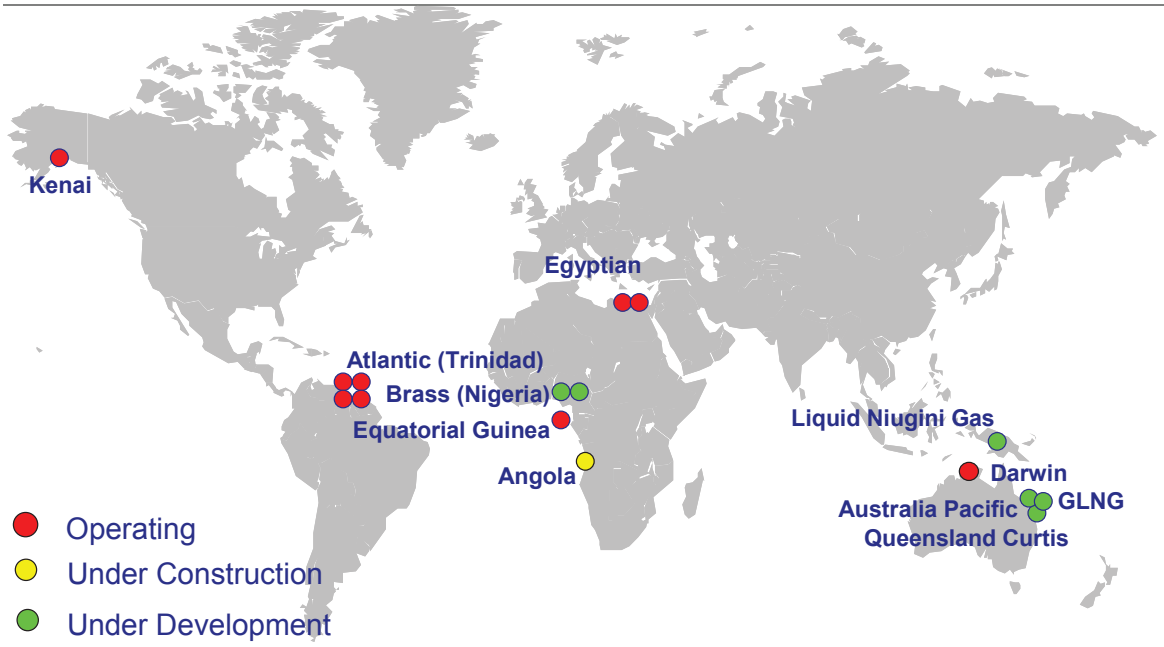


Figure 1.4 ConocoPhillips licensed LNG facilities

ConocoPhillips is also a full-service energy marketer with global expertise in all aspects of marketing including fuels procurement, transportation, storage and risk management. The company as a major marketer has established long-term LNG relationships throughout the world and provides secure markets for LNG. ConocoPhillips continues to expand its global marketing efforts by providing diverse market outlets for existing LNG production from the US (Alaska) and Australia with future LNG production from new projects in Qatar, Australia and Nigeria.

Environmental management

ConocoPhillips operates under an existing and comprehensive HSE policy (refer to Figure 1.5) which governs the company's efforts to improve health and safety performance as well as environmental stewardship. The HSE management system provides a structured approach to identify, assess and manage the risk associated with its business activities. ConocoPhillips was recognised by the Northern Territory Minerals Council Resource Awards of Excellence, in the category of Environmental Management for the Darwin LNG facility in 2007. This was awarded as a result of the following:

- Minimisation of greenhouse gas emissions
- Wickham Point management of heritage values and terrestrial vegetation including mapping
- Darwin harbour conservation values.

In 2006, ConocoPhillips signed an agreement with the Northern Territory Government, Northern Land Council and Indigenous landowners to establish the West Arnhem Fire Management Agreement. The agreement has reduced greenhouse gas emissions (approximately 180,000 tonnes of carbon dioxide equivalent per year (CO_2-e/year)) through the control of grass fires lit by indigenous landowners. As a result, the agreement has won the Insurance Australia Group Eureka Prize for Innovative Solutions to Climate Change in 2007.

ConocoPhillips' operations in Australia and Timor-Leste (ConocoPhillips Australasia) commenced in 2004 and, through construction and steady-state operations, ConocoPhillips Australasia has not been fined or prosecuted for breaches of any environmental legislative requirements.

ConocoPhillips

Health, Safety and Environment Policy

Our Commitment …

ConocoPhillips is committed to protecting the health and safety of everybody who plays a part in our operations, lives in the communities in which we operate or uses our products. Wherever we operate, we will conduct our business with respect and care for both the local and global environment and systematically manage risks to drive sustainable business growth. We will not be satisfied until we succeed in eliminating all injuries, occupational illnesses, unsafe practices and incidents of environmental harm from our activities.

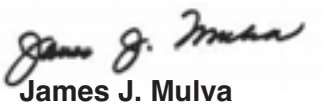
Our Plan …

To meet our commitment, ConocoPhillips will:

- Demonstrate visible and active leadership that engages employees and service providers and manage health, safety and environmental (HSE) performance as a line responsibility with clear authorities and accountabilities.
- Ensure that all employees and contractors understand that working safely is a condition of employment, and that they are each responsible for their own safety and the safety of those around them.
- Manage all projects, products and processes through their life-cycles in a way that protects safety and health and minimizes impacts on the environment.
- Provide employees with the capabilities, knowledge and resources necessary to instill personal ownership and motivation to achieve HSE excellence.
- Provide relevant safety and health information to contractors and require them to provide proper training for the safe, environmentally sound performance of their work.
- Measure, audit and publicly report HSE performance and maintain open dialogue with stakeholder groups and with communities where we operate.
- Work with both governments and stakeholders where we operate to develop regulations and standards that improve the safety and health of people and the environment.
- Maintain a secure work environment to protect ourselves, our contractors and the company's assets from risks of injury, property loss or damage resulting from hostile acts.
- Communicate our commitment to this policy to our subsidiaries, affiliates, contractors and governments worldwide and seek their support.

Our Expectations …

Through implementation of this policy, ConocoPhillips seeks to earn the public's trust and to be recognized as the leader in HSE performance.



James J. Mulva
Chairman and Chief Executive Officer
ConocoPhillips

John Carrig
President and Chief Operating Officer
ConocoPhillips

1.3 Project description

Australia Pacific LNG proposes to develop a world scale long-term CSG to LNG project in Queensland (refer to Figure 1.1). The 30 year Project has the following objectives:

- Development of the Walloons gas fields in the Surat Basin in south central Queensland with up to 10,000 CSG wells
- Construction and operation of a 450km main gas pipeline to connect the Walloons gas fields with the LNG facility near Laird Point
- Construction and operation of an LNG facility near Laird Point on Curtis Island near Gladstone for production and export of approximately 18Mtpa of LNG.

Australia Pacific LNG is seeking full development approval for the above elements through this environmental impact study (EIS) process.

Gas fields

The Walloons gas fields cover an area of approximately 570,000ha within petroleum tenures held by Australia Pacific LNG. The gas fields are located within the local government boundaries of the Maranoa, Western Downs and Toowoomba Regional Councils. The gas fields will be progressively developed over a 30 year timeframe and will ultimately require the following infrastructure:

- Up to 10,000 wells
- Underground gas and water gathering networks
- Water transfer stations
- Gas processing facilities
- Water treatment facilities
- Brine ponds
- Underground high pressure gas pipelines
- Warehouses and administration buildings.

Associated infrastructure includes: access roads, telecommunications, sewage infrastructure and temporary and permanent accommodation facilities.

A detailed description of the gas fields is provided in Volume 2 Chapter 3.

Gas pipeline

An approximately 450km long gas pipeline is required to transport dehydrated and compressed CSG from the Walloons gas fields to the LNG facility on Curtis Island. The gas pipeline will consist of the following:

- A 44km lateral connecting the Condabri development with the main gas pipeline
- A 38km lateral connecting the Woleebee development with the main gas pipeline
- A 362km main gas pipeline from the junction with the laterals east of Wandoan to Curtis Island in the north, including the marine crossing of The Narrows at Port Curtis.

The gas pipeline has been designed to meet the approximate 18Mtpa capacity of the LNG plant and will comply with applicable Australian and industry standards including AS2885 – Pipelines – Gas and liquid petroleum. Construction will take approximately 18 months.

The gas pipeline will also require the following above ground facilities:

- Mainline valves
- Launchers and receivers
- Isolation valves
- Meter stations
- Scraper stations.

A detailed description of the gas pipeline is provided in Volume 3 Chapter 3.

LNG facility

The LNG facility will involve construction and operation of the following major components:

- An inlet feed gas metering facility (including filtration, pre-heating and metering)
- An LNG plant which comprises:
  - Gas processing facilities to remove impurities and refrigerate the CSG
  - Product storage tanks
  - Plant infrastructure and utilities
- A materials off-loading facility ,which will also serve as a ferry terminal, for the transfer of construction materials and heavy equipment to the Project site
- A jetty and loading berth(s) to transfer LNG product to tankers for shipping to market
- A temporary accommodation facility
- Mainland facilities.

Standard infrastructure services (power, water, telecommunications and sewage disposal) will also need to be established.

The LNG facility will be developed in stages to a maximum ultimate capacity of approximately 18Mtpa of LNG. The final configuration of the LNG plant is yet to be determined, but may comprise up to four trains, each producing approximately 4.5Mtpa of LNG. The LNG plant will utilise ConocoPhillips' proprietary Optimized Cascade® Process technology which is a proven and reliable technology well-suited to a CSG application. This technology has also been proposed by other potential CSG to LNG projects in the region.

LNG trains range in size, from approximately 1.5Mtpa to over 7Mtpa. While larger train sizes usually relate to increased capital cost efficiency, the train size also needs to take into account the availability of gas and the timeframe in which the gas will be made available. Conventional gas projects complete the construction, drilling and well completions and then typically ramp-up a very large train quickly, utilising almost a full-flow of gas available from the outset.

Unlike conventional gas sources, CSG requires a significant number of wells and once the wells are completed, they cannot be easily shut off and 'held' in a suspended mode until ready for full production

as with conventional gas production. The wells also need to be ramped-up slowly over a period of time and during this timeframe, gas production continues to increase to the maximum production rate. To make best use of this ramp-up period, the train is brought on-stream at a point which maximises the value of capital spent versus availability of gas. While the ultimate production for the LNG facility is planned to be approximately 18Mtpa, the optimum train sizes have been determined to be approximately 4.5Mtpa per train, making effective use of capital employed while minimising the ramp-up gas that is required.

ConocoPhillips, as operator of the LNG facility for Australia Pacific LNG, started with the design basis employed for the Darwin LNG facility, which ConocoPhillips operates. That design basis, combined with lower ambient conditions in Gladstone as compared to Darwin, along with design improvements in both the gas turbine configuration and in the liquefaction process that have occurred since the Darwin facility was built, have resulted in the 4.5Mtpa capacity for the train.

A detailed description of the LNG facility is provided in Volume 4 Chapter 3.

1.4 Project rationale

Governments world-wide are supporting the use of gas as a transitional fuel to meet energy needs as the world moves towards a carbon-constrained economy. Demand for gas is expected to rise in domestic and international markets. The Australian Bureau of Agricultural and Resource Economics (ABARE) has estimated the ultimate potential CSG resource in eastern Australia could be 250 trillion cubic feet, which is more than sufficient to meet domestic and international needs. The Australian Government's Energy White Paper seeks to deliver energy security to Australia whilst at the same time realising Australia's potential as a global energy producer in the 21st Century. Australia Pacific LNG, with its strong reserves position, is well-placed to respond to such policy platforms coupled with the growing demand for gas.

The Project will enable the creation of a world-scale export industry in Queensland, utilising Australia Pacific LNG's CSG resources. It will diversify the State's economic base and generate jobs and further investment in Queensland.

The demand for, and acceptance of, CSG as a significant and viable long-term resource in Australia has undergone a dramatic shift in recent years due to:

- The Queensland Gas Scheme, whereby the Queensland Government mandated that Queensland electricity retailers are required to source a percentage of their electricity from gas-fired generation
- The acceptance of gas as the key transitional fuel to a lower carbon intensity economy
- Growth in domestic demand for gas, particularly through the development of gas-fired power stations
- The scale and economic viability of the CSG resource becoming more apparent as ongoing drilling programs have demonstrated substantial increases in reserves and identified other resources, particularly in Queensland
- The success of Australian companies in the development of CSG resources has led to significant financial investments by major international energy companies including ConocoPhillips, Santos, PETRONAS, BG Group and Shell
- Rising global energy demand has opened up the potential for development of an LNG export industry from Queensland using CSG as the feedstock.

LNG is becoming a major export product for Australia with an export income estimated at A$9.9 billion in 2008 – 2009 (ABARE 2009). Australia has become an important world supplier for nations seeking secure energy supplies produced in a stable economic and political environment. Australia is forecast to increase LNG exports to 18.2 million tonnes in 2009 – 2010. However due to the economic downturn the value is predicted to drop to A$6.9 billion (ABARE 2009).

Demand is steadily growing because LNG is a safe, flexible, reliable, economic fuel source which produces less carbon emissions than alternative energy sources such as coal. In 2009, global demand for LNG is expected to remain constant at approximately 171 million tonnes due to a decrease in demand from northern Asia and an increased demand within the European Union (ABARE 2009). ABARE has forecast the LNG trade to increase to 181 million tonnes in 2010. The global demand for LNG is predicted to reach between 245 and 340Mtpa by 2015 (McLennan, Magasanik Associates 2009).

1.4.1 Actions already undertaken within the Project area

Australia Pacific LNG currently operates the Talinga gas processing facility and water treatment facility on the Talinga petroleum lease PL226 (refer to Figure 1.1). The Talinga development has been approved to produce up to 90 terajoules per day (TJ/d) under an Environmental Authority issued by the Queensland Department of Environment and Resource Management. Commissioning of the facilities has commenced and is expected to be completed by the end of 2010. A total of 56 wells (including pilot test wells) have been drilled (December 2009) and will be progressively brought on line as the plant is commissioned. Gas is transmitted via a high pressure gas pipeline which connects the Talinga field to the Wallumbilla gas hub and to the Darling Downs Power Station being commissioned by Origin at Braemar, near Dalby.

Exploration activities are currently being undertaken within all the Walloons gas fields permit areas (refer to Figure 1.1). Activities undertaken during 2009 included the drilling of 55 exploration and appraisal wells (including pilot test wells) and completion of two seismic surveys (Quinn Gully 2D and Pathfinder 2D seismic surveys).

1.4.2 Social and economic benefits and costs of the Project

Australia Pacific LNG's investment of some A$35 billion through to 2020 is expected to generate benefits at the regional, state and national level including:

- Increases to the national economy (Gross Domestic Product) by approximately $A1.3 billion annually, on average)
- Increases to the Queensland economy (Gross State Product) by an expected A$2.0 billion annually
- Higher national employment during the construction stage of the Project by an average of approximately 9,900 jobs (directly and indirectly). Specifically, this will include the creation of around 7,600 jobs (directly and indirectly) in the Queensland economy
- Higher employment in Queensland by an estimated average of 9,000 jobs (directly and indirectly) during operations of the Project, with 5,000 of those jobs in the mining and gas industry
- Opportunities to increase local skills capacity via apprenticeships, scholarships and vocational training and training programs.

There is a potential for negative social and economic impacts associated with the Project, and the cumulative impact of multiple projects in the region. These impacts could include:

- Rises in wages and input costs for businesses, including commercial and industrial property prices and rents
- Skills shortages in critical occupations
- Diversion of land, labour and/or capital from other businesses and industries, which may require structural adjustment policies
- Pressures on local infrastructure, including roads, airports, health and community services, child and educational facilities, police and emergency services, Gladstone port infrastructure and utilities facilities (water, electricity, gas)
- Potential higher housing and rent prices. The housing market in the gas fields region and Gladstone could experience an increase. In the gas fields region, this will depend on whether the operational workforce chooses to move out of the temporary accommodation facilities and reside locally. The gas pipeline is expected to have minimal impact on property values at the project level.

Comprehensive social and economic assessments have been completed for all three elements of the Project and are provided in Volume 2 Chapters 20 and 21, Volume 3 Chapters 20 and 21, and Volume 4 Chapters 20 and 21.

1.4.3 Contribution of the Project to climate change solutions

Globally, LNG demand is largely driven by demand for power generation. Emissions from power generation are a significant proportion (25.9%) of global greenhouse gas emissions, and reducing the greenhouse gas emissions intensity of this sector will be critical to addressing climate change risks (Intergovernmental Panel on Climate Change 2007).

The International Energy Agency has developed the '450 Scenario'. This analyses measures in the energy sector which might be taken to fulfil a co-ordinated global commitment to ultimately stabilise the concentration of greenhouse gas emissions in the atmosphere at 450ppm CO_2 –equivalent[2]. The International Energy Agency's projections of world power generation to achieve the '450 Scenario' is provided in

Figure 1.6. It highlights that, although a significant increase in renewable energy is required, an increase of over 400 gigawatts (GW) in gas fired electricity generation, without carbon capture and storage, is also required to meet the targeted scenario (International Energy Agency 2009).

[2] This level of concentration is expected to give rise to a global temperature increase of 2°C

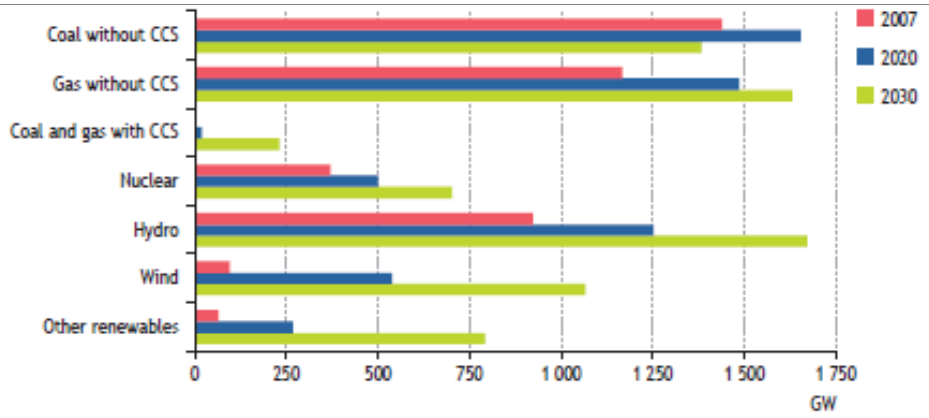


Figure 1.6 World power generation capacity in the '450 Scenario'

The Project's LNG output of 18Mtpa will be sufficient to supply approximately 16GW of capacity[3]. Using LNG to generate electricity instead of cleaner coal power generation will avoid 35 Mt CO_2-e/year.[4] This is approximately 6% of Australia's GHG emissions (based on 2007 emissions[5]), and is discussed in Volume 2 Chapter 14, Volume 3 Chapter 14, and Volume 4 Chapter 14.

1.5 Project timeframe

The Project is expected to commence construction of the gas fields, the gas pipeline and LNG facility in 2011, following the final investment decision in late 2010. It will be developed in stages to meet the required demand for LNG.

The first LNG export from train 1 will occur in late 2014 with 100% capacity reached by early 2015. First export of train 2 is expected by mid 2015 with 100% capacity reached by late 2015. The timing for trains 3 and 4 will depend on the LNG market and the gas development program. It is estimated that construction of train 3 will commence after 2015 and train 4 would commence approximately nine months after the commencement of train 3.

The anticipated development sequence of the gas fields will initially focus on the Talinga/Condabri and Combabula fields. The timing and ultimate sequencing will depend on the optimisation of the gas field development.

The Project life is approximately 30 years.

1.6 Relationship to other projects

The Australia Pacific LNG Project is one of eight proposed LNG projects announced within Queensland which could ultimately produce 59Mtpa of LNG (Department of Employment, Economic Development and Innovation 2009). These LNG projects and other relevant publically-announced projects may have interdependencies with the Australia Pacific LNG Project attributable to geographic overlap, co-location and/or competition of resources. These projects and the potential cumulative impacts are discussed in detail in Volume 1 Chapter 5.

3 Using combined cycle gas turbine (CCGT) generation at an efficiency of 51% and a capacity factor of 0.95

4 LNG-CCGT comparison with coal-fired ultra super-critical utilising GHG emission intensities specified within Volume 2 Chapter 14, Volume 3 Chapter 14 and Volume 4 Chapter 14

5 Based on annual emissions in Australia of 597 Mt CO2-e in 2007

The relationship between key elements of the Australia Pacific LNG Project and other existing or proposed internal or external developments is detailed in the sections below.

Gas fields

The gas required for the Project will be sourced from the expansion of the Walloons gas fields as detailed in Section 1.3. It is currently estimated that a maximum of 11.5Mtpa will be sourced from these fields with the remaining gas to be sourced from Australia Pacific LNG's existing operational sites, non-operated equity areas and exploration areas. These gas fields may include Spring Gully, Peat, Denison, Fairview, Arcadia Ridge, Kenya, Kenya East and Angry Jungle (refer to Figure 1.1). The activities conducted in these tenements are approved under current environmental authorities and are outside the scope of this environmental impact statement (EIS).

The Darling Downs Power Station (DDPS) is an Origin owned gas-fired power station in the Darling Downs region, west of Dalby. It is anticipated to reach full commercial operation in the first half of 2010. Ramp-up gas, which is gas produced prior to the commissioning and operation of the LNG facility, will be directed to the DDPS and the Wallumbilla gas hub for use in the domestic market.

High pressure gas pipelines will be built from the Walloons gas fields and will connect to the existing Wallumbilla to DDPS pipeline. The DDPS pipeline and power station are approved and operating under existing environmental authorities and are therefore excluded from the EIS. The high pressure gas pipelines from the gas fields to the DDPS pipeline and the Wallumbilla gas hub is proposed as part of this EIS and detailed in Volume 2 Chapter 3.

Gas pipeline

There are currently eight LNG projects that have approvals, are seeking approvals or may seek approvals through the *State Development Public Works Organisation Act 1971* (SDPWO Act) and the *Environmental Protection Act 1994* (Department of Employment, Economic Development and Innovation 2009). As a result, the Queensland Government has identified the need for a common infrastructure corridor from Callide to the western boundary of the Gladstone State Development Area (GSDA) to reduce the environmental and social impacts from the construction and operation of multiple gas pipelines to Gladstone. On 1 October 2009, the Callide Infrastructure Corridor was declared a State Development Area. This will enable the Queensland Government to facilitate and manage the development of the co-located pipelines.

The GSDA was declared in December 1993 and subsequently amended in July 2008 to include the Curtis Island Industry Precinct to assist with the establishment of LNG facilities on the west coast of Curtis Island and includes an infrastructure corridor.

Australia Pacific LNG will work with the Queensland Government and other LNG proponents to provide input into the finalisation of these infrastructure corridors, and the associated development planning and pipeline design, to ensure that its high pressure gas pipeline is constructed and operated in a safe and socially and environmentally acceptable manner.

LNG facility

The establishment of the LNG facility will require the construction of wharf and jetty structures to enable the loading of the LNG vessels. Construction will also involve a materials off-loading facility to enable the transfer of personnel, building materials and heavy equipment to the Project site for construction and operation.

Major dredging is required for shipping access to the LNG facilities in Port Curtis, including the access channels, ship berths and the materials off-loading facility approach channel for the Australia Pacific LNG Project. This will be undertaken by the Gladstone Ports Corporation as part of the Western Basin Dredging and Disposal Project to enable access for multiple port users, including the LNG facilities.

The Gladstone Ports Corporation is currently in the process of gaining the necessary environmental approvals to undertake these works. The EIS for this dredging and disposal project examines the environmental effects that may arise from the major dredging required to service the needs of the Australia Pacific LNG Project.

Two options for ship access to the proposed Australian Pacific LNG Project's marine infrastructure (referred to as Option 1b and Option 2a) are included in the Western Basin Dredging and Disposal Project EIS. Option 2a co-locates Australia Pacific LNG's berths along the same shipping channel that is used to access berths for the proposed Gladstone LNG and Queensland Curtis LNG projects.

1.7 Alternatives to the Project

This section details the alternatives to the Project; no project, alternative uses of CSG and alternative energy sources. Alternatives for Project infrastructure and ancillary infrastructure, including location, design, layout and technology alternatives are provided in detail in Volume 2 Chapter 3, Volume 3 Chapter 3 and Volume 4 Chapter 3 for the gas fields, gas pipeline and LNG facility respectively.

1.7.1 No project

The benefits that will result from the Project include:

- An investment of A$35 billion through to 2020
- An annual increase of approximately A$1.3 billion in Gross Domestic Product
- An annual increase of approximately A$2 billion to Queensland's Gross State Product
- The creation of approximately 9,900 jobs and specifically 7,600 jobs in Queensland during the construction phase
- Opportunities to increase local skills capacity via apprenticeships, scholarships and vocational training and training programs.
- The creation of a new export industry for Queensland
- The commercialisation of Australia Pacific LNG's gas reserves – the largest portfolio of independently certified CSG reserves and resources in Australia
- The diversification of state and local economies
- Greenhouse gas emissions avoidance
- Generation of extra royalties and tax revenue.

If the Project does not proceed, these benefits will be lost to the disadvantage of Queensland, Australia and the Project proponent. The Queensland Government's Blueprint for the LNG Industry is aimed at facilitating projects, such as the Australia Pacific LNG Project. Not proceeding with the Project would be inconsistent with that policy. Additionally, the Australian Government's Energy White Paper seeks to deliver energy security to Australia whilst realising the nation's potential as a global energy producer in the 21st Century. Not proceeding with the Project would inhibit that objective. If the Project did not proceed, Australia Pacific LNG would continue to develop its CSG resources in

Queensland for alternative uses, such as electricity generation and domestic gas supply. However, that development would be likely to be on a smaller and more localised scale.

1.7.2 Alternative uses of CSG

Australia Pacific LNG already produces CSG for the domestic market and will continue to meet contractual obligations. However, the amount of CSG development required for the domestic market will be significantly less than the volumes required for LNG. Resource development would also be slower than that required for the Project. The three main available non-export LNG alternative uses to which Australia Pacific LNG's CSG may be directed if the Project does not proceed are:

- Power generation – there is already a market in Australia for CSG as a fuel for power generation. The amount of CSG required for this use depends on the number of new gas-fired power generating units that are developed in East Coast Australia, and in particular, in Queensland. The construction of new power generating units depends on a number of market variables including the prevailing regulatory environment, fuel price, electricity price, customer demand and local infrastructure.
- Industrial customers – there is already a market in Australia for CSG as a feedstock (for example to make fertiliser) and fuel used by large industrial customers. The amount of CSG required for this use depends on the market conditions experienced by individual industrial businesses and other variables including infrastructure and customer location. In Queensland, these customers are concentrated in and around major industrial centres such as Mt Isa, Townsville, Gladstone and Brisbane.
- Household and small business customers – there is already a market in Australia for CSG as a fuel for household and small business use. Likely future markets for CSG for this use are in large population centres with extensive pipeline networks and cool winters, such as Melbourne, Sydney and Adelaide.

Another available alternative use to which Australia Pacific LNG's CSG may be directed if the Project does not proceed is to sell it to another Queensland-based LNG export project.

If the Project does not proceed, Australia Pacific LNG will assess the markets for each of these alternative uses for CSG. The market conditions at the time will determine the extent and timing of Australia Pacific LNG's proposed development of CSG to meet these alternative uses.

1.7.3 Alternative gas sources

If the Project does not proceed, alternative gas sources that could be used to supply LNG customers will depend on the unique context of each potential LNG customer. LNG could be supplied from other projects such as those in Qatar, Papua New Guinea, north-west Australia or Queensland.

1.8 Co-location opportunities

Co-location of infrastructure reduces the environmental impact, reduces the impact on landholders and maximises the use of resources. A number of opportunities for the co-location of infrastructure have been identified for the gas fields, gas pipeline and LNG facility.

Gas fields

A gas network and water network will be required throughout the gas fields to transport gas and associated water. The gas and water gathering network will be constructed both within and outside the

gas field tenements. Where practicable, the full length of the gas network is proposed to be co-located with the water network which will reduce the overall disturbance footprint substantially and reduce the impacts on landholders. Where practicable, the pipelines will be constructed simultaneously within the same right of way, which will allow efficient use of resources including materials and workforce.

There are several existing high pressure gas pipelines within the Project area extending from Wallumbilla, located south of the Walloons gas fields, to the DDPS west of Dalby, and from Wallumbilla to the existing Spring Gully gas plant (refer to Figure 1.1). The high pressure gas pipelines proposed for the Project will be co-located with these pipelines in several regions. This will reduce the overall disturbance footprint and reduce the impact on landholders.

Each well will require connection to the gas and water gathering network to transport gas and water to the gas processing and water treatment facilities, as applicable. Where possible, the gas and water pipelines will be co-located and installed next to existing infrastructure such as access roads, fences and other utilities. This will maximise the use of resources, reduce the overall disturbance footprint and reduce the impacts to landholders.

Further co-location opportunities will be assessed and maximised during the detailed design of the gas fields.

Gas pipeline

The main gas transmission pipeline is approximately 450km long extending from the gas fields near Miles to the LNG facility on Curtis Island near Gladstone. There are several sections of the pipeline that will be co-located with other high pressure gas pipelines (both proposed and existing) and roads, which will reduce the overall disturbance footprint and impacts to landholders. Detailed information on the pipeline co-location opportunities is provided in Volume 3 Chapter 3.

LNG facility

Australia Pacific LNG has been in discussions with other LNG proponents over the last year regarding co-location opportunities through the LNG Industry Group within the Department of Infrastructure and Planning and the Department of Employment, Economic Development and Innovation (DEEDI). Potential opportunities exist to co-locate facilities such as ferry terminals and car parks to minimise environmental and social impacts on the mainland. The LNG Industry Group within DEEDI provides a forum for these discussions to continue to identify areas where LNG proponents can work collaboratively and co-locate infrastructure as the respective projects develop.

Components of the LNG facility that are currently being pursued in a collaborative effort include dredging the Western Basin, developing safe LNG shipping protocols and LNG shipping manoeuvrability simulations. These efforts will continue throughout the further development of the LNG projects.

Australia Pacific LNG is continuing consultation with Gladstone Ports Corporation on the dredging requirements for the Project and is collaborating with them, along with Maritime Safety Queensland and other LNG project proponents, to establish shipping protocols for the Gladstone Port.

1.9 The environmental impact assessment process

1.9.1 Methodology of the EIS

On 9 April 2009, The Queensland Coordinator-General declared the Australia Pacific LNG Project to be a 'significant project for which an EIS is required' under the SDPWO Act. The EIS process under this Act is summarised in and includes the relationship to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and other relevant approvals processes.

The EPBC Act is applicable to actions that are likely to have a significant impact on matters of national environmental significance (MNES). In accordance with Chapter 4 of the Act, Australia Pacific LNG has submitted three EPBC Act referrals on 2 July 2009 to the Australian Government Environment Minister. On 3 August 2009, the Minister determined that the Project constitutes a 'controlled action' due to the potential impact on MNES. The controlling provisions for the three referrals are as follows:

- Gas fields – referral no. 2009/4974
  - Wetlands (Ramsar) (sections 16 and 17B)
  - Listed threatened species and communities (sections 18 and 18A)
  - Listed migratory species (sections 20 and 20A)
- Gas pipeline – referral no. 2009/4976
  - World Heritage properties (sections 12 and 15A)
  - National Heritage places (sections 15B and 15C)
  - Listed threatened species and communities (sections 18 and 18A)
  - Listed migratory species (sections 20 and 20A)
- LNG facility and ancillary facilities– referral no. 2009/4977
  - World Heritage properties (sections 12 and 15A)
  - National Heritage places (sections 15B and 15C)
  - Listed threatened species and communities (sections 18 and 18A)
  - Listed migratory species (sections 20 and 20A).

As a result, the Project will require formal assessment and approval under the EPBC Act. The Australian Government has a bilateral agreement in place with the Queensland Government which accredits the environmental assessment process under the SDPWO Act. This allows a single assessment process to occur, to meet the requirements of both jurisdictions.

The EIS process is shown in Figure 1.7, and is managed by the Queensland Department of Infrastructure and Planning on behalf of the Coordinator-General. Under the provisions of part 4 of the SDPWO Act, the Coordinator-General is responsible for the following:

- Preparation and release of draft terms of reference (TOR) for the EIS for public comment
- Finalising the TOR based on submissions received during the comment period
- Approving release of the EIS for public comment

- Evaluating the EIS, all submissions, a supplementary report to the EIS (if directed by the Coordinator-General), advice from relevant government agencies and other key organisations and any other information considered relevant to the Project
- Preparation of the Coordinator-General's report on the evaluation of the EIS and a determination on whether the project can proceed or not, and if any conditions must attach to specific development approvals for the project.

There are two opportunities for stakeholders to provide formal input into the EIS process; during public reviews of both the draft TOR and the EIS. Further details on input and participation in the EIS process are provided in Sections 1.11 of Volume 2 Chapter 2, Volume 3 Chapter 2 and Volume 4 Chapter 2.

Following the completion of the EIS process, the Australian Government Environment Minister will assess the EIS as it applies to MNES and determine whether to approve or reject the controlled actions. The Minister may state conditions of approval under the EPBC Act.

Subsequent to the approval under the SDPWO Act, Australia Pacific LNG will be required to make a series of component-specific development applications to relevant Queensland Government agencies. The assessment of such applications is informed by the findings of the Coordinator-General's report.

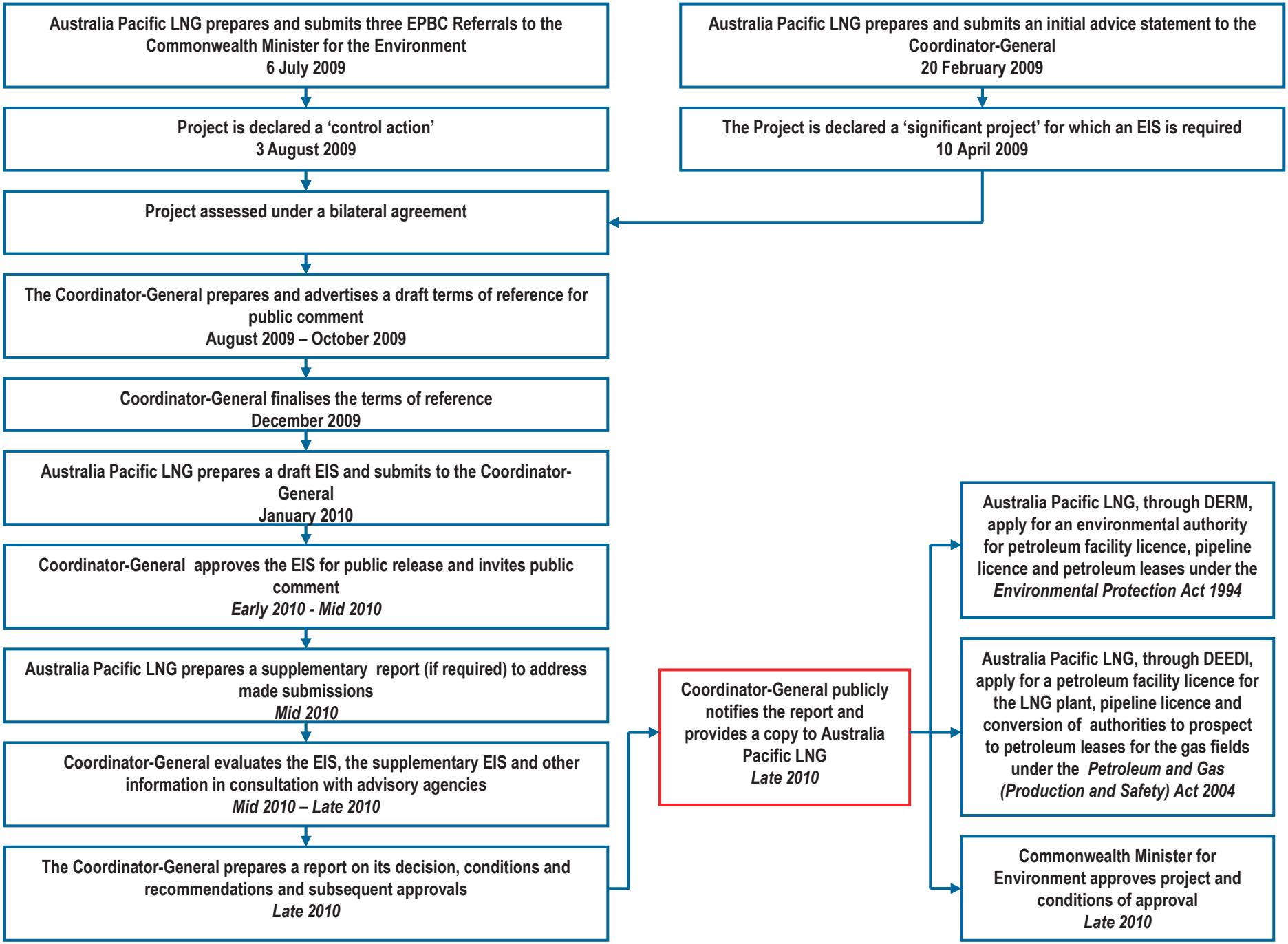


Figure 1.7 EIS process

1.10 Objectives of the EIS

This EIS has been prepared to identify and assess the potential environmental, social and economic impacts and benefits of the Project, including direct, indirect and cumulative impacts and benefits. Mitigation and management strategies have been proposed where possible to minimise and avoid adverse impacts.

The objective of the EIS is to provide information for the following stakeholders:

- Communities where the Project will be located, including landholders and Native Title groups – to provide information on the potential effects of the Project on their land, including any access arrangements
- The general public and interested bodies – to provide an understanding of the Project, alternatives, existing environmental values, potential impacts as a result of the Project and proposed mitigation measures
- Government agencies and referral bodies – to provide a framework to assess whether the Project should proceed and any conditions of approval, should it be given
- The proponent – to provide an understanding of the potential impacts, and measures to mitigate the adverse effects, of the Project.

The structure of the EIS has been established to meet the objective. For each environmental/social aspect, the relevant section of the EIS provides the following information:

- The purpose and scope of the study undertaken
- The applicable legislative framework for the particular proposed project activities
- Methodology of assessment
- The existing environmental values that may be affected by the Project
- Potential impacts as a result of the Project
- Mitigation and management measures to minimise environmental impacts and any unavoidable adverse impacts
- Qualitative assessment against the sustainability principles for the Project
- Australia Pacific LNG commitments to protect and enhance environmental values.

Three environmental management plans have been developed for each element of the Project (gas fields, gas pipeline and LNG facility). These documents summarise the environmental values, potential impacts and management strategies detailed in the EIS. The plans show how the environmental management of the Project will be implemented.

1.11 Submissions

Submissions on this EIS may be made to the Coordinator-General during the public submission period. Properly made submissions will be considered by the Coordinator-General to determine if additional information about the EIS or the Project is required and also when preparing a report evaluating the EIS.

A properly made submissions must:

- be made in writing to the Coordinator-General (either electronically or in hard copy)
- be received within the submission period
- be signed by each person who made the submission
- state the name and address of each person making a submission
- state the grounds of the submission and the facts and circumstances relied upon in support of the grounds.

Submissions should be addressed to:

The Coordinator-General
c/o EIS Project Manager - Australia Pacific LNG Project
Significant Projects Coordination
Department of Infrastructure and Planning
By post: PO Box 15009 City East Qld 4002 Australia
By fax: + 61 7 3225 8282
By email: APLNG@dip.qld.gov.au

Further information on the EIS process may be obtained by telephoning the Department of Infrastructure and Planning on: + 61 7 3224 8351.

References

Australian Bureau of Agricultural and Resource Economics (ABARE) 2009, *Australian commodities: June quarter 09.2*, vol. 16, no. 2, June quarter, ISSN 1321-7844, Australian Bureau of Agriculture and Resource Economics, Canberra.

Department of Employment, Economic Development and Innovation 2009, *Blueprint for Queensland's LNG Industry*, Department of Employment, Economic Development and Innovation, Brisbane.

International Energy Agency (IEA) 2009, *How the Energy Sector can deliver on a Climate Change Agreement in Copenhagen*, International Energy Agency, Paris, France.

Intergovernmental Panel on Climate Change (IPCC) 2007, *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)], Intergovernmental Panel on Climate Change, Geneva, Switzerland.

McLennan, Magasanik Associates 2009, *Queensland LNG Industry Viability and Economic Impact Study*, Final Report to Queensland Department of Infrastructure and Planning.