APPENDIX 30

ARROW LNG PLANT

Consultation Report

arrow energy
go further

Consultation Report
Arrow LNG Plant

September 2011

jta Australia

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Executive Summary

Arrow CSG (Australia) Pty Ltd (Arrow) is proposing the construction of the Arrow LNG Plant in the Curtis Island Industry Precinct at the south western end of Curtis Island, approximately 6km north of Gladstone and 85km south east of Rockhampton, off Queensland's central coast.

In November 2009, JTA Australia (JTA) was engaged to undertake the stakeholder engagement, community consultation and attendant communication activities for the environmental impact statement (EIS) for the Arrow LNG Plant.

The consultation and engagement approach for the Arrow LNG Plant incorporated both short and long term goals. A strategic and comprehensive approach was adopted not only to support a successful EIS process but also to provide the framework for a productive and positive long term relationship with stakeholders and the community.

The consultation process was then developed to include four phases, three of which were to include a round of public consultation across the region.

The EIS consultation was based on a continuous process of identifying stakeholders and updating and maintaining a comprehensive database. This facilitated broad engagement of the community and key stakeholders in the EIS process.

From project commencement diverse communication tools and activities were utilised to inform and engage key stakeholders and the broader community. As the project progressed, information was updated and tailored to address issues raised and to reflect the progress of the project.

Phase 1 was the preliminary planning required for the project's stakeholder and community engagement and consultation. This planning involved an analysis of the work undertaken by the other LNG proponents, preparation of a demographic and social profile of the Gladstone region, development of a list of stakeholders and issues that were ranked and mapped, and recommendations for essential communication and consultation materials. Key stakeholders were also met with individually to gain a better understanding of the Gladstone region and local perspectives on the LNG industry.

Phase 2 of consultation, which ran from June to November 2010, was designed to provide an overview of the project, explain corporate structural changes since the project was first announced, and elicit as many issues, concerns and views as possible from stakeholders and the broader community. Numerous stakeholder briefings occurred across government agencies, council officials, social welfare groups, environmental organisations, commerce and industry, elected representatives from all three levels of government, and educational institutions.

A round of community information sessions was held across the region from 30 August to 4 September 2010, as was a government agency forum. Printed materials including four fact sheets and five banners were available at the sessions to provide information on the project and how the community could be involved in the EIS.

To facilitate attendance at the community information sessions during Phase 2, the sessions were promoted through; letters of invitation and emails to stakeholders, colour posters,

newspaper advertisements, community notices in some school newsletters, and emails were distributed via networks of supportive stakeholders.

To counter consultation exhaustion due to the number of other Projects that have been consulted in the Gladstone community, JTA staff personally telephoned 250 residents in Gladstone and neighbouring towns who had been invited to the sessions but had not responded with RSVPs.

Phase 3 consultation is in progress and will run from June through to November 2011. A round of community information sessions and an issue-specific forum (business and procurement) ran from 14 to 18 June and a boating and fishing workshop was held on 30 July.

JTA gathered feedback from the Phase 2 information sessions in 2010; comments from that were collated and taken into account in revising the format of the Phase 3 sessions. As such, formal presentations were shorter and the number of speakers was reduced. The number of technical experts available to answer questions was high and received appreciative acknowledgement both during the session and in the feedback forms.

During Phase 3 of consultation invitation letters to information sessions were sent as well as emails, and newspaper advertisements were placed. The information sessions and public display were also promoted through the distribution of postcards placed in high-traffic pedestrian areas, and a more comprehensive coverage through the school newsletters. Phone calls were made to residents in areas where RSVPs were low to ensure that all were aware of the upcoming community information sessions.

Materials made available at the community information sessions and on public display included fact sheets, banners, maps, and a glossary of terms. Numerous stakeholder briefings again occurred for Phase 3 of consultation.

EIS consultation will continue on to Phase 4 which will see another round of information sessions and displays as well as other activities undertaken during the public exhibition of the EIS. These activities will include public notices, specific-issue briefings if required, one-on-one meetings and responses to email, telephone and written enquiries.

The EIS consultation for the Arrow LNG Plant presented a unique challenge in that the Gladstone community had been consulted to the point of saturation. The reality of this could have been accepted and little or no effort made to motivate the community to participate in the consultation process. This was not the case and an enormous amount of energy and resources was devoted to ensuring that the community and stakeholders were not only given every opportunity to become engaged and involved but also that their knowledge of LNG facilities and production, and the Arrow LNG Plant specifically, increased exponentially.

Feedback from, and evaluation of, the consultation activities helped both to guide the direction of the consultation and inform the project team of the significance and importance of specific issues to stakeholders and communities. In particular, the consultation assisted with understanding the social impacts of the LNG plant and allowed stakeholders the opportunity to have input into ideas and options for mitigation of those impacts.

GLOSSARY OF TERMS AND ABBREVIATIONS

TERM	MEANING
BTEX	benzene, toluene, ethylbenzene, and xylene
C3MR	propane precooled (C3) mixed refrigerant (MR) liquefaction process
CSG	coal seam gas
Coffey	Coffey Environments
DEEDI	Department of Employment, Economic Development and Industry
DERM	Department of Environment and Resource Management
DTMR	Department of Transport and Main Roads
EIS	environmental impact statement
EMP	Environmental Management Plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act* (Cwlth)
EPC	engineering, procurement and construction
FIFO	fly in/fly out
JTA	JTA Australia
LNG	liquefied natural gas
GSDA	Gladstone State Development Area
SIMP	social impact management plan

1.0 Introduction

In November 2009, JTA Australia (JTA) was engaged to undertake the stakeholder engagement, community consultation and attendant communication activities for the environmental impact statement (EIS) for the Arrow LNG Plant.

This report describes the methodology, consultation activities and outcomes that have subsequently occurred.

1.1 Proponent

Arrow CSG (Australia) Pty Ltd (Arrow Energy) proposes to develop a liquefied natural gas (LNG) facility on Curtis Island off the Central Queensland coast near Gladstone. The project, known as the Arrow LNG Plant, is a component of the larger Arrow LNG Project.

The proponent, Arrow CSG (Australia) Pty Ltd, is a subsidiary of Arrow Energy Holdings Pty Ltd which is wholly owned by a joint venture of between subsidiaries of Royal Dutch Shell Shell plc and PetroChina Company Limited.

1.2 Project overview

Arrow Energy has proposed construction of the Arrow LNG Plant in the Curtis Island Industry Precinct at the south western end of Curtis Island, approximately 6km north of Gladstone and 85km south east of Rockhampton, off Queensland's central coast.

In 2008, approximately 10% of the southern part of the island was added to the Gladstone State Development Area (GSDA) to be administered by the then Queensland Department of Infrastructure and Planning. Of that area, approximately 1,500 ha (25%) has been designated as the Curtis Island Industry Precinct and is set aside for LNG development. The balance of the GSDA on Curtis Island has been allocated to the Curtis Island Environmental Management Precinct, a flora and fauna conservation area.

The Arrow LNG Plant will be supplied with coal seam gas from gas fields in the Surat and Bowen Basins via high-pressure gas pipelines to Gladstone, from which a feed gas pipeline will supply gas to the LNG plant on Curtis Island. A tunnel is proposed for the feed gas pipeline crossing of Port Curtis.

Key infrastructure components include the LNG plant, feed gas pipeline, and marine and mainland infrastructure. Dredging required for LNG shipping access and swing basins has been assessed under the Gladstone Ports Corporation's Port of Gladstone Western Basin Dredging and Disposal Project. Additional localised dredging within the marine environment of Port Curtis may be required to accommodate the construction and operation of the marine facilities.

1.3 EIS legislative context

On 12 June 2009 the Queensland Coordinator-General declared the project to be a significant project for which an EIS is required in accordance with Part 4 of the *State Development and Public Works Organisation Act 1971.* The Australian Government has determined that the project constitutes a controlled action pursuant to the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)* (EPBC Act).

The draft Terms of Reference for the EIS were released for public review from 2 October to 2 November 2009, and government agency briefings were held in Brisbane on 13 October and Gladstone on 14 October 2009. The final Terms of Reference were released in January 2010.

1.4 Approach and methodology for EIS consultation

The consultation and engagement approach for the Arrow LNG Plant incorporated both short and long term goals. A strategic and comprehensive approach was adopted not only to support a successful EIS process but also to provide the framework for a productive and positive long term relationship with stakeholders and the community.

The engagement and consultation methodology was based on four broad priorities:

- identification and management of stakeholders and relevant relationships
- selection of appropriate communication methods and processes to meet stakeholder needs and expectations
- compliance with the *State Development and Public Works Organisation Act 1971* and
- fulfillment of the project's Terms of Reference.

The consultation process was then developed to include four phases, three of which were to include a round of public consultation across the region. Phase 1 was the preliminary planning required for the project's stakeholder and community engagement and consultation in early 2010 in conjunction with staff from the proponent and Coffey. This planning involved an analysis of the work undertaken by the other LNG proponents, preparation of a demographic and social profile of the Gladstone region, development of a list of stakeholders and issues that were ranked and mapped, and recommendations for essential communication and consultation materials. JTA consultants also met with stakeholders on a one-on-one basis to gain a better understanding of the Gladstone region and the local perception of the LNG industry.

Because the Arrow LNG Plant was the fourth LNG project in the area, one of the challenges for the consultation plan was to engage a regional community suffering from consultation exhaustion. It was also important to differentiate the Arrow LNG Plant from the other LNG projects and introduce Arrow as the proponent.

Phase 2 of consultation from June to November 2010 was designed to provide an overview of the project, explain corporate structural changes since the project was first announced, and elicit as many issues, concerns and views as possible from stakeholders and the broader community. The focus of this phase was undoubtedly the public 'roadshow' that saw detailed information sessions held in Gladstone (one during the day and one at night time to optimise accessibility for shift workers), and the townships of Mount Larcom, Miriam Vale, Calliope, South End (on Curtis Island) and Boyne Island/Tannum Sands. Appropriate communication materials were also developed and a further round of stakeholder briefings was organised.

The major outcomes of Phase 3 (February to November 2011) for the community were a project update and the provision of detailed responses to address the issues and concerns that had been raised by stakeholders during Phases 1 and 2. A greater focus was placed on business and procurement opportunities, project timing, social investment, impacts such as

housing and accommodation, environmental issues, and impacts on the harbour including boating and fishing. Information sessions were again held as was a staffed public display and specific-issue workshops.

The fourth phase (November 2011 to May 2012) will involve another round of public consultation to support the exhibition of the EIS.

Due to the large amount of consultation that has occurred in Gladstone over a relatively short period, consultation saturation factors such as community exhaustion, boredom and inertia were expected to be present amongst some sectors of the community. These factors presented major challenges in encouraging people to attend the Arrow LNG Plant consultation process and is discussed in more detail in section 3.3.

The four phases are outlined in the consultation and stakeholder engagement plan which also outlines consultation objectives; identifies key stakeholders, issues and messages; and presents the methodology and recommended key activities for the consultation process. It includes a schedule and timeline outlining how and when these should be implemented in conjunction with other EIS activities, an outline of supporting communication protocols and activities, consultation responsibilities, and reporting and feedback arrangements.

Table 1 lists the project's consultation phases and activities.

Table 1 EIS consultation phases and activities

Phase	Focus	Consultation activities	Communication tools
Phase 1 Preliminary planning Jan- April 2010	Identification of potential Issues and perceived risks Intensive stakeholder mapping exercise Review of progress of other LNG projects in Gladstone	Numerous project team meetings with proponent and Coffey Environments Commencement of Consultation Management database One-on-one meetings with key stakeholders	Key messages Likely questions from the community and preparation of detailed responses Development of appropriate maps
Phase 2 June – Nov 2010	Project introduction Relationship building	Stakeholder briefings Preliminary visit to towns in the region to determine preferred communication methods and timing of information sessions Community information sessions throughout the region Briefing of government agency representatives Establishment of 1800 telephone number Commencement of project email address and freepost service	Fact sheets Banners Media release Newspaper advertisements Articles, advertisements in school newsletters Website Direct mail and email invitations Posters/flyers distributed in each town in the region
Phase 3 Feb - Nov 2011	Issues identification and potential mitigation	Ongoing stakeholder identification Stakeholder briefings Community information sessions Business & procurement forum 1800 freecall number Project email/freepost Environmental workshop Boating and fishers workshop	Fact sheets Banners Media release Newspaper advertisements Entries in school newsletters Posters and postcards Direct mail invitations Email invitations Website updates Maps
Phase 4 Nov 2011 to May 2012	EIS findings and conclusions	Stakeholder briefings Public exhibition of EIS Community information sessions and displays 1800 freecall number Project email/freepost	Fact sheets Banners Media release Newspaper advertisements Entries in school newsletters Website Direct mail invitations Posters/flyers

1.5 Consultation objectives

The EIS consultation objectives for the Arrow LNG Plant were:

- early and ongoing identification of stakeholders, influential members of the community, project supporters and opponents
- identification of likely issues and/or risks and development of strategies for their resolution or prevention
- provision of accurate, relevant and up-to-date information to stakeholders and the broader community
- development of effective relationships with stakeholders and communities
- support for EIS decision-making through presentation of the range, significance and complexity of stakeholder issues and perceptions
- resolution of issues and ownership of the project by stakeholders prior to government approval of the EIS.

A strategic and coordinated approach to engagement and consultation is essential in order to provide a framework for productive and positive long-term relationships with those stakeholders and communities potentially impacted by the project. As required in the Terms of Reference, the plan was developed to ensure community involvement in the EIS process as well as education, awareness and understanding of the components of the project and their potential impacts. Importantly, implementation of the consultation plan assured identification of the issues of concern as well as an understanding of the proponent's intention and capacity to address issues raised from the project planning stage through to construction and operations.

1.6 Communication activities

From project commencement diverse communication tools and activities have been utilised to inform and engage key stakeholders and the broader community. As the project progressed, information was updated and tailored to address issues raised and to reflect the progress of the project. Specific activities have been covered in Chapters 2, 3 and 4.

2.0 Phase 1 of consultation

This first phase involved intensive preliminary planning which commenced in January 2010 and ended in April 2010.

Preliminary planning involved identifying stakeholders and issues, establishing and developing various communication tools, and establishing a project database.

2.1 Stakeholders

2.1.1 Stakeholder identification

A list of key stakeholders, landholders, interest groups, and individuals across the proposed study area was developed as part of the preliminary planning with the proponent and Coffey. Stakeholders were defined as an individual or representative of a group who had an interest in a particular issue related to the project, and were then mapped according to whether they could influence a decision, potentially be affected by the project, or both. This information was integrated into the consultation plan and helped to tailor the consultation approach to the needs and expectations of the stakeholders.

The stakeholder list included representatives from offices of local, state and federal elected officials, employees of regulatory bodies, industry groups, education and training groups, representatives of non-government stakeholders (such as social welfare groups, local business organisations, environmental groups and special interest associations), and the general community.

The stakeholder list grew and evolved as stakeholders were either self-nominated through consultation activities, the freecall telephone number or project email, or were made known through project contacts. In addition, the media was closely monitored to identify interested parties through Letters to the Editor where comments made were in relation to specific issues. Opinion leaders were also targeted to elicit information in relation to community groups or individuals they considered significant or useful in building up knowledge about local attitudes and concerns. These groups, organisations and individuals are broadly identified in Table 2.

Table 2 Summary of major stakeholder groups and individuals

Stakeholder group	Organisation/representative (name/title as at March 2010)
Political	Local councillors Local state members Local federal members Queensland and Australian Government Ministers

Stakeholder group	Organisation/representative (name/title as at March 2010)
Government agencies	*Queensland Government agencies:* Department of Premier and Cabinet Department of Environment and Resource Management (DERM) Department of Employment, Economic Development and Innovation (DEEDI) Department of Infrastructure and Planning (later incorporated into DEEDI) Maritime Safety Queensland Department of Education and Training Department of Public Works Queensland Health Department of Transport and Main Roads Department of Communities Department of Community Safety Queensland Police Gladstone Ports Corporation Queensland Water Commission *Commonwealth Government agencies:* Department of Sustainability, Environment, Water, Population and Communities (formerly Department of Environment, Water, Heritage and the Arts) Department of Climate Change and Energy Efficiency Department of Resources, Energy and Tourism Department of Agriculture, Fisheries and Forestry Great Barrier Reef Marine Park Authority Australian Maritime Safety Authority Civil Aviation Safety Authority *Local council:* Gladstone Regional Council
Landowners and occupiers	Adjacent or close to the infrastructure components of the project
Local industry and businesses	Gladstone Chamber of Commerce and Industry Gladstone Economic and Industry Development Board Gladstone Area Promotion and Development Ltd Gladstone Industry Leadership Group AgForce Industry associations Peak bodies Significant local business operators
Regional communities	Gladstone Curtis Island (South End) Calliope Boyne Island/Tannum Sands Township of Mount Larcom Miriam Vale
Indigenous groups	Port Curtis Coral Coast Aboriginal Corporation
Environmental groups	Port Curtis Integrated Monitoring Program 1770 Action Group Environmental Defenders Office Queensland

Stakeholder group	Organisation/representative (name/title as at March 2010)
	Birds Australia Capricornia Group Fitzroy Basin Association - Boyne Calliope Sub Region Gladstone Healthy Air Project Civic Beautification Committee Agnes Water Land Care Group Baffle Creek Landcare/Coastcare and Conservation Group Tannum Boyne Coastcare Queensland Conservation Council Capricorn Conservation Council Conservation Volunteers Australia Gladstone and District Wildlife Carers Association World Wildlife Foundation Australia Boyne Island Environmental Education Centre Wetlands International Greening Australia Australian Conservation Foundation 1770 Heritage Group Great Barrier Reef Foundation Great Barrier Reef Marine Park Authority The Wilderness Society Miriam Vale Rural Science and Landcare Society Inc Agnes Water Volunteer Wildlife Carers
Community and interest groups	Community service groups and peak bodies, CWA, progress associations, heritage groups, sporting groups, action groups, community health and emergency service providers, religious groups, employment and training agencies, senior citizen representatives and social welfare groups including Lifeline, St Vincent de Paul, Anglicare and the Salvation Army Gladstone Foundation
Schools	Benaraby State School Boyne Island State School Builyan State School Calliope State School Clinton State School Gladstone Central State School Gladstone South State School Gladstone State High School Gladstone West State School Kin Kora State School Nagoorin State School Rosella Park School Tannum Sands State High School Tannum Sands State School Toolooa State High School Ubobo State School Chanel College (Gladstone) Faith Baptist Christian School (Gladstone) St Francis Catholic Primary School St John the Baptist Catholic Primary School

Stakeholder group	Organisation/representative (name/title as at March 2010)
	St Stephen's Lutheran College Star of the Sea Catholic Primary School (Gladstone) Trinity College (Gladstone)
Media	Print: *Gladstone Observer* *Community Advocate* *Gladstone News*

2.1.2 Stakeholder briefings

During the preliminary planning period, in April 2010, representatives of JTA met with a number of key stakeholders to ascertain and assess local opinion of the LNG industry and associated projects (Table 3 refers). These meetings provided JTA with a good insight into the current standing of LNG in the community and enabled consultation and communication planning to be better aligned with the needs and interests of stakeholders and the community.

The purpose of the JTA meetings was to continue to expand the information required for the stakeholder mapping exercise, including issues and concerns that could be listed as priorities, and to establish local views and attitudes regarding the timing of future community information sessions, format and preferred venues. The exercise was very useful in both establishing stakeholder relationships for the future and ascertaining the real issues as perceived by the communities. Meetings were held in a relaxed environment in a neutral location in the towns visited and more often than not with several locals in attendance to ensure a broader discussion elicited a cross-section of views.

In addition to the stakeholder meetings convened by JTA staff, the Arrow team held meetings with numerous stakeholders during Phase 1 including relevant government agency representatives, elected officials, and key stakeholders to brief them on the project.

Table 3 Stakeholder meetings (April 2010) during Phase 1

Stakeholder	Name and Role
Gladstone Regional Council	Cale Dendle, Director of Commercial and Community Services
Gladstone Area Promotion and Development Limited	Glenn Churchill, CEO
Gladstone Ports Corporation	Jane MacDonald, Communications Manager Emma Kirkby, Corporate Relations General Manager
St Vincent de Paul	Dennis Mitchell, President
St Vincent de Paul	Ron Clough, President
Anglicare	Kathy Horton, Regional Manager
Salvation Army	Captain Jeff Bush, The Corps Officer
Education Queensland	Alan Whitfield, Acting Regional Director
Curtis Lodge	Ailsa and Alan Smith, owner/operators

2.1.3 Management of stakeholder information

The project database which was established by JTA played an important role in recording details of individuals and groups with specific interests, influences or triggers that might have an impact on or from the project, as well as those who required additional attention.

After the detailed community and stakeholder mapping exercise in Gladstone and the broader region, a substantial list of people and groups was entered onto a web-based database (Consultation Manager). The database was initially managed by JTA but as the project progressed Arrow Energy took over ownership and management of the database. In addition to recording stakeholder details, Consultation Manager was used to:

- record, monitor and report consultation issues and actions
- record stakeholder details
- record attendance and issues nominated at public events
- track stakeholder contacts (email, post, phone, fax or in person)
- create responses to stakeholder requests in an accountable and timely manner
- analyse current and emerging issues and
- generate reports.

2.2 Issues identification

While there is plenty of information available in relation to the issues of concern to Gladstone and neighbouring towns from previous LNG projects' stakeholder consultation in the area, nothing was assumed. The project team contributed a lot of time and energy into identifying any movement in known concerns as well as subsequent concerns that may have arisen or were being talked about within discrete sections of the community.

Table 4 below lists the issues that were identified during the preliminary planning. The issues that were raised during the subsequent consultation activities can be found in the following chapters.

Table 4 Issues Identified During Preliminary Planning

Issues identified during preliminary planning
Location of workforce, including construction camp
Source of workforce
Scarcity and high cost of housing and accommodation
Impacts on marine life
Impacts on shipping, dredging and marine safety
Aviation safety
Social investment expectations of the community
Decrease in quality of life
Consultation fatigue

Issues identified during preliminary planning
Trust, honesty and transparency
Impacts on boating and fishing
Lack of Gladstone shopfront
Strain on existing health facilities
Local employment opportunities
Loss of community values
Health/air quality
Procurement and business opportunities
Cumulative impacts of the four proposed LNG projects
LNG safety
Land use on Curtis Island
Spread of weeds along pipeline
Traffic movements and increased burden on transport corridors, impact on safety and deterioration of roads
Water use and management
Increase in drug use/trafficking
Noise from LNG facility
Native title
Emergency response
Domestic LNG vs export emphasis
Visual amenity
Cultural heritage

2.3 Communication activities

2.3.1 Freecall telephone number, email and freepost addresses

A freecall telephone number, dedicated project email address and a freepost service were established to provide a number of ways in which people could contact the project team at no cost. This approach was designed to encourage the community to get in touch with the project team to learn more about the project and provide feedback.

Answers to enquiries were provided directly by the JTA consultation team where possible, although technical or business-related questions were referred to relevant Arrow specialists for resolution and response.

Information collected through the freecall number, email address and freepost service was recorded in the Consultation Manager database as were contact details (if provided) for individuals.

2.3.2 Key messages

Work commenced on the development of key messages to provide consistent, plain English information about the project to stakeholders and the community. The content ensured consistency amongst the project team and staff and was updated regularly to ensure the content remained relevant. These key messages were supported by a set of internal questions and answers to ensure greater accuracy and consistency in responses to issues pertinent to the project.

2.4 Printed materials

Although preliminary work began on consultation materials during Phase 1, no printed materials were available until the next phase which included the initial roll out of the project.

2.5 Media monitoring

Media monitoring was undertaken during Phase 1 to assist with issues identification. Both Gladstone and Rockhampton print media were closely monitored to gain an understanding of the developing dynamics and sensitivities of the Gladstone region.

A weekly media report to project team members summarised relevant stories in local newspapers, painting a broad and timely picture of community reactions and attitudes. This allowed consultation and communication materials to be oriented towards providing information that was responsive to local needs and attitudes.

2.6 Outcomes of preliminary planning phase

Initial planning for the Arrow LNG Plant EIS was arguably the most intensive JTA has ever done. This was driven to some extent by the then proponent who insisted that there be complete awareness and understanding of all issues of concern to both key stakeholders and the broader community, and that potential mitigation strategies were addressed prior to any public forays.

Because of the planning intensity, both the JTA consultants, as the independent EIS community consultants, and the project team were extremely well-informed by the commencement of Phase 2 which saw the first round of community information sessions.

The need for the detailed provision of information was increased because members of the Arrow project team were based in overseas locations. This necessitated a return to basics for the JTA team because as a Queensland-based consultation organisation it could have made a number of assumptions about an area it knew well. The result was that the region was looked at not only with completely new eyes but also with the benefit of JTA's previous experience with, and knowledge of, the area and its residents. The demographics, geography, and economic and social profile of Gladstone and neighbouring towns were examined and re-defined for an audience which had no prior knowledge of the area. Both stakeholder and issues identification and mapping were therefore extraordinarily comprehensive and inclusive.

3.0 Phase 2 of Consultation

Phase 2 consultation ran from June to November 2010. Numerous stakeholder briefings occurred across government agencies, council officials, social welfare groups, environmental organisations, commerce and industry, elected representatives from all three levels of government, and educational institutions. A round of community information sessions was held across the region from 31 August to 4 September 2010 and the details are outlined in section 3.2.

3.1 Stakeholder briefings

Senior Arrow management and technical staff held both one-on-one meetings with a wide range of stakeholders within the public and private sectors, and a group briefing for government agency representatives. Many of these meetings coincided with the community information sessions (outlined in Section 3.2). JTA consultants accompanied the Arrow team to many of the briefings as observers to ensure all information was captured for the purposes of EIS consultation.

Stakeholders included state and federal elected representatives, local councillors and their officials, education and training groups, industry associations, local business organisations, social welfare representatives, Indigenous representatives, affected landholders, media, environmental groups and some government officials. The issues raised at stakeholder briefings can be found in section 5.2.

Table 5 below provides a list of the stakeholder briefings undertaken during the second phase of consultation.

Table 5 Summary of stakeholder briefings during Phase 2

Stakeholder	Name and Role
Member for Flynn (LNP)	Ken O'Dowd MP
Member for Gladstone (IND)	Liz Cunningham MP
Gladstone Airport	Glen Robinson, Airport Manager
Gladstone Regional Council	Cale Dendle, Director of Commercial and Community Services
Gladstone Regional Council	Cr Gail Sellers, Acting Mayor (subsequently elected to the position) Graeme Kanofski, CEO
Gladstone Community Advisory Service	Jenny Cockerill, Manager, Sexual Assault Support and Prevention Kurt Heidecker, Chief Executive Officer, Gladstone Industry Leadership Group Andrea Hughes, Community Development Officer, Gladstone Regional Council Faith Hutchinson, President, Gladstone Region Women's Business Network

Stakeholder	Name and Role
	Ann Jelf, Regional Admissions Manager, Domain Auckland Place Graeme Kanofski, Chief Executive Officer, Gladstone Regional Council Veronica Laverick, Manager Human and Social Services Natalia Muszkat, Program Co-ordinator, Women's Intercultural Network Cr Gail Sellers, Acting Mayor, Gladstone Regional Council
Gladstone Regional Council	Veronica Laverick, Manager, Human and Social Services
Gladstone Area Water Board	Jim Grayson, CEO
Gladstone State High School	Sally Thompson, Principal
Toolooa State High School	Alan Whitfield, Principal
Tannum Sands State High School	Ray Johnston, Principal
Gladstone Area Group Apprentices	Kerry Whittaker, General Manager
Gladstone Multicultural Association	Peter O'Dwyer, President
Gladstone Common Equity Housing	Lawrence Sant, President
St Vincent de Paul, Lifeline, Salvation Army	Dennis Mitchell, Mandy Jones, Capt Jeffrey Bush
Gladstone Industry Leadership Group	Kurt Heidecker, CEO
Schools and Industry Network	Greg Seeds, Chair
Gladstone Economic and Industry Development Board	Dr Ken King, Chief Executive Sandra Williams, Marketing Manager
Gladstone Area Promotion and Development Ltd	Glenn Churchill, CEO Joanne Goldsborough, Project Officer

3.1.1 Government agency forum

While Arrow took responsibility for engagement with key government stakeholders, JTA incorporated into its plan a meeting with government agency representatives from the Gladstone area. This forum was held on Friday 3 September to provide representatives with a focussed and relevant (to government) opportunity to learn more about the project and to ask questions of key project team members. A presentation was given followed by a question and answer session with representatives of Arrow and Coffey Environments. The agencies invited included:

- Department of Communities
- Department of Community Services
- Department of Education and Training
- Department of Employment, Economic Development and Innovation
- Department of Transport and Main Roads

- Environmental Protection Agency
- Gladstone Area Promotion and Development Ltd
- Gladstone Area Water Board
- Gladstone Engineering Alliance
- Gladstone Ports Corporation Ltd
- Maritime Safety Queensland
- Powerlink
- Queensland Health
- Queensland Police.

3.2 Community information sessions

Community information sessions were held in Gladstone and the townships of Calliope, Mount Larcom, Miriam Vale, Boyne Island/Tannum Sands and South End (on Curtis Island) to ensure that people who would be impacted by, or have an interest in, the project would have easy access to at least one of the sessions. Two information sessions (one during the day and one at night, on separate days) were held in Gladstone to ensure optimal accessibility for shift workers and business people.

Because of their format, these sessions served to provide both formal and informal consultation opportunities in recognition of the varying levels of interest in the project. Details of these sessions are listed below in Table 6.

Table 6 Phase 2 community information sessions

Date & Time	Location	Venue	Registered Attendees
31 Aug 2010 10am-2pm	Boyne Island/Tannum Sands	Boyne Tannum Community Centre	10
31 Aug 2010 6pm-9.30pm	Calliope	Calliope Community Centre	27
1 Sept 2010 10am-2pm	Miriam Vale	Miriam Vale Community Centre	10
1 Sept 2010 6pm-9.30pm	Gladstone	CQU Conference Centre	26
2 Sept 2010 10am-2pm	Mount Larcom	Mount Larcom Public Hall	13
3 Sept 2010 10am-2pm	Gladstone	CQU Conference Centre	49
4 Sept 2010 10am-2pm	Curtis Island	Capricorn Lodge	29

Note: the number of 'registered attendees' represents a number fewer than the true number of attendees as a minority of people preferred not to register. No pressure was applied to do so (although it was always spelt out during the information sessions that only people registered would automatically receive notice of subsequent sessions and project updates).

3.2.1 Information session objectives

The key objectives of the information sessions were to:

- provide an overview of the project and address any concerns or issues raised by the community and key stakeholders
- advise members of the community about EIS processes and explain how they could be involved
- capture community issues and provide feedback to the Arrow LNG Plant team.

3.2.2 Phase 2 community information sessions

The sessions were extensively advertised and promoted and were open to anyone to attend; they were staffed by personnel from Arrow Energy, Coffey Environments, JTA and specialist technical experts (from Royal Dutch Shell) who travelled to Gladstone from a number of overseas locations. This international LNG expertise was welcomed by the audience who clearly appreciated the depth of knowledge and experience made available to them, and the willingness of the Project team to address questions that had previously gone unanswered by other proponents.

At the beginning of each session, attendees were provided with an information pack containing fact sheets (section 3.4.1.refers), and had the opportunity to read this as well as view maps and large banners displaying project photographs and text. In addition, ample time was provided to enable stakeholders and community members to engage privately with individuals from the large team of specialists that Arrow had on hand. A formal presentation was given, followed by a question and answer session. Project team members were again available for one-on-one discussions at the end of the question and answer period. A sample agenda is attached at Appendix A.

Attendees were asked to fill out a registration form which allowed JTA to include them in the database for future communication of project updates and public consultation events. This information was also useful from an evaluation perspective as it allowed JTA to keep track of the number of attendees and the manner in which they found out about the sessions.

Notes were taken during the question and answer periods and subsequent to the sessions a printed summary was mailed to all the participants who had provided their contact details. A request was made that, where possible, these notes be circulated amongst their friends and colleagues to provide others in the area with some idea of the issues discussed and the information disseminated. A copy of the document is in Appendix A and the list of issues can be found below in Table 7.

Table 7 Summary of issues raised at community information sessions August/September 2010

Location	Issues Raised
Boyne Island/Tannum Sands	Pipeline approvals Construction camp on Curtis Island EIS timeframe and opportunity for community contributions Consolidation of projects Supply contracts/workforce Employment/skills training

Location	Issues Raised
	Impacts of shipping on boating and fishing
	Proposed technology
Calliope	Pipeline corridor and logistics of pipeline construction
	Weed spread
	Cooling system for plant
	Impacts of shipping on boating and fishing
	Impacts on health and education system
	CSG, management of water, and its history
	Impact on World Heritage Area
	Air emissions and flares
	Construction timeframe
	Impacts on Curtis Island and size of LNG plant
	Construction camp Curtis Island
	Employment/apprenticeships
	Gas destination (domestic or overseas)
Miriam Vale	Construction camp
	Consolidation of LNG projects
	Treatment of water from CSG and desalination
	Water use, treatment and discharge at LNG plant
	Air emissions/contaminants
	Energy source and consumption of project
	Gas destination (domestic or overseas)
	Lifespan of project
	Environmental impacts
	Pipeline corridor across the harbour/ bridge option
	Impacts of shipping on boating, fishing, the harbour environment
	Impact on road infrastructure
	Emergency response and impact on health system
	Impact on social infrastructure and facilities
	Local workers vs importing workers
Gladstone (at the two sessions)	CSG drilling and impact on water table and aquifers
	Energy for plant
	Emergency response and impact on health system
	Impact on road infrastructure
	Weed spread
	Managing construction workers in camp
	Environmental Management Precinct and management of environmental impacts

Location	Issues Raised
	Purchasing policy Construction camp lifespan Pipeline corridor/bridge option Potential for gas supply to Curtis Island residents Impact on marine life Impacts on Gladstone infrastructure including cumulative impacts Impact on harbour/dredging Fly in/fly out workforce, apprenticeships Safety of LNG plant Impacts on boating and fishing Location of LNG plant and its life expectancy Job creation Air quality/controlling emissions Cumulative impacts of LNG plants Impact of shipping and exclusion zones Pipeline corridor and construction Dredging of Calliope River Pipeline leaks and safety Shipping turnaround and frequency Contribution to greenhouse gases and air emissions Visual impact of stacks Power source for the plant and gas turbines Local employment policy and procurement policy Desalination and use of harbour water LNG plant safety Number of trains and changes to shipping Market for LNG and its use Lifespan of project Workforce accommodation CSG and salt
Township of Mount Larcom	EIS, land zoning and community input The market for LNG Impacts of dredging on The Narrows, location of LNG plants in narrow channel World Heritage Area and the Great Barrier Reef Marine Park Impacts of shipping including exclusion zones Impact of shipping accident/emergency response plan
Curtis Island (South	Impact of shipping on the harbour including exclusion zones

Location	Issues Raised
End)	Location of construction camp on Curtis Island vs workers housed in Gladstone Logistics of numerous camps on Curtis Island Refrigeration requirements for LNG Dredging requirements for the project

3.3 Promotional activities

The key community-wide consultation activities undertaken during the EIS process were information sessions, stakeholder briefings, a public display and relevant materials to support these activities.

Due to the level of consultation that the community has been exposed to over several years, the LNG project team was aware it was not going to be easy to persuade people to invest time in learning about another LNG proponent or express issues and concerns which they had already expressed to other LNG companies.

To facilitate attendance at the community information sessions during Phase 2, the sessions were promoted through more than 500 letters of invitation and emails to stakeholders on the database; 46 colour posters were placed on shop windows and community noticeboards; four advertisements appeared in newspapers; community notices in some school newsletters were inserted with the assistance of school principals or parents and citizens' associations, and emails were distributed via networks of supportive stakeholders. Samples of the invitation, posters, and advertisements can be found in Appendix A.

JTA staff personally telephoned 250 residents in Gladstone and neighbouring towns who had been invited to the sessions but had not responded with RSVPs. The purpose of the call was to ensure the recipient was aware the sessions were on, ascertaining if they were interested in attending and, if not, ensuring they had contact details for the future in the event that any relevant issues or concerns might arise. While this did result in more acceptances, it was both time and cost-intensive. It was an appropriate exercise, however, in view of the high levels of consultation fatigue affecting many in the community because, as referred to above, three other LNG proponents had conducted their own forms of consultation during the preceding two to three years.

A particularly interesting outcome of the phone calls was that a significant number of respondents advised they had received the letter of invitation but due to the lead time they had forgotten the sessions were being held; they then advised they would attend. This distinguished Gladstone regional residents from their counterparts in the Surat Basin; in the latter area, mail services are often infrequent so that at least two to three weeks' notice of events was necessary. In busy centres such as Gladstone where there appeared to be a lot of functions and sporting events occurring regularly, shorter term notice could sometimes work better.

Newspapers in which community information session advertisements were placed are listed below in Table 13.

Table 8 Newspaper advertising schedule of community information sessions

Newspaper	Publication date
Gladstone Observer	21 and 28 August 2010
Community Advocate	16 August 2010
Gladstone News	18 August 2010

A media release was forwarded to the *Gladstone Observer* on 30 August 2010 and appeared on the website shortly afterwards. Subsequent feedback from stakeholders and community representatives indicated that Arrow's EIS consultation differed from other industry players both in terms of the diverse ways in which people were encouraged to attend the sessions and the level of technical expertise available to the community at these sessions. One of the more memorable comments from an attendee was that the Arrow LNG Plant consultation team 'might not have been as pretty as its competitors but it beat the others hands down in terms of the level of expertise available'. This was received positively and further comment on the amount of technical experience available at the sessions is made in section 4.2.2.

3.4 Printed Materials

Printed materials were prepared for the community consultation activities held in August/September 2010. These included factsheets and banners.

3.4.1 Fact sheets

For the consultation activities undertaken in August/September 2010, four fact sheets were developed to provide information about the project to stakeholders and the community. These fact sheets were titled *Project Overview, Environmental Impact Statement, LNG Shipping Information* and *LNG Safety Information;* they were prepared in plain English and presented in an attractive but non-glossy format (overly glossy, apparently expensive, types of printed information are often viewed unfavourably by communities who believe the money could have been spent more productively). Copies are attached in Appendix A.

3.4.2 Banners

A set of five banners was developed for the Phase 2 consultation process; they included *Arrow Energy LNG Project*, *EIS Process*, *LNG Shipping*, *LNG Safety*, and *Employment and Workforce*. The banners were displayed at the information sessions and public display and provided a snapshot of key elements of the project. Copies of these are attached in Appendix A.

3.5 Website

Content about the Arrow LNG Plant was loaded onto the Arrow website (www.arrowenergy.com.au) 23 August 2010. Content included information about the project, copies of the fact sheets and details of upcoming consultation activities. Information was also provided for those members of the public unable to attend community information sessions; this was done through placement on the website of the presentation text, community questions and Arrow's responses, and photographs.

The website address was widely advertised on all project and communications materials.

4.0 Phase 3 of Consultation

Phase 3 consultation is in progress and will run from June through to November 2011. While Phase 3 is ongoing, the following outlines the results of the consultation activities which ran from 14 June to 18 June and the boating and fishing workshop held on 30 June. Further community information sessions and a display were held in June as well as a specific issue workshop. Numerous one-on-one stakeholder briefings occurred across government agencies, council officials, social welfare groups, environmental organisations, business, elected representatives, and educational institutions. An Environmental Impact Workshop is planned to be undertaken in November 2011, prior to the release of the EIS.

4.1 Stakeholders

During this phase of consultation, in the week of the June information sessions in particular, further one-on-one meetings were held with key stakeholders, either to build on the information given during the previous phase of consultation or to provide more specific information to stakeholders with particular interests or issues relating to the project. The issues raised at stakeholder briefings can be found in section 5.2.

Table 9 provides a list of the stakeholders met with during the June consultation activities.

Table 9 Stakeholder briefings during Phase 3 of consultation (June 2011)

Stakeholder	Name and Role
Gladstone Regional Council	Cale Dendle, Director of Community Services
Salvation Army Lifeline St Vincent de Paul	Captain Jeffrey Bush, The Corps Officer Mandy Jones, Client Service Manager Ron Clough, President
Gladstone Regional Council	Cr Gail Sellers, Mayor Cr Mat Burnett, Deputy Mayor Graeme Kanofski, CEO Russell Schuler, Director of Strategic Planning
Gladstone Foundation	Jim Petrich, Chair
AgForce	Leo Neill-Ballantine, Chairperson (Calliope) Danielle Hogarth, Regional Manager (Rockhampton)
Central Qld University	Professor Chad Hewitt, Pro-Vice Chancellor (Research) & Head of Gladstone Campus Dr Peter Clark, Manager – Research Development
Capricorn Conservation Council	Michael McCabe, Coordinator Cheryl Watson, Member
Conservation Volunteers	Karl French, Operations Manager
Gladstone Regional Council	Veronica Laverick, Manager, Human and Social Services, Gladstone Community Advisory Service

Please note that this table lists the meetings held up to 18 June. Meetings may have occurred between the writing of the report and its submission to government.

4.1.1 Forum for local businesses, suppliers and contractors

During the June 2011 consultation activities, a forum specifically focused on project-related business and procurement was held on Friday 17 June 2011. The forum was held as a result of the intense interest displayed regarding this topic during the Phase 2 information sessions in September 2010 and in subsequent enquiries. This was an invitation-only activity to enable a relevant and balanced discussion of the issues experienced by local Gladstone businesses with other LNG developments in the past. Invitations were extended to representatives from:

- Department of Employment, Economic Development and Innovation
- Gladstone Area Promotion and Development Ltd
- Gladstone Chamber of Commerce and Industry
- Gladstone Economic and Industry Development Board
- Gladstone Engineering Alliance
- Gladstone Industry Leadership Group
- Gladstone Regional Council
- Industry Capability Network
- Local businesses, including contracting, engineering, legal services, and human resources and recruitment.

Arrow procurement executives and the Vice President LNG/Integration (responsible for both the construction and operational stages of the project) provided a presentation on Arrow's timeframe and procurement processes, followed by a question and answer session which provided the opportunity for information sharing amongst all participants.

The forum captured a range of issues relating to labour hire, procurement policy, potential contracting for local businesses, pre-qualification and tendering. The list below provides an overview of the issues raised:

- accommodation requirements dependent on which consortium is successful
- Arrow's use of contractors and involvement in staff selection
- estimated production workforce
- geotechnical information not available for other projects
- local businesses used to increase bids for tenders and then dumped once contract awarded
- more time needed for tender bids
- need for tender information to be complete and accurate, and streamlined
- policy on classification of local business
- publication of list of all packages and names of those tendering to allow for formation of joint ventures.
- publication of successful bidder for contract to facilitate capacity of sub-contractors to approach successful contractor for potential work
- registration for vendor lists
- size of packages too big for local businesses
- use of local companies rather than local employees to prevent staff leaving and taking skills with them

4.2 Community information sessions and public display

Information gathered from the community during Phase 2 was used to help shape future activities, including both the content of communication materials as well as the format for the consultation activities undertaken during Phase 3. As seen in section 4.1.1, a greater focus was placed on business and procurement opportunities as well as project timing, social investment, social impacts (such as housing and accommodation), environmental issues, and impacts (including boating and fishing) on the harbour.

4.2.1 Location of information sessions and public display during Phase 3

Based on attendance at information sessions held during Phase 2, the number of towns in which such events were held in June 2011 was reduced to four, Gladstone, Mount Larcom, Calliope and South End (on Curtis Island). Gladstone's previous attendance levels warranted holding two information sessions, while the remaining three towns held one each. Miriam Vale was omitted but its residents who attended the first session were invited to attend information sessions in nearby towns during Phase 3.

Subsequent to the consultation activities undertaken in Phase 2, the township of Mount Larcom was removed from the scope of the EIS study area; however, it was still included as one of the locations for an information session to allow the Mount Larcom community to receive an update on the project and the revised project area. Feedback was received after Phase 2 consultation that the timing of the first session in the Mount Larcom township had been inappropriate (it was held during the day) so the criticism had been taken on board and the second information session was held during the evening.

The low turnout at the first information session held at Boyne Island/Tannum Sands resulted in a decision in Phase 3 to hold a display there instead of the more formal presentation format.

Table 10 provides the details of the sessions, including location and number of registered attendees.

Table 10 Phase 3 community information sessions and public display

Date	Location	Venue	Registered Attendees
14 June 2011 5pm-8.30pm	Gladstone	CQU Conference Centre	23
15 June 2011 10am-1.00pm	Boyne Island/Tannum Sands	Boyne Tannum Community Centre	5
15 June 2011 5pm-8.30pm	Mount Larcom	Mount Larcom Public Hall	11
16 June 2011 5pm-8.30pm	Gladstone	CQU Conference Centre	35
16 June 2011 5pm-8.30pm	Calliope	Calliope Community Centre	17
18 June 2011 10am-1pm	South End (Curtis Island)	Capricorn Lodge	19

Note: the number of 'registered attendees' represents a number fewer than the true number of attendees as a minority of people preferred not to register. No pressure was applied to do so (although it was always spelt out during the information sessions that only people registered would automatically receive notice of subsequent sessions and project updates).

4.2.2 Revised format of information sessions and public display

JTA gathered feedback from the Phase 2 information sessions in 2010; comments from that were collated and taken into account in revising the format of the Phase 3 sessions. As such, formal presentations were shorter and the number of speakers was reduced. The number of technical experts available to answer questions was high and received appreciative acknowledgement both during the session and in the feedback forms. Members of the audience commented that it was a great help, and reassurance, to have senior management (including the Chief Executive Officer and Vice President LNG/Integration) present as well as experts in shipping, procurement, operations, accommodation and marine and environmental matters. This meant all the communities' questions could be answered immediately and this distinguished Arrow's consultation from other proponents' activities the community had previously attended.

A greater focus was placed on business and procurement opportunities as well as project timing in the formal presentation and supporting materials. Previously, there had been some confusion regarding the timeline for the Arrow LNG Plant and issues regarding worker accommodation. As such, considerable effort was made during this round to ensure these topics were completely understood by the community.

The impacts on the harbour, and boating and fishing in particular, were also given a greater focus due to the questions asked, and the feedback received, from consultation during Phase 2.

Information on Arrow's approach to social investment was also featured in Arrow's presentation and supporting materials. There were several questions in relation to the Gladstone Foundation as well as Arrow's Brighter Futures program. The Brighter Futures program enables Arrow to provide financial support for projects, events and initiatives in an effort to develop stronger communities by working in conjunction with local organisations and service providers.

At the public display in Boyne Island/Tannum Sands information was displayed via banners and fact sheets, and project staff were available to talk one-on-one with attendees.

A complete list of the issues raised at the community information sessions and public display can be found in Table 11.

Table 11 Summary of issues raised at community information sessions and public display (June 2011)

Location	Issues Raised
Gladstone	Provision of gas to South End (Curtis Island) Supply of electricity to plant Life span of LNG plant EPC tendering and selection

Location	Issues Raised
	Location of tunnel from Gladstone to Curtis Island Use of tunnel for transferring workers between Gladstone and Curtis Island Boat traffic on Port Curtis Exclusion zones around LNG vessels Impacts on accommodation and housing Offsets for ecosystems Pipeline pressure and risk of fire/leak Upstream (CSG) impacts on environment and water CSG extraction process, BTEX and hydraulic fracturing Conditions and contributions pertaining to Gladstone Foundation Temporary workers' accommodation facilities and permanent housing/accommodation legacy for Gladstone Size of workforce Treatment of gas in the field Battery limit of LNG plant Water supply for plant Insulation and cladding of pipes Tug boats for LNG vessels LNG vessels and proximity to major population centres Future of temporary accommodation when construction is finished and integration of temporary accommodation into community as permanent housing (e.g. aged care accommodation) to be left as a legacy for the community Rehabilitation of area Liquefaction process (C3MR) definition and process Impact of workforce residing in Gladstone EIS and social impacts Integration of workers (particularly foreign workers) into the community/cultural induction Recognition of overseas qualifications Risk quantification Design of LNG vessels and oil storage Capability of local tug pilots Possibility of project cancellation because of opposition to CSG Arrow Energy's involvement in research on discharge of contaminated water Arrow Energy's health safety and environment training provision Social impact management plan for upstream (CSG) project
Boyne Island/ Tannum	Housing and accommodation

Location	Issues Raised
Sands	Employment/supply opportunities
Township of Mount Larcom	Launch site options and access to Curtis Island Identification of areas for offsets Origin and number of LNG projects Consolidation of projects Number of pipelines from Surat Basin to Gladstone Industrial terrorism and safety of plant
Calliope	Impact of increased traffic on Bruce Highway Spread of weed seed along pipeline Payment of landholder time Responsibility for housing and accommodation Assurance of contractors' knowledge of local area
Curtis Island	Foreign ownership of Arrow Electricity generation Noise from plant Advice of offset locations Origin of workforce Source of CSG Opposition in Surat Basin and LNP support for farmers Access from plant to South End Insurance for plant and risk analysis Health risk of heat plume Tunnel for transportation of people Other proponents' access to South End Temperature and volume of gas at time of conversion from CSG to LNG Carbon tax and LNG industry Location of tunnel/location of crossing Pressure test of pipe, pressure test certificates Manufacture of pipe Lack of Gladstone motel accommodation and disconnect between flights and Curtis Island ferry Health provision/facilities Distrust of government managing the environmental management plan

Interestingly there were considerably more questions asked on both the Arrow LNG Plant and Arrow's upstream activities in the Surat Basin (Surat Gas Project) than in the previous phase. Previous consultation for the Arrow LNG Plant had evinced only limited interest in CSG. Clearly the media coverage of recent months had caused concern in relation to the

future sustainability of farming and the welfare of farmers and had highlighted the lack of knowledge that Gladstone residents felt they had in terms of CSG exploration and production. Explanations of the methods used for CSG drilling and its impacts were provided and a decision was made to ensure there was more information available on this aspect for Phase 4 of consultation during the EIS public comment.

More time was scheduled after the formal presentations for a question and answer session. Additionally, ample time was provided before and after the formal part of the program for one-on-one discussions with the Arrow staff and technical experts available.

JTA took notes of the questions and answers during the sessions and a summary of this was subsequently forwarded to all those who had attended. Copies of a sample agenda and the summary of questions and answers can be found in Appendix B respectively.

Additional community information sessions will be held during the period that the EIS is available for public comment in early 2012.

4.2.3 Boating and Fishers Forum

Due to the continuing strong interest in issues related to the harbour (including dredging, shipping, exclusion zones, recreational boating, marine life, and fishing) a specific-issues forum on this was held on 30 July 2011 at the Gladstone campus of Central Queensland University. The experts who participated included the Assistant Harbour Master, Chief Pilot and Arrow's own experienced shipping expert.

The forum was attended by a total of 17 stakeholders who represented a range of groups with an interest in the harbour. The groups represented at the forum were:

- Boyne Tannum Hook Up Fishing Committee
- commercial and recreational fishermen
- Rob Benn Charters
- Wanderers Fishing Club
- Gladstone Ports Corporation
- Capline Charters
- Port Curtis Sailing Club
- Maritime Safety Qld
- Volunteer Marine Rescue
- Gladstone Fish Market
- Kanimbla Charters
- Gladstone Local Marine Advisory Committee

The two-hour forum commenced with a presentation by the manager of the Arrow LNG Plant EIS and the Marine Advisor for the project, and was followed by a question and answer session. The forum proved to be a very useful way of dispelling some rumours that had developed about the LNG industry and the harbour, as well as informing stakeholders on the LNG carrier protocols, marine safety and potential impacts the construction and operation of the LNG plant may have on boating and fishing activities in Port Curtis. The issues raised at the forum included:

- exclusion zone for LNG carriers
- reasoning for locating jetty at Boatshed Point

- dredging in Calliope River
- loss of seagrass due to dredging
- impact on flooding as a result of dredging
- recognition of commercial fisherman and processors as a stakeholder group
- displacement of scallop processors
- pollution of harbour as a result of dredging
- land use between China Bay and Hamilton Point
- cumulative impacts on harbour
- water quality testing and reporting
- impacts on fishing industry
- dredging and death of marine life in harbour
- dredging and acid sulphate soils
- water traffic rules and safety regulations
- construction camp on Curtis Island
- community investment
- timeframe for Arrow LNG Plant EIS and construction

4.3 Promotional activities

During Phase 3 of consultation, 716 invitation letters were sent along with 452 emails and four newspaper advertisements (Appendix B and Table 12 refer) were placed. The information sessions and public display were also promoted through the distribution of nearly a thousand postcards placed in high-traffic pedestrian areas such as shops and council facilities, and a more comprehensive coverage through the school newsletters (see Appendix B for an example). More than a hundred phone calls were made to residents in areas where RSVPs were low to ensure that all were aware of the upcoming community information sessions.

Table 12 Newspaper advertising schedule

Newspaper	Publication date
Gladstone Observer	5 and 12 June 2011
Community Advocate	6 June 2011
Gladstone News	9 June 2011

4.4 Printed Materials

Materials made available at the community information sessions and public display included fact sheets, banners, maps, and a glossary of terms.

4.4.1 Fact sheets

Fact sheets from Phase 2 of consultation were updated and two new fact sheets were specifically developed in response to community concerns and interest expressed during the second phase of consultation. These were titled *Boating and Fishing – Arrow LNG Plant*, and *Employment and Business Opportunities*. In addition, a glossary of industry acronyms and terms was developed for community members to refer to during presentations (and as a

reference source later) to demystify industry jargon (Appendix B provides copies of the fact sheets and glossary). A further five brochures and fact sheets regarding Arrow Energy and its policies were made available to the community during the sessions, and included *Arrow Environmental Policy, Brighter Futures* (Arrow's community investment program), *Working at Arrow, Arrow Energy* (general information brochure about Arrow) and *Information for Landholders*. Some fact sheets produced for the upstream part of the project, the Surat Gas Project, were also made available to provide further information on the production of CSG.

4.4.2 Banners

Banners from Phase 2 consultation were updated and an additional two new ones were produced. The new banners were *What is an EIS?* and *Visual Impacts.* Four banners that have been used for consultation in the Surat Basin were also displayed, and these included *Land Access Rules, Business Opportunities, Working at Arrow*, and *Brighter Futures*. Copies of these are attached in Appendix B.

5.0 Summary of issues

This section outlines the issues and questions raised by stakeholders and community members during the consultation process. It also provides information regarding the ongoing consultation for the project.

5.1 Issues raised at one-on-one stakeholder briefings

Issues raised during one-on-one stakeholder meetings remained similar throughout the consultation phases and have therefore been grouped by topic in Table 13.

Table 13 Issues raised at one-on-one meetings during all consultation phases

Issues Raised	Description of issue
Housing and accommodation	Reduction in affordability and availability Impact of construction worker accommodation Location of the construction camp Housing strategy should be developed to pick up any increase in rent A legacy of a diversity of housing types should be considered by Arrow Preference for local workers rather than fly-in, fly-out workforce Lack of crisis accommodation due to hotels being booked up by proponents and contractors
Social and health infrastructure	Impacts can already be seen on already overstretched social welfare and community related services Greater support needed for family support areas Health services are under pressure Contributions to community infrastructure currently provided by LNG companies are not appropriate, i.e. either not needed or in oversupply Greater support needed for social infrastructure and community services Preference for LNG industry to contribute to Social Infrastructure Strategic Plan No obvious link between proponents and the Gladstone Foundation No mental health support
Employment and training opportunities	Limited employment opportunities, both short and long term, and what is available is mostly aimed at skilled workers Industry needs to get involved in education with regard to apprenticeships/training that can provide a 'living legacy' across the region
Impacts on environment	Short and long term environmental impacts Impacts of waste water disposal into the harbour
Business and procurement opportunities	Local procurement policy Opportunities for gas beyond LNG, such as chemicals and fertilisers

Issues Raised	Description of issue
Impacts on Gladstone Harbour, particularly boating and fishing	More information required on impacts on boating and fishing
EIS	EIS needs to address and mitigate the cumulative impacts of the four projects Consultation fatigue
Hard infrastructure	Concern about impacts on local and regional roads Public transport is currently inadequate and needs to improve if population is to increase
Corporate citizenship	Community perception that the LNG companies are set to make a large profit operating in Gladstone with no tangible benefits for its residents Sponsorship opportunities

5.2 Issues raised at community information sessions and public display

The following table (14) provides a list of the issues raised at the community information sessions and public display held during the second and third phases of consultation. The issues have been categorised by topic rather than location where they were raised.

Table 14 Issues raised at community information sessions and public display during all consultation phases

Topic	Issues Raised
Worker accommodation	Construction camp on Curtis Island Managing construction workers in camp Lifespan of the camp Logistics of numerous camps on Curtis island Access from plant to South End Health care provision/facilities for workers
EIS and approvals	Pipeline approvals EIS timeframe and opportunity for community contributions to the EIS process Land zoning and community input Possibility of project cancellation because of opposition to CSG in Surat Basin and Liberal National Party support for farmers Distrust of government managing the environmental management plan
Employment, business and procurement	Supply contracts Employment/skills training Apprenticeships Local workers versus importing workers

Topic	Issues Raised
	Purchasing policy
	Fly in, fly out workforce
	Job creation
	Local employment policy and procurement policy
	EPC tendering and selection
	Size of workforce
	Recognition of overseas qualifications
	Assurance of contractor's knowledge of local area
	Foreign ownership and origin of workforce
Social and health infrastructure	Impacts on health and education system
	Impacts on social infrastructure and facilities
	Impacts on accommodation and housing
	Temporary workers' accommodation facilities and permanent housing legacy for Gladstone
	Impact of workforce residing in Gladstone
	Integration of workers (particularly foreign workers) into the community/cultural induction
	Lack of Gladstone motel accommodation for tourists and other business activity
Port Curtis Harbour	Boat traffic on Port Curtis
	Impact of shipping and exclusion zones
	Impact on harbour/dredging
	Dredging of Calliope River
	Shipping turnaround and frequency
	Impacts of dredging on The Narrows, location of LNG plants in narrow channel
	Tug boats for LNG vessels
	LNG vessels and proximity to major population centres
	Launch site options and access to Curtis Island
Safety	Emergency response and impacts on health system
	Safety of LNG plant
	Pipeline leaks and safety
	Impact of shipping accident/emergency response plan
	Risk quantification
	Design of LNG vessels and oil storage
	Capability of local tug pilots
	Industrial terrorism and safety of plant
	Insurance for plant and risk analysis
Market	Consolidation of LNG projects

Topic	Issues Raised
	Gas destination (domestic or overseas)
	Carbon tax and LNG industry
Hard infrastructure	Impact on road infrastructure
	Impact of increased traffic on Bruce Highway
LNG Plant	Technology proposed, liquefaction process (C3MR) definition and process
	Cooling system for plant
	Construction timeframe
	Impacts on Curtis Island and size of LNG plant
	Water supply, use, treatment and discharge at LNG plant
	Energy source and project consumption
	Location of LNG plant and its life expectancy
	Potential for gas supply to Curtis Island residents
	Desalination and use of harbour water
	Number of trains
	Refrigeration requirements for LNG
	Battery limit of LNG plant
	Noise from plant
Pipeline	Pipeline corridor and logistics of pipeline construction
	Weed spread
	Pipeline corridor across the harbour/bridge option
	Location of tunnel from Gladstone to Curtis Island
	Use of tunnel for transferring workers between Gladstone and Curtis island
	Pipeline pressure, pressure tests and risk of fire/leak
	Insulation and cladding of pipes
	Manufacture of pipe
Coal seam gas	Management and treatment of water from CSG and desalination
	CSG drilling and impact on water table and aquifers
	CSG and salt
	CSG extraction process, BTEX and hydraulic fracturing
	Treatment of gas in the field
	Arrow's involvement in research on discharge of contaminated water
	Social impact management plan for CSG project
	Number of pipelines from Surat Basin to Gladstone
	Payment of landholder time
Environment	Impacts on World Heritage Area and Great Barrier Reef Marine Park
	Air quality, emissions, contaminants and flares
	Environmental Management Precinct and management of environmental

Topic	Issues Raised
	impacts Impact on marine life Cumulative impacts of LNG plants Contribution to greenhouse gases Visual impact of stacks Offsets for ecosystems Rehabilitation of area Health risk of heat plume
Social investment	Conditions and contributions pertaining to Gladstone Foundation

5.3 Ongoing consultation

As stated in section 1.4, EIS consultation will be ongoing and Phase 4 will see another round of information sessions and displays as well as other activities undertaken during the public exhibition of the EIS. These activities will include public notices, specific-issue briefings if required, one-on-one meetings and responses to email, telephone and written enquiries.

Once Phase 4 consultation is complete, and if a final investment decision to proceed is made by the joint venture partners, Arrow will develop and maintain community relationships and liaison during the construction and operational stages of the plant. Senior management of Arrow, including the Chief Executive Officer and the Vice President LNG/Integration, have made it publicly clear that they regard the EIS consultation as the beginning of a continuum, not the end, and that the EIS consultation has established a basis for the future integration of Arrow staff, contractors, and the plant as constructive and positive parts of the Gladstone community which will continue to add value for the duration of the LNG Plant's life.

To this end Arrow will continue to have community relations officers based in Gladstone to represent the company and the project, and to provide a conduit for the community to stay informed about the project and have the opportunity to raise any issues or opportunities. This will be further facilitated by the opening of a shopfront in Gladstone and Arrow project staff will reside in Gladstone during construction of the LNG plant and its operation.

6.0 Conclusion

The EIS consultation for the Arrow LNG Plant presented a unique challenge in that the Gladstone community had been consulted to the point of saturation. The reality of this could have been accepted and little or no effort made to motivate the community to participate in the consultation process. This was not the case, however, and an enormous amount of energy and resources was devoted to ensuring that the community and stakeholders were not only given every opportunity to become engaged and involved but also that their knowledge of LNG facilities and production, and the Arrow LNG Plant specifically, increased exponentially.

Feedback from, and evaluation of, the consultation activities helped both to guide the direction of the consultation and inform the project team of the significance and importance of specific issues to stakeholders and communities. In particular, the consultation assisted with understanding the social impacts of the LNG plant and allowed stakeholders the opportunity to have input into ideas and options for mitigation of those impacts.

A great deal of effort has been expended to ensure that all issues raised during the EIS consultation process have been incorporated into this report; it is hoped they will subsequently have an impact on the design, construction and operation of the project.

Arrow is to be commended for its willingness to import a range of technical experts who clearly impressed every audience with their patience, level of expertise and plain english translation of highly complex information during question and answer sessions; additionally their willingness to be accessible and responsive before and after the formal presentation sessions was commented on frequently. The energy, forthrightness and goodwill demonstrated by the Arrow team augurs well for its relationship with Gladstone and neighbouring towns as the project moves forward.

Appendices

A. Phase 2 materials and information
B. Phase 3 materials and information

Appendix A

18 August 2010

Dear

Invitation to community information sessions about the Arrow LNG Project

You are invited to an information session to learn more about the Arrow LNG Project, formerly Shell Australia LNG.

Arrow Energy is proposing to take coal seam gas from Gladstone by underground pipeline to a gas liquefaction and export facility on Curtis Island, for which it is currently conducting an Environmental Impact Statement (EIS). The coal seam gas will be supplied by Arrow Energy's reserves in the Surat Basin in South East Queensland, and in the Bowen Basin in Central Queensland.

Planning and investigation for the proposed project is underway and you will find on the reverse side of this letter a map of the area covered by the EIS. An EIS is a comprehensive study of all environmental, economic and social issues and potential impacts and benefits associated with the development of major projects. The results of the EIS studies will be publicly available when the EIS is published.

Community input is an important part of an EIS and Arrow Energy is committed to consulting with local communities and stakeholders throughout the process. The first consultation sessions on the Arrow LNG Project will commence this month on 31 August 2010.

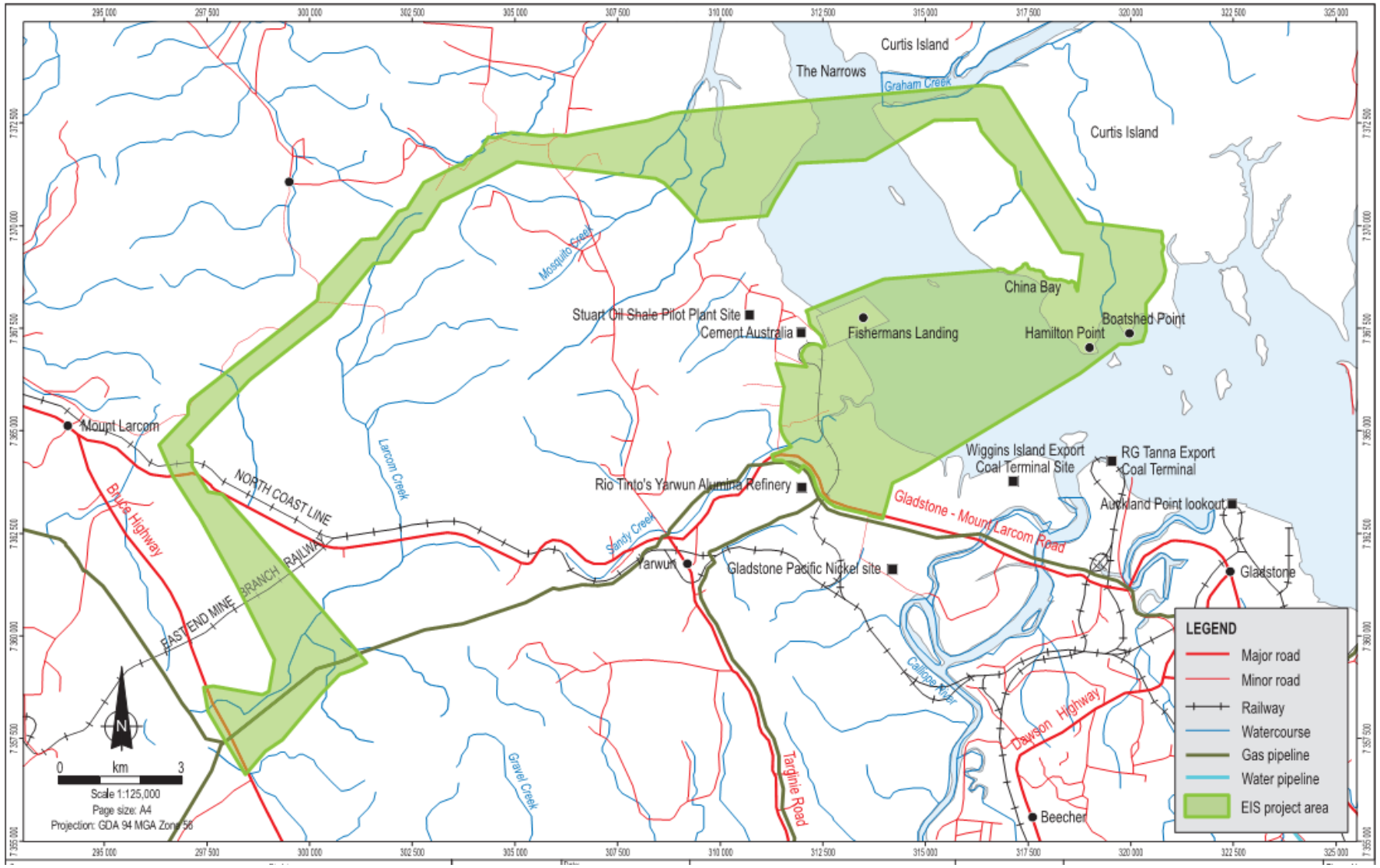
You are invited to attend one of the seven community information sessions being conducted in the EIS area. The sessions include presentations by senior project staff from Arrow Energy, and environmental consultants from Coffey Environments who are preparing the EIS. You will have an opportunity to meet the project team, hear more about what is proposed and ask questions about any aspect of the project. Full details about these sessions are on the enclosed flyer. You are most welcome to pass this information on to anyone who may be interested in the project so they are able to attend.

Light refreshments will be provided so your RSVP to your preferred session would be appreciated to assist with catering. To RSVP, or if you require any further information on the project, please contact the EIS project team on freecall **1800 038 856** or email **arrowlng@arrowenergy.com.au**

Your views are very important to the EIS process and we look forward to meeting you at one of these sessions. Further opportunities for community participation will also be provided over the coming months.

Yours sincerely

Leisa Elder
Vice-President
Community and Corporate Affairs


Curtis Island
The Narrows
Graham Creek
Curtis Island
Mosquito Creek
China Bay
Stuart Oil Shale Pilot Plant Site
Cement Australia
Fishermans Landing
Hamilton Point
Boatshed Point
Mount Larcom
NORTH COAST LINE
Larcom Creek
Bruce Highway
Rio Tinto's Yarwun Alumina Refinery
Wiggins Island Export Coal Terminal Site
RG Tanna Export Coal Terminal
Auckland Point lookout
Gladstone - Mount Larcom Road
Sandy Creek
Yarwun
Gladstone Pacific Nickel site
Gladstone
FASTEND MINE
BRANCH RAILWAY
Calliope River
Dawson Highway
Gravel Creek
Targinie Road
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Scale 1:125,000
Page size: A4
Projection: GDA 94 MGA Zone 56
LEGEND
Major road
Minor road
Railway
Watercourse
Gas pipeline
Water pipeline
EIS project area

Community Information Sessions
30 August – 4 September
Arrow LNG Project

Agenda

Morning session – 10.00am to 2.00pm

10.00am	Welcome and refreshments
10.30am	Presentation
11.30am	Questions
12.00pm	Break
12.20pm	Questions continued
2.00pm	Session ends (can be extended if required)

The Arrow Energy Project team will be in attendance for discussions as required.

Arrow LNG Project

Community Information Sessions 31 Aug-4 Sept 2010

Arrow Energy is planning the development of an LNG facility on Curtis Island off Gladstone; the facility will play an important role in meeting growing world demand for cleaner burning fuels. The project was formerly known as the Shell Australia LNG Project and is now called the Arrow LNG Project.

The proposed Arrow LNG plant on Curtis Island will be supplied with coal seam gas from Arrow Energy reserves located in the Surat Basin in Southeast Queensland and the Bowen Basin in Central Queensland.

In late August/early September 2010, Arrow Energy held its first series of community information sessions to discuss the Arrow LNG Project. Questions and answers from those sessions were captured by JTA Australia (who facilitated the consultation) and are presented in this document.

Questions varied across the seven sessions. To ensure that valuable information is shared throughout the communities of the Gladstone region, these notes summarise questions and answers asked across all sessions, and are grouped under topics for easy reference. The notes are based on written records and include paraphrasing. Where similar questions were asked at different sessions, the questions and responses have been combined to give a comprehensive response.

The Arrow LNG community information sessions were held from 31 August to 4 September 2010 at:

- Boyne Island 31 August
- Calliope 31 August
- Miriam Vale 1 September
- Gladstone 1 September
- Mt Larcom 2 September
- Gladstone 3 September
- Curtis Island 4 September.

How to read these notes

(1) Topics covered are:

- environmental impact statement (EIS)
- pipeline
- environment and water
- construction
- LNG plant and Curtis Island
- construction camp (Curtis Island)
- shipping and boating
- employment/workforce/training
- social/health
- transport
- consolidation
- market for LNG.

(2) Questions and comments from the audience are in bold type. The unbolded responses are from Arrow Energy's project representatives.

(3) In some cases, responses have been summarised. Where one response to a commonly-asked question was more comprehensive at one session than another, the more extensive response has been used in the interests of better understanding. In some cases, additional information is included to provide further context or explanation; this information is in brackets within the text, or italicised following the answer.

Arrow will hold another round of consultation sessions in the first half of 2011 to update the community on its EIS progress. Arrow will release further information closer to the time. If you have any questions or comments about the project or the meeting notes, please contact the project team during working hours on:

freecall 1800 038 856
email: arrowlng@arrowenergy.com.au
post: Arrow Energy LNG Project, Reply Paid 81 Hamilton QLD 4007

Commonly used acronyms

APLNG	ConocoPhillips/Origin Energy Australia Pacific LNG Project
BG/QGC	British Gas/Queensland Gas Company
CSG	coal seam gas
DERM	Department of Environment and Resource Management
DIP	Department of Infrastructure and Planning
DTMR	Department of Transport and Main Roads
EIS	environmental impact statement
EMP	Environmental Management Plan
EPBC	*Environment Protection and Biodiversity Conservation Act* (Cwlth)
FID	final investment decision
FIFO	fly in/fly out
GAWB	Gladstone Area Water Board
GPC	Gladstone Ports Corporation
LNG	liquefied natural gas
PPL	pipeline licence
SIMP	social impact management plan

Details of community information sessions

	Boyne Island community information session	
Date:	Tuesday 31 August 2010	
Venue:	Boyne/Tannum Community Centre	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Robbert de Weijer, Chief Operating Officer	Arrow Energy
	Barton Napier, Senior Principal	Coffey Environments
Other speakers:	Johan Goudriaan, LNG Project Manager	Arrow Energy
	Leisa Elder, Vice President, Community and Corporate Affairs	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
	Stuart Flynn, LNG Commercial Shipping Manager	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
	Michael Lampp, Manager Arrow LNG EIS	Arrow Energy
	Chris Mahoney, Associate	Coffey Environments
	Calliope community information session	
Date:	Tuesday 31 August 2010	
Venue:	Calliope Community Centre	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Robbert de Weijer, Chief Operating Officer	Arrow Energy
	Barton Napier, Senior Principal	Coffey Environments
Other speakers:	Johan Goudriaan, LNG Project Manager	Arrow Energy
	Leisa Elder, Vice President, Community and Corporate Affairs	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
	Stuart Flynn, LNG Commercial Shipping Manager	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
	Michael Lampp, Manager Arrow LNG EIS	Arrow Energy
	Chris Mahoney, Associate	Coffey Environments
	Miriam Vale community information session	
Date:	Wednesday 1 September 2010	
Venue:	Miriam Vale Community Centre	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Andrew Faulkner, Chief Executive Officer	Arrow Energy
	Barton Napier, Senior Principal	Coffey Environments
Other speakers:	Johan Goudriaan, LNG Project Manager	Arrow Energy
	Leisa Elder, Vice President, Community and Corporate Affairs	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
	Stuart Flynn, LNG Commercial Shipping Manager	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
	Michael Lampp, Manager Arrow LNG EIS	Arrow Energy
	Chris Mahoney, Associate	Coffey Environments
	Gladstone community information session (1)	
Date:	Wednesday 1 September 2010	
Venue:	Rex Metcalfe Theatre, Leo Zussino Building, CQU	
Facilitator:	Jan Taylor, Principal	JTA Australia

Presenters:	Al Mueller, Vice President, Operating Services	Arrow Energy
	Barton Napier, Senior Principal	Coffey Environments
Other speakers:	Johan Goudriaan, LNG Project Manager	Arrow Energy
	Leisa Elder, Vice President, Community and Corporate Affairs	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
	Stuart Flynn, LNG Commercial Shipping Manager	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
	Michael Lampp, Manager Arrow LNG EIS	Arrow Energy
	Chris Mahoney, Associate	Coffey Environments
	Mt Larcom community information session	
Date:	Thursday 2 September 2010	
Venue:	Mt Larcom Public Hall	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Al Mueller, Vice President Operating Services	Arrow Energy
	Barton Napier, Senior Principal	Coffey Environments
Other speakers:	Johan Goudriaan, LNG Project Manager	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
	Stuart Flynn, LNG Commercial Shipping Manager	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
	Gladstone community information session (2)	
Date:	Friday 3 September 2010	
Venue:	Rex Metcalfe Theatre, Leo Zussino Building, CQU	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Al Mueller, Vice President Operating Services	Arrow Energy
	Barton Napier, Senior Principal	Coffey Environments
Other speakers:	Alexandre Santos, Senior Process Engineer	Arrow Energy
	Leisa Elder, Vice President, Community and Corporate Affairs	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
	Stuart Flynn, LNG Commercial Shipping Manager	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
	Michael Lampp, Manager Arrow LNG EIS	Arrow Energy
	Curtis Island community information session	
Date:	Saturday 4 September 2010	
Venue:	Capricorn Lodge	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Al Mueller, Vice President Operating Services	Arrow Energy
	Barton Napier, Senior Principal	Coffey Environments
Other speakers:	Alexandre Santos, Senior Process Engineer	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
	Stuart Flynn, LNG Commercial Shipping Manager	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
	Michael Lampp, Manager Arrow LNG EIS	Arrow Energy

SUMMARISED QUESTIONS AND RESPONSES (compiled from all sessions)

ENVIRONMENTAL IMPACT STATEMENT (EIS)

What is the timeframe for the EIS approval?

Under the current schedule the EIS will be submitted next year, with state and federal government processes to follow.

Once the EIS is done, is everything locked in concrete?

No. The EIS considers the impacts of the project using worst case scenarios. The project will be refined during the design process but as worst case scenarios have been used in the environmental impact assessment, the impacts of the plant will probably be less than what are identified in the EIS.

What is the worst case scenario? If the Minister says no, have you got plans to move elsewhere?

Why would the Minister say no? The EIS will assess the impacts on the World Heritage Area, which essentially means Arrow Energy has to look at how it would adversely change the values of the area. It would have to be a significant impact for the Minister to be concerned. Arrow Energy will look at the values and their importance, e.g. the importance of Graham Creek in the World Heritage area, in assessing the project's impacts.

The southern route for the pipeline is focussed on reducing impacts which don't constitute a significant impact on World Heritage values. It is therefore hard to find a sound reason why the Minister would say no.

Thanks for coming to Mt Larcom. You are the first of the four that has come to the area. How similar will the draft EIS be to the final document? We see many that are very different. How much notice will there be on changes in The Narrows due to the dredging?

The purpose of the EIS is to assess the impacts of the project. We try to get it as close as possible to what it will be like in the functional design phase. However, the assessment is based on the worst case scenario, not on the detailed design, so we can demonstrate to the community and regulatory bodies that the impacts are manageable under the worst case scenario.

Once the EIS is prepared and displayed, people can make submissions and a supplementary EIS is then prepared to address them. Arrow Energy is not racing to get its EIS finished; it has an 18 month timeframe which puts Arrow Energy well behind the other proponents. The objective is to get the initial EIS right so that Arrow Energy doesn't have to address substantial issues in a supplementary EIS. To achieve this, Arrow Energy will attempt to pre-empt and address any concerns that could be raised in a supplementary EIS.

There will be a change to the planning schemes regarding the pipelines to Curtis Island. Approximately 99% of the pipeline route goes through the Gladstone State Development Area. The pipelines are incompatible with the current zoning so Arrow Energy has to apply for a material change of use. The licensed pipeline routes that travel through the Yarwun gap are located in a declared infrastructure corridor so we don't expect a problem in a material change of use application being accepted by the Queensland Department of Infrastructure and Planning (DIP).

All zoning has occurred since the government said that land cannot be changed. Is it supporting or opposing? There was no EIS to change the land from farming to industry. The EIS is just a document to make it look like it is doing the right thing. There are no rights for landowners.

Approval needs to be given not just by the Queensland Government but also the Australian Government as well. The authority for the project sits with the Queensland Coordinator-General who takes the requirements of both levels of government very seriously. The Australian Government must be satisfied.

PIPELINE

Are the pipelines approved for BG and Santos, as well as Arrow's pipeline, in the same corridor (from CSG fields to Gladstone)?

All four proponents' pipelines will be located in the Callide Infrastructure Corridor declared by the Queensland Government between the Callide Ranges and the Bruce Highway. There is currently no declared corridor for the pipelines east of the Bruce Highway. From the Bruce Highway there are two potential corridors for Arrow Energy – the Gladstone Infrastructure Corridor and the proposed Northern Corridor. Arrow Energy may share part of the proposed Northern Infrastructure Corridor with BG/QGC, Santos and Origin Energy or, alternatively, utilise allocated space in the Gladstone Infrastructure Corridor. South and west of the Callide Infrastructure Corridor the pipelines diverge to go to their respective gas fields. Arrow Energy's Surat Gas and Central Queensland pipelines have been subject to an EIS and a pipeline licence has been issued.

Are there other pipelines associated with each plant (from Gladstone to Curtis Island)?

There are currently four pipelines with two corridors identified. The Queensland Government is promoting a corridor north of Mt Larcom.

The northern corridor is being used by the other three proponents and possibly Arrow Energy. It will contain up to four pipelines. It is not practical to amalgamate all the proponents into one pipeline. It would be too big to construct and the pipelines need to cater for different pressures and travel to different connections at different plants. The type of gas will also differ. Arrow Energy's gas is pure methane, while the other projects will use gas of variable quality.

The second crossing to the south will involve an underground tunnel or horizontal directional drilling to cross Port Curtis. This option would have no impact on recreational fishers. Arrow Energy is yet to determine whether it participates in the Northern Infrastructure Corridor with the other proponents or uses its existing pipeline licences to Fisherman's Landing.

Arrow Energy can fit within the northern route option, i.e. the joint corridor, but it already has licensed pipelines all the way to Fisherman's Landing. It is waiting on the government's assessment of the northern corridor and its subsequent direction.

The pipeline in the northern corridor would be buried approximately two metres under the seabed at The Narrows. Smaller boats will have no issue during construction but larger ones may be affected. The dredging will have some effect on local fishers but restrictions on access through The Narrows during construction should only be about two days when the pipes are installed. BG's pipeline will be installed first, followed by the other pipelines.

There is also the question of whether all the projects will go ahead. Arrow Energy is confident its project will do so as it has supplies of gas both from the Bowen and Surat Basins, customers in Shell and PetroChina who will buy all the LNG produced, and the finance required due to Shell and PetroChina's involvement.

What are the logistics of the pipeline being built?

A pipeline is constructed by welding individual pipe segments together. The welded joints are coated before the pipeline is lowered into the trench and the trench backfilled to protect the pipe and reinstate the land to its natural surface. The land is then rehabilitated. This work takes place in the construction right of way (the area required to construct the pipeline) typically 30 metres wide.

Delivery of pipe to the pipeline route or right of way is a major logistical exercise. The pipe segments will be shipped to a port from where they will be transported by rail or trucked to pipe stockpiles (often at rail heads) along the pipeline route. Where possible, shipments of pipe are delivered directly strung out along the right of way in advance of the welding crews. The balance of pipe is delivered from stockpiles to the right of way. The pipe may come in through Bundaberg, Townsville or Brisbane then by rail up to Gladstone. Arrow is not likely to use the Gladstone Port as it is too congested.

The construction camp will move with the construction approximately every month, with spacing between the camps approximately 100km.

Arrow Energy will be working with the Queensland Department of Transport and Main Roads (DTMR) and other proponents regarding impacts on road infrastructure, particularly the cumulative impacts during construction of multiple projects.

Is the pipe being made locally?

The pipe is likely to be manufactured both internationally and in Australia depending on the size chosen. Moving it from the mills to the site is a significant logistical issue.

What do you see as the disadvantages of the tunnel (i.e. the southern pipeline option)?

The only disadvantage is the cost and the longer time to build, approximately three and a half years. The advantage is that it has very little environmental impact.

Is the environment as important to you as your commitment to safety?

There has to be a practical limit to what we can do to protect the environment. With regards to the northern pipeline route, the current proposal is that it be used by all four proponents so it is almost certainly going to be used i.e. even if Arrow Energy doesn't use that option, and opts for the tunnel instead, the northern option will still stand.

Would it be advantageous to build a bridge from Gladstone to Curtis Island, attaching the pipeline to the bridge and reducing the traffic on the harbour?

The road/rail bridge was not proposed by the LNG proponents but is being investigated by the Queensland Government. The bridge forms part of a land use study being undertaken by the state government at Hamilton Point, Curtis Island. It is also being looked at as part of a 50 year plan being undertaken by the Gladstone Ports Corporation to develop a connection between Hamilton Point and Gladstone.

The conceptual alignment is right on the edge of the Great Barrier Reef Coast Marine Park at The Narrows. The proposed pipeline corridor is south of the bridge. There has been some opposition to the bridge by residents and government. The bridge introduces a new access point that could lead to the introduction of feral animals and increased numbers of people visiting the island. The government will need to consider and resolve such issues in deciding how Hamilton Point will be developed.

It is not a good idea to attach the pipeline to the bridge as it is a large diameter pipeline and it is safer to have it on the sea floor where it cannot be accidentally hit by a ship.

With regard to the EIS approval for the pipeline (second option), why haven't you decided yet about the pipeline route? Is there going to be a supplementary EIS?

Only the corridor to Fisherman's Landing has been approved, as well as the pipeline to the Gladstone City Gate. The pipeline licences held by Arrow Energy don't extend to Curtis Island so we are looking at the impacts of building pipelines from those points to the Island.

What are the potential benefits to be delivered to the community? If you are taking natural gas to the island, can you take a small line to South End to provide natural gas?

The pressure of the gas being delivered to Curtis Island is very high. A small line wouldn't cope with the pressure and pressure reduction would be required. When you reduce the pressure of gas it has to be heated to avoid it freezing in the pipe. This involves a high cost for no reasonable return, particularly when there are few customers, as in a small community. The cost would be too high for the residents so there would be a lot of expenditure for very little benefit, although it is technically possible.

Will there be joint training with emergency services for emergency response in relation to the pipeline?

Emergency services will be consulted and their requirements included in management plans for dealing with emergencies including leaks or other incidents. Arrow Energy will work closely with all local services and factor in emergency management plans.

Fisherman's Landing looks south on the map, so whereabouts are you looking at crossing?

We are looking to cross Port Curtis from a point about 300m south of Boat Creek. The tunnel access shaft would be located off Port Curtis Way in the mudflats south of Fisherman's Landing.

Is it located in the oil shale preservation area?

The tunnel access shaft is located south of Boat Creek just outside the oil shale preservation area. It is located on DIP freehold land.

How do you determine leaks in the pipeline?

Pressure monitoring occurs at a series of valves along the pipeline. Pressure differences can be detected at these points and will then show up any leaks. Arrow Energy is also looking at a leak detection system which uses fibre optic cables that are very sensitive and it can pinpoint tiny leaks. There is also a visual component. If there is a small leak then there is an impact on the ground and plants usually die, leaving evidence of the leak.

The pipeline is constructed from very heavy gauge steel and is fully coated. Every five years Arrow Energy utilises what is called an 'intelligent pig'. It takes pictures inside the pipeline and measures the thickness of the pipe wall to identify evidence of corrosion or any cracking of the steel.

Australian regulations say every five years, but what is world's best practice?

Australian Government legislative requirements lead the way in terms of world's best practice. Parts of the USA do have similar requirements but many parts of the world do not have anything equivalent.

What is the depth of the pipeline and what sort of machines are used in construction

The pipeline on the mainland will be 1.2m below the ground while in some rural areas it might be 750mm. Pipe is laid at about 1.5 - 2km per day. A variety of equipment is used, depending on the terrain and soil conditions, including bucket wheel excavators in open country, excavators and, where rock is encountered, drilling and blasting

Are there benefits in starting the pipeline works now when the other proponents are digging?

Arrow Energy's pipeline is at least 30m from the other proponents' pipeline and therefore it would not be economically advantageous to dig one large trench. Arrow Energy can safely construct its pipeline next to the others, even when they are operational. This includes blasting, as the charges are designed not to cause damage to adjacent pipelines.

ENVIRONMENT AND WATER

Do you consider noxious weeds? The construction would disturb the soil and possibly spread weeds – do you cover the costs this would cause? What precautions are in place to prevent weed seed spread between properties?

This is a significant issue. This will apply to the pipeline corridor and the potential transfer of weeds along the corridor. As part of the Construction Environmental Management Plan (EMP), Arrow Energy is required to manage the corridor. We map the natural flora and fauna and are also required to map the weeds and identify infestations. The information gets built into a detailed Construction EMP, which includes strategies to ensure we don't introduce weeds into the region (for example via wash down of vehicles), and don't spread weeds within the region. There will be wash downs at points along the pipeline either side of an infestation. This gets addressed in the EIS, and then planning on how you deal with it is incorporated into the Construction EMP. Noxious weed procedures are already in place for our contractors undertaking fieldwork as part of the EIS.

If an outbreak does occur and it is related to transport associated with the project, then the project must deal with construction-related weeds. There would be remedial work following the pipeline to ensure weed-free pasture.

Is the water salty from CSG?

The amount of salt in the water varies, but the level of salt is about 25% of that of sea water. Arrow Energy plans to use a reverse osmosis plant to get the water to drinking water level.

What happens to the saline in the Basins?

The government has a very specific set of standards and requirements for the CSG industry. There are strict water and salt management standards and extensive monitoring is required. Our obligation is to treat water to meet Queensland Health requirements. We are looking at using reverse osmosis to treat water, but we are also actively exploring other options. Dams are also to be managed to a new set of standards which are retrospective. We are also looking at the beneficial uses for salt. Currently the salt is to be taken to a regulated landfill which may be in or outside the area. As a base case the salt will be removed from the landscape. We are also looking at other processes, such as crystallisation and thermal heat.

What happens to the water taken out of the gas?

The vast majority of the water is taken out upstream (in the Bowen and Surat basins). A lot of water is extracted so there are extensive discussions about what to do with it. Downstream (within the LNG process), any remaining water needs to be removed as the gas freezes, so the water is vaporised. The gas is air-cooled, and does not use water.

We have heard about problems in the Surat Basin regarding the bores, what guarantees are there it won't be the same here?

The publicity that has surrounded bores in Kingaroy is regarding underground coal gasification, not CSG. It is a different process. With CSG, water is produced to release gas and must be stored under strict regulations set by the government. The bores have to be protected from seepage. We are working hard to gain an understanding of the connectivity of aquifers, and work will be done to minimise any impacts. Currently, there is no evidence to suggest there have been any impacts.

Will there be methane in the water table? Can you address it?

The particular incident shown on television (*60 Minutes*) where gas was entering the water supply is not how it happens. The water bore on TV that was ignited occurred because the landholder (in Arrow Energy's tenure area) drilled his own bore which tapped into the Walloon coal measure. This is the same coal measure from which Arrow Energy takes its coal seam gas. By taking the water he has reduced the pressure in the coal seam and gas has started flowing. This has been happening for ten years and is not a result of the CSG industry.

What is likely to happen as more sites get drilled? Will it crack gas into the water table?

There is a process called fraccing which involves fracturing the coal to access the gas. In Surat we operate at quite shallow depths as the coal seam is permeable. However, in the Bowen Basin it is less permeable. To access the gas in the less permeable coal seams we inject water at high pressure to fracture the coal. The coal doesn't fracture above or below, just horizontally from the perforated spots in the pipe. Therefore it doesn't affect the connectivity of aquifers.

What studies are you drawing on to understand the impact you have on water, such as on the Great Artesian Basin?

We undertake base level assessments, model water volumes, study the amount of salt and research treatment processes. We will get better at predicting volumes as we get to know the area better e.g. the actual permeability of the coal seams.

Arrow Energy is also working with other proponents to understand the impacts on water. We will also make sure that information, such as water levels and water quality, is publicly available.

Is any of it based on past studies and models?

Arrow Energy has its own information that has been gathered in the past, and also uses information from government and landholders. However, we are planning more extensive groundwater modelling than has occurred previously.

On Curtis Island, what happens to the discharge water? Will the contaminants be emptied into the harbour?

The LNG will be cooled using air-cooling so there is no need for water. Water will be used for drinking, showering etc. There will be a water stream in the plant, which will be a closed loop stream. This water will be treated, along with the domestic water, in the sewage treatment plant to a level where it can be used for irrigation. Some water may need to be taken from the bay which will be treated using reverse osmosis (RO) and the brine sent back into the bay.

What happens with the excess saline resulting from the desalination?

The process used at the LNG plant to cool down the gas uses air cooling, not water cooling. In other parts of the world large amounts of water are used for cooling the gas.

The water used for drinking, plant processes and cleaning the gas turbines (once per month) is sourced from the sea and put through a reverse osmosis plant. The resulting saline is discharged back into the sea. The remaining clean water is used in the plant, approximately 750m³ per day. We are also having ongoing discussions with GAWB on sourcing water.

I would recommend you take water from GAWB. As a fisherman I would see some impact from taking water from Graham Creek and other fishing areas.

This option is being looked at seriously. The issue is getting a water pipeline to Curtis Island. If we use the southern route (i.e. a tunnel) then including a water pipeline is not a big issue.

With the discharge to the sea, there is no change of temperature and the discharge is done through a diffuser. We are investigating the environmental impacts of saline water discharges.

What is the minimum amount of water and the minimum impact using desalination? The heat eventually gets vented into the air. Have you looked at thermal desalination (mechanical vapour compression) instead of reverse osmosis?

When we extract the heat from the gas, the heat needs to go somewhere. We are aware of LNG facilities in the world that consume huge amounts of water. In those processes the conservation of water is very limited.

We reject the heat to the air, which has much less environmental impact than water cooling. Thermal desalination is much more energy intensive, whereas the footprint of reverse osmosis is much lower for the amount of water we are looking at. All process heat requirements come from the heat of the exhaust stacks.

What level of treatment will occur at the sewage treatment plant?

The water will be treated to the tertiary level and used in on-site irrigation. Primary treatment involves removal of solids in a settling tank following by secondary treatment that removes biological organisms. Tertiary treatment uses micro-filtration and/or ultraviolet light to treat discharges to standards suitable for reuse.

If each of the four plants uses reverse osmosis, then will this mean there will be four plants discharging brine into the harbour?

Arrow Energy is also looking at the option of piping fresh water from Gladstone to Curtis Island although the reverse osmosis plant may be preferred for economic reasons. We are having discussions with the other proponents and groups such as GAWB and the Gladstone Regional Council to look at ways to get services across to the island. Discharges from the reverse osmosis plant will need to comply with Queensland Government water quality standards.

Is there any other waste generated by the total process?

Gas is burned by the gas turbines (to produce power and compress refrigerants). Solid waste is also produced from areas such as the office and canteen which is put in regulated dumps on the mainland. There are emissions from the plant, such as gas turbine exhausts and waste gas. The plant itself produces no solid waste. With the domestic sewage, once the waste has been treated, any sludge is compacted and taken off the island.

What about the air quality and controlling emissions? What kinds of air contaminants are produced?

The emissions are reasonably clean as they are principally carbon dioxide and burnt hydrocarbon, and have very low levels of other toxic substances to the point of being almost negligible. There will be point source emissions from the turbines and other exhausts/stacks on the plant. These will

be modelled in a program using atmospherics and meteorology over the period of a year to assess how the plumes disburse. Preliminary results from our modelling show that we won't have a significant impact on the Gladstone air shed.

The Gladstone air shed is heavily loaded. However, on Curtis Island there are different topographic features to that in Gladstone (which is affected by the Mt Larcom Range which tends to trap air). With Curtis Island being further away the air quality is more influenced by the sea breezes rather than the Mt Larcom Range. The emissions should fall within acceptable standards partly because of the location where the emissions are more easily diluted by sea winds. This is also beneficial for the Gladstone air shed.

Do you have to look at the cumulative impacts of other plants?

It is a requirement of the EIS process to model point source emissions, how they disburse and how they mix with the emissions of other proponents. Arrow Energy's EIS will assess its emissions as a stand-alone project and will also look at the cumulative impacts of the four proponents. Arrow Energy will be using the same group that did the government study.

We always model the worst-case scenario, not the real case, as we don't know what else will contribute to the air shed. The modelling takes into account the air quality guidelines and levels of the Queensland Department of Environment and Resource Management (DERM), and then we add four projects. If we meet the requirements and standards of the worst case scenario, then anything less will be an improvement.

How much energy is consumed during the whole process? Is it clean, green energy?

It is a scientific fact that you don't get energy without expending energy, there are always inputs. Electricity is measured in conversion factors usually somewhere between 20-60%. This is the penalty paid for extracting, converting and shipping the gas. The economics of using gas makes it popular as it requires a lower conversion factor. Approximately 6-7% of the total gas will be used for powering the LNG plant.

The CSG comes out by itself at no pressure, although the drilling etc takes quite a bit of power. Again, it will be 6-7% if done through our own gas, but if we use electricity it has to be taken from elsewhere. So in total 12-14% of total energy taken out of the fields would be needed to supply power.

What impact do you expect to have on the environment, both plants and animals (for example, seagrass beds, dugongs, mangroves)?

The Commonwealth Government requires Arrow Energy to look at matters of national significance, such as turtles and dugongs. The primary purpose of the *Environment Protection and Biodiversity Conservation (EPBC) Act* is to protect environmental values even though it lists species to be protected. The Great Barrier Reef World Heritage Area listing covers the reef system and continental islands but it doesn't specifically mention Curtis Island. Consequently, we have to look at the values that would be impacted. These include habitat and geomorphic landforms. In the waters of Port Curtis there are listed species, such as the turtles and dugongs, but there aren't any listed fauna species at the LNG plant site on the island.

What about the option of a bridge over The Narrows?

The bridge is not an LNG proponent's option. The Queensland Government has developed a conceptual route for a road and railway to Hamilton Point which includes a road/rail bridge over The Narrows.

Arrow Energy is looking at two pipeline options. The northern option is across a wetland complex and The Narrows south of the proposed road/rail bridge. This option would lead to some

disturbance of the wetland complex. DERM has noted that it would like to see construction consolidated in a single trench, which would be fairly wide, and works on the assumption of a maximum of four pipelines. This would require an open cut method using steel sheet piles to create trench walls. The sheet pile walls would extend into The Narrows to deeper water. Material excavated from the trench would be trucked to the mainland to be treated due to the acid sulphate soils. Each pipeline section (about 2.5 km long) would be pulled into the flooded trench and dragged into and across the channel dredged across The Narrows. The pipeline sections would then be joined up to complete the pipeline from near Humpy Creek to Laird Point on Curtis Island. . There would be some impact on the listed migratory bird sites related to the wetlands. Arrow Energy has to assess the value of the site rather than just the fact that the birds are there. For example, the location could be a resting point but not a breeding site.

The southern option is the most direct route to the LNG plant but it does cross major seagrass beds south of Fisherman's Landing. The feeding trails of dugongs have been observed in these seagrass beds. There are no mangroves where Arrow Energy's proposed southern option pipeline comes ashore on Curtis Island but there are mangroves on the mainland. The options for this route are tunnelling or horizontal directional drilling (HDD) or a combination of HDD and dredging which effectively create an undersea pipeline. Construction using any of these options avoids impacts on the mangroves and seagrass beds and associated intertidal ecosystems.

On the LNG plant site, there is a minor creek and an endangered ecosystem. Arrow Energy will need to look at an offset site because impacting the endangered ecosystem can't be avoided due to the size of the plant. There are also small pockets of semi-evergreen vine thicket on the island but we avoid it all with the current design. There are no threatened fauna on the site that we are aware of at the moment. We will be removing all vegetation on site and will need to find an offset site in some forest red gum communities elsewhere. The Queensland Government favours regrowth to assist with the restoration and protection of these communities. Protecting regenerating forests through to maturity is one option available to Arrow Energy. Eco-fund can assist in identifying and purchasing suitable land for offsets and Arrow Energy will work with the fund managers to explore offset opportunities.

Does the company do some replanting to make up for vegetation cut down? Do you regenerate what's taken out?

Replanting doesn't protect the ecosystem. The idea is to protect ecosystems, not plants. The offsets allow for the restoration of an ecosystem although there are other greenhouse implications which may lead to mass planting elsewhere. The multiples of plantings are two to ten times that which is disturbed. The more endangered the plant, the higher the multiplier.

The environmental management precinct is 4500 hectares and is not currently part of the offsets. At the rehabilitation stage, we must put back (as close as possible) what was there originally.

What about the impact on marine life with the increased frequency of ships entering and leaving an already crowded harbour?

There are two aspects to consider. Firstly the LNG carriers are relatively slow moving so should have little impact on marine life. A greater impact is likely to come from cross-harbour traffic ferrying people and materials to or from Curtis Island. A further issue is the introduction of foreign pests and plants from ship ballast water. The port has significant seagrass beds used by dugongs for foraging so there is the potential for interaction and impact. Discharging ballast water is regulated by Australian Quarantine and Inspection Service which has published guidelines on its discharge.

The Queensland Government has written to the LNG proponents asking how we can manage the harbour traffic via frequency etc to minimise the impact on dugong and their habitat. It is likely that the dugongs will still use the area, as they have assimilated with the level of current traffic; however, we still need to consider it.

With regard to The Narrows, how much have you looked at the impact of dredging on water flows etc?

Arrow Energy is looking at two route options. The first option is the Northern Infrastructure Corridor which is being encouraged by the Queensland Government. This corridor involves crossing some mudflats and The Narrows. Arrow Energy understands that the current hydrodynamic modelling (undertaken by the other proponents) is not showing a significant impact from dredging The Narrows to install up to four pipelines. Once the trench has been backfilled there should be no impact on The Narrows.

The second option involves tunnelling straight across the harbour and would have little impact on the harbour.

The Arrow Energy site requires the least amount of dredging to access the site, if it was done in isolation. If the Western Basin project does proceed Gladstone Ports Corporation will work to understand the impacts of the larger dredging program.

What Great Barrier Reef Marine Park Authority (GBRMPA) zoning applies? The other LNG projects have said 'we can do this', but it is part of the World Heritage Area. Does the Federal Government have to give approval?

The declared boundary of the Great Barrier Reef Marine Park (GBRMP) runs along the eastern coast of Curtis Island to Cape Keppel and then through Keppel Bay. Port Curtis and Curtis Island are not part of the marine park. The marine park covers about 80% of the World Heritage Area which extends to the low water mark of the Queensland coast and includes Port Curtis and Curtis Island. We have to assess the values of the World Heritage Area as part of the EIS process, including the seagrass, dugongs and Curtis Island. This is required by the Federal Government.

What opportunities are there for the community to be involved in the federal process?

There is an opportunity for submissions under the EPBC Act. If you aren't satisfied with the answer from the Commonwealth Government regarding matters of national environmental significance, the community can ask for reconsideration of the Minister's decision. Once a controlled action has been declared you can apply for this at any time. Arrow Energy's LNG project has been declared a controlled action under the EPBC Act.

If a container leaks a large amount of gas, what impact does it have on greenhouse gases as it evaporates?

LNG contains methane, a greenhouse gas. A leak would result in methane being released to the atmosphere. Part of the EIS involves compiling an inventory of greenhouse gases which includes assessing the impact on greenhouse gases if there was an incident which released a large amount of LNG. While we do take this into account it is very unlikely that such a large leak would occur. A section of the EIS will be dedicated to greenhouse gases.

In terms of the plant's operations, there is a very limited impact on greenhouse gases from LNG production. The plant is designed in normal operations not to release any hydrocarbons i.e. it is designed for zero emissions. Other greenhouse gases (principally carbon dioxide) will be released from the combustion of gas in the turbines.

If there was an LNG spill, you wouldn't see the LNG but you would see water freezing or condensing. The gas would move along with the wind. There is only one atom of carbon in methane, which makes it very light. It naturally rises up and moves away from the facility as it warms up. For materials that have more than one atom of carbon (e.g. petrol or propane), then safety becomes more significant.

With the visual impacts of the stacks, would we see any emissions and what environmental impact would there be if you keep them low to reduce the visual impact?

The visual impact would include LNG tanks, exhaust stacks (from the gas turbines) and the flare stack. The height of the stack is determined by the plume rise. Gas turbine stacks are typically 40m. Methane is almost completely converted to carbon dioxide when combusted. Small amounts of nitrogen oxide are also emitted, but this substance is not harmful to humans or plants in those quantities. There would also be some greenhouse gas emissions from the carbon dioxide.

The heat plumes from the gas turbines and flare emit larger amounts of heat which could have implications for air traffic. An assessment is underway to look at this potential impact and we will be working with Civil Aviation Safety Authority on aviation matters. The flare is required for safety during emergency releases. Under normal operating conditions there is a small pilot flame so that the facility is in a state of readiness in case of an emergency (it is not a large flame).

The plant is designed for a scheduled shut down every three years and is designed for one to five controlled emergency responses per year.

The EIS is required to assess the impacts of the air emissions. We model the worst case scenarios of the plumes to see if they still comply with the state's regulations for emissions. Generally methane and its combustion by-products fall well within the standards.

We will also be using the Gladstone air shed model to understand the current circumstances and to model the cumulative effects of all proposed LNG plants. All these results are published as part of the EIS.

My experience with nitrogen oxide production at the power station [NRG's Gladstone Power Station] is that it needs very strict controls, and that it isn't innocuous.

The feed gas for the LNG plant is methane. Nitrogen oxide is produced during combustion in the gas turbines but at concentrations below 25 parts per million (ppm). Methane has a much higher thermal efficiency compared to coal, which has higher concentrations of nitrogen oxide. LNG is well within the limits of nitrogen oxide concentrations by an order of magnitude.

CONSTRUCTION

What year will you start construction?

The final investment decision (FID) will be made at the end of 2012. Construction would start shortly afterwards and there will be 44 months from start to finish. Therefore, impacts on resources and local services will not start happening until 2013. Some facilities will need to be developed in 2012, but site preparation will commence in 2013.

Is Arrow leading the way with its project?

Arrow Energy is one of the last. BG/QGC will make its FID much sooner. However, Arrow Energy is not in a hurry and has time to do the studies and make a final decision.

Which LNG project is going first? Real estate agents have had little notice from another project and we need to be prepared.

Currently the BG (QCLNG) project is the most advanced, with work commencing next year. There will be an industry approach to housing.

LNG PLANT AND CURTIS ISLAND

What technology will be used at the LNG plant?

The technology will be C3MR, which is a mix of propane (C3) and mixed refrigerant (MR).

What is the cooling system that will be used? Will it require water pumped from the river?

The system will use air cooling, not water. There may be a need for remedial water, but in a very limited amount. Arrow Energy is looking at using a reverse osmosis plant to provide drinking water to the plant and construction camp on the island.

How does the gas get extracted (in the coal seam gas fields)?

The gas is trapped in the coal seam by water, so a well is drilled and the water pumped out by an electric motor. When the well has been sufficiently de-watered the gas will flow. Over 20 years there are likely to be approximately 10,000 wells, which is about one well every square kilometre.

Arrow Energy is looking at a range of options for dealing with the extracted water, including reinjecting the water. Arrow is committed to managing the water it produces.

Is CSG/LNG used elsewhere? Is it a new procedure or has it been around for a long time?

CSG/LNG is new in Australia but it has been going on in the United States for 20 years. We have a lot to learn from North America, such as how best to drill the wells.

What happens to the surrounding area after 20-30 years?

There will be no major negative impact on the landscape.

Is it true that hot air goes up with a flame at the refinery?

Yes, a flare produces a hot air stream (if there is no wind). The EIS needs to look at the height and dispersion of the hot air stream to determine what elevation planes can travel at safely.

What will the impacts be on the residents of Curtis Island?

The project should have no impact. There is no relationship between South End and the plant site. There are about 10km between the Arrow Energy site and South End, and the track that links the two sites will be closed at the northern boundary of the Arrow Energy site. Other construction staff not housed on Curtis Island will commute by boat on a daily basis from Gladstone to the plant, so there will be no need, and no provision, to go to South End.

Will there be site visits for the community?

There will be a public open day, although we will be limited by how to get people there and the safety/security of the site. We will also need to consider at what stage the day is held, e.g. during construction or operation? Plus, we also have to be mindful of our neighbours (the other LNG facilities).

How many acres will the site require on Curtis Island?

It will be 140 hectares, with 80 hectares for the site and 60 hectares to the east for the construction camp. It will be approximately 600-800m long and 400m wide.

Will construction involve 24 hour shifts on the LNG facility?

No, work will occur during daylight hours. Only in exceptional circumstances, for example due to loss of time, will there be shift work.

Will you be using Bechtel?

We aren't sure about using Bechtel - probably not, as it will be working on the other three plants. The tender will go out for bidding; if Bechtel can demonstrate it can do it, we will consider it.

Are you looking at taking energy from the current grid or do you intend to generate the electricity you require for the plant on Curtis Island?

Currently the plan is to generate our own power using gas turbines, and use our own CSG to drive the (gas turbine) compressors for the liquefaction process.

However, we will also consider taking energy from the grid. Queensland has a robust energy grid with spare capacity. The compressors can use either electricity or gas turbine drives.

Will there be an on-site power station? Will you be using an air-cooled condenser for condensation to create steam to run the turbines?

There won't be any steam. We will be using gas-fired turbines to directly drive the compressors. Exhaust gas from the turbines will be used to heat water for use in the plant. The rest of the exhaust goes into the atmosphere, so there is no steam or water in the system.

Are the gas turbines also the power source for the LNG plant?

Yes, the plant uses gas turbines to generate electricity, as well as in the refrigeration process. There are separate power generation gas turbines and gas turbine compressors for the refrigeration process

What is the power of the gas turbines?

There are two levels of power required. There are four turbines per train for the gas compressors which run at 50 megawatts plus a spare turbine. Each gas turbine for power generation is 30 megawatts.

If the lifespan of the project is 30-40 years what happens after that regarding the availability of CSG in those basins?

The project could extend for longer than that. There is a large volume of CSG; however, it will be driven by the economics of producing the CSG. The plant will be abandoned once the gas runs out or it is no longer economically viable. Abandoning the plant means that it will be cleaned up, removed and the site rehabilitated. This is the requirement under the licences and arrangements from the government.

Is the abandonment built into the project costings?

Yes, it is built into the project economics, but given that it will happen possibly 30-60 years down the track it doesn't influence the decision on whether to go ahead with the project.

With the deal with the state government, the LNG proponents have been asked to put a considerable amount of money into the environmental management precinct. Will there be representatives from the proponents on the committee?

Arrow Energy has been consulted on aspects of the Environmental Management Precinct, particularly the management plan that is being prepared. Arrow Energy has asked if it can have a representative on the committee, but the decision is still up in the air.

Do you have the same commitment to the environment as you do to safety? If you were going to have a representative on the committee, wouldn't you hire professionals to be on it?

One report on the state of the area in terms of its conservation assets now shows that parts are degraded by previous land uses. The environmental management precinct will be coordinated by DIP and the LNG proponents will contribute to the costs. The next phase is the preparation of the management plan which will be designed to enhance the value of the precinct. This will be presented to you as what the government sees as the appropriate response.

Will there be increased turbidity due to sewage etc and what impacts will this have on the harbour? Would the discharge from the plant cause turbidity?

There won't be increased turbidity from Arrow Energy's plant. There will be some turbidity from the dredging and possibly from the methods used to construct the pipeline in the proposed Northern Infrastructure Corridor across The Narrows.

If Arrow Energy pursues the southern option there will be negligible levels because of the tunnel or horizontal drilling. The only turbidity would be from installing caissons (a sealed underwater structure in the harbour to enable the three stage horizontal directional drill, which would be local and minimal.

The LNG plant will be an air-cooled facility. It will use water for drinking, showers and toilets but the plant and camp will use a closed loop freshwater circuit. We will use water out of the bay, run it through a reverse osmosis plant, and then the brine that is left will go back into the bay at Boatshed Point. The water from the sewage treatment plant will be treated so that it can be used for irrigation on the site.

Does the Arrow Energy plant need dredging?

Yes, although it is being done through the Western Basin dredging project. Our participation in the project involves the least amount of dredging because of where the plant is located. If the Arrow Energy project was the only one to proceed there would be considerably less dredging.

What about the fire on Varanus Island in Western Australia between the plant and the ship? It was from oil, not CSG, and you say that LNG has a 100% safety record but I'm sure your competition says the same thing. What assurances do you have to reduce concerns?

Our pipeline design is not based on the same approach. We design on a risk-basis and use a very heavy wall pipe. In WA it was a very different industry i.e. heavy oil and gas. There have been no significant leaks to date on Australian gas pipelines. Our most important task is to keep the gas on the inside and we take that very seriously. We run tests every five years, which couldn't be done on Varanus Island because the pipeline comes from offshore. We use what is called an "intelligent pig" which measures the thickness of the wall, looks for corrosion and at the potential for leaks.

There is a 100% safety record in LNG shipping, but that's not at the plant. Issues happen in a perfectly designed plant because it's the quality of the operators not the materials. Issues have happened, but not major incidents. The quality, competence, training and rigour of the operators is just as important as the design. We can never rule out incidents so we have to keep a focus on them.

For example, the design of the plant gives us an indication of the potential hazards, which is then used to identify the hazard zones. We identify the results of potential hazards (e.g. an explosion) and ensure that it is not a hazard to anyone outside the plant fence. It would not have an impact on Gladstone either from pressure waves or fire. We do consider various scenarios and look at what

has happened in other industries. There are also government regulations for calculating the risks that we have to consider.

Are you cheek by jowl with the other facilities?

No, our neighbours are not directly against the Arrow Energy boundary. However, because the neighbouring facilities are LNG plants, the explosion can be greater although the general population would not be exposed. We identify the results of potential hazards (e.g. an explosion) and ensure that it is not a hazard to anyone outside the plant fence. It would not have an impact on Gladstone from either pressure waves or fire

How many metres above sea level will the plant be?

The site will be terraced; the lower section will be approximately 10m Australian Height Datum (AHD - the datum to which all vertical control for surveying functions is to be referred) and the higher section will be approximately 14m AHD. At 7m AHD the site would theoretically flood, so there is still a safe level of three metres if the flood was at its highest level.

Do you have any idea of the life expectancy of the plant? It is not a renewable energy, so when does it end?

The plant is designed for 25 years although that doesn't mean that it's then no good. There is no reason that it can't surpass 25 years. There is a plant in Brunei that has been operating since 1972 and is still going. In terms of how long we actually use the plant, it depends on the upstream gas reserves. There is a large amount of gas in the reserves, but we also need to consider the commercial/economic extraction of the gas as to whether the project remains worthwhile. We will learn more over the next five, ten, fifteen years as exploration progresses. You will hear many proponents talk of three to four trains, and there is also the opportunity for Arrow Energy to develop more trains, but that depends on the upstream activities.

Does it depend on worldwide demand?

We are confident that worldwide demand will continue to grow. There is worldwide demand for LNG and we predict that to continue on to and beyond 2020-30.

Community comment: We have been to all of the proponents' sessions in Gladstone, and we would like to compliment the team here tonight as you have been less confrontational and less threatening.

Are the plants in the Northern Territory/Western Australia close to open sea or in a narrow channel?

In the Northern Territory the plant is on the coast in Darwin Harbour. In Western Australia the plants are located on the coast and on islands.

How many LNG plants world-wide are located in a narrow channel?

The existing shipping channel is 180m wide. Withnell Bay in Western Australia is approached down a narrow channel and the vessel is required to complete a 180 degree swing before backing into berth. An LNG plant in Nigeria is also situated in a narrow channel which is dictated by the tides. There are quite a few regasification terminals in narrow channels, especially in the United States, that are not dissimilar to Gladstone.

The channel does bring restrictions with it. The LNG ships will be guided in by tug boats with a minimum of 30 minute intervals between them. There will be exclusion/safety zones around the LNG carriers and the channel will have one-way traffic only during the passage of the vessel.

With the one to five emergencies per year, what is an emergency?

There are two types of emergencies or upset conditions. The first is a result of equipment malfunction which causes the shutdown of the LNG train and the release of gas through the malfunction of a compressor or pump. This is a much more controlled emergency because we can control how we feed the gas to the LNG tanks. However, this is not 100% efficient so we need to release some gas through the flares.

The second type of emergency is an uncontrolled emergency which involves standard tests and procedures to minimise the risk. In an extreme case there could be a leak in the high pressure vessel. We would immediately stop the feed gas and isolate the area around the leak. This would also involve the release of gas via the flare to release the pressure.

This would not be catastrophic to the plant. LNG has a very good safety record but emergencies do happen.

Does the construction have cyclonic impacts factored in?

Yes, local meteorological conditions have been factored into LNG facility and shipping design. The engineering design has to cope with such events and risk management processes must be put in place to deal with abnormal conditions.

All ships trade worldwide and anchor offshore from a port in cyclonic events.

At a plant on the North West Shelf (Western Australia) there are six trains and they experience a lot more cyclones than Queensland. The LNG facility is well-designed and the plants generally keep running during these events.

Over time the gas picks up mercury/sulphur. How will they be extracted?

The gas to be used by Arrow Energy is very clean and only contains very small amounts of mercury/sulphur. There is a mercury removal unit in the process but there is no sulphur removal unit required at this stage. If it is required down the track then the plant is designed to allow for the addition of sulphur removal units.

What is the capacity of the trains?

Ultimately the plant will produce approx 16 million tonnes per annum from the four trains. The first phase will involve construction of two trains, and then it will depend on gas demand as to whether we go to three or four trains.

How will the increase from two to four trains change the shipping?

The shipping estimates are based on four trains. If you assume that all four projects have the same output, then there will be sixteen ships per week.

If there are four LNG plants is there a possibility for a domino effect should one of them catch fire?

There are safety zones included in the design. We model the effect of leaks and explosions to establish the safety zones. We position the facility away from the other plants to avoid a domino effect. We also design the facility so if there is an issue, one train won't be affected by the other one. This approach is applied even more so for the site next door. The safety zones are contained entirely within the Arrow Energy site so that any impact on the site will not affect our neighbours. The proponents' LNG plant sites are also 500m to 1km apart.

What size will the 'shut-down' maintenance workforce be?

We are forecasting 200-300 for normal operations and then for the maintenance turnaround every three years (for four weeks) there will be approximately 500-600 workers required.

Will Arrow Energy consult with the council around local planning? We have a major concern that the council is left out of the process but it will have to deliver the services to the community.

Arrow Energy will consult with all stakeholders including local council.

The refrigeration process would need propane. Where do you source the propane and where is it stored?

The refrigeration process requires two cycles. The first cycle is at minus 35 degrees, and the second cycle minus 160 degrees. The first cycle is the propane cycle, sourced from a barge and offloaded to the facility and stored. The second source is from iso-containers (containers that are designed to transport freight by ship, truck or rail) delivered to the plant on barges. The coal seam gas does not contain propane and is not consumed in normal operations. Some propane will be required for maintenance.

CONSTRUCTION CAMP

Will the construction camp on Curtis Island be single persons' quarters?

Yes, on Curtis Island they will be single person's quarters, and on the mainland families will be housed in a range of accommodation.

Will the camp be a wet or dry camp?

It will be a wet camp but when people show up for work they will be breath-tested and there must be no blood alcohol. There will be zero tolerance.

It is rumoured that there will be 1000 to 2000 people in the camps and there are different ideas about how the alcohol will be provided e.g. two hours around meal time?

The camp will be a wet camp, but it will serve light alcoholic beverages in limited amounts each time. There will also be breath-testers at the entrance to the site.

With 60% of the construction force accommodated on Curtis Island, will they be housed in singles' quarters?

Yes, the units will be 20-40m² in size.

Is the construction camp only going to be erected for the period of construction of the LNG plant? What happens to the structure at the end of the construction period?

Yes, for 44 months approximately. At the end of the construction period it will be removed and the ground will be remediated.

You took land from the area near South End residents, and their objections led to identification of an environmental management precinct. How are you going to keep 2500 workers on Curtis Island in place?

This will involve management of the construction workforce. Workers will be told to stay away from South End, and it will involve an education process with the right carrots and sticks. There will also be a hotline that South End residents can call.

Shell has constructed a number of facilities in environmentally sensitive areas, and we also recognise that we have to respect and work with Indigenous populations and local communities.

What is the reason behind bringing 2000 workers to live on Curtis Island and then developing infrastructure to support them? A fly-in fly-out (FIFO) work force is destructive to the community. Why place workers on Curtis Island and not in Gladstone?

The reason is related to safety. Arrow Energy has made a commitment to employ as many local people as possible, but we have to consider the scenario that there will not be enough local people to employ on the project. Therefore, we have to consider how we can safely move the FIFO workforce to and from work. The closer they are to the plant, the safer they are. Otherwise we are looking at 3000 people crossing the port each day.

The other reason is productivity and travel time. They can start work sooner if leaving from a camp on the island, in comparison to leaving a camp on the mainland and travelling to the island. The construction camp will also be temporary for five years, and will be dismantled once construction is complete.

But then not a cent gets spent on the island.

Not necessarily. The camp will need to be serviced. Due to the range of goods and services required, it is most likely to be supplied from Gladstone.

How are you going to protect the workers from the sandflies?

Shell has a lot of experience working in tropical conditions.

Each of the LNG projects has a different timeline. At any one time you may have 8000 workers on Curtis Island plus 4000 workers being transferred. This is an enormous task in terms of logistics. How will you do it?

Shell is very experienced with large camps. It will have a canteen and will provide utilities to generate power and supply water to the camp. We are also looking at local utility providers to provide power and water. We have been speaking with Gladstone Area Water Board about an alternative source of water and this is being looked at as part of the water study.

The overlapping of the projects will not be at peak construction. The proponents will be phasing their construction and workforce. After the facility has been built the construction camp will be removed, and the operational workforce of 200-300 staff will be housed on the mainland.

The number of construction workers will peak, and there won't be 3000 people in the construction camp the whole time, is that right?

For the first six months there will be civil works requiring 300 people. The peak workforce of 3000 people will be for one to two years, and then they will be phased out as we head into operation. There will be four years from the final investment decision to the first shipment of LNG.

There is a rumour there will be a camp behind the airport.

We are not aware of such plans.

SHIPPING and BOATING

You will be dredging a new channel, is that correct?

For the initial phases of LNG development, the Gladstone Ports Corporation (GPC) will be widening the current main shipping channel which will cater for expected shipping traffic. GPC is considering options to duplicate the main shipping channel, particularly if projects like Wiggins Island export coal terminal goes ahead. However, the current channel is sufficient for LNG shipping.

Where will recreational fishing boats go? Does the jetty get moved from The Narrows?

The project should have little impact on recreational fishing. There will be restrictions around the loading jetty and a safety buffer around the carriers. There is no planned work for Graham Creek and no restrictions on boats passing in and out of The Narrows. Irrespective of where Arrow Energy develops its mainland launch facilities, there will be no restrictions on the Calliope River boat ramp or on the Gladstone Marina.

Will there be a change in the shipping channels? How will it affect recreational shipping and boating?

Arrow Energy recognises that this is an issue. One of the advantages of being the last proponent is that Arrow Energy can get a better understanding of the cumulative impacts of LNG shipping. The EIS will address the impact on commercial and recreational boating and fishing, as well as traffic to/from the island. Arrow Energy will also work closely with GPC and the harbour master with regard to the increase in shipping. The LNG carriers will stick to the dredged channels and an education program on LNG shipping will be provided.

The marina is in the centre of the harbour – will it be moving to make way for LNG shipping?

No, there is no need to move the marina. This is the reason why we are looking north of Gladstone for launch sites.

How much consideration has been given to putting a bridge across to The Narrows rather than increasing boat traffic?

The Queensland Government has looked at putting a bridge across The Narrows. It is not part of Arrow Energy's plans, but we need to consider it and make provision for it in our pipeline route selection in case the Queensland Government decides to proceed with it.

Is there likely to be an accident with the increased traffic on the harbour?

We are working with the government to prevent accidents, and we will also be having a workshop for those with an interest in boating and fishing to discuss the impacts and their concerns.

Will there be an education campaign?

Marine Safety Queensland will run the program for boaties and fisherman.

Will there be an exclusion/safety zone around the carriers? What will the distance be?

There will be an exclusion zone around the jetty and the LNG carrier when it is loading. The exclusion zone is a radius of 250m from the centre of the LNG carrier. For the ships entering and exiting along the main shipping channel, there is to be half an hour between each ship movement so the impact on recreational boating should be minimal. As the ship moves there will be a separation of 30 mins between ships equating to approx 4 to 6 nautical miles separation. Additionally there will be a safety zone of about 1km at the front and 0.5km at the rear. Common sense should prevail for a boat approaching an LNG carrier from the side.

The carriers will be in a deep channel, which will have one-way traffic only; there will be approximately two ships per day.

Tug boats have been factored into the simulation at twelve knots although the actual speed is six knots. The traffic from all the projects has been taken into account for the purposes of our modelling.

Will there be markers showing the route through the channel?

GPC and the harbour master will maintain the route. If an LNG carrier is moving in one direction then nothing can come the other way. There will not be ships passing. Unlike coal carriers, LNG carriers will not be dependent on the tide.

What percentage increase do you expect in shipping traffic? Are the current shipping lanes sufficient?

We have done lots of modelling, including traffic crossing to and from the island and the impacts of the other projects. Arrow Energy's project is expected to result in a 12% increase in shipping, which means 240 movements per year and approximately four ships per week. If all four projects get up and running, there will be two ships per day. The ships will be at half hour intervals which means a lot of space between vessels. The ships will use the outer marine channels. The Gladstone Port Capacity Model shows no undue strain on the port's channels at this stage.

With the shale oil project about to commence again, plus steel, nickel and coal, how many ships will there be for them as well? With the exclusion zones there is plenty of space in high tide but in low tide it may be a problem.

The deep water channel that the ships use will have exclusion zones. It is hard to speak on others' behalf. The harbour currently has sufficient capacity but a bypass channel may be required in the future. GPC needs to manage the harbour as a whole. There will be an education program and interactive programs on shipping safety.

You need to look at the long term and the increase in traffic in the same channel. What about the cumulative impact because of all the proponents?

There will be a cumulative impact, and there is also the Wiggins Island Coal Terminal project that will contribute another group of ships into the harbour. One of the advantages of being the fourth proponent is that Arrow Energy can see what's happened with other projects and how they have dealt with the issue. It also allows us to see the government's response to their proposal, and to see how it works. Also, being the last proponent means we have to consider all the cumulative impacts as part of our EIS, which includes the impacts on dugongs, marine life etc.

If there is the potential that 1000 staff will be housed on the mainland and travelling backward and forward to Curtis Island, how will this impact on local boaties?

We don't know how many will be housed on the mainland; it depends on how many people can be sourced locally. There is the potential for an increased FIFO workforce if we can't source locally which means there might be fewer than a thousand Arrow Energy workers in Gladstone. Construction vessel rules are as laid down by the Gladstone harbour master.

In any case we would use passenger ferries which can carry a few hundred passengers at a time and may therefore only require one to three trips in the morning and in the evening. Obviously, the more you use the harbour the more congestion there is, so we would be trying to optimise movements across the harbour. This is being done in conjunction with the other proponents and the Gladstone Ports Corporation to work out the overall movements, then perhaps looking at certain times of day. Yes, there will be an impact on recreational boating and fishing, but the extent

of it is still to be determined. There will be consultation with the community and government on this issue.

If a ship is leaving the port fully loaded and has a crash, what is the result? Is there an explosion?

The Gladstone Ports Corporation has set ships to come in and out at 30 minute intervals, so precautions are being taken. The double hull carriers have an LNG hull and a ship hull so there is only a very limited possibility that the ship would sustain damage to both hulls in a collision. In theory, if it did happen the LNG would spill. If it was a small spill the area of the spill would freeze and the LNG would evaporate as the liquid became methane gas. There are limited ranges in which LNG would burn. There has been extensive testing of deliberate spilling and it is very difficult to ignite due to the concentration of methane and oxygen needed. The LNG may start to burn but it then burns off. It is very unlikely that it would explode. All of this testing gets factored into design and planning. If there was an explosion, the general population would hear or see the explosion but would not be affected by it as the shipping channel is a long way from the town. In the past 40 years the LNG industry has had a perfect safety record. When methane gas is transferred into LNG and stored it is not at pressure so if there was a break in the hull there would be a normal slow flow. A Quantitative Risk Assessment has also been completed.

With the transport plan site in Calliope River where you will take the material across, it gets very low at low tide. Do you plan to dredge in this location?

Yes, if we used the Calliope River we would need to dredge a five to six metre deep channel. The hydrodynamic modelling would look at the effect of the dredging on the behaviour of the river.

***Comment*: The dredging could be of more benefit than disadvantage. We often cannot get onto the Calliope River or Boyne Valley because of low tide. Therefore, any improvement due to dredging would be a benefit.**

With regard to the shipping, what is the load turnaround time and how many ships will be loading in a year?

The turnaround time for loading an LNG carrier is approximately 24 hours. There will be 240 Arrow Energy ship movements per year, which means approximately 4 per week. If all the projects go ahead and all have the same shipping numbers, then there will be 16 ships per week (approximately two a day – one at night and one during the day).

How controlled will the exclusion zone be?

The exclusion zones will be policed by the state government. There will also be a standby tug boat when the ship is in berth. The exclusion zone around the jetty and ship when berthed will be a 250m radius from the centre of the LNG carrier and also aligned adherence to the Gladstone Port Operations Regulation.

What effect will this have on The Narrows?

LNG carriers will not be using The Narrows. APLNG's loading jetty is located southeast of The Narrows near North Passage Island. The swing basin and access channel will be dredged as part of GPC's Western Basin dredging project.

Did the simulation take into account the currents at Hamilton Point?

We have used all available metocean (meteorological and oceanographic conditions) data. All simulations take into account the worst sea and weather conditions in the harbour. The materials offloading facility has been designed to address currents.

The current shipping schedules and barge timelines for South End permit residents to head into town in a window between 10.30am-2.00pm. We have a lot of problems now with schedules due to tides and the number of people on the island that need service. What will the shipping schedule for the harbour be when the LNG ships have been incorporated? When will South End residents be advised of the schedule so we can plan accordingly if we enter the harbour from South End heading to town...how long will we have to wait?

There will still be 30 mins between vessels thus there will be plenty of windows for crossing the channels. Better scheduling of commercial ships will be put in place by GPC. Also a timetable of ferry crossings will be available from LNG proponents.

EMPLOYMENT/WORKFORCE/TRAINING

We are concerned about the size of the fly-in/fly-out workforce. There is already a skills shortage in the area and people are arriving looking for jobs. What do you plan to do about skills/training? Will this be outlined in the EIS? Will you support up skilling?

Workforce and labour requirements will be looked at in the EIS. Time is what is needed to prepare a workforce. Arrow Energy will look at partnering with training institutes and TAFE, as well as working with schools, to increase the skill levels in the area. Arrow Energy has already had talks with the Gladstone Area Group Apprentices Ltd (GAGAL) and Energy Skills Queensland with regard to up skilling and new apprenticeships locally, in Brisbane and across the state. Our talks with Energy Skills Queensland, a state-wide provider, have been to discuss the upstream and midstream (pipeline construction and operation) opportunities. We know that due to the global financial crisis people have been losing jobs and therefore losing apprentices. We are working with these groups to identify opportunities for the region. Shell and PetroChina can also add value with respect to training. During the operating phase of the project, it is anticipated that staff will be Arrow employees.

What pressure will there be on larger contractors to engage smaller local companies rather than taking staff from local companies?

Arrow Energy is keen to work with smaller companies e.g. we are not looking at working with major international drilling companies. We will involve local companies where possible and will encourage the bigger Arrow contractors to do the same.

All proponents have said they will try to employ local people; however, at the front end engineering design (FEED) selection criteria weighting on tenders does not encourage larger companies to use local ones.

Arrow Energy will look at opportunities for local companies, such as the construction of the launch site. It can be difficult because the successful tenderer generally has a huge degree of freedom regarding whom they choose as subcontractors. They may choose Australian, but not necessarily local companies.

***Comment*: How you structure your contracts will affect what the larger companies do – your contract should specify that they have to engage companies, not people. This also helps with housing.**

All the proponents have said they will engage local companies but they haven't. You need to make the choice now to make the difference by looking at long term growth not a flash in the pan. Take advantage of not being time driven. You can have a major influence on tenders.

This is at the back of Arrow's mind. We will be here for 30-40 years and we want to develop local ability to support our activities.

Do you require special trades for construction? In the past larger contracting companies brought their own trades people. There are always all sorts of commitments. Is Arrow prepared to make a commitment to local employment?

We need to look at skills training to assist with our preferred option of local employment. The low temperature section of the plant requires special materials and specialist tradesman (e.g. in the welding of stainless steel). We will also need general coal industry skills such as civil and mechanical engineers and technicians.

Arrow will also need operators. Training for the maintenance and operation of our facilities has been achieved successfully previously.

One issue is whether the local market can sufficiently meet the demand for skilled and unskilled labour. Arrow Energy won't try to pursue people from outside the area; however, we need to consider whether the local market can support our activities. Arrow Energy actively pursues and supports local employment. We recognise that it is difficult for local companies to get a seat at the major contractor (consortium) level. We need to look at this in our contracting.

Arrow Energy's CEO has made a commitment to reviewing Arrow Energy's contracting strategy to include local content from a business and employment perspective.

Will foreign workers be brought in? There is a rumour surrounding another project that they had their own crew who were specialised LNG staff.

The goal is to have Australian workers, whether from Gladstone or elsewhere in Australia. We will need some specialists in LNG industries, so there will be some foreign workers.

Will you do this while constructing, not later?

It is around the facilities that local growth will occur. The construction workforce will be needed for four to five years and then will be gone. We don't want the local community to explode and then after five years all the people are gone.

***Comment*: There has been a rush to open local offices in Gladstone by national companies. You are not local if you have a shopfront.**

The smaller companies can be trained by larger companies to raise their standards so that they can grow with the larger companies.

We need to provide clear expectations to the community. We demand higher standards, for example for OH&S, which means the local suppliers have to meet these standards, including their business structure and how they manage it.

The Queensland Government also has a strong local content policy, and Arrow Energy is working with local government as well.

During, prior to or at the FEED process, how does someone or a group suggest a technology/approach? How does it fit into the FEED process?

The project will use Shell's patented design for an LNG plant.

The approach would be for upstream. It's not used in Australia, but it is used overseas. Who should I send it to?

Send it to me (Robbert de Weijjer).

Post meeting note: To send information to the project staff, please email the project address arrowlng@arrowenergy.com.au where it will be forwarded on to the appropriate staff member.

Will the 300 jobs during the operation phase be local?

Arrow Energy would like local staff. We will identify them, train them and base them in Gladstone.

How do you make contact with the company?

You can contact Arrow via the freecall number 1800 038 856, or by email arrowlng@arrowenergy.com.au

What is the percentage of fly in/fly out workers on Curtis Island?

Based on previous experience throughout Australia, we expect that up to approximately 1000 construction staff will be from the Gladstone region. Therefore approximately 2000 workers will be FIFO. If the other projects come online there will be more pressure for the region to provide workers, so therefore the FIFO workforce may be more.

Will the level of skill required be higher than what is available in Gladstone?

Not necessarily as the construction will be modular. The construction starts with civil work, then the modules which will be constructed overseas need to be positioned and joined together. It won't require specialist welding skills so local people could be trained. Some of the work may require specialists, but locals should be able to be trained for the majority of tasks.

***Community comment*: If local workers are overlooked then the project will lose community support.**

What is your purchasing policy? Will you be buying locally?

We are keen to procure locally; this is a driver for Arrow. We also need to consider the cost angle, but our perfect outcome would be to procure locally. We need to get to grips with the large contracts and look at how we can influence the large contractors to engage smaller local contractors.

How many jobs will be created with the actual pipeline and will more jobs be created due to the pipelines from the Bowen and Surat basins?

The workforce for the pipeline from the Surat Basin near Dalby to Gladstone and on to Curtis Island will peak at 600-700 people and there will be four construction seasons. There will be substantially more jobs in the upstream pipelines in the coal seam gas basins. The pipeline construction will have a shorter timeframe (three to four years) and is very specialised. It will require a camp-style FIFO workforce and every month it will move 50-60 kilometres. We will build one pipeline and then the other one. Ideally we would like to train people locally.

Will the FIFO workforce increase the air traffic? How often will people fly in and out?

The present schedule shows the workforce will fly in and out every two weeks which will increase air traffic, especially when talking about four projects. We are working hard to iron out the impacts by incorporating the capacity of the airport and we're also looking at the cumulative impacts. We will then work out whether the airport is sufficient. We are also working with the airport authorities on this issue.

What is your policy to employ locally? If all four projects employ locally then there will be no one in Gladstone to employ. Also, is there a buy locally policy?

Arrow Energy will employ locally where possible. Our policy and preference is to use local suppliers if possible, such as the contractors responsible for the construction of the facility. The use of local suppliers will be worked into our tender process.

Some specialist facilities will require international contractors.

Once the facility is operational where will people live?

The camp on Curtis Island is for construction only. The operations staff will be based on the mainland in Gladstone and surrounding communities.

What support mechanisms are there for local companies and tradesmen to approach Arrow for assistance?

Arrow Energy will also look at pre-qualification measures/processes for local suppliers.

What assurances are there that the contractors will have the same commitment as the proponent?

We realise we need to look seriously at how to incentivise contractors to employ local people and companies.

You say you are a Queensland company. Have you considered moving your headquarters to Gladstone?

We currently have staff located in Dalby and Moranbah. We need to maintain a head office in Brisbane but some of our operations, including upstream activities, will move to Gladstone when we open an office here. More and more Arrow Energy staff will head to Gladstone once construction is underway. In the short term there will be limited numbers of Arrow Energy staff in Gladstone.

SOCIAL/HEALTH

Do you intend to complete a social impact management plan (SIMP)?

A social impact assessment (SIA) must be done as part of the EIS; this will lead to a SIMP being developed. The SIMP will apply for the duration for the project.

What will the impact be on education in the Gladstone area?

Education Queensland has been very proactive and well organised, and has done rigorous planning to cater for all contingencies.

How will recommendations regarding health services be put to the Queensland Government? It is one thing to increase numbers, but how will people be recruited once the numbers have increased?

Arrow Energy is conscious of the health issues in relation to the project. The Queensland Government has done a Health Impact Assessment (HIA) and Arrow Energy will work with the government regarding the increased demand on services as a result of the project. The government will then use that information, combined with the HIA, to formulate strategies to deal with the increased demand.

Is the emergency response plan done in conjunction with other plants? How will the state government accommodate the extra LNG facilities? The current hospital facilities are

inadequate. Have you been talking to state and local government? How do you address it? What happens if there is a fire or an explosion and you need hospital beds etc?

We have been talking extensively to the Queensland Government as we do not want to be a burden. One of the options we have looked at in the Surat Basin is using private providers so that we are virtually self-sufficient. We are aware that Gladstone Hospital does not have an emergency doctor, so an option we are looking at is bringing services in via private providers. We also keep track of council discussions and are working with the government to come up with adequate solutions.

What about the influx of the general population as a result of more shops etc which also puts pressure on facilities?

We are trying to help government understand the number of people which will put pressure on services. We run scenarios to plan for it so that government knows what it needs to develop. We will also be using the Social Infrastructure Strategic Plan (a plan being developed for Gladstone Regional Council to guide investment decisions for providing strategic social infrastructure in the Gladstone Regional Council area) to help determine pressure points.

Are you in a position to pressure government to upgrade the hospital?

We have had conversations to help government understand the number of people and subsequent pressure this will place on this type of service. However, there needs to be transparency regarding taxes and royalties, as industry doesn't get a say in where the money goes.

When there are 3000 workers, it is too simplistic to simply use that number to determine the impacts. Once one person comes there is a multiplier effect e.g. when people come with their families. Then the multiplier calculation blows out, especially when you consider the other projects as well. You could be talking about 20,000 people. This is likely to have a huge impact on infrastructure.

A lot of the construction workforce will be FIFO, and they won't be bringing their families. With regards to the operational workforce, we are looking to state government to provide information on the multiplier effect, but this hasn't yet been provided.

The capacity of social infrastructure will be looked at as part of the EIS. The Social Infrastructure Strategic Plan (SISP) that has been undertaken for the Gladstone region will help us to work out the total impact of the project by showing where the deficiencies are.

TRANSPORT

There is already a high volume of traffic and wide loads on the Bruce Highway. Has the government made mention of upgrading the highway or mentioned safety aspects of the movement of large pieces of equipment? Is there going to be a collaborative effort by council and the state government?

We have already started discussions with the Queensland Department of Transport and Main Roads (DTMR) and the three other proponents (facilitated by DIP) and we are looking at the cumulative impacts and the pinch points around Gladstone, along the transmission pipeline and in the upstream field developments. This information will help to inform DTMR planning requirements and assist us with developing a logistics plan. The pinch points are where LNG proponents may put money towards road or intersection upgrades or introduce controls to reduce their impacts. The work with local council will follow.

What will be the effects on the roads from the increased volume and loads?

The assessment looks at road maintenance, bridges etc and timeframes. Each proponent is required to do a road impact assessment which then goes back to DTMR.

Will Queensland Rail be involved?

Not in the road impact discussion; however, we are having logistics planning discussions with QR to look at using rail to transport pipe to the pipeline right of way.

CONSOLIDATION

There is speculation about the number of LNG plants and rumours about consolidation of LNG projects – what is going to happen?

It is no secret that Shell and PetroChina have been having discussions with Santos. We are all looking at commercially advantageous ways to make our project better. However, it doesn't always work. Logic says there could be consolidation, but time will tell. Arrow Energy's current focus is on a stand-alone project, as we are capable of doing it on our own.

Arrow is not schedule-driven, therefore it can approach the project more strategically and do it properly.

Personal opinion of Robert de Weijjer (Chief Operating Officer, Arrow Energy): the Arrow Energy LNG project will happen because it has the backing of Shell and PetroChina which will also be its customer. BG/QGC (QCLNG) will also happen, but I'm not sure about the other two projects.

If there is consolidation, with possibly one or two plants which could mean changes to the timelines etc, will there be changes to the EIS?

Not necessarily. To use a hypothetical example – if someone bought into Santos, providing the project didn't change in configuration/shape/form of its project, then nothing else needs to happen. If there was a fundamental change, then the changes need to be addressed, although not necessarily through a new EIS which would push out deadlines.

Could it reduce the timeframes?

If there is an existing approval then there could be a time advantage if nothing changes in terms of the project.

MARKET FOR LNG

Are there supply contracts for the Arrow Project?

Shell and PetroChina are the customers; they will buy all the LNG and market it. Shell and PetroChina can afford to both finance the project and buy the gas generated by it.

So you are not in a rush because you have a secure market?

PetroChina is a 50% Joint Venture Partner along with Shell, so yes we have a fairly secure market.

Now that you are foreign-owned will any of the gas be sold domestically?

Arrow Energy provides 20% of domestic gas production in Queensland. Our focus will be on the LNG plant but we will not be ignoring the provision of domestic gas. The demand for gas in Queensland is relatively small and there is plenty of gas available.

Is every home in Gladstone going to get cheap gas?

The Central Queensland Pipeline has an allocation for domestic use. Not all the gas will go to the LNG plant. Arrow Energy is committed to supplying the domestic market.

What happens when China gets gas from Russia?

If the gas flows from Russia to China, then Russia would be very happy. China is trying to source gas, which is ongoing for them. It is not difficult to sell the gas due to global demand. Normal supply contracts are long term (20 years) and we are working towards an LNG facility that could potentially last 30-50 years. The demand for energy and LNG keeps growing.

Other proponents are talking about infusing LPG to LNG. Will Arrow also be doing this?

No. The reason for the LPG is to open up other markets. The Arrow Energy market does not require LPG. It has never been factored into our planning. We will need to import propane for operational purposes.

What is the projected lifespan based on gas flows and market plan?

The plant is designed for 25 years though this can be extended. We will need to drill at least 6000 wells to service two trains over 20 years. The productivity of the wells is lower here than in Western Australia where natural gas is produced. However, the full potential of the very large coal seam gas reserves is not fully understood and may produce gas well into the future. The gas coming out of the ground is almost pure methane which requires very little processing before being transformed into LNG. This makes coal seam gas attractive as a feed gas for LNG production.

GET INVOLVED IN THE ARROW LNG PROJECT

Arrow Energy invites you to attend a **community information session** about its plans to take coal seam gas from Gladstone by an underground pipeline to a gas liquefaction and export facility on Curtis Island (formerly the Shell Australia LNG (SALNG) project). Gas will be delivered to Gladstone via underground pipelines from Arrow Energy's tenements in the Surat and Bowen Basins. At each information session, specialist project staff will give a presentation about the project including the work to date on the Environmental Impact Statement (EIS). Staff will be available to answer your questions and talk one-on-one.

Sessions in your area include:

Boyne Island/ Tannum Sands	Tuesday 31 August, **10am-2pm** (presentation starts at 10.30am) Boyne/Tannum Community Centre, Cnr Wyndham and Hayes Ave, Boyne Island
Calliope	Tuesday 31 August, **6pm-9.30pm** (presentation starts at 6.30pm) Calliope Community Centre, Don Cameron Drive, Calliope
Miriam Vale	Wednesday 1 September, **10am-2pm** (presentation starts at 10.30am) Miriam Vale Community Centre, Blomfield St, Miriam Vale
Gladstone	Wednesday 1 September, **6pm-9.30pm** (presentation starts at 6.30pm) Rex Metcalfe Theatre, Leo Zussino Building, CQU, Bryan Jordan Drive
Mt Larcom	Thursday 2 September, **10am-2pm** (presentation starts at 10.30am) Mt Larcom Public Hall, 47 Raglan St, Mt Larcom
Gladstone	Friday 3 September, **10am-2pm** (presentation starts at 10.30am) Rex Metcalfe Theatre, Leo Zussino Building, CQU, Bryan Jordan Drive
Curtis Island	Saturday 4 September, **10am-2pm** (presentation starts at 10.30am) Capricorn Lodge, South End, Curtis Island

As light refreshments will be provided, an indication of your interest would be appreciated to assist with catering.

To **RSVP** or find out more about the Arrow LNG project and how to get involved in the EIS, contact the project team at **freecall** 1800 119 382, **email** arrowlng@arrowenergy.com.au

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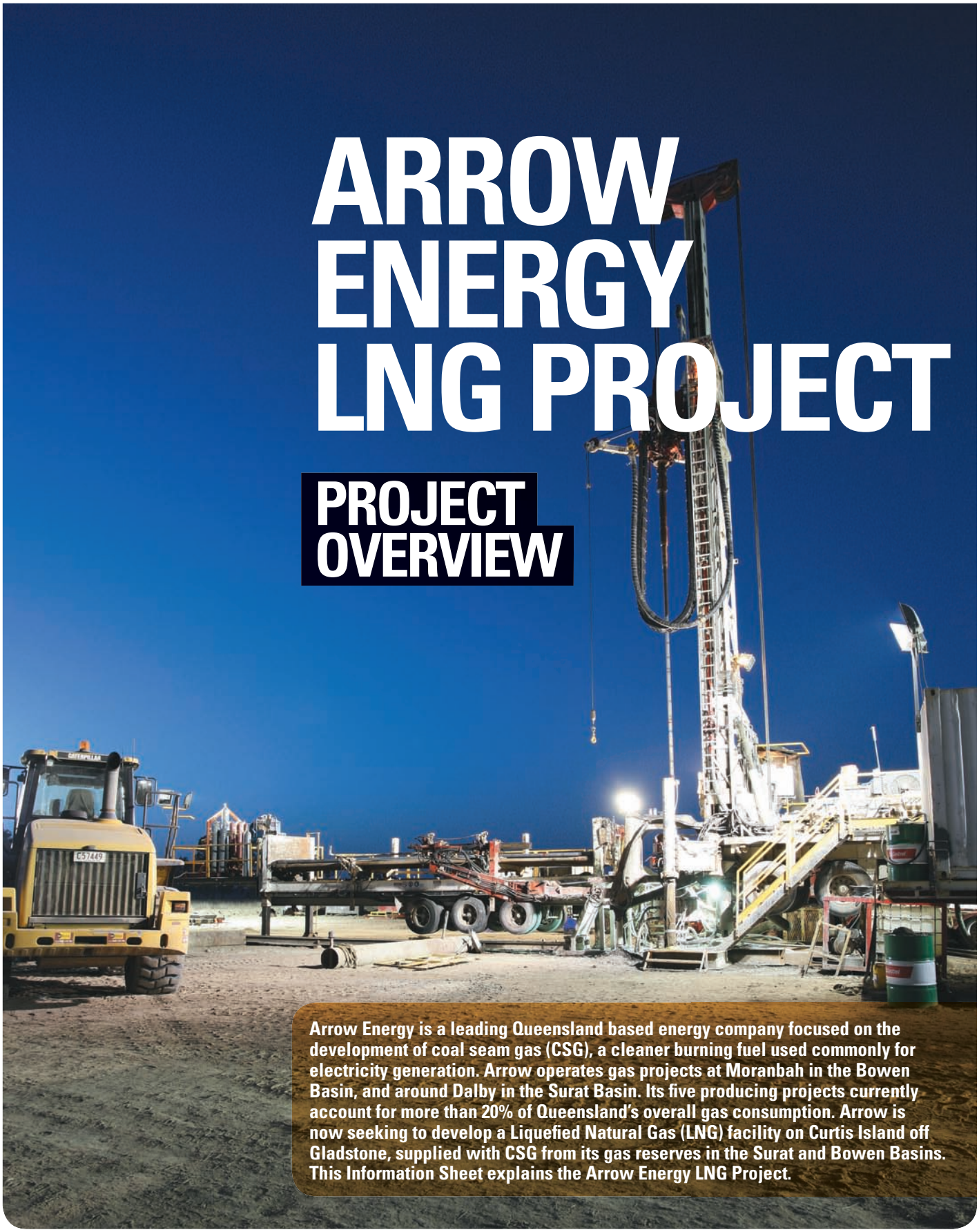
ARROW ENERGY LNG PROJECT

PROJECT OVERVIEW



Arrow Energy is a leading Queensland based energy company focused on the development of coal seam gas (CSG), a cleaner burning fuel used commonly for electricity generation. Arrow operates gas projects at Moranbah in the Bowen Basin, and around Dalby in the Surat Basin. Its five producing projects currently account for more than 20% of Queensland's overall gas consumption. Arrow is now seeking to develop a Liquefied Natural Gas (LNG) facility on Curtis Island off Gladstone, supplied with CSG from its gas reserves in the Surat and Bowen Basins. This Information Sheet explains the Arrow Energy LNG Project.

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PROJECT OVERVIEW

Arrow is planning the development of an LNG facility on Curtis Island off Gladstone which will play an important role in meeting growing world demand for cleaner burning fuels. The project was formerly known as the Shell Australia LNG Project and is now called the Arrow Energy LNG Project.

The proposed Arrow Energy LNG plant on Curtis Island will be supplied with coal seam gas from Arrow Energy reserves located in the Surat Basin in South East Queensland and the Bowen Basin in Central Queensland.

The Arrow Energy LNG Project has been declared a 'significant project' by the Queensland Government; this reflects the complexity of Queensland and Commonwealth approvals required, the project's potential impacts, and the importance of the Gladstone region to national, state and local economies.

The project involves:

- construction of a gas pipeline from near the Bruce Highway to Curtis Island
- construction of a liquefaction facility where coal seam gas will be converted to LNG and stored for shipment in LNG carriers to growing LNG markets
- construction of marine facilities such as jetties on the mainland
- construction of jetties, offloading facilities and LNG Carrier Terminal on Curtis Island in the vicinity of North China Bay, Hamilton Point and Boatshed Point
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The project is also supported by a dredging program off Port Curtis being managed by the Gladstone Ports Corporation to extend shipping lanes to berth pockets and develop swings basins for LNG carriers to load and manoeuvre. The Western Basin Dredging Project by the Port is subject to a separate EIS approval.

The liquefaction facility will produce up to 16 million tonnes per annum (mtpa) of LNG, and includes the phased construction of up to four trains or processing plants on its Curtis Island site. Stage 1 includes the construction of two trains of around 4mtpa of LNG each on the Arrow site at Boatshed Point.

In December 2009, Shell signed an agreement with the Gladstone Ports Corporation to acquire land on the south western end of Curtis Island. This land is within the 1,500ha Gladstone State Development Area (GSDA) – Curtis Island Precinct, set aside for LNG development.

Before the project can proceed, Arrow must gain approval from the Queensland and Commonwealth Governments. Prior to government approval, regulatory authorities must be satisfied the activities have been properly assessed and that appropriate measures are in place to avoid or minimise environmental impacts. To do this, Arrow will prepare an Environmental Impact Statement (EIS) which will examine the entire development.

An EIS is a comprehensive study of all environmental, economic and social issues and potential impacts associated with development of major projects. The EIS for the Arrow Energy LNG Project will set environmental controls to govern all aspects of the project's construction and operation. The EIS is required to consider all potential impacts from the project including impacts on land use, geology and soils, terrestrial, aquatic and marine ecosystems, marine hydrology, surface water and ground water, air quality and greenhouse gas emissions, noise and vibration, landscape and visual amenity, marine and road traffic, roads and infrastructure; cultural heritage and socio-economics will also be extensively studied.

Public input is an important part of an EIS and Arrow is committed to consulting with Curtis Island and Gladstone communities and stakeholders throughout the process. Activities such as consultation sessions will be advertised in local media. For more information about the EIS process, please read the Information Sheet Arrow LNG Project: Environmental Impact Statement.

ABOUT ARROW ENERGY

Arrow Energy is a Queensland based company owned by a 50/50 joint venture between Shell and PetroChina which took ownership of Arrow Energy on 23 August 2010.

Arrow Energy is an emerging leader in coal seam gas development. It is the single biggest acreage owner of CSG reserves in Queensland, with interests in more than 65,000 km2 of petroleum tenures located close to Queensland's key markets (Brisbane, Gladstone and Townsville). Arrow has four producing CSG projects in the Surat Basin near Dalby and one project in the Bowen Basin near Moranbah which account for more than 20% of Queensland's overall gas production.

Shell has had a presence in Australia since 1901. Its current operations include developing large gas resources and maintaining substantial exploration portfolios off the coasts of Western Australia and the Northern Territory, as well as pursuing coal seam gas opportunities in Queensland. Shell is an internationally-recognised leader in LNG, has delivered some of the world's most complex LNG projects in the last 40 years and today operates one of the largest LNG carrier fleets in the world.

PetroChina is China's largest oil and gas producer and distributor, and one of the world's largest oil companies. PetroChina was incorporated as a joint stock company in 1999 as part of the restructuring of China National Petroleum Corporation (CNPC). PetroChina brings extensive experience in exploration, refining and marketing of oil and natural gas in China and other countries.

The Shell and PetroChina investment in Arrow Energy means that the Arrow Energy LNG Project will be underpinned by significant field development expertise, established LNG technology, production and supply experience, and industry and market knowledge.

SITE SELECTION

A detailed site selection study has been undertaken to identify and evaluate suitable sites for an LNG facility. The study confirmed Curtis Island as the most suitable site due to its proximity to CSG fields, a protected deep water port, existing infrastructure, access to a local workforce and the availability of land within the Gladstone State Development Area. A number of preliminary investigations were commissioned to confirm the suitability of the site, including geotechnical surveys, vegetation assessment and a cultural heritage survey.

Extensive studies and simulations for the safe navigation of LNG carriers within the Port of Gladstone have been carried out in consultation with Maritime Safety Queensland, the Regional Harbour Master, Gladstone Ports Corporation and other LNG proponents. These aim to ensure a common agreement on the safe navigation of LNG carriers through the Port.

PIPELINE ROUTE

Two pipeline route options are being investigated:

- a direct route using the Surat-Gladstone Pipeline corridor to the south of Fisherman's Landing and across Port Curtis to the LNG facility site
- an indirect route around Mount Larcom and across The Narrows between Friend Point and Laird Point via the proposed Northern Infrastructure Corridor.

Ongoing investigations as well as studies conducted as part of the EIS will help inform Arrow on the most appropriate route.

PROJECT BENEFITS

The Arrow Energy LNG Project is expected to have many economic benefits for Queensland and the Gladstone region, including job creation, taxable income, and increased regional and local business opportunities.

The project is expected to create benefits such as:

- employment opportunities directly through job creation at the facility and indirectly through the provision of goods and services
- an estimated 2,500 to 3,000 jobs during the peak construction period
- between 200 and 300 permanent jobs at the LNG facility
- a substantial and sustained investment in the Gladstone and Queensland economies over the next 35 years or more
- growth in Gladstone's economy through increased employment opportunities, provision of goods and services, and stimulation of other industry development
- diversification of Gladstone's industry base with the introduction of new technologically advanced businesses in the region and
- development of Queensland's vast gas reserves for a growing export market, leading to the provision of increased revenue from taxation and royalty payments to state and federal governments.

WORKING WITH LANDHOLDERS

Arrow recognises every piece of land as unique. The company is committed to working closely with landholders to ensure work practices minimise impacts on land and existing agricultural activities.

Prior to commencing any activities on private property, including EIS investigations, Arrow communicates with landholders. When determining temporary and/or permanent locations for plant and equipment, all aspects of the property are considered in consultation with the landholder. Agricultural activities, stock considerations, seasonal conditions, topography, drainage lines, service corridors and vegetation and fauna communities are all taken into account.

FOR FURTHER INFORMATION ABOUT THE ARROW ENERGY LNG PROJECT

Telephone: freecall 1800 038 856
Email: arrowlng@arrowenergy.com.au
Visit: www.arrowenergy.com.au

RELATED PROJECT INFORMATION

Arrow Energy LNG Project: Environmental Impact Statement
Arrow Energy LNG Project: LNG Shipping
Arrow Energy LNG Project: LNG Safety

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www.dme.qld.gov.au/mines/coal_seam_gas.cfm

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Department of Environment and Resource Management
www.epa.qld.gov.au/environmental_management/land/petroleum/guidelines.html

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Department of Infrastructure and Planning
www.dip.qld.gov.au/projects

Commonwealth Government Environmental Assessment

Department of Environment, Water, Heritage and the Arts
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BE INVOLVED

Arrow Energy will run a comprehensive program of engagement and consultation activities that ensure all residents, businesses, community members and other stakeholders have adequate opportunity to discuss the Arrow Energy LNG Project. It will include community information sessions, group briefings, meetings and other events.

Independent community consultants, JTA Australia, will facilitate consultation with the community, document community concerns, questions and comments, and compile an independent consultation report for government as part of the EIS that will inform decision-making processes.

Representatives from Arrow Energy and Coffey Environments, Arrow's lead EIS consultant, will be available at community information sessions to outline the project, the government process, and to answer questions.

All consultation events will be promoted through the web (www.arrowenergy.com.au) and in the local media.

To obtain further information about the project, you can:

- call the Arrow Energy LNG Project freecall number 1800 038 856
- access up-to-date material at www.arrowenergy.com.au
- email arrowlng@arrowenergy.com.au
- write to Arrow Energy LNG, Reply Paid 81, Hamilton QLD 4007.

Enquiries will be handled promptly and your privacy will be respected.

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ARROW ENERGY LNG PROJECT

LNG SAFETY INFORMATION

Arrow Energy is a leading Queensland based energy company focused on the development of coal seam gas (CSG), a cleaner burning fuel used commonly for electricity generation. Arrow operates gas projects at Moranbah in the Bowen Basin, and around Dalby in the Surat Basin. Its five producing projects currently account for more than 20% of Queensland's overall gas use. Arrow is now seeking to develop a Liquefied Natural Gas (LNG) facility on Curtis Island off Gladstone, supplied with CSG from its gas reserves in the Surat and Bowen Basins. This Information Sheet explains safety aspects of the project.

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PROJECT OVERVIEW

Arrow is planning the development of an LNG facility on Curtis Island off Gladstone which will play an important role in meeting growing world demand for cleaner burning fuels. The project was formerly known as the Shell Australia LNG Project and is now called the Arrow Energy LNG Project.

The proposed Arrow Energy LNG plant on Curtis Island will be supplied with coal seam gas from Arrow Energy reserves located in the Surat Basin in South East Queensland and the Bowen Basin in Central Queensland.

The project involves construction of:

- a gas pipeline from near the Bruce Highway to Curtis Island
- a liquefaction facility for conversion of CSG to LNG and storage for shipment in LNG carriers
- marine facilities, such as mainland jetties
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The liquefaction facility will produce up to 16 million tonnes per annum (mtpa) of LNG, and includes the phased construction of up to four trains, or processing plants, on its Curtis Island site. Stage 1 includes the construction of two trains of around 4mtpa of LNG each on the Arrow site at Boatshed Point.

The project is also supported by a dredging program off Port Curtis managed by the Gladstone Ports Corporation to extend shipping lanes to berth pockets and develop swings basins for LNG carriers to load and manoeuvre. The Western Basin Dredging Project by the Port is subject to a separate EIS approval process.

LNG CHARACTERISTICS

LNG is a natural gas which is cooled and condensed into a liquid. It is odourless, non-toxic, non-corrosive and less dense than water. It is methane with small amounts of ethane, propane and butane. It is generally transported and stored at atmospheric pressure for bulk transport. LNG is typically stored at temperatures around minus 160˚C.

While LNG vapours have no odour or colour, if an LNG release occurs its low temperature will cause condensation of water vapour in the air and form a visible white cloud.

LNG PROPERTIES

LNG itself does not burn because it does not contain oxygen. However, LNG vapours are flammable in air within a concentration range of 5 to 15%. If the vapour concentration is lower than 5% it cannot burn because of insufficient fuel. If the vapour concentration is higher than 15% it cannot burn because there is insufficient oxygen.

LNG PRODUCTION

An LNG facility is technically classified as a hazardous facility under government guidelines. However, the relative risks are low as LNG production facilities adhere to strict international standards that provide criteria for site selection, layout, equipment fabrication and installation, construction and operation of these facilities. The facility's design, safety monitoring systems and operator training will ensure that in the unlikely event of an incident the consequences are minimised.

LNG production facility personnel are highly trained and specialised. They are fully versed in detailed contingency plans to cover even the most unlikely incidents. Regular exercises are conducted to test their response capabilities.

Best management practices are integral for safe and secure LNG production and include such things as continuous training of plant personnel in process operations and safety, detailed procedures, planned and unannounced safety and security inspections. In addition, pre-arrival inspections of facilities and ships are carried out with regular third party safety and code compliance audits. Site security is considered a high priority at an LNG facility and is maintained by limiting access via protected enclosures, constant monitoring and security personnel.

LNG STORAGE

LNG is stored in purpose-built, sealed low pressure storage tanks at -161˚C. LNG is 600 times smaller in volume than in its gaseous state.

The LNG tanks are of the full containment type, i.e. they have a primary and secondary containment system. The primary containment is designed for low temperatures, made of nickel steel in full containment tanks or corrugated stainless steel in membrane tanks, with a secondary containment system to ensure that any potential leaks or spills are contained and isolated. The secondary containment consists of a post-tensioned reinforced concrete tank surrounding the primary containment.

Storage facilities use advanced monitoring systems to immediately detect any potential liquid or gas leaks or fires and are fitted with pressure safeguarding devices.

All tank piping enters and exits the tank from the top above the liquid levels so that there is no side or bottom penetration below liquid level, removing any risk of LNG leakages at nozzle connections. Tanks are equipped with advanced safety systems such as level alarms and emergency shutdowns.

POTENTIAL HAZARDS

LNG is less hazardous than other commonly used flammable substances such as gasoline or diesel. It is not toxic, carcinogenic or chemically reactive. However, all hydrocarbon fuels are flammable and therefore can be hazardous if not handled properly. The primary LNG hazards are pool fires and vapour clouds.

Pool fire

If spilled, LNG will vaporise quickly. The generated cloud of natural gas could burn if mixed with the correct proportion of air and ignited by a spark, flame, or sufficiently hot surface. The vapour will only burn (in unconfined spaces) if the concentration of gas-in-air is greater than 5% and less than 15%.

When LNG is spilled, it will spread and absorb heat from the surroundings and vaporise. The radiant heat effects from an ignited pool of LNG depend on the amount of flammable material and the supply of air to the fire. Small pool fires burn with a relatively clear flame. In the case of a large pool fire, there is insufficient air supply to support complete combustion, resulting in soot and smoke generation. Therefore, smaller pool fires may give off more heat, relative to their size, than larger pool fires.

Vapour cloud

If there is no spark or fire to ignite the natural gas, a vapour cloud will form. The clouds can also drift away from the source under the influence of the wind. Initially, due to the sub-cooled nature of vapour from LNG, it is denser than air, and the vapour clouds tend to hug the surface and move progressively downwind. As the cloud warms, the vapour becomes lighter than air, rising into the atmosphere and dispersing. The cloud will continuously dissipate as the natural gas is diluted with the surrounding air. However, if the cloud was ignited by a spark or flame, portions of the cloud with a concentration of gas-in-air at 5% to 15% would burn.

Due to the slow flame speed associated with combusting natural gas, in unconfined surroundings an explosion will not occur and the fire will burn back to the source. If the vapour cloud is in a confined or congested area it can explode. The damage resulting from such an explosion depends on the size of the congested area and of the vapour cloud. The design of facilities handling LNG minimises congestion and contained spaces where LNG vapour could accumulate and explode if ignited.

Within an LNG facility or on board a ship, there are various types of hazard detectors used to alert personnel to a leak or spill. These include detectors for the presence of gas, flame and smoke, high temperatures or low temperatures.

LNG terminals and related facilities have an excellent safety record when compared with other large-scale industrial operations. Busy ports in Belgium, France, Japan, Korea, Spain, Turkey, Puerto Rico, Dominican Republic, Italy, Taiwan, and the US have LNG terminals that have operated safely for up to 40 years without an incident impacting the public.

LNG SHIPPING

LNG is transported in large, specially designed ships. These ships are double hulled and are typically about 300 metres long and 40 metres wide. The double hulls provide two complete solid structures between the sea and the structure of the containment tanks.

LNG is not explosive in open air. If there is a spill, LNG will vaporise and the natural gas dissipates. The released quantity would have negligible effect on the environment.

In the unlikely event of a cargo tank being ruptured (it has never happened in over 40 years of cargo deliveries) the liquid would spread over the sea and evaporate faster than on land. This is because water acts as a sustained heat source due to the cooled water sinking and being replaced with fresh warmer water.

The vapour cloud would drift downwind and diffuse into the atmosphere. Any risk of a fire would only be in a limited radius of the ship because the ignited vapour cloud will burn back to the source.

There have been no accidents resulting in a major release of LNG or fire in the 40-year history of transporting LNG and nor has there ever been a fire involving the insulation of an LNG ship while carrying LNG. The chances of this happening are extremely remote. The insulation materials used in LNG ships are treated with fire retardants to meet international standards of fire resistance. When an LNG ship is carrying its cargo, access to the tank spaces is strictly controlled and there are no ignition sources present. The insulation spaces are also purged with nitrogen, which is a gas that cannot support combustion.

The only insulation fires that have occurred have been during vessel construction or maintenance, when there has been no LNG on board. In general, these fires have been caused by engineering activities that are never performed when any LNG is present.

LNG ship safety systems are divided into ship handling and cargo system handling. The ship handling includes the most up to date navigational systems including sophisticated radar and positioning systems that alert the crew to other traffic and hazards around the ship. Distress systems and beacons automatically send out signals if the ship is in difficultly. The cargo system has an extensive instrumentation package that safely shuts down the system if it starts to operate out of predetermined parameters. There are also gas and fire detection systems.

The unloading piers have emergency shutdown systems, closed circuit TV, vapour and fire detection systems and emergency release coupling on the unloading lines. Ship crew access into the LNG terminal is restricted under International Ship and Port Facility Security Code (ISPS) requirements and by the individual terminals.

Australia has been supplying LNG since 1989 and has an enviable record for safety and reliability. Over 2,200 shipments have been dispatched without incident.
(Source:Australian Department of Resources, Energy and Tourism)

LAND SPILLS

An LNG spill on land will result in a cloud of natural gas vapours. The initial rate of vaporisation declines as the surface under the spill is cooled. Unlike gasoline, diesel or fuel oil, an LNG spill does not result in soil contamination and does not leave any residue when it evaporates. However, because of its low temperatures it can cause frost damage.

GENERAL SAFETY DESIGNS AND FEATURES

Safety assurance is accomplished by:

- safe site design and construction of the terminal in accordance with stringent design codes
- safety studies complying with European Directive Seveso II 96/82/EC for European countries
- requirements for ship design and construction to comply with the International Maritime Organisation's (IMO) International Gas Code
- independent monitoring of ship construction and maintenance by *classification societies* such as Bureau Veritas, DNV, Lloyds' Register of Shipping, NKK, RINA and the American Bureau of Shipping
- pre-arrival inspections of facilities and ships
- third party safety and code compliance audits
- initial and ongoing training programs for all personnel
- integrated emergency response programs.

In Australia LNG is regulated by the Australian Department of Resources, Energy and Tourism. Under the *Maritime Transport and Offshore Facilities Security Act 2003* offshore oil and gas facilities are required to have security plans based on a security risk assessment similar to those required by port facilities and ships.

The following table compares hazards related to LNG and other fuels.

Hazard	LNG	LPG	Gasoline	Diesel
Toxic	No	No	Yes	Yes
Carcinogenic	No	No	Yes	Yes
Flammable	Yes	Yes	Yes	Yes
Asphyxiant	Yes, in confined spaces	Yes, same as LNG, but higher density encourages accumulation	No	No
Other health hazards	Low temperature	No	Eye irritant, narcosis, nausea, others	Forms a flammable pool and flammable vapour cloud; environmental clean up required
Flammable limit in air %	5-15	2.1-9.5	1.3-6	N/A
Stored pressure	Ambient, except in some small containers	Pressurised	Ambient	Ambient
Behaviour, if spilled	Evaporates, forming visible, flammable vapour cloud that disperses quickly	Evaporates forming flammable vapour cloud that tends to accumulate	Forms a flammable pool and flammable vapour cloud; environmental clean up required	Forms a flammable pool and flammable vapour cloud; environmental clean up required

FOR FURTHER INFORMATION ABOUT THE ARROW ENERGY LNG PROJECT

Telephone: freecall 1800 038 856
Email: arrowlng@arrowenergy.com.au
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RELATED PROJECT INFORMATION

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Arrow Energy LNG Project: LNG Shipping
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Coal Seam Fact Sheet / Coal Seam Gas Video
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Coal Seam Gas in Queensland

Queensland Mines and Energy
www.dme.qld.gov.au/mines/coal_seam_gas.cfm

Queensland Regulation of the Petroleum Industry

Queensland Mines and Energy
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Department of Environment and Resource Management
www.epa.qld.gov.au/environmental_management/land/petroleum/guidelines.html

www.epa.qld.gov.au/environmental_management/impact_assessment/index.html

Department of Infrastructure and Planning
www.dip.qld.gov.au/projects

Commonwealth Government Environmental Assessment

Department of Environment, Water, Heritage and the Arts
www.environment.gov.au/epbc/assessments/index.html

SUMMARY

LNG production and storage facilities and ships are designed to incorporate numerous safeguard systems including gas/heat/fire detection and suppression systems, spill containment systems, emergency shutdowns, pressure release systems and advanced communications systems.

The potential risks associated with LNG are well understood and are successfully mitigated by the following elements that provide multiple layers of protection for LNG production and transport:

- primary containment
- secondary containment
- safeguard systems
- separation distances (safety and security zones).

Arrow will integrate these elements with industry standards, regulatory compliance and best management practices to form a strong foundation for safety and security for the Arrow Energy LNG project.

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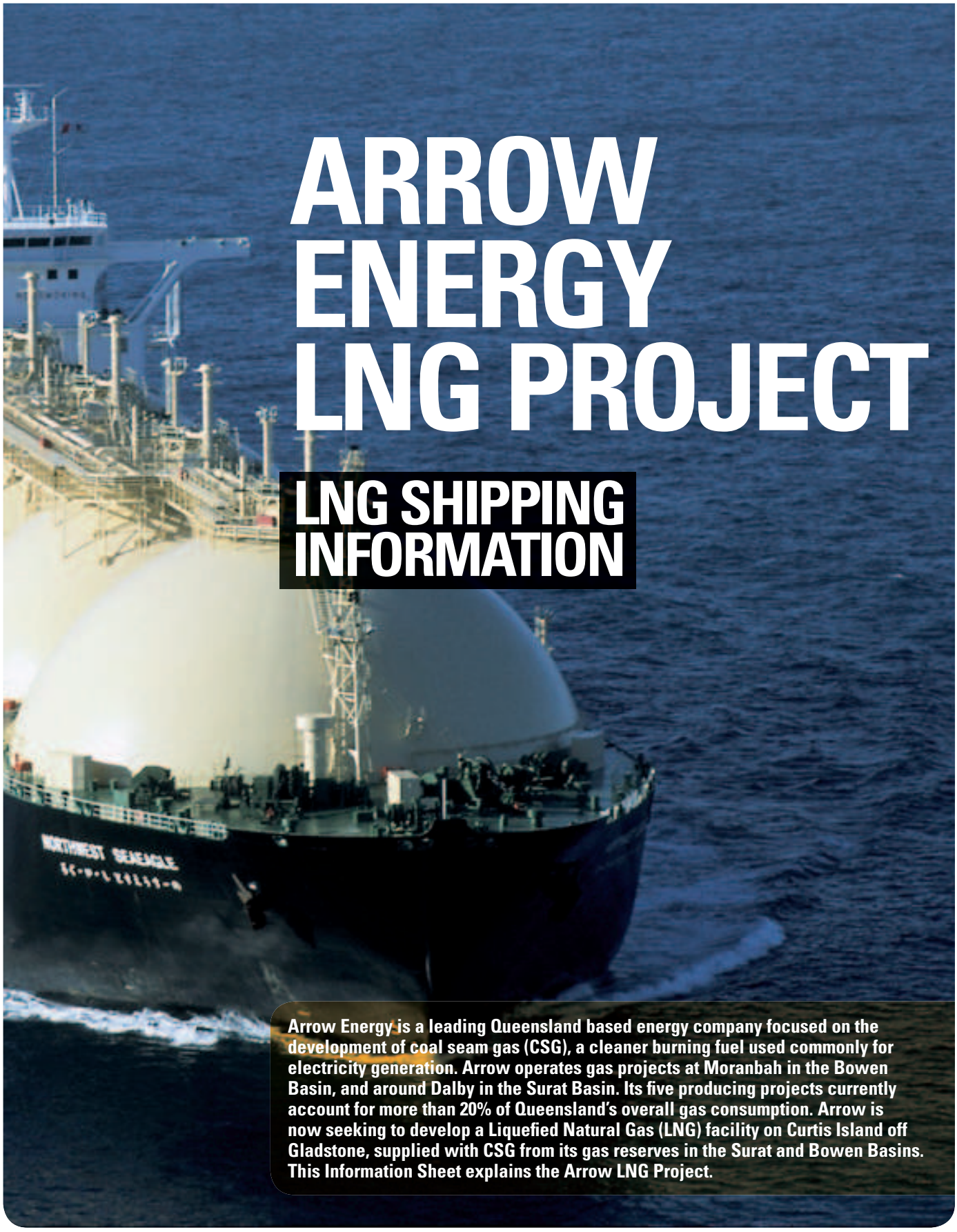

ARROW ENERGY LNG PROJECT

LNG SHIPPING INFORMATION

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ABOUT THE PROJECT

Arrow is planning the development of an LNG facility on Curtis Island off Gladstone which will play an important role in meeting growing world demand for cleaner burning fuels. The project was formerly known as the Shell Australia LNG Project and is now called the Arrow Energy LNG Project.

The proposed Arrow Energy LNG plant on Curtis Island will be supplied with coal seam gas from Arrow Energy reserves located in the Surat Basin in South East Queensland and the Bowen Basin in Central Queensland.

The Arrow Energy LNG Project has been declared a 'significant project' by the Queensland Government; this reflects the complexity of Queensland and Commonwealth approvals required, the project's potential impacts, and the importance of the Gladstone region to national, state and local economies.

The project involves:

- construction of a gas pipeline from near the Bruce Highway to Curtis Island
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The liquefaction facility will produce up to 16 million tonnes per annum (mtpa) of LNG, and includes the phased construction of up to four trains or processing plants on its Curtis Island site. Stage 1 includes the construction of two trains of around 4mtpa of LNG each on the Arrow site at Boatshed Point.

THE SAFETY OF LNG SHIPS AND SHIPPING

A crucial part of exporting liquefied natural gas (LNG) is the transportation via ships to international markets.

LNG shipping has a long and excellent safety record; it has been safely delivering LNG across the oceans and around the world for over 40 years. A significant amount of research has been done into minimising safety risks and the Arrow Energy LNG Project will be underpinned by Shell's extensive expertise and experience in established LNG technology and safe shipping.

Natural gas has only ever been shipped commercially in a fully refrigerated, liquefied form at low (essentially atmospheric) pressure. LNG is transported in large, specially designed ships. These ships are double hulled and are typically about 300 metres long and 40 metres wide. All LNG ships require hulls that have specially designed insulation to carry LNG at minus 161˚C.

As the LNG is at its boiling point of -161˚C, any heat flow from the outside into the containment system will cause evaporation, or 'boil off' of natural gas from the LNG. Insulated tanks therefore minimise transfer of heat from the environment, and design developments in this field have seen significant reductions in boil off in recent years. LNG ships have specialist technologies to manage any boil off gas whilst in transit. In addition, special insulation protects the integrity of the outer steel hull.

Since the mid 1960s, two main designs for the transport of LNG have emerged - the single barrier, self-supporting system and two membrane systems. There is a recent trend towards the use of the double membrane tank type instead of the self supporting storage tank (dome type structure) as the double membrane tanks utilise the hull shape more efficiently and thus have less void space between the cargo tanks and ballast tanks.

LNG SHIPPING IN GLADSTONE HARBOUR

It is estimated that when the Arrow Energy LNG Project reaches peak production there will be up to 240 vessel visits to Gladstone Harbour per year, equating to about four vessels per week.

To minimise impact on other commercial and recreational vessels in the harbour from LNG shipping, Arrow will work closely with the Gladstone Ports Corporation in the precise scheduling of visits.

It is imperative that all necessary support services such as qualified local pilots, tug boat services and movement safety zones are planned well in advance to enable safe and efficient entry and exit from the harbour.

The establishment and enforcement of safety zones is an important measure which protects the safety of other users of the harbour. A fixed safety zone of 250m will be maintained by tugs and marked by retractable buoys around LNG vessels at berth to eliminate the potential for a source of ignition in the unlikely event of a leak or spill.

Fixed safety zones will not impede the passage of recreational boat traffic, including between South Passage Island and the terminal jetty on Curtis Island.

In addition to fixed safety zones, moving safety zones will be enforced and set minimum separation distances for ships entering and leaving port will be based on the stopping distance of a typical LNG ship travelling at 12 knots.

Security is ensured through conformance with the International Ship and Port Facility Security Code.

Through the planning and application of stringent safety procedures, Arrow aims to continue the outstanding safety record of LNG shipping.

As part of the EIS, a detailed examination of all potential impacts associated with shipping is being undertaken. This assessment will investigate issues ranging from the potential for introduction of exotic organisms from increased shipping rates, to the potential risk of spills and their management. To ensure these issues are addressed Arrow will be conducting ongoing consultation with all potentially affected stakeholders during and beyond the EIS process.

FOR FURTHER INFORMATION ABOUT THE ARROW ENERGY LNG PROJECT

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Department of Environment and Resource Management
www.epa.qld.gov.au/environmental_management/land/petroleum/guidelines.html

www.epa.qld.gov.au/environmental_management/impact_assessment/index.html

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Commonwealth Government Environmental Assessment

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Before the project can proceed, Arrow Energy LNG Project must gain approval from the Queensland and Commonwealth Governments. To do this, an Environmental Impact Statement (EIS) will be prepared which will examine the entire proposal's potential impacts, and proposed management measures to mitigate these potential impacts.

WHY PREPARE AN EIS?

Arrow is committed to meeting global needs for cleaner burning fossil fuels in an economically, socially and environmentally viable manner, now and in the future. Arrow will meet regulatory requirements by assessing the environmental, social and economic impacts associated with its project.

Before Commonwealth and state approvals are issued, regulatory authorities must be satisfied that our activities have been properly assessed and that appropriate measures are in place to avoid or minimise environmental, social and economic impacts.

The Arrow Energy LNG Project EIS will:

- identify potential adverse impacts and beneficial impacts of the project
- ensure Arrow finds practical and workable solutions to protect environmental, social and economic values that may be affected by the project
- identify environmental management measures for the project
- ensure community and stakeholder views are understood and considered in the EIS process.

Arrow activities are governed by the *Queensland State Development and Public Works Act 1971*,*Petroleum & Gas (Production and Safety) Act 2004* and the *Environmental Protection Act 1994*. The Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* also requires that Arrow Energy demonstrates that its activities will not significantly impact matters of national environmental significance.

WHAT WILL THE EIS INVOLVE?

Figure 1 (EIS process diagram) shows the approvals process for the Arrow Energy LNG Project EIS and the interaction amongst Arrow, the Queensland and Commonwealth Governments, and the public at various stages of the approvals process.

On 12 June 2009, the Arrow Energy LNG Project was declared a 'project of state significance requiring an EIS' by the Queensland Coordinator-General under the Queensland *State Development and Public Works Act 1971*, due to the complexity of approvals required, its potential impact on existing infrastructure and the environment, and the importance of the Gladstone region to the local, state and national economies.

Further, in August 2009, the Commonwealth Department of Environment, Water, Heritage and the Arts declared the Arrow LNG project a 'controlled action' which requires assessment and approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The project has been declared a controlled action for potential impacts on World Heritage Areas, National Heritage Places, migratory birds and listed threatened species and communities (matters of national environmental significance). The Australian Government has accredited the Queensland EIS process as the appropriate level of assessment.

Following a period of public comment in late 2003, final Terms of Reference (ToR) were released by the Queensland Department of Infrastructure and Planning in January 2010 outlining the specific requirements for the EIS and its structure.

A wide range of environmental, social and economic studies will be conducted for the EIS, and Arrow will consult with the community throughout the process.

THE EIS STUDIES

As part of the EIS studies, various community members and groups may be contacted about matters such as:

- air quality, climate change and greenhouse gases
- terrestrial, aquatic and marine flora and fauna
- river, stream and marine water quality
- social, economic and community aspects
- health, safety and hazards
- traffic and transport
- noise, vibration and visual amenity
- historic places, or areas that hold cultural heritage significance.

Prior to undertaking any environmental studies/investigations on land or property, Arrow will contact landholders to discuss access and technical components of the studies. Studies on private property may involve taking water samples, setting up noise monitors for a period of time, soil sampling and recording flora and fauna.

To guide the EIS, the Queensland Government has released final Terms of Reference (ToR) for the EIS. These can be accessed from the Department of Infrastructure and Planning's website:

www.dip.qld.gov.au/resources/project/

COMMUNITY INVOLVEMENT IN THE EIS

Public participation is an important part of an EIS and Arrow is committed to consulting with the Curtis Island and Gladstone communities and stakeholders throughout the process. Public feedback provides valuable information and understanding of potential impacts of the project.

Arrow is planning a community engagement program. The program will include meetings with key stakeholders, community forums and public displays, the distribution of information materials, and opportunities for public input, including written submissions. These activities will take place throughout the EIS process. All opportunities for the community to be involved will be promoted through the web www.arrowenergy.com.au and in the local media.

Prior to making a decision on the project, regulators must be satisfied that the company has appropriately responded to issues raised by the community and stakeholders.

If you have questions about the EIS or information to share, call Arrow's freecall information line on 1800 038 856 or email arrowlng@arrowenergy.com.au

THE EIS PROCESS

Commonwealth EPBC Act Assessment Process	Queensland SDPWO Act Assessment Process	Public Consultation
Lodge Referral with Commonwealth under EPBC Act (Arrow)	Lodge Initial Advice Statement and request for 'significant project'	Information available via freecall 1800 038 856, website or project email (ongoing consultation throughout EIS process)
Decision on Controlled Action (DEWHA)	Coordinator-General's decision Declaration of Significant Project (DIP) EIS required	Information sessions and community displays Stakeholder briefings
Review of EIS and Coordinator-General's Assessment Report by DEWHA and Commonwealth Minister (DEWHA)	Draft Terms of Reference prepared and publicly notified (DIP)	Public may lodge submissions on draft Terms of Reference with DIP
	Finalise Terms of Reference (DIP)	
	EIS prepared in accordance with Final Terms of Reference (Arrow)	Information sessions and community displays Stakeholder briefings
	EIS submitted to DIP (Arrow)	
	Review of EIS against Final Terms of Reference (DIP)	
	Decision to proceed to public notification. EIS advertised and exhibited (DIP) Public advisory agency review of EIS	Information sessions and community displays Stakeholder briefings Public may lodge submissions on EIS with DIP
	Supplementary report to address public submissions (Arrow)	
Review of EIS and Coordinator-General's Report by DEWHA and Commonwealth Minister (DEWHA)	Evaluation of EIS and preparation of Coordinator-General's Assessment Report, including any conditions and recommendations on the project	Coordinator-General's Assessment Report available to the public and Arrow
Decision and conditions issued by Commonwealth Minister for Environment (DEWHA)	Application for Environmental Authority(s) for petroleum activities (Arrow)	
	Issue of Environmental Authority(s) for petroleum activities (DERM)	

DIP
Queensland Department of Infrastructure and Planning

DEWHA
Commonwealth Department of Environment, Water, Heritage and the Arts

EIS
Environmental Impact Statement

EPBC Act
Commonwealth Environment Protection and Biodiversity Conservation Act 1999

SDPWO Act
State Development and Public Works Organisation Act 1971 (Qld)

DERM
Queensland Department of Environment and Resource Management"

FOR FURTHER INFORMATION ABOUT THE ARROW ENERGY LNG PROJECT

Telephone: freecall 1800 038 856
Email: arrowlng@arrowenergy.com.au
Visit: www.arrowenergy.com.au

RELATED PROJECT INFORMATION

Arrow Energy LNG Project: Environmental Impact Statement
Arrow Energy LNG Project: LNG Shipping
Arrow Energy LNG Project: LNG Safety

Coal Seam Fact Sheet / Coal Seam Gas Video
www.arrowenergy.com.au/page/Our_Company/Coal_Seam_Gas/

For further information about CSG or relevant legislation, visit the following websites

Coal Seam Gas in Queensland

Queensland Mines and Energy
www.dme.qld.gov.au/mines/coal_seam_gas.cfm

Queensland Regulation of the Petroleum Industry

Queensland Mines and Energy
www.dme.qld.gov.au/mines/petroleum_gas.cfm

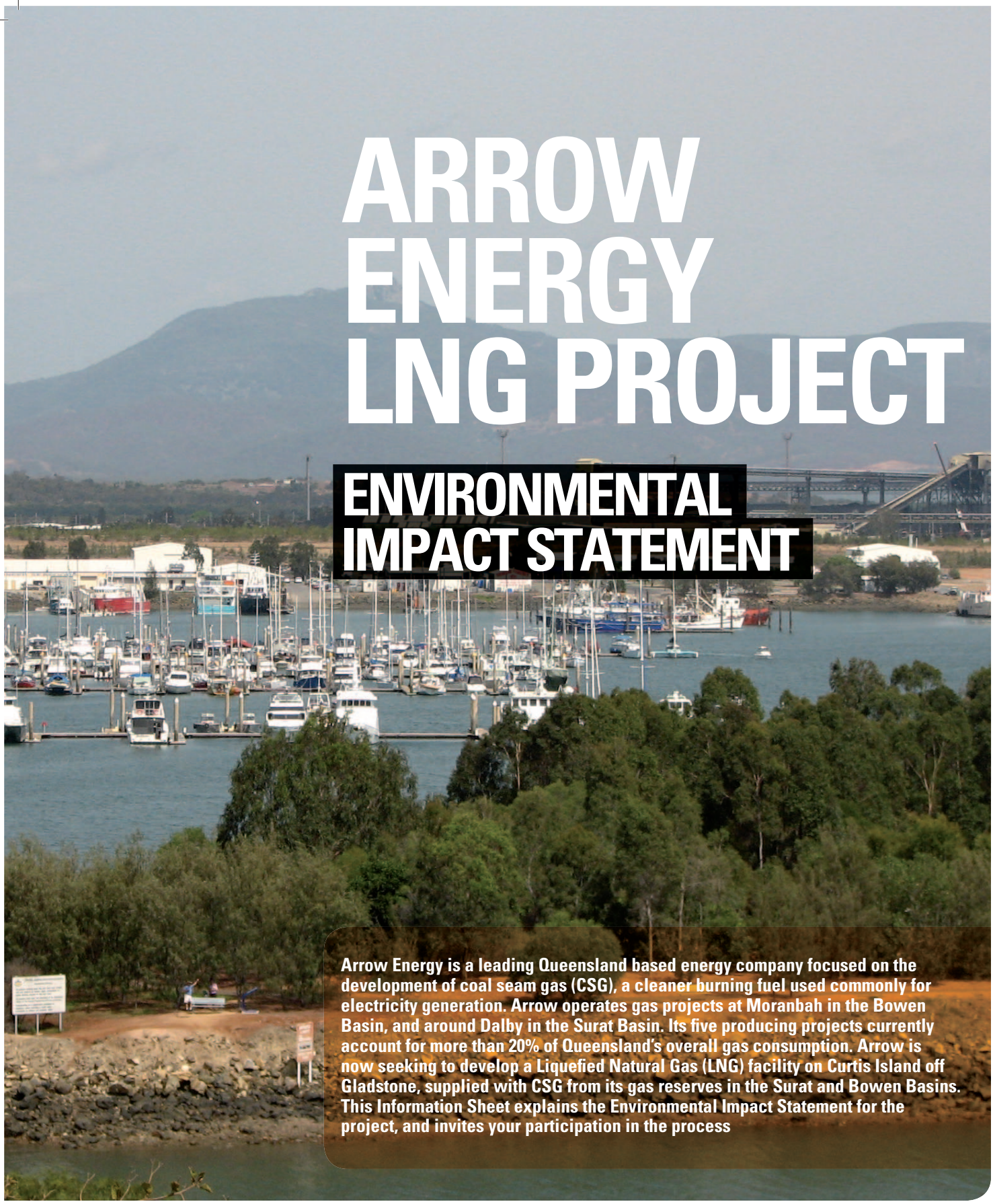
Department of Environment and Resource Management
www.epa.qld.gov.au/environmental_management/land/petroleum/guidelines.html

www.epa.qld.gov.au/environmental_management/impact_assessment/index.html

Department of Infrastructure and Planning
www.dip.qld.gov.au/projects

Commonwealth Government Environmental Assessment

Department of Environment, Water, Heritage and the Arts
www.environment.gov.au/epbc/assessments/index.html



ARROW ENERGY LNG PROJECT

ENVIRONMENTAL IMPACT STATEMENT

Arrow Energy is a leading Queensland based energy company focused on the development of coal seam gas (CSG), a cleaner burning fuel used commonly for electricity generation. Arrow operates gas projects at Moranbah in the Bowen Basin, and around Dalby in the Surat Basin. Its five producing projects currently account for more than 20% of Queensland's overall gas consumption. Arrow is now seeking to develop a Liquefied Natural Gas (LNG) facility on Curtis Island off Gladstone, supplied with CSG from its gas reserves in the Surat and Bowen Basins. This Information Sheet explains the Environmental Impact Statement for the project, and invites your participation in the process

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ARROW ENERGY LNG PROJECT

The Arrow Energy LNG (liquefied natural gas) project will play an important role in meeting growing domestic and world demand for cleaner burning fuels.

The proposed LNG facility on Curtis Island will be supplied with coal seam gas (CSG) from Arrow Energy reserves located in the Surat Basin in South East Queensland and the Bowen Basin in Central Queensland. It will produce up to 16 million tonnes per annum (mtpa) of LNG, and includes the phased construction of up to four trains or processing plants on its Curtis Island site. Stage 1 includes the construction of two trains of around 4mtpa of LNG each on the Arrow site at Boatshed Point.

The project involves:

- construction of a gas pipeline from near the Bruce Highway to Curtis Island
- construction of a liquefaction facility where coal seam gas will be converted to LNG and stored for shipment in LNG carriers to growing LNG markets
- construction of marine facilities, such as jetties on the mainland
- construction of jetties, offloading facilities and LNG Carrier Terminal on Curtis Island in the vicinity of North China Bay, Hamilton Point and Boatshed Point
- potential localised dredging at marine facilities.

The project is also supported by a dredging program off Port Curtis being managed by the Gladstone Ports Corporation to extend shipping lanes to berth pockets and develop swings basins for LNG carriers to load and manoeuvre. The Western Basin Dredging Project by the Port is subject to a separate EIS approval.

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LNG SHIPPING

A crucial part of exporting liquefied natural gas (LNG) is the transportation, via ships, to international markets.

LNG Shipping Safety

LNG is transported in large, specially designed ships. These ships are double hulled and are typically about 300 metres long and 40 metres wide. The double hulls provide two complete solid structures between the sea and the structure of the containment tanks.

LNG shipping has an excellent safety record; and has been safely delivering LNG around the world for over 40 years. A significant amount of research has gone into minimising safety risks and the Arrow Energy LNG Project will be underpinned by Shell's extensive expertise and experience in established LNG technology and safe shipping.

Through the planning and application of stringent safety procedures, Arrow aims to continue the outstanding safety record of LNG shipping.

LNG Shipping in Gladstone Harbour

It is estimated that when the Arrow Energy LNG Project reaches peak production, there will be up to 240 vessel visits to Gladstone Harbour per year, equating to about four vessels per week.

To minimise impact on other commercial and recreational vessels in the harbour from LNG shipping, Arrow will work closely with the Gladstone Ports Corporation on the precise scheduling of visits.

The establishment and enforcement of fixed safety zones around ships at berth, and moving safety zones around LNG ships accessing the harbour, are an important measure which protects the safety of other users of the harbour.

It is important to note that fixed safety zones will not impede the passage of recreational boat traffic, including between South Passage Island and the terminal jetty on Curtis Island.

As part of the EIS, a detailed examination of all potential impacts associated with shipping is being undertaken. To ensure these issues are addressed, Arrow will be conducting ongoing consultation with all potentially affected stakeholders during and beyond the EIS process.

LNG SAFETY

Overview

LNG facilities and transport methods have an excellent safety record. LNG has been safely produced and delivered across the oceans and around the world for more than 40 years.
The potential risks associated with LNG are well understood and are successfully mitigated by the following four elements that provide multiple layers of protection for LNG production and transport:

- primary containment
- secondary containment (including double hull ships)
- safeguard systems
- separation distances (safety and security zones).

Arrow will integrate these elements with industry standards, regulatory compliance and best management practices to form a strong foundation for safety and security for the Arrow Energy LNG Project.

LNG Production

An LNG facility is technically classified as a hazardous facility under government guidelines, similar to other facilities producing and handling flammable gases and liquids. However, the relative risks are low as LNG production facilities adhere to strict international standards that provide criteria for sites, layout, equipment fabrication and installation, construction and operation of these facilities. The facility's design, safety monitoring systems and operator training will help ensure that in the unlikely event of an incident the consequences are minimised.

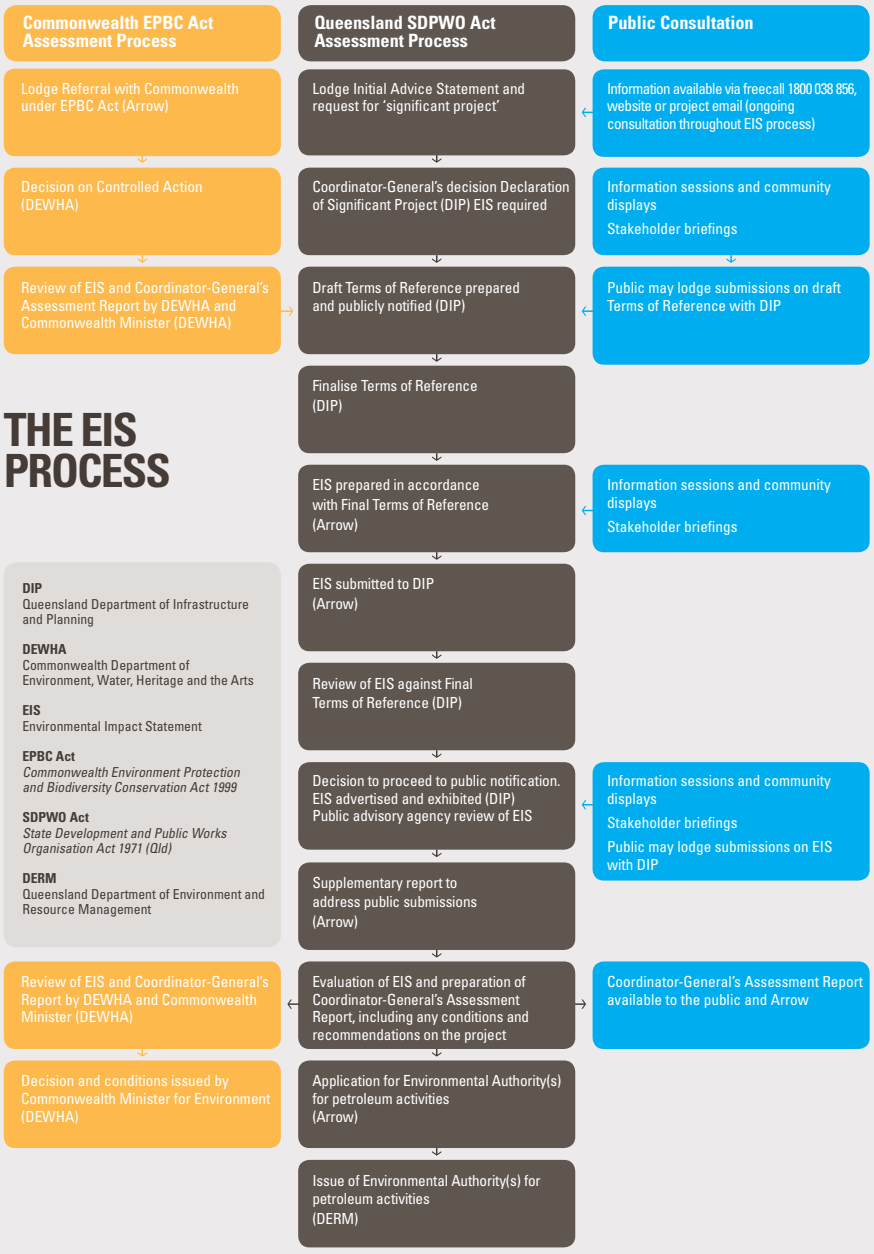
LNG Storage

LNG is stored in specialised, sealed, non-pressurised tanks at minus 161°C and is 600 times smaller in volume as a liquid, than in its gaseous state.

The LNG tanks are of the full containment type, i.e. they have a primary and secondary containment system. The primary containment is designed for low temperatures, made of nickel steel in full containment tanks or corrugated stainless steel in membrane tanks, with a secondary containment system to ensure that any potential leaks or spills are contained and isolated. The secondary containment consists of a post-tensioned reinforced concrete tank surrounding the primary containment.

Storage facilities use advanced monitoring systems to immediately detect any potential liquid or gas leaks or fires and are fitted with pressure safeguarding devices.

ENVIRONMENTAL IMPACT STATEMENT (EIS) PROCESS



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EMPLOYMENT AND WORKFORCE

Construction workforce requirements

The Arrow Energy LNG Project will require a build up and ramp down of workforce over time, with a peak workforce of approximately 3000 people. Arrow expects that the labour force will be made up of 20-30% local trade and field non-manual personnel who will live at their current residences in Gladstone City or surrounding region, commuting to Curtis Island daily.

Whether the Arrow LNG project is able to achieve a 20-30% local labour force will depend to a large extent on availability, particularly when up to five major projects may be sourcing labour in the same time frame in this region.

Arrow expects the remainder of the workforce to be sourced from within Queensland, Australia and internationally, who will be housed in specific construction accommodation on Curtis Island, located close to the LNG facility site.

Construction workforce will include:

- management staff (project managers, engineers, supervisors)
- earthmoving equipment operators
- builders, fitters, electricians, supervisors and labourers
- specialist technicians associated with the installation of high pressure gas pipelines, LNG train technology, LNG storage tanks, wharf facilities, power generation and water treatment equipment.

Operational workforce requirements

During the operational phase of the Arrow Energy LNG Project, it is estimated that there will be between 200 and 300 permanent operational staff, however it is likely that there will be significantly more direct and indirect jobs generated by maintenance and other support services to the LNG plant.

Arrow staff training and development programs

Arrow is currently involved in the following training and development initiatives aimed to maximise local recruitment in the communities where Arrow currently operates:

- competency-based training for field-based personnel
- high school-based program in process plant operations
- process plant operation certificates (through TAFE and competency-based training)
- Indigenous traineeships
- graduate development and vacation employment programs.

During development of the Arrow Energy LNG Project, Arrow will be working with local communities, education and training providers to identify appropriate education and training initiatives within the local region.

Appendix B

27 May 2011

Dear

Invitation to community information sessions 14-18 June 2011

Arrow Energy will be holding a series of community information sessions in the Gladstone region in June. These sessions will give community members the opportunity to find out about the Arrow LNG Plant, and to ask questions about the project.

Since Arrow Energy held community sessions last August/September, the company has been continuing its work on the environmental impact statement (EIS) for the Arrow LNG plant and is examining all environmental, economic and social issues, plus the associated impacts and benefits.

I hope you will be able to attend one of the community information sessions which will be held from 14 to 18 June 2011. Details of the sessions are overleaf.

The sessions will commence with an opportunity for one-on-one and small group discussions with the project team, followed by a project update and question and answer time.

The update will include the latest information on the project description and timeline, progress of the EIS, employment and supplier information.

The sessions are open to the whole community and refreshments will be available. If you require any further information, and to assist with catering, please RSVP by contacting the project team on freecall **1800 038 856** or email **arrowlng@arrowenergy.com.au**.

Feel free to pass this information on to anyone who may be interested in knowing the latest information about the project.

Yours sincerely

Leisa Elder
Vice President Community and Corporate Affairs

Arrow LNG Plant community information sessions
June 2011

Location	Date	Time	Venue
Gladstone	14 June	5.00pm-8.30pm *presentation at 6.00pm)	Rex Metcalfe Theatre Leo Zussino Building, CQU Bryan Jordan Drive
Boyne Island/Tannum Sands	15 June	10.00am-1.00pm *no presentation, display only	Boyne/Tannum Community Centre Cnr Wyndham & Hayes Ave Boyne Island
Mt Larcom	15 June	5.00pm-8.30pm *presentation at 6.00pm	Mt Larcom Public Hall 47 Raglan St Mt Larcom
Gladstone	16 June	10.00am-2.00pm *presentation at 11.00am	Rex Metcalfe Theatre Leo Zussino Building, CQU Bryan Jordan Drive
Calliope	16 June	5.00pm-8.30pm *presentation at 6.00pm	Calliope Community Centre Don Cameron Drive Calliope
Curtis Island	18 June	10.00am-1.00pm *presentation at 10.30am	Capricorn Lodge South End Curtis Island

Community Information Sessions
Arrow LNG Project

Agenda

Gladstone	Tues 14 June
Mt Larcom	Wed 15 June
Calliope	Thurs 16 June

Evening session – 5.00pm to 8.30pm

5.00pm	Display and opportunity for one-on-one discussions
6.00pm	Presentation
6.45am	Break
7.00pm	Question and answer session (can be extended if required)
8.00pm	Display and opportunity for one-on-one discussions
8.30pm	Session ends

The Arrow Energy Project team will be in attendance for discussions as required.

Arrow LNG Plant

Community Information Sessions 14 – 18 June 2011

Introduction

Arrow Energy has proposed construction of the Arrow LNG Plant in the Curtis Island Industry Precinct at the south western end of Curtis Island, approximately 6km north of Gladstone and 85km south east of Rockhampton, off Queensland's central coast.

In June 2011 Arrow Energy (Arrow) held a series of community information sessions to provide further information on the Arrow LNG Plant. Questions and answers from those sessions were captured by JTA Australia (JTA) and are presented in this document.

The purpose of these meeting notes is to reflect the questions asked and answers provided during the community meetings. The notes are based on a written record and include some paraphrasing and summarising; every effort has been made to preserve the integrity of the discussions. Where the same or a similar question has been asked in other sessions, the most complete answer has been provided.

Questions varied across the five sessions. To ensure that valuable information is shared throughout the Gladstone region, these notes summarise questions and answers asked across all sessions.

The Arrow LNG Plant community information sessions were held from 14 to 18 June 2011 at:

- Gladstone 14 June 2011
- Mount Larcom 15 June 2011
- Gladstone 16 June 2011
- Calliope 16 June 2011
- Curtis Island 18 June 2011

How to read these notes

Questions and comments from the audience are in bold type. The unbolded responses are from Arrow staff.

In some cases responses have been summarised. Where one response to a commonly-asked question was more comprehensive at one session than another, the more detailed response has been used in the interests of better understanding. In some cases, additional information is included to provide further context or explanation; this information is in brackets within text, or italicised following the answer.

Arrow will hold another round of consultation sessions in the first half of 2012 during the public exhibition of the EIS. Arrow will release further information closer to the time. If you have questions or comments about the project or the meeting notes, please contact the project team during working hours on:

freecall: **1800 038 856**
email: arrowlng@arrowenergy.com.au
post: Arrow LNG Plant, Reply Paid 81 Hamilton QLD 4007

Commonly used acronyms

APLNG	ConocoPhillips/Origin Energy Australia Pacific LNG Project
BG	British Gas
C3MR	propane precooled (C3) mixed refrigerant (MR) liquefaction process
CSG	coal seam gas
DERM	Department of Environment and Resource Management
DTMR	Department of Transport and Main Roads
EIS	environmental impact statement
EPC	engineering, procurement and construction
FEED	front end engineering design
FID	final investment decision
GAWB	Gladstone Area Water Board
GLNG	Santos, PETRONAS, Total and KOGAS Gladstone LNG project
GPC	Gladstone Ports Corporation
GRP	glass reinforced plastic
GSDA	Gladstone State Development Area
HS&E	health, safety and environment
HSES	Health, Safety, Environment & Security
IFL	Intensively Farmed Land committee
LNG	liquefied natural gas
MPA	megapascal
MSQ	Marine Safety Queensland
MW	megawatt
PSI	pounds per square inch
PU	polyurethane insulation system
QCLNG	BG/QGC Queensland Curtis LNG Project
SIGTTO	Society of International Gas Tankers and Terminal Operators
SIMP	Social Impact Management Plan
ULDA	Urban Land Development Authority
W/m-2	watts per square metre

Gladstone (day session)

Date:	14 June 2011	
Venue:	Leo Zussino Building, CQ University	
Presenters:	Andrew Faulkner, CEO	Arrow Energy
	Hilary Mercer, Vice President, LNG/Integration	Arrow Energy
	Kevin Daubner, Marine Advisor	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
Facilitator:	Jan Taylor, Principal	JTA Australia

1. **Origin was taking a mass of great pipes of gas over to the island, what's wrong with running a four inch pipe down to the township of South End and reticulating the whole lot? One hundred houses, put meters on them and we'd pay for the gas.**
   I'm not going to stand here and say 'No - we won't do it'. Neither will I say that we will do it. In relation to the provision of support to local communities, this is something we'd have to look at. In terms of how Arrow might help the local community, be it via a gas-fired power station, supplying gas to South End – those are two things that'd we'd have to look at. A difficulty lies in the fact that LNG supply goes up and down; it would not be desirable for a community to be too reliant on Arrow energy in the event that supply did not meet demand. The manner in which Arrow can utilise its infrastructure to assist the local community is a continuing and open discussion.

2. **Well last time I think we agreed to put it on the back burner, so I'm asking now to bring it to a forward burner.**
   If I can just add to what I said earlier, the Arrow project is some way behind the other projects so the back burner is a little further behind as well.

   Comment - Well, if you can't supply us we'll have to go to the opposition.

3. **Isn't there a finite time for the supply of this product? Even if you were getting it free or as a consumer in South End, it's only got a 30 year lifetime from what I hear.**
   That is correct. We can offer support to communities, but people have to recognise the limitations of the project. It doesn't mean we shouldn't offer support. But it needs to be understood that the project ultimately has a finite life.

4. **You said earlier you are considering sourcing electrical power. Is that for economic reasons? It does seem strange that with your type of technology you may have to rely on electrical power.**
   A big power station produces electricity far more efficiently than a small scale gas-powered generator like our proposal on Curtis Island. So even if we can generate our own power (we have about five gas-turbine generators), it's not as efficient as if we were doing it on a large scale. So yes, there's an economic argument. There's also an argument in terms of the greater good. Construction usually involves diesel generators which are dirty and noisy. Electricity is more efficient and more environmentally friendly.

And you're right, it's unusual for an LNG plant to contemplate using electricity-based power but LNG plants don't normally operate in locations where they can be reliant upon somebody else's electric power. However, Queensland has a very reliable electricity grid system which has a lot of power. Although there is potential for us to use it is only an option.

5. **Still, 450 megawatts (MW) is a lot to take from the grid.**
   Yes, you are correct, so we will need to look at what the other proponents are doing. Taking from the grid is just one option and we are still considering its viability. Our base case is that the turbines will be gas-powered.

6. **Thirty years is essentially the life of the plant. What happens after that in relation to the de-commissioning of things? I presume that's all covered in the EIS?**
   De-commissioning costs are usually factored into the economics of a project. However, there are historical precedents where we have refurbished LNG plants because they have lasted longer than first planned. It depends on the gas supplies upstream.

7. **How do you go about selecting the engineering, procurement and construction (EPC) contractor?**
   We go out to tender and do a technical and commercial evaluation. We provide six to eight months for a tender because there's such a large quantity of technical information to consider. We then undertake a tender evaluation process. The first matter considered is whether each of the bidders is technically compliant. Once we've seen that they're technically compliant, in other words they are all operating on a level playing field technically, then we look at the commercial aspects of the bids.

   Recently we asked for tenders for the front end engineering and design (FEED) and we checked in principal the same groups would submit for the EPC tender. We expect bidders to be joint ventures between international and Australian contractors so that they have some knowledge of Australia. Bechtel won't be bidding because Arrow uses a C3MR[1] liquefaction process while the other proponents use the Cascade process with which Bechtel is partnered. Companies that may possibly bid for the contract include CBNI, Thiess, John Holland, Hatch, Worley Parsons, Foster Wheeler, or KBR.

8. **You say there is going to be a tunnel under the Narrows? What do you mean by a tunnel?**
   The tunnel will be created via a tunnel boring machine 40 metres under the sea bed. It won't be constructed under The Narrows but will start from around Fisherman's landing and then travel across to Hamilton Point. The tunnel will be 3.5 to 4 metres in diameter.

9. **Could you transport the thousand plus workforce to Curtis Island via the tunnel?**
   The problem is timing. We would need to build the tunnel 36 months before we needed it for the pipeline so that we could use it for the workforce. Also there are safety considerations when placing people in the same tunnel as a gas pipeline; there would be ventilation issues.

10. **How long is the tunnel?**

[1] Propane precooled (C3) mixed refrigerant (MR) liquefaction process.

The tunnel will be about 5.5 to 6.5km.

11. **There's going to be so much traffic in the port, I can't see how fishermen and other residents are going to be able to use the waterway. It's not just about the daily average 1.5 LNG ships (*stated maximum from LNG projects*), it's all the others as well.**

There will be 30 minutes between the big vessels. On the Curtis Island side, there will only be approximately 1.5 ships a day but that passage will still be free to go through. I'm not sure what the port authorities have got in mind for the Fisherman's Landing side.

12. **Do LNG carriers have to wait for the tide to enter port?**

LNG carriers may be the same size as coal carriers but they only have a 12 metre draft. We'll be able to use the low tides where the coal carriers can't.

13. **This 30 minute exclusion zone, does it apply to recreational vessels and local fisherman?**

No, it only applies to large ships.

14. **It is very difficult to get hotel accommodation in Gladstone. Will you take better care of tourists? House prices have shot through the roof, and you can't rent anything. Are you considering this?**

It's certainly an area of concern. We will have a construction camp on Curtis Island and potentially a camp on the mainland. In the next twelve months we'll be looking at options for long-term housing for our own staff. When we look at the details of tenders that's one of the things we look at i.e. what are contractors proposing to do in terms of providing housing, road transportation etc. The invitation to tender will certainly focus on those issues.

The Queensland Government has required other proponents to provide an integrated housing strategy in order to facilitate a significant investment in housing. Arrow will also need to develop a similar strategy and will be able to benefit from the work the other proponents are doing.

Comment – You can talk to the other proponents but you should also talk to the Gladstone Regional council as it sees it differently. The proponents are looking after themselves.

15. **You mentioned 1.5 boats a day, is that just for the Arrow project or all the projects?**

No, that's for the LNG projects combined.

16. **Will there be significant water traffic daily during construction?**

Yes, and planning is being undertaken. There's a Marine Management Safety Committee which is comprised of representatives of all the proponents and Marine Safety Queensland (MSQ) and Gladstone Ports Corporation (GPC). There's a charter as well as procedures in place for how this construction vessel traffic is going to be managed.

17. **The proof will be in how quickly we get told about what happened in that tragic accident on the weekend. We assumed everything was being done properly, so we'd be very interested to see what the turnaround time is going to be on that.**

On Thursday we're going to be given a briefing by MSQ in regards to that matter. We don't know how long any investigation is going to take. We've got to leave that to the authorities.

(*Arrow understands the investigation is still in progress)*

18. **Can you please explain how the movement of a thousand people translates to vessel movements?**
    There would be two, two hundred and fifty person fast cats and a Ropax (which is a vessel for vehicles as well as passengers). In the morning and again in the evening they'd make two trips each, to transport the workforce to and from the island. The trips would take 20 minutes each way. The harbourmaster and his colleagues are developing an extended vessel traffic system for the inner harbor. This is the same system in principle as that which already applies to the outer harbor, and it will be a positive reporting system which will allocate timeslots and plot passages for all vessels in the inner harbour.

    Comment - As a board member of Capricorn Tourism and Economic Development Ltd, I ask proponents not to exclude the possibility of Rockhampton providing some of your accommodation solutions. Gracemere is only 50 minutes up the road. I spent some three years myself commuting to and from Rockhampton.
    Our study is based on the region and we look at a range of possibilities.

19. **Could you explain how Arrow Energy will manage its offset solution?**
    An offset solution applies to a situation where we're having an impact on something like a vegetation community – an impact we can't avoid. In terms of the size of the area we impact upon, we have to offset that impact by finding and protecting an equivalent type community in the same region. The offset solution works in multiples so if we impact one hectare, we would have to protect three to five hectares elsewhere. Protection is constituted by some form of permanent covenant or land tenure agreement to ensure that that particular ecosystem or community is protected. At the moment we're still quantifying what our requirements are going to be and what locations we're going to identify to serve as offset communities.

20. **What sort of pressure is in the pipeline? What would happen if there was a fire or a leak?**
    The pressure in the pipeline is designed to be 10.2 megapascals (MPa) or approximately 1400 pounds per square inch (PSI). We have two parts to our leak detection system. One works on differential pressure – if there's a small hole it will show some indication, but if it's a large hole it will detect it instantly. We are looking at another system which employs a fibre optic microphone to track the length of the pipeline and it can pick up the tiniest of holes. Another indication of a leak, even a leak such as a very small pinhole, is that the area around the hole will freeze and the vegetation dies giving you a visual indication of where the leak is located. We will also do monthly fly/drive inspections.

21. **If you clear an acre or a hectare of mangroves you have to protect maybe ten acres or hectares of mangroves somewhere else? Do you need to find an existing mangrove colony or would the solution mean that you try to establish a mangrove colony where there wasn't one before?**

Government offset policy requires that you have to protect a 'like' community. Typically government policy doesn't allow you to replant a vegetation community and count that as an offset. Offset is about protecting existing biodiversity around those ecosystems in perpetuity. It's about finding an area that isn't currently protected and safeguarding it from future development. It focusses on protection, not increasing the population.

22. **A question about the stated traffic figure of one and a half ships per day – that's one and a half in, one and a half out?**
    No that's one and a half total, per day.

23. **We don't know what happens at the other end of the pipeline. What damage are you doing or not doing? Is there any truth in the belief some farmers have that there are deleterious impacts on their ecosystems, that there are toxic materials generated by your process? I'd be grateful for an explanation of the extraction process.**
    I'll start with an explanation of what we're doing in the upstream. When I mention downstream, I'm talking about the LNG plant project. When I mention upstream, we're talking about the actual gas wells, the area where we're drilling into the coal seams to extract gas. We're running an EIS process in the upstream region; it's a similar process to what we see here today. We're at a similar point (in the upstream) of progressing through the EIS in terms of being well advanced in doing our required studies which relate to all the issues you may have heard through different media. We believe we can deal with all the environmental issues to ensure the safe extraction and processing of gas to send to Gladstone.

    There has been concern regarding any potentially negative effect to ground water aquifers. As recently as three weeks ago we did a full round of consultation meetings in the Surat Basin. As part of that process, we gave people preliminary results on what impacts the key ground water aquifers are likely to experience as a result of our activity. The drawdown that the Condamine alluvial aquifer is to experience will be between one and four metres. We are doing continuing work to define that figure more precisely. That was a localised drawdown in the far western area of the aquifer. Across the majority of the aquifer, the drawdown was between a half metre and one metre. Via beneficial uses such as substitution (after treating the water with a reverse osmosis process) we can supply irrigators with water so they don't have to pump their allocation out of the aquifers. Hopefully we will see a recharge of those aquifers. This is an example of the sort of detail and modelling we're going through at present with landholders in the Surat Basin.

24. **How does the extraction process work?**
    We drill wells at spacings of between 700m and 1.2km although in some areas they can be further apart. We drill wells into the coal seams and the well is only opened at that spot. Any aquifers that we drill through in the process are cemented off through the finishing process so we don't get movement of water or gas between the different aquifers. Once the well is finished, we pump out the water which releases the pressure in the coal and allows the gas to flow. We get a peak in the first two or three years in terms of water production. The water curve starts high and falls off as time goes on and the gas curve is almost exactly the opposite.

In the early days, when there is a lot of water in the coal, the gas flow is restricted by the water. As the water level reduces, the gas is able to flow from the coal into the wells. From each well head there's a gathering system containing two pipes, a water pipe and a gas pipe. They flow to centralised compression (gas supply) and water treatment (reverse osmosis) facilities. We take responsibility for our waste water and if our brine stream can't be utilised beneficially by another industry, we will truck or pipe it to a regulated waste landfill where it will be encapsulated in a safe manner. In terms of our clean water stream, we're required to balance that water to restore any minerals we might have removed, before supplying it to irrigators. We have some brochures we can provide to detail further information about the upstream project. There's also an animation available on our website that takes you through that process.

25. **You don't use fracturing? How do you turn coal into gas?**
    In the Surat Basin we don't use hydraulic fracturing. When you release the pressure in the coal seam by pumping out the water, the gas naturally dissolves from the coal. In the Bowen Basin we use a technology called hydraulic fracturing. You pump water at great pressure down the well. You get localised fracturing of the coal. It allows pathways for the water and gas to escape. It's done under a highly controlled method to minimise any uncontrolled fracturing.

26. **On television, I've seen footage of water burning.**
    We've seen that footage also. There are examples in the Surat Basin today of water bores that produce gas. There's a famous one that you might have seen on *Four Corners* and the like. That water bore is on one of Arrow's tenements but is a long way away from any coal seam gas (CSG) production. Essentially what the landholder has done is drilled himself a gas well. He's drilled a water bore down in to the Walloon coal measures which is the main coal measure we target for gas. He's pumped water out for use on his property. He's locally de-watered the coal measure and gas has dissolved from the coal and has come up through his bore. He's produced his own gas well.

27. **What about pollution? Are there hazardous materials produced as a result of the process in terms of de-watering and producing gas in the well?**
    No.

28. **And fracturing?**
    In terms of fracturing (in the Bowen Basin), typically the chemicals we use in hydraulic fracturing are baking soda, vinegar and chlorine (as well as sand). It's very heavily regulated. They are all extremely common chemicals. This process is very carefully regulated by the state government. The government is comfortable that our process is not toxic unlike similar processes overseas. We are happy to supply some fact sheets about the process if you're interested.

29. **In the agricultural sector there's a real concern that a snow job is being done by the industry and that millions of dollars are being paid in compensation as a means of getting people to 'shut up' in other words.**

We run consultation meetings just like this one here out in the Surat Basin. People come along and questions are posed. Over the last twelve months we've come a long way in terms of correcting some of the myths that are out there. Some of what you see on television reflects American situations that are not part of the coal seam gas industry here in Australia.

Arrow Energy is working with the community, both on a one-on-one basis and through groups such as the Intensive Farming Committee set up in the Surat Basin in an effort to find a way to co-exist on the land. We are working with people who are at the coal face.

30. **The state government has said that Gladstone will be looked after by the Gladstone Foundation. Each of the proponents has so far said that they will consider delivering funds to the Foundation although without any specific commitment. There has been some fairly significant planning undertaken in the Gladstone region. One hundred million dollars' worth of projects has been identified in terms of infrastructure required to meet the industrial development of the region but there have been no firm commitments. There is a high level of cynicism as the social contract is not being met. As a proponent do you undertake to offer any firm commitment to the Gladstone Foundation?**
    There is a concern that companies are required to meet their commitments and then on top of that be required to contribute to the Gladstone Foundation. It is too early for the company to decide whether it wants to participate in the Gladstone Foundation. We believe in time that decision will be clearer for us. Understandably, the company doesn't want to progress a project that is not economically viable. We don't want to double dip i.e. have a condition that we commit to a particular social impact management plan and then additionally have responsibilities to the Gladstone Foundation. I've met with Jim Petrich (the Chairman of the Foundation) several times and have had that conversation with him. The calibre of people on the Foundation board will ensure that there's some way to move forward.

31. **From a council perspective we're not moving forward. As I said, there are no commitments being made.**
    As part of the EIS process we have to identify our impacts on the environment which includes social, economic and community. It appears to me that there's a disconnect between the actual, identifiable impacts of our project and some of the items contained on the Gladstone Foundation's list. The issue is to align our responsibility to mitigate our impacts with some of the Foundation's projects.

32. **I just wanted to clarify a definition. Downstream is the LNG plant and upstream is where the gas is extracted, what's the pipeline?**
    Midstream – there is a separate EIS for the pipeline.

33. **With regard to the temporary workers' accommodation, I'm surprised that you haven't considered re-commissioning old retirement villages, or even going to the university. They have a large block of land in town that they'd develop into accommodation, if only they could secure a backer. I'm surprised alternatives such as these haven't been looked at.**

I've led the project to find land for the past year. We've arrived at two options. We were keen to secure land that would serve some mutual benefit to the community either in or outside of town. Our use requirements however meant that we needed to source some twenty hectares or so of land. We went outside town and have found 50 hectares. We arrived at the decision to select this land having consulted the findings of three external studies. We concluded that the way forward was to find an area of land where we could control the development applications. If we sought to utilise a smaller block of land that already had an existing use it wouldn't have suited all our purposes. We decided that we required at least 20 hectares and obviously that scale of property is not to be found in the town.

34. **So when you are finished building your processing plant you will have left no legacy in the town, except maybe a hundred workers. You come into town, you impact on the town. Is there some sort of legacy that Arrow might deliver to offset the pain the town's gone through?**
    The social impact management plan that we're required to deliver as part of the EIS will have to consider what those impacts are going to be and how Arrow will address them and leave a legacy beyond that of an operational workforce.

    In terms of housing, there are three different types of housing that we'll need to provide. At a later date, when we're able to consider further locations, I dare say some of them might be at sites within the town such as those you've mentioned.

    Comment - One of the things holding the university back is the lack of accommodation. For the next 50 years, students will not be able to compete for rental accommodation. Universities are here for hundreds if not thousands of years. I was the sole committee member who dealt with proponents who were keen to consider the development of accommodation at university sites, but it was not a co-operative process and a very appropriate block of land is still sitting there empty. It would take two or three million dollars total I suggest to fully develop this site. It would be a wonderful legacy.

35. **In terms of taking electricity from the grid, given that the NRG power station is at full capacity, where exactly would you be getting your power from?**

    That's a discussion we're having currently with Powerlink and other proponents. One of the issues is to understand what the capacity is and where it would have to come from.

36. **Is there a possibility that another power station might be constructed?**
    Yes, there may be a business opportunity to do that.

Mount Larcom

Date:	15 June 2011	
Venue:	Mount Larcom Public Hall, Mount Larcom	
Presenters:	Hilary Mercer, Vice President, LNG/Integration	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
Facilitator:	Jan Taylor, Principal	JTA Australia

1. **Which is the preferred launch site?**
   Each of the sites identified have different advantages and disadvantages and we don't have a preference as yet. The EIS is looking at both options (Calliope River & the Western Basin Dredging Bund - 4N). We are considering both from the points of view of environmental advantage, distance and sound. There are also timing considerations at launch site 4N.

2. **If you use reclaimed land it will be land that's already been destroyed. Wouldn't such a use be preferable to ruining another area such as the Calliope River?**
   That is interesting as we've spoken with some fishermen who were interested in the idea of removing the Calliope sandbar.

3. **Where will you find areas to serve as offsets?**
   At the moment we are in the process of determining the total extent of our impact. Once we have some understanding of our total impacts, we can begin to identify appropriate offset sites.

4. **How do you duplicate pristine environments?**
   In Queensland it is not about duplicating environments. Our offset system is based around the requirement that we find a previously unprotected allotment of land, the size of which is a multiple of the affected site's area. The offset site needs to have a similar ecosystem to that of the affected site. We then secure the long-term protection of that land and its ecosystem in perpetuity. This protection is ensured through some manner of land tenure agreement. We do not replicate the affected site's ecosystem at another location as part of our offset requirement.

   An example would be the Surat Gas Pipeline which goes through an area of cycads. We are transplanting these and any that we lose get replaced on a ratio of five to one. The area that we plant out is given to the state forest.

5. **Why are you allowed to do this in the Gladstone State Development Area (GSDA)?**
   It has been a government-driven decision. The government has declared a particular area of Curtis Island to be an LNG precinct. I believe we can mitigate any impacts that we have.
   Question relates to developing an LNG plant in in the GSDA

6. **Is it correct that LNG gas is intoxicating, because the government is obviously drunk on it?**

No, it's non-toxic. It mainly consists of methane, a very light hydrocarbon. It's odourless and transparent. If there is a leak, all you will see of it is a cloud of water condensing. You can breathe it in but it is not toxic.

7. **There are a lot of companies involved. Which is the main company?**
   There are four separate projects: APLNG (Origin and Conoco Phillips), QCLNG (BG and QGC), GLNG (Santos, Petronas, Total and Kogas), and Arrow LNG (Shell & PetroChina). We all have acreage in the Surat Basin and additionally Arrow has acreage in the Bowen Basin. The gas produced there will be piped to LNG plants in Gladstone before it is liquefied and then shipped overseas where it gets converted back to gas.

8. **Why hasn't there been a consolidation of all the projects into one project, one plant?**
   Any potential consolidation would have been difficult for practical reasons. The ownership of each company is separate. The timescale of each company is different. When BG (the first company) was ready, none of the other proponents were ready to act. There is some cooperation between the companies. In the Surat Basin we recently signed an agreement with the other proponents on a medical evacuation facility.

9. **Why are there five different pipelines?**
   This is because all companies hold acreage in different areas, we are quite spread out. So again it would not be practical to have one pipeline.

   In addition, at its largest point our pipeline will be 48 inches in diameter. If we were to combine the gas from all companies the transmission pipeline would have to be almost two metres in diameter which would present a great technical challenge.

10. **Have you thought about terrorism, what if someone decided to crash a plane into the LNG plant? Would there be a fire?**
    If someone deliberately decided to crash a plane the first thing you would see would be loss of containment. We ensure that the gas has two levels of containment in both LNG plants and ships. If the primary containment is compromised, the secondary containment holds the LNG while the primary containment is repaired. We have an emergency response system, and if there is a loss of containment then we go to flare to burn off the gas.

    A risk analysis has been done which assumes if there is an explosion there are safety contours around the flare. Assuming somehow there was an explosion, we calculate the extent of possible damage and ensure that buildings are a sufficient distance away so as not to be affected. We also will have a system of controlled access to the plant and will have procedures in place to keep people safe. The LNG Plant has multiple security systems including restricted access to the plant.

    In terms of fire, yes there likely would be a fire but it would be contained within the Arrow Energy site and our safety zones would reduce the risk to the public. Originally when we did the risk analysis we were impacting on an additional area so we purchased some additional land.

11. **These plants are on the flight path into Gladstone, surely that increases the risk of someone crashing into the plants?**
    We are aware that the flight path is over the plant. As I understand it there are several reviews being carried out as to whether the flight path should continue to be over that area. We've also had to look at plume heights to consider the possible impacts this could have on planes. It's not unusual to have LNG plants near airports – however we will not build an LNG plant unless there is an area 2500m above the plant to where the planes are flying.
    As a point to note, the main flight path into Gladstone is not over Curtis Island. It is however under the path taken when planes are in a holding pattern. There is also a sterile zone around the flare. The flare is defined as the thermal radiation zone 6.2 watts per square metre (W/m-2). The only access is through a permit to work with a very controlled access.

Gladstone (evening session)

Date:	16 June 2011	
Venue:	Leo Zussino Building, CQ University	
Presenters:	Hilary Mercer, Vice President, LNG/Integration	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
Facilitator:	Jan Taylor, Principal	JTA Australia

1. **Is 3,500 the peak workforce or is it a cumulative total?**
   That is the peak workforce. There will be 2,500 in the camp on Curtis Island, and we want to have additional facilities as an overflow. Once we have done a detailed design we will have a better idea of these facilities. The last time we were in Gladstone we said the peak workforce would be 2,500, but we have revised that up to 3,500 people.

2. **Will the gas be pre-treated in the field so there's no risk of mercury or other harmful materials being distributed?**
   The gas we extract is sales quality gas. In the samples we've seen so far we've not seen any mercury. It has been cleaned and is 98% methane and there will be no sulphur components, water or hydrogen in it. We traditionally put a mercury guard at all of our LNG plants and that's to protect the aluminium components of some of our processing equipment which is otherwise susceptible to mercury-induced cracking.

3. **What will the battery limit of the LNG plant be?**
   The Surat Gas Pipeline EIS (in 2009) moved to a location that has changed slightly since that time so the EIS scope has been increased to allow for the assessment of this change to the pipeline alignment. From an operational point of view, the limit will exist where the pipeline comes out of the ground near the LNG plant on Curtis Island.

4. **Where will you source the water supply for the plant during construction and operation?**
   We have two options. One is to take our own water and desalinate it on site. An alternative is to work with the Gladstone Area Water Board (GAWB). GAWB is presently putting both a sewerage and water line across Port Curtis and we're actively working with it to look at the opportunity for us to link our own water and sewerage facilities to those lines.

5. **What is the preferred method of insulating pipes?**
   Traditionally we use polyurethane (PU) insulation system which is a solid foam insulation system. An alternative to this would be to use glass reinforced plastic (GRP). A benefit of GRP is a capacity to self-amalgamate and provide a continuous water barrier. It is malleable and cures itself in sunlight.

6. **Is there a problem in controlling the outside diameter of the pipe after applying GRP insulation?**

Some of the polyethylene products available can give problems in terms of maintaining a consistent outside diameter of the pipeline. Such products require that a differential between zero and 20 millimetres needs to be considered.

7. **Has there been a change to the number of tugs? Is it correct that there were initially four tugs dedicated to each vessel?**
   Two tugs will be attached to the tanker from the point of the fairway buoy. An additional two tugs will assist the vessel to berth as it approaches the jetty.

8. **How do the standards of the Society of International Gas Tankers and Terminal Operators (SIGTTO) apply to Gladstone where fuel tankers come close to population centres?**
   We've carried out a quantitative risk analysis of the passage between the fairway buoy and the jetty. We've established that the risk levels are exceedingly low throughout the whole passage. The escort and berthing tugs are there to counter any risk. There are many examples in the world where these are located near population centres such as Boston, Rotterdam and Singapore.

9. **What happens to the accommodation sites once they're no longer required?**
   The site at Boatshed Point will be demolished and we'll rehabilitate the area. The mainland sites are also marked for demolition and rehabilitation as a first option. At the end of phase 1 of the project which involves the first two trains, we'll look forward to see when phase 2 is going to commence for the next two trains. Depending upon the event of a gap opening between the two phases, we'll either demolish the facility at the conclusion of phase 1 and then rebuild for phase 2, or maintain it until the close of phase 2.

10. **Are the sites rehabilitated to their original condition?**
    In principle the requirement is to rehabilitate and return the site to its original state as far as is possible. If it was a forested site, we would have to replace trees. In prior instances, rocks from a site have been removed, stored and returned to their location as part of the rehabilitative process.

11. **In terms of refrigeration what does C3MR stand for and how does it work compared to the Optimised Cascade process used by ConocoPhillips?**
    Both processes are in operation. The C3MR is known as the workhorse of the industry. The Darwin LNG plant makes use of it. C3 stands for propane and MR is mixed refrigerant. The C3MR process utilises two cycles of refrigeration, a propane cycle then a mixed refrigerant cycle, similar in principle to that of a domestic fridge or air conditioner. The Cascade process uses three cycles. The C3MR has one main cryogenic heat exchanger but in the Cascade process it has a heat exchanger for each stage in the cascade. The C3MR is a vertical process whereas the Cascade process is horizontal as if it works through a series of boxes. Essentially it is the same type of materials and processes and the same temperatures are used.

12. **Is C3MR a proprietary system?**
    No, the technology is in the public domain.

13. **How does the EIS consider the possibility that the CSG workforce will elect to live permanently in Gladstone?**
    The EIS looks at the percentage of the workforce composed of local residents as well as acknowledging those who might wish to come to Gladstone and become residents. The EIS will look at any impacts posed to housing, public amenities and so on by an influx of people.

14. **Will you be considering the work that other LNG proponents have done in terms of planning for additional housing and infrastructure?**
    Arrow Energy has been participating in ongoing discussions with other proponents and representatives of the state in looking at issues relating to housing.

15. **How does the EIS consider the housing and environmental impacts posed by contractors and sub-contractors? The size of that particular workforce can be difficult to quantify.**
    Direct contractors and subcontractors are included in a workforce that we anticipate will number three and a half thousand. It is more difficult to anticipate the numbers and influence posed by other subcontractors who may move to the area to support non-project businesses.

    The cultural background of workers can exert an influence upon population influx. There is a greater tendency for European workers to bring their families to live in the community. In contrast, Japanese workers for example are far more likely to live (as singles) in the camps with other workers. We haven't yet selected our contractor workforce although we know who our principal bidders are likely to be. We need to consider what their philosophies are likely to be in terms of providing workers.

16. **In addition to housing, are you considering the impact to community institutions such as schools, health services and so on?**
    Yes, we've engaged in consultation with different community services as part of the social impact assessment process. There will need to be ongoing consultation in some of those areas.

    There's a broader initiative to look at affordable housing to ensure all housing needs are met. All LNG proponents are looking at working with the ULDA (Urban Land Development Authority) to consider the requirements of all residents be they first home buyers, renters, more mature purchasers and so on.

17. **Projects come to town and create a jump in population. With this increase comes a greater need for emergency services workers and doctors and so on. One of the difficulties in attracting doctors to this region is the lack of housing. Are the projects taking some responsibility for housing those additional health and community service workers?**
    We are in talks with Gladstone Regional Council at the moment about these issues. We would like to encourage the release of more land and housing onto the market. Developers and investment holders have a great deal of influence over the availability of land. Many would be hoping to achieve a particular price point before releasing their property. We would like to encourage them (perhaps through incentives) to try to keep pace with the market. Our

influence is through debate. It's not just about housing LNG workers, but relieving pressure on property generally. It's an unusual dilemma and there's no one easy answer.

18. **What measures are you putting in place to integrate new employees into the Gladstone community? Are you going to implement mechanisms that will assist new residents to have their qualifications recognised?**
Michelle Jones is our Community Relations Adviser in Gladstone. She works very closely with community advocacy groups that have specific programs devised for newly arrived visitors and residents. As I said previously, the contractors will exert an influence over any population influx. We will need to consider how any prospective contractors would plan to facilitate the housing of their workforce – whether they bring their families or not, whether they become residents of Gladstone.

    When we go out to tender at the engineering, procurement and construction (EPC) phase, we're not so interested in looking at how the contractors will build the plant; I'm interested in how they plan to function within the specific context of Gladstone. How will they implement health and safety and environmental systems that comply with local legislation? How are they going to integrate their workers into the local community? Are they going to bring in workers on 457 visas and if so what qualifications will they be requiring of those workers? The process that we follow to develop our project requires that we ask these sorts of questions.

19. **I understand that the proponents offer a deal of information directed to welcoming a multicultural population to Gladstone. Are you aware all that information is in English?**
Yes. That is something we need to look at further.

20. **There is a need for companies to offer a program of cultural induction for their employees. There is a need to state what behaviour is culturally appropriate here, as distinct from the varying cultural norms of other countries.**
I'm not anticipating a workforce that is as multicultural as I've seen on prior projects. However, we are very aware of the fact that language and communication are important considerations on construction sites.

21. **Gladstone had a situation like this boom 47 years ago. Here we are today still proposing a single men's work camp. Couldn't we move forward and make some of those temporary buildings permanent so that they can be integrated into the community?**
There's been some previous discussion on this matter. A development on the university's land was queried with a view to leaving dwellings for later use by students and staff. One issue to consider has been the unwillingness from some parts of the community to house large numbers of (predominantly) single men in close quarters in the immediate town precinct. We will look at the opportunity to provide some permanent housing in the local community for use by Arrow staff or major contract staff, housing that might later be available to the local community. It's another option as we're in the planning stage at the moment.

22. **There has been some discussion previously from some of the other companies about housing that will later function as an aged care centre?**
    We're two years away from making our final investment decision. We have an Implementation Planning Manager who is to join the LNG plant as of 1 July. His role will be to look at how we prepare for construction, how we organise transport and housing for our own staff, contract staff and so on.

23. **In terms of shipping and Qualitative Risk Assessment, in what terms was risk reported? Was it reported in dollar terms or in probability of occurrence?**
    It was reported in probability of occurrence.

    Comment: at the university we've looked at quantifying risk in dollar terms as you can weigh-up benefits against cost quite easily.

24. **In recent years there've been two major shipping incidents on the coast, both of which involved the spilling of oil. Is the design of the LNG carriers going to be any different from that of those vessels?**
    LNG carriers will carry a certain amount of heavy fuel. The main source of fuel propulsion will come from the 'boil off' from the LNG carried. Manoeuvring of the carriers in port requires use of a dual fuel system. Modern day design utilises double-skin bunker tanks. In the very remote event of a carrier running aground, the chances of breaching a bunker tank are very small. That risk of running aground is further mitigated by two escort tugs. In the event of rudder or engine failure, those two tugs will be able to secure and stabilise the carrier in the main channel. The carriers will not be bunkered here, they will be refuelled overseas.

25. **Have Gladstone pilots been trained to handle LNG carriers?**
    Over the past two years we've taken Gladstone pilots, GPC and the Harbour Master to simulation centres overseas which provide very real-life situations. We've arranged for Gladstone pilots to go to Withnell Bay (Dampier, Western Australia) where they have gained experience on escort tugs and LNG carriers. They will go aboard some LNG carriers there and have hands-on experience in manoeuvring the vessels.

26. **Is there any possibility that the project will fail due to any prior adverse treatment of landholders upstream?**
    We've recently held a series of community information sessions as part of the Surat Gas Project. During those meetings, Arrow acknowledged that its past attempts to engage with the community around issues of land access had not been as productive or as successful as we would have hoped. Arrow has committed to a series of principles concerning the ways in which we negotiate with landholders. We have worked on providing a transparent compensation framework for landholders.

    Arrow has a strong belief that it can work co-operatively with landholders and the broader community. As part of our commitment to this co-operation we've founded two committees. The Intensively Farmed Land committee looks at how Arrow operates on intensively farmed land. That committee is comprised of members including key senior staff at Arrow as well as landholders from different farming technologies. The Surat Community Reference Group

looks at larger, holistic issues such as the use of water and how Arrow interacts with the community generally. The state government has commissioned a CSG engagement group which is directed to addressing water and landholder issues.

27. **Has the industry or has Arrow specifically dealt with the issue of discharge of contaminated water?**
    I think your question is in regard to the water from the coal seam which is regarded by the Queensland Government as regulated waste. We dewater the coal seams to release gas. The water is the same as that which farmers bring up from their bores and use on their properties for stock watering and domestic purposes. We currently aggregate the water in dams. We then treat the water via a reverse osmosis process which generates both a brine and a clean water stream. We are currently looking at ways in which the brine stream might serve some beneficial, commercial use. In the event that it can't be utilised it will be confined to a regulated waste treatment plant. The clean water stream will be balanced (via a restoration of minerals) before being suitable for irrigation purposes. It is our hope that we can reach agreements with farmers such that they will not draw their water from the aquifers but rather will be supplied with re-mineralised, clean stream water by us in lieu of their allocation.

28. **During construction safety will be your priority. Will the Health, Safety and Environment (HS&E) platform be provided by Arrow, or by your principal contractor?**
    As part of the tender, we will request HS&E plans and check that they are compliant with Arrow's own HS&E requirements. The major contractor's HS&E plans will be used because Arrow's HS&E is not specific for construction, so there will be a mixture of both. In regard to the training, there will be a combination of training from Arrow and targeted safety training which may be brought in from external providers.

29. **I'm assuming there'll be a Social Impact Management Plan to specifically consider communities upstream?**
    Yes. There is a need for a separate EIS to be completed for the plant, each pipeline and the two upstream developments the Bowen and Surat Basins). A Social Impact Management Plan (SIMP) is required for each EIS. The reason why the projects are separate is a historical anomaly. Prior to Arrow's takeover, the projects were being developed by different agencies. It wasn't efficient to go back to the beginning and re-start the EIS process as one large single project.

30. **Is the security considered before or after the completion of the plant?**
    The HS & E plan, as part of the front end engineering design (FEED) package, considers the security we require during the building phase as well as the operational phase. EPC contractors will have to show us in the tender how they will meet those security requirements. During the tendering phase we often have a site visit to allow contractors to meet with the local community and businesses. Like all our tendering requirements, it is important that prospective contractors demonstrate a consideration of how they would operate within the specific context of Gladstone.

Calliope

Date:	16 June 2011	
Venue:	Calliope Community Centre, Calliope	
Presenters:	Hilary Mercer, Vice President, LNG/Integration	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
Facilitator:	Jan Taylor, Principal	JTA Australia

1. **What effect will increased traffic have upon local community?**
   As part of the EIS process we need look at where traffic is flowing. We use a model to look at what impacts increased traffic flows will have on key intersections. We'll be able to discuss any anticipated traffic issues when the EIS is completed.

   Arrow is also involved in a cumulative impact assessment being undertaken by the Department of Infrastructure and Planning which is looking at bringing work forward on key aspects of proposed road upgrades. Department of Transport and Main Roads (DTMR) is also part of the discussion.

2. **We have concerns about the spread of weeds.**
   The Surat to Gladstone pipeline addressed the issue of weed spread in the EIS. A weed and pathogen management plan must be prepared and consultation is required under the *Rural Lands Act*. There's a requirement that Arrow produce weed management plans. As we get closer to construction we'll engage with local council to ensure that we don't spread weed seed. Everyone recognises that prevention is the best outcome. Our agreements with contractors require that they also follow our weed and seed processes and there are significant breach consequences should they not adequately comply with those processes.

3. **What happens if this company is bought out by another? How can the community be sure that commitments made by Arrow in regard to weed seed (or any other matter) will be upheld by any subsequent company?**
   The obligations and conditions contained within the approval process for any project still apply to any subsequent company that might purchase or take on that project. There are significant penalties if the conditions are breached. The approvals are attached to the project therefore if someone takes over they are legally obliged to do the same.

4. **Is Arrow of the opinion that landowners' time is valuable? Do they give their time for free or will landholders be paid?**
   We agree that their time is very valuable. In the early stages of negotiation we will agree how this time will be compensated at the time of negotiating access.

5. **Can you explain the way in which any additional accommodation/housing infrastructure will be managed? Will this be managed by the contractor that wins the tender or by Arrow?**
   In principle, the company which wins the contract will do it. Hilary will move to Gladstone to manage the main contractor or groups of contractors. The tender will have requirements

regarding infrastructure and other components beyond the LNG plant. Contractors will look after housing/infrastructure requirements specific to their project and their tender agreement with Arrow will specify their responsibilities in this regard. Arrow will have day to day on-site input to ensure that contractors are managing all their responsibilities as outlined in their tender agreement.

6. **If Bechtel is not handling the construction for Arrow, how do you choose someone who knows the area?**
   We prefer a joint venture arrangement so that an Australian company is involved with the contract to increase the local knowledge of the area. We will also hold a site visit to allow contenders to familiarise themselves with the local environment.

Curtis Island

Date:	18 June 2011	
Venue:	Curtis Lodge, South End, Curtis Island	
Presenters:	Hilary Mercer, Vice President, LNG/Integration	Arrow Energy
	Alexandre Santos, Senior Process Engineer	Arrow Energy
	Gerard Coggan, EIS Project Manager	Arrow Energy
Facilitator:	Jan Taylor, Principal	JTA Australia

1. **Is PetroChina a Chinese government-owned corporation?**
   It is semi-government owned. There are three large resource companies in China (PetroChina, CNOOC and Sinopec) which are all semi-government owned.

2. **Is the tunnel from Gladstone to Curtis Island a more costly solution compared to the option the other proponents are using?**
   Yes, it is more costly but environmentally it is the better option.

3. **Is there an opportunity for you to generate power and supply back to the grid?**
   If we use electricity then there will be no gas turbines. However, if we go with our base case which is using the gas turbines we would not put an electrical cable through the tunnel. Also, to be able to sell power back to the grid you have to create at least 30MW of power.

4. **How much noise do your gas turbines make compared to electricity-driven turbines?**
   Gas turbines have noise enclosures around them to reduce the noise. Electrically powered plants are generally less noisy than those supplied by gas turbine. We are doing noise studies at the moment and will be able to supply that information next time we return to Curtis Island. Fans and other equipment are likely to make more noise than gas turbines. At the distance they will be from South End I don't believe it would have any material effect.

5. **How do we know where you do offsets?**
   There's a statutory process of identifying and assessing sites and then negotiating with government to establish that the offset site is sufficient. It's a formal process but I'm not aware of there being any public record as to which sites are identified to serve as offset locations.

6. **So it could be smoke and mirrors?**
   No it's not smoke and mirrors, but Arrow could look at a process where that information could be delivered to the community.

7. **You mention that 20% of the workforce will come from the local area? If so, where will the remaining 80% come from?**
   There is a capacity in the local area for us to gain up to 20% from the local community. The remainder is likely to be fly in, fly out who will be based at the construction camp.

8. **Will you be using Australian workers or foreign workers?**

I would hope that the majority are Australian workers. As part of our tendering processes we ask potential contractors where their workforce is coming from, their policy on visa applicants, percentage of Australian vs. foreign workforce etc. Consideration of local and Australian content is part of the technical evaluation of the contract.

9. **With the Chinese Government having part ownership is there any obligation for Chinese workers to be part of the project?**
   No. In that regard it would be far more likely that we'd consider having pieces of the plant (modules) fabricated in China. I'm not sure about the upstream component of the project. But there is no obligation to take Chinese workers.

10. **Are the sources of gas for the different companies mutually exclusive?**
    Yes. We have acreage in both the Surat Basin and Bowen Basin and we'll be taking 60/40 or 70/30 proportions, with Surat being the larger source initially and then bringing gas in from the Bowen Basin later. Our sites in the Surat Basin are predominantly on the eastern side whereas some of the other proponents are on the west and Santos in the north.

11. **What happens if the LNP wins the next election and it supports the farmers? Where are you then?**
    We've been holding meetings in the Surat Basin recently, much like this one. There are some areas out there with significant concerns about potential impacts that any CSG project might have on their businesses. We are talking through issues such as groundwater management, and working together to manage our footprint, and minimise the impacts. To this end we have established two committees. One is the Intensively Farmed Land (IFL) Committee which has representatives from both Arrow Energy and different agricultural enterprises. We're sitting down with them and having detailed technical discussions about how to put a gas well and pipeline on an intensively irrigated property as opposed to a wheat property or as opposed to grazing land. The other committee is the Surat Reference group which deals with broader issues such as how we engage with the community and how we manage and treat water.

    The way in which Arrow and our contractors and subcontractors behave is very important to us as well. We are focussed on safety and have developed 'life-saving' rules which outline how we expect staff and contractors/subcontractors to behave. If they don't adhere to these rules, then disciplinary action can be taken, such as moving employees off-site or contracts being terminated.

12. **Will there be road access from your plant down to South End?**
    No.

13. **Do you handle your own insurance?**
    There are two elements. During the construction phase we will buy construction risk insurance. There are a few large companies around the world that will act as an insurance aggregator. With operational risk, we sometimes self-insure a proportional amount but we also have an operational insurance policy with a number of big insurers.

14. **If we have a problem do we see you?**
    Yes.

15. **In terms of risk analysis, do you do that yourselves, or is that done independently?**
    Risk analysis is carried out independently. Risk assessors come twice a year during construction, then once a year during operation. They check all the details and go through maintenance records. Sometimes they accept our records but sometimes they don't and we have to repeat tests and demonstrate shutdowns.

    Shell has a record of obtaining insurance at a good premium because of its safety record as it has had no significant incidents since 1972. Shell is able to obtain quality insurance and it is checked regularly.

16. **Does the heat plume pose any health risk to us?**
    What comes out of the gas turbines is fairly benign. It is primarily butane with small amounts of nitrogen and carbon dioxide. There is no sulphur emitted. The main product of combustion is carbon dioxide and some nitrogen and oxygen. There are standards and we need to demonstrate that we are complying with those standards, such as those from the World Bank. We have to measure and monitor the emissions coming from the plant and show compliance.

17. **Why don't you make the tunnel bigger and use it for transportation as well?**
    Once you have people utilising a tunnel there are additional things you have to do including air and ventilation systems that need to be run. Once you have people involved it becomes much more complicated in terms of what you're allowed to do. It becomes a large, complex and very costly process.

18. **Does the 'no vehicle access' to South End from the plant apply to the other proponents as well?**
    I can't answer on their behalf but I believe so.

19. **How many cubic metres of gas do you have to freeze? What happens at -82˚ to the gas?**
    The gas that comes into the plant is approximately 350 cubic metres per day. The gas condenses at about -120˚. The volume of gas is 13,000 standard cubic feet per day which if you divide by it by .3 gives approximately 400 cubic metres per day.

20. **Is it true that the LNG industry will be exempt from the carbon tax?**
    There have been discussions in the media about this, but as far as I know it hasn't been decided yet.

ARROW ENERGY

INFORMATION SESSIONS

arrow energy
go further

The site of the proposed Arrow LNG Plant on Curtis Island, off Gladstone.

INFORMATION UPDATE ON THE ARROW LNG PLANT

Arrow Energy will be holding a series of community information sessions in the Gladstone region from 14 to 18 June.

These sessions will give community members the opportunity to find out more about the Arrow LNG Plant and to ask questions about the project. The project team will be available at the start of the sessions for one-on-one discussions about the plant, followed by a project update, and then question and answer time.

To obtain further information about the Arrow LNG Plant or get involved with the EIS contact the project team at:

FREECALL 1800 038 856
EMAIL arrowlng@arrowenergy.com.au
POST Arrow Energy LNG
Reply Paid 81 Hamilton Q 4007

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Gladstone	14 June	5.00pm – 8.30pm Presentation: 6.00pm	Rex Metcalfe Theatre Leo Zussino Building, CQU Bryan Jordan Drive, Gladstone
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Issue 17

6 June 2011

Gladstone State High School

State Highlights

In this Issue

QUICK NEWS

Mini-Carnivals –

School uniform must be worn on these days. Please have a hat, sunscreen and water bottle.
Year 8 – Monday 20 June Period 1 & 2
Year 9 - Monday 20 June Period 3 & 4
Year 10 – Tuesday 21 June Period 1 & 2
Year 11 – Wednesday 22 June Period 3 & 4
Year 12 – Wednesday 22 June Period 1 & 2

Athletics Carnival – Wednesday July 20, 2011

SHARKS
Gladstone State High School

Mountain Bike Connect Camp



At the beginning of last week 13 grade 9 boys attended the Mountain Bike Connect Camp. The boys were required to ride the 160km from Granite Creek (on the highway) back into Gladstone. The first day was very challenging, as the boys had to ride 35km up hill, travel through creek crossings and plough through muddy terrain. To add to the challenge the support vehicle also struggled along the track and night fell a bit earlier than expected. Light rain began to fall during the last couple of kilometres, the boys walked their bikes when while sun set and were required to set up camp in the rain. This day was more of a mental challenge than a physical one; however, all boys handled the day with tremendous tolerance and perseverance and must be congratulated for the character they showed. The next day was a bit easier. It was again 35km but mostly downhill and along the flats, that took them through the township of Builyan. After arriving at Harmony Farm, they set up camp and were able to engage in some light activities, such as a game of footy and rounding up the farmer's goats. The final day was a very lengthy 90km. However, the views of the back of Awoonga Dam made the ride go a bit quicker when travelling the winding road through the Boyne Valley. All the boys found the energy to make the final journey back into Gladstone. This camp was a very rewarding experience and all the boys made the transition into young men quite admirably.

A special thanks to Mr Andrew Crighton for his organisation of the ride. This will certainly be a very memorable camp for all who attended. A further thank you to Mr Burke and Mr Johnson for their contribution to the camp and adding very valuable experience an insight into helping the boys make the transition into very fine young men.

Thankyou
Mr Hooley



Dawson Highway, PO Box 260, Gladstone Qld 4680
Phone (07) 4976 6111 Fax (07) 4976 6100
Absentee Notification: (07) 4976 6158

the.principal@gladstonshs.eq.edu.au
www.gladstonshs.eq.edu.au
absentees@gladstonshs.eq.edu.au

Students are issued with the weekly newsletter each Monday during their form class. Parents/caregivers are encouraged to ask their students for a copy each week.

Rehearsals for the musical *Aladdin* are storming ahead. Sunday and Tuesday afternoon rehearsals is showing those involved that they have a beauty on their hands which is guaranteed to delight all those who come to see it. The music alone makes it all worthwhile but the story is so well known and loved by so many that the two shows are destined to become legendary. This musical is shaping up to become one of the best productions in our school's history and an experience which cannot be missed. The two shows are scheduled to take place on Friday 5th August (a matinee exclusively for students) and Saturday 6th August (the night performance). A magic carpet ride awaits all those who come along for the journey.

CALLIOPE STATE SCHOOL
Cleaner
Permanent Part-Time – 16 hrs per wk

A vacancy exists for a permanent part-time Cleaner at Calliope State School. Application packages can be collected from the school office, by phoning (07) 4975 8333 or emailing admin@calliopess.eq.edu.au.

Applications close on Wednesday 15th June 2011.

Applications can be returned, marked "Confidential" to:-
The Principal, Calliope State School,
PO BOX 232, CALLIOPE QLD 4680
Or email admin@calliopess.eq.edu.au

Applicants are required to submit a brief resume which includes contact details for 2 referees and a written response outlining their experiences/knowledge against each point under 'How you will be assessed' in the position description.

Queensland Government

Gladstone State High School

Quick News

Dance Workout (new times)

Women from the community meet to workout to a popular and easy Zumba dance DVD (daughters who wish to join in are welcome). These are low key, beginners' classes. No booking required.

Times:
Tuesday – 9am (free child-minding available)
Wednesday – 6pm
Thursday – 7:15pm

Place: Shed 19, 19 Dalrymple Drive, Toolooa

Cost: gold coin donation

Enquiries: contact Stacy – 4979 3626, or Alex 0432 438 456

Hopelink HEAL.GROW.SUCCEED.

Arrow Energy will be holding a series of community information sessions in the Gladstone region from 14-18 June. These sessions will give community members the opportunity to find out more about the Arrow LNG Plant, and to ask questions about the project.

Gladstone	14 June	5.00pm-8.30pm	Rex Metcalfe Theatre, Leo Zussino Building, CQU
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To find out more about the community information sessions or the Arrow LNG Plant contact the project team at:
Freecall: 1800 038 856,
Email: arrowlng@arrowenergy.com.au
Visit: www.arrowenergy.com.au/community

STRATEGIES TO PREVENT ADOLESCENT ALCOHOL-RELATED HARM
FREE Session with UQ psychologists doing research in this area

The University of Queensland's Centre for Youth Substance Abuse Research offers parents a **FREE** individualised session with a registered psychologist to discuss practical strategies to prevent adolescent alcohol-related harm, tailored to meet their family's needs. This session is valued at over $200 (according to Australian Psychology Society's recommended rates), but is provided **FREE** as part of the Project SHIELD research program (see brochure attached for more information). This is a great opportunity for parents of 13-17-year-olds living in more rural areas, as the session can occur over the phone at their convenience. Research indicates that most teenagers will be exposed to risky situations involving alcohol consumption at some point, regardless of whether they choose to drink or not. Many parents feel that they have no control over whether their adolescent drinks, but recent research suggests that parents have more influence than they might expect. Project SHIELD is a prevention/early intervention strategy, so teenagers do not need to have experimented with alcohol for parents to benefit from the program.

Project SHIELD is funded by the National Health and Medical Research Council and has clearance from the UQ Research Ethics Committee. Education Queensland has also given permission for the project to be advertised to schools.

If you would like more information, please contact Dayna Smith by phone: 3346 4833 or email: projectshield@uq.edu.au

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

Career Corner

The Technical College Gladstone Region is recruiting Year 11 students for commencement in Term 3 students interested in the following trades:-

- Tiling
- Boiler Making
- Machining
- Chefing
- Business Administration
- Cabinet Making

should contact Julia or Aileen at the Technical College on 4976 6101 for information on how to apply. Application forms can be found at www.eqipgladstone.com.au.

QR National are advertising their Apprenticeship Intake for 2011. There are a number of areas available. If any students are interested please see Mrs Christopoulos in D9 during break times only. Be quick as the application process closes on Monday 6th June, 2011.

Hungry Jacks Gladstone is now hiring, students 15 and over can apply in-store or at www.hungryjacks.com.au.

Dates to Remember

8 June	ICAS Science Comp.	16 - 17 June	Yr 10 Mock Interviews
13 June	Queens Birthday Holiday	20 June	Yr 8 & 9 Athletics Carnival
16 - 21 June	Yr 11 & 12 Senior Block exams	21 June	Yr 10 Athletics Carnival

Gladstone State High School

Quick News

Fundraiser

Calliope Kindergarten is holding a Family Portrait Fundraising Day on Sunday 19th June 2011.

Receive a 10 x 13" Framed Family Portrait Photograph plus a Family Portrait Keyring for just $15.00.

All Proceeds will go to Calliope Kindergarten.
Please contact Lisa Rooney on 4975 7093 or 0488 796 424 to arrange your sitting time.

Year 12 Study Tutorials

Study tutorials are held every Wednesday afternoon for Year 12 students. Tutorials take place from 3.05 to 4.30 pm in the Resource Centre. These are designed to support students needing assistance with research and assessment, in particular English and Math, as well as preparation for the QCS test. This is one way of ensuring that Year 12 students reach their potential. If your student works and cannot come on a Wednesday afternoon, alternative arrangements can be made for lunch times by speaking to Ms. Low in the Resource Centre.

Uniform Shop Opening Hours

Monday 8:15am-11:15am
Wednesday 11:00am-2:00pm
Friday 8:15am-11:15am

Gladstone State High School Sport

Rugby League Match Report 1.6.11

Open boys - Gladstone SHS vs Biloela

The GSHS Sharks Open Boys recorded an impressive victory on Wednesday, punishing their tired opponents 70-6.

The boys were keen to avenge their last-start loss to Chanel and started with a high tempo yet disciplined strategy. They quickly capitalised on Biloela's fatigue – with several players backing up from earlier games Biloela were no match for State High's physical forwards and fleet-footed backs.

Gladstone's attacking nous was evident with multiple tries to JG Fichardt, Lachy Winterbottom, Shea McLelland, Mitch Radell and Ben Marold. It was hard to pick a single highlight, as the team executed swift backline movements along with dynamic broken field running to run in a plethora of tries. Coach Rod Dahl was particularly impressed with the support play and defence exhibited by his enthusiastic team. With 13 tries scored and a solitary four-pointer conceded, the boys are brimming with confidence ahead of next weeks match.

Final Score: Gladstone 70 (Tries: JG Fichardt 2, Lachy Winterbottom 2, Shea McLelland 2, Mitch Radell 2, Ben Marold 2, Matt Ellacott, Beau Bailey, Andrew Hebblewhite. Goals: Matt Ellacott 3, Lachy Winterbottom 2, Shea McLelland, Mitch Radell, Jack Champion, Tom Dahl) defeated Biloela 6.

Under 15's – Gladstone SHS vs Biloela

The Under 15's team showcased their array of attacking weapons on Wednesday as they put an outclassed Biloela team to the sword 52-0. Gladstone asserted their dominance early through hard running and tackling by the forwards and exciting support play from the backs.

This steamrolling attack was responsible for the teams 10 tries, with Jethro Rampton and Caleb Lawick bagging hat-tricks. Lawick collected a personal haul of 18 points with 3 successful conversions. Other tries were shared around the team with 6 try scorers in total.

Aside from the blistering pace of Jethro and Caleb, notable players included Dayn Richards with incisive passing, Dylan Raguse with rugged dummy-half work and Dean Dow who contributed well off the bench.

The players were all pleased to keep their opponents scoreless and eagerly await their next fixture with the season nearing its conclusion.

Under 13's – Gladstone SHS vs Biloela

The Under 13's Sharks team suffered a narrow loss to Biloela in a Wednesday evening fixture at Calliope. Despite playing with enthusiasm and occasional glimpses of flair, the boys went down to their disciplined opponents 14-8.

Their opponents capitalised on defensive lapses in a see-sawing match, eventually scoring three tries to two. State High's try scorers were crafty five-eight Garrett Dynevor and speedy prop Ijaaz Khan, who motored over for a well-deserved try.

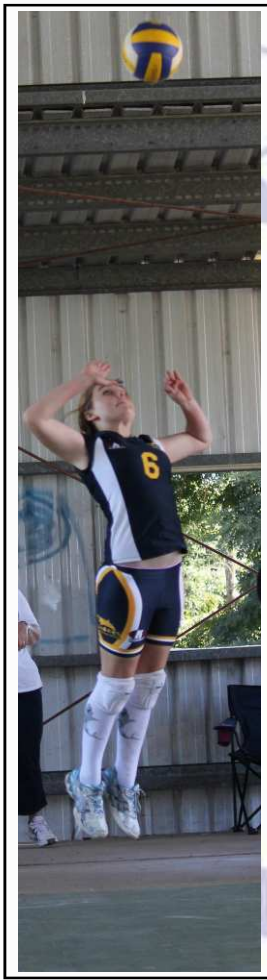
The boys are looking to bounce back in their next fixture, and would really love to have you at the game to cheer them on. Thanks go to all parents and support staff who do a great job each week ferrying the boys to games and spurring them on.

Joel Purdon

Gladstone State High School Sport

Capricornia Info

The last few weeks have been very busy for representative sport. Our Cross Country contingent competed at Fairbairn Dam, Emerald on Monday. Congratulations to Elliott Hodgson for taking out the 16 Years Boys Cap Cross Country.
Rebekah Pearce was selected in the State Volleyball Team after her excellent performance as part of the Cap Volleyball Team in Caloundra two weeks ago. Jared Hayne's performance at State AFL last week must also be mentioned as he has now been selected as part of the Queensland Country AFL side. Congratulations to these athletes, as well as to the large number of students who have represented our school and region this term. Well done!



Volleyball

Last Saturday, two teams from the Volleyball School of Excellence headed to Moura to play against Moura State High. The Year 8 girls had a successful first tournament, winning one game and losing one.

For a first tournament, the girls played exceptionally well and learnt a lot. The Year 9 girls kept up their winning form, being victorious in all three games. It was a great day, where friendships and networks were made, this will increase the profile of volleyball in our extended community.

Rebecca Huth
Sports Co-ordinator

Student Absence Notification

Student Name: _____

Form Class: _____

Date: ___/___/____
Reason (Circle): Sick Personal Family Other
Date: ___/___/____
Reason (Circle): Sick Personal Family Other
Date: ___/___/____
Reason (Circle): Sick Personal Family Other

Parents Signature: _____

PROCEDURE FOR STUDENT ABSENCES

If your student is away for any reason there are several ways of notifying the school.

- ✓ Phone on 07 4976 6158
- ✓ Email on absentees@gladstonshs.eq.edu.au
- ✓ Use the notification slip in the Newsletter each week
- ✓ Use the slip in your student's diary

We appreciate and thank-you for your cooperation.

WORKING WITH COMMUNITIES

INFORMATION UPDATE ON THE ARROW LNG PLANT

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To RSVP your attendance at a session, find out more about the Arrow LNG Plant or get involved with the EIS contact the project team at:

freecall 1800 038 856, **email** arrowlng@arrowenergy.com.au,
or **post** Arrow LNG Project, Reply Paid 81, Hamilton, QLD 4007.

Also visit www.arrowenergy.com.au/community

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BOATING AND FISHING

ARROW LNG PLANT ›

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RELATED PROJECT INFORMATION

Arrow Energy: General Information
Arrow Energy LNG Plant: Environmental Impact Statement
Arrow Energy LNG Plant: LNG Shipping
Arrow Energy LNG Plant: LNG Safety

Coal Seam Fact Sheet / Coal Seam Gas Video
www.arrowenergy.com.au/page/Our_Company/Coal_Seam_Gas/

FOR FURTHER INFORMATION ABOUT CSG OR RELEVANT LEGISLATION, VISIT THE FOLLOWING WEBSITES:

- **Coal Seam Gas in Queensland**
  Queensland Mines and Energy
  www.dme.qld.gov.au/mines/coal_seam_gas.cfm
- **LNG Vessel Operating Parameters Port of Gladstone**
  http://www.cqpa.com.au/Pages/Publications/Port%20Notice/LNG_Vessel_Operating_Parameters_for_Port_of_Gladstone.pdf
- **Maritime Safety Queensland**
  Standard for Marine Construction Activities within Gladstone harbour
  http://www.msq.qld.gov.au/~/media/dea60c93-4367-4da1-a6c9-1dcb6e2ef288/gladstone_construction_document.pdf
- **Port Procedures and Information for Shipping – Gladstone**
  http://www.msq.qld.gov.au/Shipping/Port-procedures/Port-procedures-gladstone.aspx
- **Queensland Recreational Boating and Fishing Guide**
  http://www.msq.qld.gov.au/Publications/Recreational-boating-fishing-guide.aspx
- **Queensland Regulation of the Petroleum Industry**
  Queensland Mines and Energy
  www.dme.qld.gov.au/mines/petroleum_gas.cfm
- **Department of Environment and Resource Management**
  www.epa.qld.gov.au/environmental_management/land/petroleum/guidelines.html
  www.epa.qld.gov.au/environmental_management/impact_assessment/index.html
- **Department of Infrastructure and Planning**
  www.dip.qld.gov.au/projects
- **Commonwealth Government Environmental Assessment**
  Department of Environment, Water, Heritage and the Arts
  www.environment.gov.au/epbc/assessments/index.html

OUR DETAILS ›

Find out more about the Arrow LNG Plant:

FREECALL 1800 038 856
EMAIL arrowlng@arrowenergy.com.au
POST Arrow Energy, Reply Paid 81, Hamilton Q 4007

This brochure is printed on paper stocks manufactured with the environment in mind.

Manufactured from 100% post consumer waste

ISO 14001 Environmental Management System in use

Manufactured using process chlorine free (PCF) pulps

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MARINE INFRASTRUCTURE AND VESSELS

Typical vessels used in Gladstone Harbour will be:

- LNG carriers – typically a double hull membrane carrier between 125,000m^3 and 215,000m^3; up to 300m long and 40m wide with a 12m draft
- Fast Cats – high speed people movers with a capacity of 200 – 250 people; up to four Fast Cats will be required during construction
- ROPAX – roll-on/roll-off ferry approximately 80m long with a capacity of 200 people and 60 vehicles
- Barges – require tugs to manoeuvre; typically 80m long and 20m wide with a capacity of 5,000 – 6,000m^3.

There will be a range of vessels used during the construction and operational phases of the project. During the construction phase, staff and equipment will be transferred by passenger transport vessels (eg Fast Cats) between the mainland and the passenger terminal located at Boatshed Point. The mainland launch site will be located at either Calliope River or the northern end of the Western Bay Dredging reclamation area. Vehicles will be transported to Curtis Island by suitable vehicle transportation vessels (eg ROPAX).

Also located at Boatshed Point will be the Materials Offloading Facility where equipment and large LNG plant modules (up to 2,500 tonne) will be offloaded from cargo vessels. Barges of 5,000 to 6,000m^3 capacity may be used to transport bulk equipment to the LNG Facility.

During operation, Fast Cats will continue to service the Arrow LNG Plant. LNG carriers will berth at the LNG jetty located on Hamilton Point in North China Bay for loading.

THE RISKS ASSOCIATED WITH LNG ARE MITIGATED BY CONTAINMENT SYSTEMS AND SAFEGUARDS.

LNG JETTY SAFETY ZONES

The establishment and enforcement of safety zones is important for protecting the safety of other harbour users. A fixed safety zone of 250m will be maintained by tugs and marked by retractable buoys around docked LNG vessels to eliminate potential ignition sources and ensure the public is kept at a safe distance in the unlikely event of a leak or spill. The safety zone is complimented by gas detectors on the LNG jetty.

With LNG loading lines and arms on the jetty there is potential for LNG to be present even when an LNG carrier is not in port. As such, the 250m safety zone remains in place at all times.

Fixed safety zones will not impede the passage of recreational boats, including between South Passage Island and the terminal jetty on Curtis Island. The exclusion zones do not include the main channels.

Recreational boaties need to be aware of tugs and LNG carriers when these vessles are operating in the swing basins, which are adjacent to the safety zone. LNG staff and contractors will not be allowed to crab or fish on the respective jetties or while on shift.

As part of the EIS, a detailed examination of all potential impacts associated with shipping is being undertaken. This assessment will investigate issues ranging from the potential for introduction of exotic organisms from increased shipping rates, to the potential risk of spills and their management. To ensure these issues are addressed, Arrow is consulting with all potentially affected stakeholders.

LNG PRODUCTION FACILITY PERSONNEL ARE HIGHLY TRAINED AND SPECIALISED.

WHO IS ARROW ENERGY?

Arrow is one of the largest integrated energy companies in Australia with gas producing projects in the Surat and Bowen Basins and interests in three gas fired power stations. The company provides approximately 20 per cent of Queensland's gas and electricity needs.

Arrow is expanding its exploration activities to also deliver a major CSG to LNG project to meet international demand for cleaner energy.

ABOUT THE PROJECT

Arrow Energy is planning the development of a liquefied natural gas (LNG) facility on Curtis Island, off Gladstone, which will play an important role in meeting growing world demand for cleaner burning fuels.

The proposed Arrow LNG Plant will be supplied with coal seam gas (CSG) from Arrow reserves located in the Surat Basin in south east Queensland and the Bowen Basin in central Queensland as part of the broader Arrow LNG project.

The Arrow LNG Plant has been declared a 'significant project' by the Queensland Government. This reflects the complexity of Queensland and Commonwealth approvals required, the project's potential impacts, and the importance of the Gladstone region to national, state and local economies.

The project involves:

- construction of a gas pipeline from the mainland to Curtis Island
- construction of a liquefaction facility where CSG will be converted to LNG and stored for shipment to growing LNG markets
- construction of marine facilities, such as jetties, on the mainland
- construction of jetties, offloading facilities and an LNG carrier terminal on Curtis Island in the vicinity of North China Bay, Hamilton Point and Boatshed Point
- potential localised dredging at marine facilities.

The project is also supported by a dredging program, being managed by the Gladstone Ports Corporation (GPC), to extend shipping lanes to berth pockets and develop swing basins for LNG carriers to load and manoeuvre. The GPC's Western Basin Dredging Project has been granted separate Environmental Impact Statement (EIS) approval.

The Arrow LNG Plant will produce up to 18 million tonnes per annum (mtpa) of LNG and includes the phased construction of up to four trains or processing plants on its Curtis Island site. Stage 1 includes the construction of two trains of around 4mtpa of LNG each on the Arrow site.

Before the project can proceed, the Arrow LNG Plant must gain approval from the Queensland and Commonwealth Governments. To do this, an EIS is being prepared to examine the proposal's potential impacts and proposed management measures to mitigate those impacts.

LNG SHIPPING IN GLADSTONE HARBOUR ›

It is estimated that when the Arrow LNG Plant reaches peak production there will be up to 240 vessels in Gladstone Harbour per year, or about four vessels per week. Arrow has a responsibility to maintain the exemplary safety record of LNG shipping and respects the activities of recreational boaties and fishers already using the harbour.

To minimise impact on other commercial and recreational vessels in the harbour from LNG shipping, Arrow will work closely with the Gladstone Ports Corporation (GPC) in the precise scheduling of visits. It is imperative that all necessary support services – such as qualified local pilots, tug boat services and moving safety zones – are planned well in advance to enable safe and efficient entry and exit from the harbour. This involves extensive planning with Maritime Safety Queensland (MSQ), GPC and the other LNG proponents.

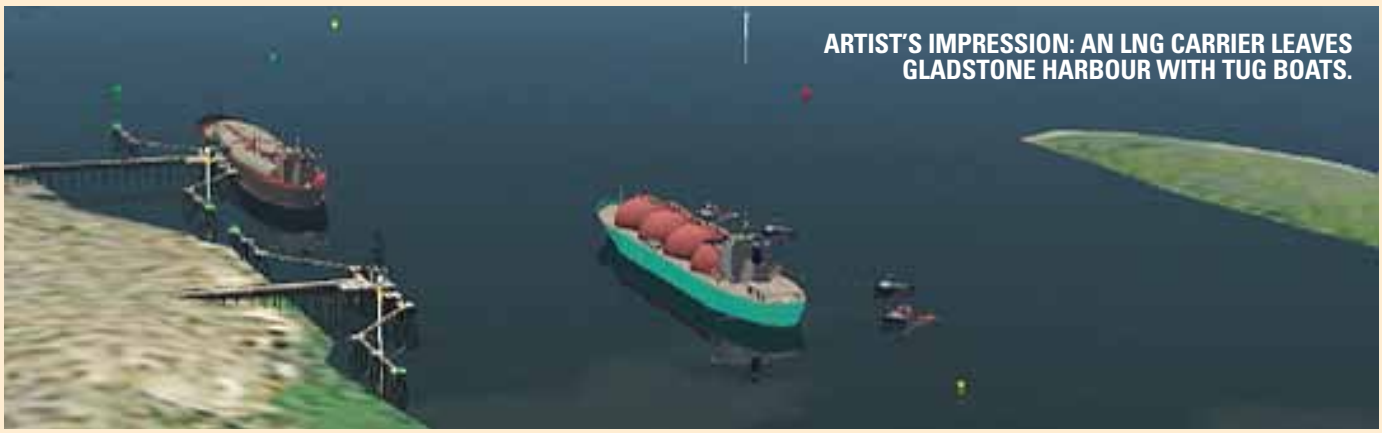
Simulations and modelling have been completed to ensure the safe passage of LNG carriers from the outer harbour to the LNG jetty in North China Bay. Additionally a vessel tracking system will be installed in the harbour to track vessels greater than 12m in length.

In addition to fixed safety zones, moving safety zones will be enforced with a set minimum of 30 minute separation distance for ships entering and leaving port. This is based on the stopping distance of a typical LNG ship travelling at 12 knots. An LNG carrier entering and leaving the port will be escorted by two tugs with an additional two tugs on standby. All tugs have full fire-fighting capabilities.

Security is ensured through compliance with the International Ship and Port Facility Security Code. Further, Arrow is a member of the Maritime Safety Committee (MSC) which has been formed to manage harbour safety during the busy construction phase of the respective LNG projects. The MSC is made up of MSQ, GPC and the LNG proponents.

Protocols have been developed between all LNG proponents, MSQ and GPC to ensure safe passage of LNG carriers through Gladstone Harbour. These protocols will be reviewed periodically to ensure up to date information and experience can be included in the LNG protocols.

For more information go to GPC's website: http://www.gpcl.com.au/



ARTIST'S IMPRESSION: AN LNG CARRIER LEAVES GLADSTONE HARBOUR WITH TUG BOATS.

AUSTRALIA HAS DISPATCHED OVER 2,200 LNG SHIPS SINCE 1989 WITHOUT INCIDENT.

(SOURCE: AUSTRALIAN DEPARTMENT OF RESOURCES, ENERGY AND TOURISM)

ARROW LNG PROPOSED SITE LAYOUT ON BOATSHED POINT, CURTIS ISLAND.

THE EIS STUDIES ›

As part of the EIS studies, various community members and groups may be contacted about matters such as:

- air quality, climate change and greenhouse gases
- terrestrial, aquatic and marine flora and fauna
- coastal processes and hydrodynamics
- river, stream and marine water quality
- social, economic and community impacts
- health, safety and hazards
- traffic and transport
- noise, vibration and visual amenity
- historic places or areas that hold cultural heritage significance.

Prior to undertaking any environmental studies/investigations on land or property, Arrow will contact landholders to discuss access and technical components of the studies. Investigations on private property may involve taking water samples, setting up noise monitors for a period of time, soil sampling, and recording flora and fauna.

To guide the EIS, the Queensland Government has released final Terms of Reference. These can be accessed online at the Department of Infrastructure and Planning's website: **www.dlgp.qld.gov.au/projects/energy/gas.html**

PUBLIC FEEDBACK PROVIDES VALUABLE INFORMATION AND UNDERSTANDING OF POTENTIAL IMPACTS OF THE PROJECT. ›

COMMUNITY INVOLVEMENT IN THE EIS ›

Public participation is an important part of an EIS and Arrow is committed to consulting with the Curtis Island and Gladstone communities and stakeholders throughout the process. Public feedback provides valuable information and understanding of potential impacts of the project.

Arrow is undertaking a community engagement program. The program includes meetings with key stakeholders, community forums and public displays, the distribution of information materials, and opportunities for public input, including written submissions. These activities will take place throughout the EIS process. All opportunities for the community to be involved will be promoted online at **www.arrowenergy.com.au** and in the local media.

Prior to making a decision on the project, regulators must be satisfied that the company has appropriately responded to issues raised by the community and stakeholders.

RELATED PROJECT INFORMATION

Arrow Energy: General Information
Arrow LNG Plant: Overview
Arrow LNG Plant: LNG Shipping
Arrow LNG Plant: LNG Safety
Arrow LNG Plant: Boating and Fishing

Coal Seam Gas Video
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FOR FURTHER INFORMATION ABOUT CSG OR RELEVANT LEGISLATION, VISIT THE FOLLOWING WEBSITES:

- **Coal Seam Gas in Queensland**
  Queensland Mines and Energy
  www.dme.qld.gov.au/mines/coal_seam_gas.cfm
- **Queensland Regulation of the Petroleum Industry**
  Queensland Mines and Energy
  www.dme.qld.gov.au/mines/petroleum_gas.cfm
- **Department of Environment and Resource Management**
  http://www.derm.qld.gov.au/environmental_management/land/petroleum/guidelines.html

  http://www.derm.qld.gov.au/environmental_management/impact_assessment/index.html
- **Department of Employment, Economic Development and Innovation**
  http://www.dlgp.qld.gov.au/projects/energy/gas.html
- **Commonwealth Government Environmental Assessment**
  Department of sustainability, Environment, Water Population and Communities
  www.environment.gov.au/epbc/assessments/index.html

OUR DETAILS ›

To obtain further information about the Arrow LNG Plant, you can:

FREECALL 1800 038 856
EMAIL arrowlng@arrowenergy.com.au
POST Arrow Energy LNG, Reply Paid 81 Hamilton Q 4007

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ARROW LNG PLANT

ENVIRONMENTAL IMPACT STATEMENT

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ARROW WILL ENSURE COMMUNITY AND STAKEHOLDER VIEWS ARE UNDERSTOOD AND CONSIDERED IN THE EIS PROCESS. ›

WHAT IS AN EIS?

An Environmental Impact Statement is being prepared to examine the potential impacts from the proposed Arrow LNG Plant and management measures to mitigate those impacts. This will be examined by the Commonwealth and Queensland Governments before project approval is considered.

ABOUT THE PROJECT ›

Arrow Energy is planning the development of a liquefied natural gas (LNG) facility on Curtis Island, off Gladstone, which will play an important role in meeting growing world demand for cleaner burning fuels.

The proposed Arrow LNG Plant will be supplied with coal seam gas (CSG) from Arrow reserves located in the Surat Basin in south east Queensland and the Bowen Basin in central Queensland as part of the broader Arrow LNG project.

The Arrow LNG Plant has been declared a 'significant project' by the Queensland Government. This reflects the complexity of Queensland and Commonwealth approvals required, the project's potential impacts, and the importance of the Gladstone region to national, state and local economies.

The project involves:

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The project is also supported by a dredging program, being managed by the Gladstone Ports Corporation (GPC), to extend shipping lanes to berth pockets and develop swing basins for LNG carriers to load and manoeuvre. The GPC's Western Basin Dredging Project has been granted separate Environmental Impact Statement (EIS) approval.

The Arrow LNG Plant will produce up to 18 million tonnes per annum (mtpa) of LNG and includes the phased construction of up to four trains or processing plants on its Curtis Island site. Stage 1 includes the construction of two trains of around 4mtpa of LNG each on the Arrow site.

Before the project can proceed, the Arrow LNG Plant must gain approval from the Queensland and Commonwealth Governments. To do this, an EIS is being prepared to examine the proposal's potential impacts and proposed management measures to mitigate those impacts.

WHY PREPARE AN EIS?

Arrow is committed to meeting global needs for cleaner burning fossil fuels in an economically, socially and environmentally viable manner, now and in the future. Arrow will meet regulatory requirements by assessing the environmental, social and economic impacts associated with the project.

Before Commonwealth and State approvals can be issued, regulatory authorities must be satisfied that our activities have been properly assessed and that appropriate measures are in place to avoid or minimise environmental, social and economic impacts.

The Arrow LNG Plant EIS will:

- identify potential adverse and beneficial impacts of the project
- ensure Arrow finds practical and workable solutions to protect environmental, social and economic values that may be affected by the project
- identify environmental management measures for the project
- ensure community and stakeholder views are understood and considered in the EIS process.

A range of State and Commonwealth legislation regulates Arrow's LNG project including the Queensland *State Development and Public Works Act 1971*, *Petroleum and Gas (Production and Safety) Act 2004* and the *Environmental Protection Act 1994*. The Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* also requires that Arrow demonstrates that our activities will not significantly impact matters of national environmental significance.

WHAT WILL THE EIS INVOLVE?

The EIS process diagram (opposite page) shows the approvals process for the Arrow LNG Plant EIS and the interaction between Arrow, the Queensland and Commonwealth Governments, and the public at various stages of the approvals process.

In June 2009, the Arrow LNG Plant was declared a 'project of state significance requiring an EIS' by the Queensland Coordinator-General under the Queensland *State Development and Public Works Act 1971*. This was due to the complexity of approvals required, its potential impact on existing infrastructure and the environment, and the importance of the Gladstone region to the local, state and national economies.

Further, in August 2009, the Commonwealth Department of Environment, Water, Heritage and the Arts declared the Arrow LNG Plant a 'controlled action' which requires assessment and approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The project has been declared a controlled action for potential impacts on World Heritage Areas, National Heritage Places, migratory birds, and listed threatened species and communities (matters of national environmental significance). The Commonwealth Government has accredited the Queensland EIS process as the appropriate level of assessment.

Following a period of public comment in late 2009, final Terms of Reference were released by the Queensland Department of Infrastructure and Planning (now the Department of Employment, Economic Development and Innovation) in January 2010 outlining the specific requirements for the EIS and its structure.

A wide range of environmental, social and economic studies will be conducted for the EIS and Arrow will consult with the community throughout the process.

THE EIS PROCESS

Commonwealth EPBC Act Assessment Process	Queensland SDPWO Act Assessment Process	Public Consultation
Lodge Referral with Commonwealth under EPBC Act (Arrow)	Lodge Initial Advice Statement and request for 'significant project'	Information available via freecall 1800 038 856, Arrow website or project email (ongoing consultation throughout EIS process)
Decision on Controlled Action (DSEWPC)	Coordinator-General's decision Declaration of Significant Project (DEEDI) EIS required	Information sessions and community displays Stakeholder briefings
Review of EIS and Coordinator-General's Assessment Report by DSEWPC and Commonwealth Minister (DSEWPC)	Draft Terms of Reference prepared and publicly notified (DEEDI)	Public may lodge submissions on draft Terms of Reference with DEEDI
	Finalise Terms of Reference (DEEDI)	
	EIS prepared in accordance with Final Terms of Reference (Arrow)	Information sessions and community displays Stakeholder briefings
	EIS submitted to DIP (Arrow)	
	Review of EIS against Final Terms of Reference (DEEDI)	
	Decision to proceed to public notification EIS advertised and exhibited (DEEDI) Public advisory agency review of EIS	Information sessions and community displays Stakeholder briefings Public may lodge submissions on EIS with DEEDI
	Supplementary report to address public submissions (Arrow)	
Review of EIS and Coordinator-General's Report by DSEWPC and Commonwealth Minister (DSEWPC)	Evaluation of EIS and preparation of Coordinator-General's Assessment Report, including any conditions and recommendations on the project	Coordinator-General's Assessment Report available to the public and Arrow
Decision and conditions issued by Commonwealth Minister for Environment (DSEWPC)	Application for Environmental Authority(s) for petroleum activities (Arrow)	
	Issue of Environmental Authority(s) for petroleum activities (DERM)	

DEEDI
Department of Employment, Economic Development and Innovation

DSEWPC
Commonweatlth Department of Sustainability, Environment, Water, Population and Communities

EIS
Environmental Impact Statement

EPBC Act
Commonwealth Environment Protection and Biodiversity Conservation Act 1999

SDPWO Act
State Development and Public Works Organisation Act 1971 (Qld)

DERM
Queensland Department of Environment and Resource Management

PROJECT BENEFITS ›

The Arrow LNG Plant is expected to have many economic benefits for Queensland and the Gladstone region, including job creation, taxable income, and increased regional and local business opportunities.

The project is expected to create benefits such as:

- employment opportunities directly through job creation at the facility and indirectly through the provision of goods and services
- an estimated 3,000 to 3,500 jobs during the peak construction period
- between 200 and 300 permanent jobs at the LNG plant
- a substantial and sustained investment in the Gladstone and Queensland economies over the next 35 years or more
- growth in Gladstone's economy through increased employment opportunities, provision of goods and services, and stimulation of other industry development
- diversification of Gladstone's industry base with the introduction of new technologically advanced businesses in the region
- development of Queensland's vast gas reserves for a growing export market, leading to the provision of increased revenue from taxation and royalty payments to State and Commonwealth Governments.

OUR DETAILS ›

To obtain further information about the Arrow LNG Plant, you can:

FREECALL 1800 038 856
EMAIL arrowlng@arrowenergy.com.au
POST Arrow Energy, Reply Paid 81, Hamilton Q 4007

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ARROW ENERGY

LNG PLANT OVERVIEW

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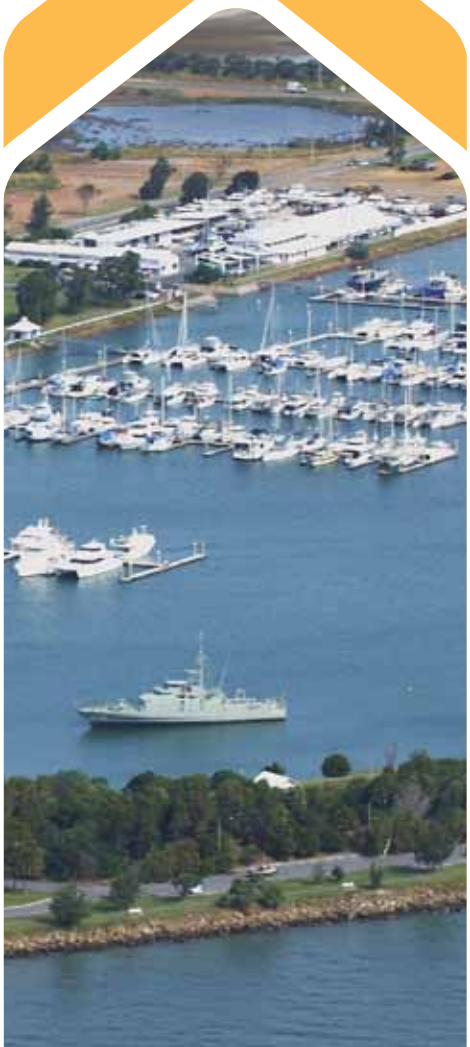
EXTENSIVE STUDIES AND SIMULATIONS HAVE BEEN CARRIED OUT TO ENSURE THE SAFE NAVIGATION OF LNG CARRIERS THROUGH THE PORT.

SITE SELECTION

A site selection study has confirmed Curtis Island as the most suitable site for an LNG plant due to its proximity to CSG fields, a protected deep water port, existing infrastructure, access to a local workforce and the availability of land within the GSDA. Preliminary investigations have confirmed the suitability of the site, including geotechnical surveys, vegetation assessment and a cultural heritage survey.

ABOUT ARROW ENERGY



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Arrow is currently expanding its coal seam gas (CSG) exploration activities across Queensland and northern New South Wales, to also deliver a major CSG to liquefied natural gas (LNG) project to meet international demand for cleaner energy.

Arrow is investigating two pipeline routes – the Arrow Surat Pipeline (formerly known as the Surat Gas Pipeline) and the Arrow Bowen Pipeline. These pipelines will transport CSG across Port Curtis to the Arrow LNG Plant.

Arrow's key priority is the safety of our employees, contractors and those people living in the communities in which we operate.

The company has offices in Brisbane, Gladstone, Moranbah and Dalby.

PROJECT OVERVIEW

Arrow is planning the development of an LNG facility on Curtis Island, off Gladstone, which will play an important role in meeting growing world demand for cleaner burning fuels.

The proposed Arrow LNG Plant will be supplied with CSG from Arrow reserves located in the Surat and Bowen Basins. The Arrow LNG Plant has been declared a 'significant project' by the Queensland Government. This reflects the complexity of Queensland and Commonwealth approvals required, the project's potential impacts, and the importance of the Gladstone region to national, state and local economies.

The Shell and PetroChina investment in Arrow means that the Arrow LNG Plant will be underpinned by significant field development expertise, established LNG technology, production and supply experience, and industry and market knowledge.

The project involves:

- construction of a gas pipeline from the mainland to Curtis Island
- construction of a liquefaction facility where CSG will be converted to LNG and stored for shipment to growing LNG markets
- construction of marine facilities such as jetties on the mainland

ARROW PROVIDES APPROXIMATELY 20 PER CENT OF QUEENSLAND'S GAS AND ELECTRICITY NEEDS.

- construction of jetties, offloading facilities and an LNG carrier terminal on Curtis Island in the vicinity of North China Bay, Hamilton Point and Boatshed Point
- potential localised dredging at marine facilities.

The project is also supported by a dredging program, being managed by the Gladstone Ports Corporation (GPC), to extend shipping lanes to berth pockets and develop swing basins for LNG carriers to load and manoeuvre. The GPC's Western Basin Dredging Project has been granted separate Environmental Impact Statement (EIS) approval.

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Before the project can proceed, Arrow must gain approval from the Queensland and Commonwealth Governments. Prior to Government approval, regulatory authorities must be satisfied the activities have been properly assessed and that appropriate measures are in place to avoid or minimise environmental impacts. To do this, Arrow will prepare an Environmental Impact Statement (EIS) which will examine the entire development.

An EIS is a comprehensive study of all environmental, economic and social issues, and potential impacts associated with development of major projects. The EIS for the Arrow LNG Plant will set environmental controls to govern all aspects of the project's construction and operation. The EIS is required to consider all potential impacts from the project including impacts on land use, geology and soils, terrestrial, aquatic and marine ecosystems, marine hydrology, surface water and ground water, air quality and greenhouse gas emissions, noise and vibration, landscape and visual amenity, marine and road traffic, roads and infrastructure. Cultural heritage and socio-economics will also be extensively studied.

Public input is an important part of an EIS and Arrow is committed to consulting with Curtis Island and Gladstone communities and stakeholders throughout the process. Activities such as consultation sessions will be advertised in local media.

For more information about the EIS process, please see the fact sheet *Arrow LNG Plant: Environmental Impact Statement* or go to www.arrowenergy.com.au

ARROW LNG PROPOSED SITE LAYOUT ON BOASTSHED POINT, CURTIS ISLAND.

GENERAL SAFETY DESIGNS AND FEATURES ›

In Australia, the LNG industry is tightly regulated under State and Commonwealth legislation. Safety assurance is accomplished by:

- safe site design and construction of the terminal in accordance with stringent design codes
- safety studies complying with European Directive Seveso II 96/82/EC for European countries
- requirements for ship design and construction to comply with the International Maritime Organisation's (IMO) International Gas Code
- independent monitoring of ship construction and maintenance by classification societies such as the Bureau Veritas, Lloyds' Register of Shipping and the American Bureau of Shipping
- pre-arrival inspections of facilities and ships
- third party safety and code compliance audits
- initial and ongoing training programs for all personnel
- integrated emergency response programs.

THE POTENTIAL RISKS ASSOCIATED WITH LNG ARE WELL UNDERSTOOD AND MITIGATED BY CONTAINMENT SYSTEMS AND SAFEGUARDS. ›

LNG SUMMARY ›

LNG production and storage facilities and ships are designed to incorporate numerous safeguard systems including gas, heat, fire detection and suppression systems, spill containment systems, emergency shutdowns, pressure release systems and advanced communications systems.

The potential risks associated with LNG are well understood. These risks are mitigated by the following elements that provide multiple layers of protection for LNG production and transport:

- primary containment
- secondary containment (including double hull ships)
- safeguard systems
- separation distances (safety and security zones).

Arrow will integrate these elements with industry standards, regulatory compliance and best management practices to form a strong foundation for safety and security for the Arrow LNG Plant.

RELATED PROJECT INFORMATION

Arrow Energy: General Information
Arrow LNG Plant: Project Overview
Arrow LNG Plant: Environmental Impact Statement
Arrow LNG Plant: Shipping
Arrow LNG Plant: Boating and Fishing

Coal Seam Gas Video
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  www.dme.qld.gov.au/mines/coal_seam_gas.cfm
- **Queensland Regulation of the Petroleum Industry**
  Queensland Mines and Energy
  www.dme.qld.gov.au/mines/petroleum_gas.cfm
- **Department of Environment and Resource Management**
  http://www.derm.qld.gov.au/environmental_management/land/petroleum/guidelines.html

  http://www.derm.qld.gov.au/environmental_management/impact_assessment/index.html
- **Department of Employment, Economic Development and Innovation**
  http://www.dlgp.qld.gov.au/projects/energy/gas.html
- **Commonwealth Government Environmental Assessment**
  Department of Sustainability, Environment, Water Population and Communities
  www.environment.gov.au/epbc/assessments/index.html

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ARROW LNG PLANT

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ABOUT LNG

LNG CHARACTERISTICS

LNG is a natural gas which is cooled and condensed into a liquid. It is odourless, non-toxic, non-corrosive and less dense than water. It is methane with small amounts of ethane, propane and butane. It is generally transported and stored at atmospheric pressure for bulk transport.

If an LNG release occurs its low temperature will cause condensation of water vapour in the air and form a visible white cloud.

LNG PROPERTIES

LNG itself does not burn because it does not contain oxygen. However, LNG vapours are flammable in air within a concentration range of five to 15 per cent. If the vapour concentration is lower than five per cent it cannot burn because of insufficient fuel. If the vapour concentration is higher than 15 per cent it cannot burn because there is insufficient oxygen.

LNG PRODUCTION

Under government guidelines an LNG facility is technically classified as a major hazard facility. However, the relative risks are low as LNG production facilities adhere to strict international standards that provide criteria for site selection,

layout, equipment fabrication and installation, construction and operation. The facility's design, safety monitoring systems and operator training will ensure that in the unlikely event of an incident the consequences are minimised.

Highly trained and specialised LNG production facility personnel are fully versed in detailed contingency plans to cover even the most unlikely incidents and regular exercises are conducted to test their response capabilities.

Best management practices are integral for safe and secure LNG production. They include continuous training of plant personnel in process operations and safety, detailed procedures, and planned and unannounced safety and security inspections. In addition, pre-arrival inspections of facilities and ships are carried out with regular third party safety and code compliance audits. Site security is considered a high priority at an LNG facility and is maintained by limiting access via protected enclosures, constant monitoring and security personnel.

LNG STORAGE

LNG is stored in purpose-built, sealed low pressure storage tanks at -162°C. It is 600 times smaller in volume than in its gaseous state. The LNG tanks are fully contained with a primary and secondary containment system. The primary containment is designed for low temperatures, made of nickel steel in full containment tanks or corrugated stainless steel in membrane tanks. The secondary containment system ensures that any potential leaks or spills would be isolated. This system consists of a reinforced concrete tank surrounding the primary containment.

Storage facilities use advanced monitoring systems to immediately detect any potential liquid or gas leaks, or fires. They are fitted with pressure safeguarding devices.

All tank piping enters and exits the tank from the top, above the liquid level, so that there is no side or bottom penetration, which removes the risk of LNG leakages at nozzle connections. Tanks are equipped with advanced safety systems such as level alarms and emergency shutdowns.

POTENTIAL HAZARDS

LNG is less hazardous than other commonly used flammable substances such as gasoline and diesel. It is non-carcinogenic and does not chemically react. All hydrocarbon fuels are flammable and therefore can be hazardous if not handled properly.

POOL FIRE

In the unlikely event of a spill, LNG would vaporise quickly. The generated cloud of natural gas could burn if mixed with the correct proportion of air and ignited by a spark, flame or sufficiently hot surface.

If LNG is spilled, it spreads and absorbs heat from the surroundings and vaporises. The radiant heat from an ignited pool of LNG would depend on the amount of flammable material and the supply of air to the fire. Small pool fires burn with a relatively clear flame. In the case of a large pool fire, there would be insufficient air supply to support complete combustion, resulting in soot and smoke generation. Therefore, smaller pool fires may give off more heat, relative to their size, than larger pool fires.

VAPOUR CLOUD

If there was no spark or fire to ignite the natural gas, a vapour cloud would form. Wind could cause clouds to drift away from the source. Initially, due to the sub-cooled nature of LNG vapour it would hug the surface because it would be denser than air and move progressively downwind. As the cloud warmed, the vapour would become lighter

AUSTRALIA HAS DISPATCHED OVER 2,200 LNG SHIPS SINCE 1989 WITHOUT INCIDENT.

(SOURCE: AUSTRALIAN DEPARTMENT OF RESOURCES, ENERGY AND TOURISM)

than air and rise into the atmosphere and disperse. The cloud would continuously dissipate as the natural gas diluted with the surrounding air.

However, if the cloud was ignited by a spark or flame, portions of the cloud with a concentration of gas-in-air between five to 15 per cent would burn. Due to the slow flame speed associated with combusting natural gas in unconfined surroundings, an explosion would not occur and the fire would burn back to the source. If the vapour cloud was in a confined or congested area it could explode. The damage resulting from such an explosion would depend on the size of the congested area and vapour cloud. LNG facilities are designed to minimise LNG congestion and contained spaces where LNG vapour could accumulate and explode if ignited.

Within an LNG facility and on board LNG ships, hazard detectors are used to alert personnel to a leak or spill. These include detectors for the presence of gas, flame and smoke, and high or low temperatures.

LNG terminals and related facilities have an excellent safety record when compared with other large-scale industrial operations. Busy ports in Belgium, France, Japan, Korea, Spain, Turkey, Puerto Rico, Dominican Republic, Italy, Taiwan and the US have LNG terminals that have operated safely for up to 40 years without serious incident.

LAND SPILLS

An LNG spill on land would result in a cloud of natural gas vapours. The initial rate of vaporisation would decline as the surface under the spill cooled. Unlike gasoline, diesel and fuel, an LNG spill would not result in soil contamination or leave any residue once evaporated. However, because of its low temperatures, it could cause frost damage.

LNG SHIPPING ›

LNG is transported in large, specially designed ships. These ships are double hulled and are typically about 300m long and 40m wide. The double hulls provide two complete solid structures between the sea and the structure of the containment tanks.

If there is a spill, LNG would vaporise and the natural gas dissipate. The released quantity would have negligible effect on the environment. In the unlikely event of a cargo tank being ruptured the liquid would spread over the sea and evaporate faster than on land, as the water would act as a sustained heat source. The vapour cloud would drift downwind and diffuse into the atmosphere. A fire would be in a limited radius of the ship because the ignited vapour cloud would burn back to the source.

There have been no incidents resulting in the major release of LNG in the 40-year history of transporting the product. Further, there have been no fires involving the insulation of a ship while carrying LNG. The insulation materials used in LNG ships are treated with fire retardants which meet international standards. When an LNG ship is carrying its cargo, access to the tank spaces is strictly controlled and there are no ignition sources present. The insulation spaces are also purged with nitrogen, which is a gas that cannot support combustion.

LNG ship safety systems are divided into ship handling and cargo system handling. The ship handling includes the most advanced navigational systems including sophisticated radar and positioning systems that alert the crew to other traffic and hazards around the ship. Distress systems and beacons automatically send out signals if the ship is in difficultly. The cargo system has an extensive instrumentation package that safely shuts down the system if it starts to operate out of predetermined parameters. There are also gas and fire detection systems.

The unloading piers have emergency shutdown systems, closed circuit TV, vapour and fire detection systems and emergency release coupling on the unloading lines. Ship crew access into the LNG terminal is restricted under the International Ship and Port Facility Security Code and by the individual terminals.

RELATED PROJECT INFORMATION

Arrow Energy: General Information
Arrow LNG Plant: Project Overview
Arrow LNG Plant: Environmental Impact Statement
Arrow LNG Plant: Safety
Arrow LNG Plant: Boating and Fishing

Coal Seam Gas Video
www.arrowenergy.com.au/page/Our_Company/what_is_coal_seam_gas/

FOR FURTHER INFORMATION ABOUT CSG OR RELEVANT LEGISLATION, VISIT THE FOLLOWING WEBSITES:

- **Coal Seam Gas in Queensland**
  Queensland Mines and Energy
  www.dme.qld.gov.au/mines/coal_seam_gas.cfm
- **Queensland Regulation of the Petroleum Industry**
  Queensland Mines and Energy
  www.dme.qld.gov.au/mines/petroleum_gas.cfm
- **Department of Environment and Resource Management**
  http://www.derm.qld.gov.au/environmental_management/land/petroleum/guidelines.html

  http://www.derm.qld.gov.au/environmental_management/impact_assessment/index.html
- **Department of Employment, Economic Development and Innovation**
  http://www.dlgp.qld.gov.au/projects/energy/gas.html
- **Commonwealth Government Environmental Assessment**
  Department of Sustainability, Environment, Water Population and Communities

OUR DETAILS ›

Find out more about Arrow's LNG shipping processes by contacting the project team:

FREECALL 1800 038 856
EMAIL info@arrowenergy.com.au
POST Arrow Energy, Reply Paid 81, Hamilton Q 4007

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SHIPPING

ARROW LNG PLANT ›

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JUNE 2011

LNG HAS BEEN SAFELY DELIVERED AROUND THE WORLD FOR 40 YEARS.

WHO IS ARROW ENERGY?

Arrow Energy is one of the largest integrated energy companies in Australia with gas producing projects in the Surat Basin in south east Queensland and the Bowen Basin in central Queensland and interests in three gas fired power stations. The company provides approximately 20 per cent of Queensland's gas and electricity needs.

Arrow is expanding its CSG exploration to deliver a major CSG to LNG project to meet international demand for cleaner energy.

ABOUT THE PROJECT

Arrow Energy is planning the development of a liquefied natural gas (LNG) facility on Curtis Island, off Gladstone, which will play an important role in meeting growing world demand for cleaner burning fuels.

The proposed Arrow LNG Plant will be supplied with coal seam gas (CSG) from Arrow reserves located in the Surat Basin in south east Queensland and the Bowen Basin in central Queensland as part of the broader Arrow LNG project.

The Arrow LNG Plant has been declared a 'significant project' by the Queensland Government. This reflects the complexity of Queensland and Commonwealth approvals required, the project's potential impacts, and the importance of the Gladstone region to national, state and local economies.

The project involves:

- construction of a gas pipeline from the mainland to Curtis Island
- construction of a liquefaction facility where CSG will be converted to LNG and stored for shipment to growing LNG markets
- construction of marine facilities, such as jetties, on the mainland
- construction of jetties, offloading facilities and an LNG carrier terminal on Curtis Island in the vicinity of North China Bay, Hamilton Point and Boatshed Point
- potential localised dredging at marine facilities.

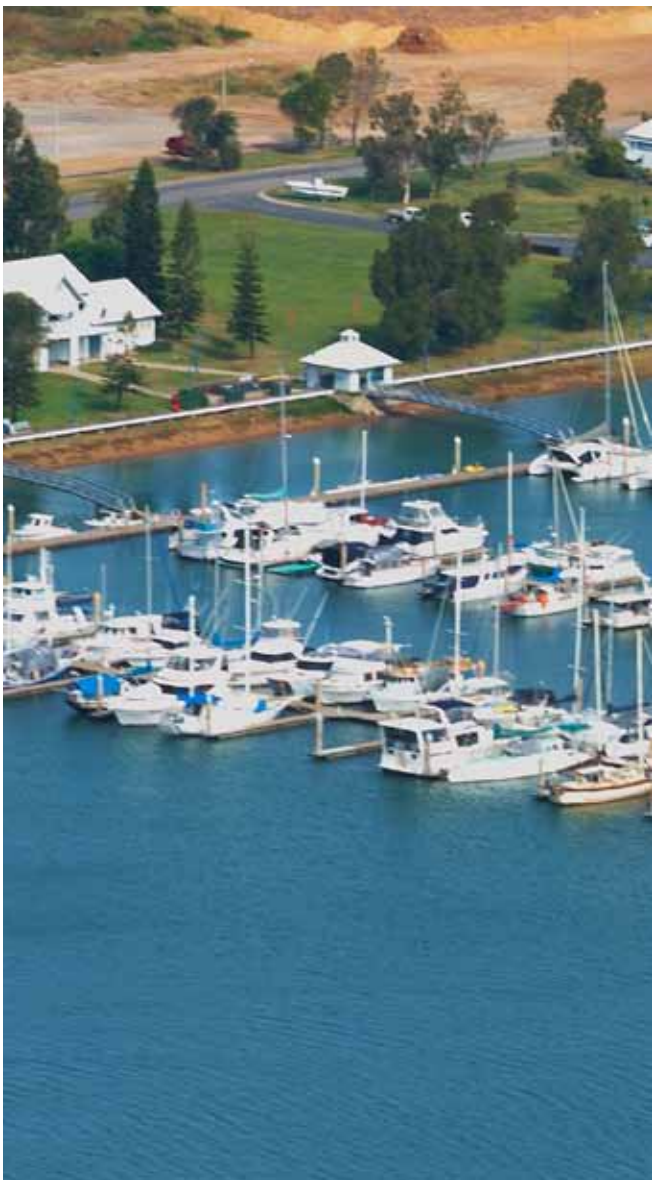
The project is also supported by a dredging program, being managed by the Gladstone Ports Corporation (GPC), to extend shipping lanes to berth pockets and develop swing basins for LNG carriers to load and manoeuvre. The GPC's Western Basin Dredging Project has been granted separate Environmental Impact Statement (EIS) approval.

The Arrow LNG Plant will produce up to 18 million tonnes per annum (mtpa) of LNG and includes the phased construction of up to four trains or processing plants on its Curtis Island site. Stage 1 includes the construction of two trains of around 4mtpa of LNG each on the Arrow site.

Before the project can proceed, the Arrow LNG Plant must gain approval from the Queensland and Commonwealth Governments. To do this, an EIS is being prepared to examine the proposal's potential impacts and proposed management measures to mitigate those impacts.

THROUGH THE PLANNING AND APPLICATION OF STRINGENT SAFETY PROCEDURES, ARROW AIMS TO CONTINUE THE OUTSTANDING SAFETY RECORD OF LNG SHIPPING.

SAFETY OF LNG SHIPS AND SHIPPING ›



A crucial part of the LNG process is its shipping to international markets.

LNG shipping has an exceptional safety record. The product has been safely delivered around the world for 40 years. A significant amount of research has been done to minimise the safety risks associated with LNG. The Arrow LNG Plant will be underpinned by both of Arrow's parent companies, Royal Dutch Shell and CNPC, and their extensive expertise and experience in established LNG technology and safe shipping.

Natural gas is only shipped commercially in a fully refrigerated, liquefied form at low (essentially atmospheric) pressure. LNG is transported in large, specially designed ships. These ships are double hulled and are typically about 300m long and 40m wide. All LNG ships have hulls with specially designed insulation to carry LNG at -162˚C.

As the LNG is at its boiling point at -162˚C, any heat flow from the outside into the containment system will cause evaporation – or boil off – of natural gas. Insulated tanks minimise transfer of heat from the environment. Design developments in this field have seen significant reductions in boil off in recent years. LNG ships have specialist technologies to manage any boil off gas while in transit. In addition, special insulation protects the integrity of the outer steel hull.

Since the mid 1960s, two main designs for the transport of LNG have emerged – the single barrier, self-supporting system and the two membrane system. There is a recent trend towards the use of the double membrane tank instead of the self supporting storage tank (dome type structure).

ARROW LNG PLANT

EMPLOYMENT AND WORKFORCE

WHO IS ARROW ENERGY?

Arrow Energy is one of the largest integrated energy companies in Australia with gas producing projects in the Surat Basin in south east Queensland and the Bowen Basin in central Queensland, and interests in three gas fired power stations. The company provides approximately 20 per cent of Queensland's gas and electricity needs.

Arrow is expanding its exploration activities to deliver a major coal seam gas (CSG) to liquefied natural gas (LNG) project to meet international demand for cleaner energy. This project will require significant recruitment during both construction and production.

WORKFORCE REQUIREMENTS

CONSTRUCTION

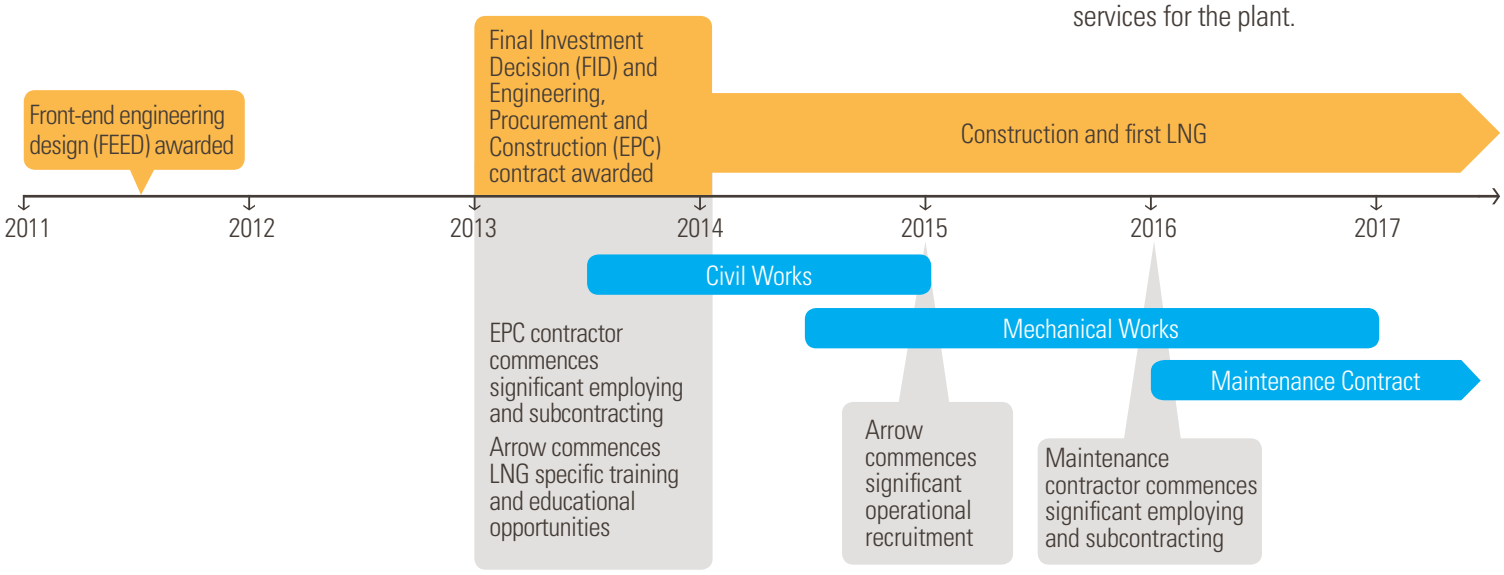
The Arrow LNG Plant will require a peak workforce of approximately 3,000 to 3,500 people during construction. The construction workforce will include:

- managers (project managers, engineers)
- earthmoving equipment operators
- builders, fitters, electricians, supervisors and labourers
- specialist technicians associated with the installation of high pressure gas pipelines, LNG train technology, LNG storage tanks, marine facilities, power generation and water treatment equipment.

Trade and office personnel already living in Gladstone and the surrounding region are anticipated to make up to 20 per cent of the workforce, depending on availability with concurrent projects. These people will commute to Curtis Island daily. The remainder of the workforce will be housed on Curtis Island adjacent to the LNG plant site.

OPERATION

Arrow estimates there will be between 200 and 300 permanent staff during the operational phase of the project. Further, there will be direct and indirect positions generated through maintenance and support services for the plant.



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WE WILL BE WORKING WITH THE COMMUNITY AND LOCAL PROVIDERS TO IDENTIFY APPROPRIATE EDUCATION AND TRAINING INITIATIVES WITHIN THE REGION.

TRAINING AND DEVELOPMENT PROGRAMS ›

Arrow offers regional training and development initiatives to maximise local recruitment in the communities where we operate. The following opportunities are already provided by Arrow in the Dalby and Moranbah regions, and will expand to the Gladstone region as the Arrow LNG Plant moves towards FID:

- competency-based training for field-based personnel
- high school-based program in process plant operations
- process plant operation certificates
- graduate development and vacation employment programs.

During development of the Arrow LNG Plant, we will be working with the community and local providers to identify appropriate education and training initiatives within the region.

OPPORTUNITIES FOR LOCAL BUSINESS ›

BUSINESS VENDOR REGISTER

Interested suppliers, subcontractors and service providers are invited to register their interest and provide detailed company profiles by obtaining a Vendor Approval and Evaluation Form from Arrow's website.

Successful construction contractors will be given details of prequalified Australian and local area suppliers, subcontractors and service providers on the Arrow business vendor register.

INDUSTRY CAPABILITY NETWORK QUEENSLAND (ICN)

The ICN allows Australian businesses to register their services and maximise opportunities that arise from both Government and private sectors, particularly in major project infrastructure and industrial projects. Arrow refers to the ICN database for potential suppliers. Further information is available at **www.icnqld.org.au**

LOCAL BUSINESS ASSISTANCE

During the detailed planning phase, Arrow's Contracting and Procurement Department will proactively engage with the local business community to ensure opportunities to supply goods and services are effectively communicated. Our Contracting and Procurement Department will also organise business-specific information sessions to assist with tender requirements such as safety management and quality management plans, insurances and demonstration of capacity.

Contracting and Procurement staff are available to talk one-on-one at many of Arrow's community consultation sessions. For more information on these sessions, visit our website.

OUR DETAILS ›

Find out more about the Arrow LNG Plant employment and workforce:

FREECALL	1800 038 856
EMAIL	arrowlng@arrowenergy.com.au
POST	Arrow Energy, Reply Paid 81, Hamilton Q 4007

CSG – LNG GLOSSARY OF TERMS

ARROW PROJECTS

- Arrow LNG Plant
- Surat Gas Project (SGP)
- Dalby Expansion Project
- Arrow Surat Pipeline (ASP)
- Moranbah Gas Project (MGP)
- Bowen Gas Project
- Arrow Bowen Pipeline (ABP)

ABBREVIATIONS

APLNG	Australia Pacific LNG project – Origin Energy/ ConocoPhillips
ATP	Authority to Prospect
BTEX	Benzene, toluene, ethylbenzene and xylene
CSG	Coal seam gas
DEEDI	Department of Employment, Economic Development and Industry (Qld)
DERM	Department of Environment and Resource Management (Qld)
DTMR	Department of Transport and Main Roads (Qld)
DLGP	Department of Local Government and Planning (Qld)
EA	Environmental Authority
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPBC	Environment Protection and Biodiversity Conservation Act (Cwlth)
EPC	Engineering, procurement and construction
FEED	Front-end engineering design
FID	Final investment decision
FIFO	Fly in/fly out
GAB	Great Artesian Basin
GAWB	Gladstone Area Water Board
GLNG	Gladstone LNG Project – Santos, Petronas, Total and Kogas
GPC	Gladstone Ports Corporation
GQAL	Good quality agricultural land
GRC	Gladstone Regional Council
GSDA	Gladstone State Development Area
LNG	Liquefied natural gas
MOF	Material offloading facility
MSQ	Maritime Safety Queensland
PL	Petroleum Lease
PPL	Petroleum Pipeline Licence, commonly referred to as a pipeline licence
PPM	Parts per million
PSL	Petroleum Survey Licence
QCLNG	Queensland Curtis LNG project – British Gas/Queensland Gas Company
QWC	Queensland Water Commission
RO	Reverse Osmosis
SCL	Strategic cropping land
SIMP	Social impact management plan
TWAF	Temporary Workers Accommodation Facility
UCG	Underground coal gasification

TERMINOLOGY

1P Proven gas reserves.

2P Proven and probable gas reserves.

3P Proven, probable and possible gas reserves.

BOIL OFF Usually refers to the gases generated during the storage of liquefied gases, such as LNG. LNG boils at slightly below -162°C at atmospheric pressure and is loaded, transported and discharged at this temperature.

COMPRESSOR A mechanical device used to raise the pressure of a gas. Compressors can be axial, centrifugal or reciprocating and are usually powered by electrical motors, steam turbines or gas turbines.

CORE HOLE A bore drilled to obtain cores of the underlying geological strata to inform analysis of soil/rock/coal type, strength, permeability, chemical composition and yield.

ENGINEERING, PROCUREMENT AND CONSTRUCTION Detailed design, procurement, construction and commissioning of the LNG Plant.

EXCLUSION ZONE An area which the public will not be able to enter. This is also known as a safety zone and is predominantly around the LNG jetty.

FLARE A flame used to burn off unwanted gas; a flare stack is the steel structure on a processing facility from which gas is flared.

FRACCING Hydraulic fracturing or 'fraccing' is a process used to stimulate or fracture underground coal seams to increase the flow of gas and water.

GAS-TURBINE POWER PLANT A power plant in which the prime mover is a gas turbine. A gas turbine typically consists of an axial-flow compressor that feeds compressed air into one or more combustion chambers where liquid or gaseous fuel is burned. The resulting hot gases are expanded through the turbine, causing it to rotate. The rotating turbine shaft drives the compressors as well as the generator, producing electricity.

GLADSTONE STATE DEVELOPMENT AREA (GSDA) A significant industrial land bank. The purpose of the GSDA is to secure and protect a large area of suitable land with ready access to a deep water port for large scale industrial development over 30 – 50 years. The GSDA currently totals approximately 28,000ha with 4,592ha set aside as the Curtis Island Environmental Precinct.

LIQUEFIED NATURAL GAS (LNG) An odourless, colourless, non-corrosive and non-toxic natural gas product consisting primarily of methane (CH_4). It is in liquid form at near atmospheric pressure.

LNG TRAIN The refrigeration unit which cools natural gas to a liquid. There are four main elements in the cooling cycle – impurity removal, dehydration, compression and liquefaction using heat exchangers.

MAKE GOOD If water extraction by a CSG operation is affecting an existing bore, then the relevant CSG company must undertake restoration measures to restore the bore's capacity to supply water or provide the bore owner with an alternative water supply. The bore owner and CSG company may also agree to a monetary settlement.

REVERSE OSMOSIS A liquid filtration method which removes many types of large atomic molecules from smaller molecules, by forcing the liquid at high pressure through a membrane with pores (holes) just big enough to allow the small molecules to pass through.

TELEMETRY A technology which allows remote measurement and reporting of information collected at wells, compressor stations, and gas pipeline valves and meters.

TENEMENT The area and location over which petroleum leases are granted.

WELL A bore hole drilled into suitable geological formations to enable the extraction of a liquid (eg water or oil) or gas (eg CSG).

WELL CASING Steel lining used to provide the structural basis for a gas well or core hole.

VISUAL IMPACTS

AUCKLAND POINT

Visual simulation looking over Gladstone Harbour to the Arrow LNG Plant from Auckland Point.

ROUND HILL

Visual simulation looking over Gladstone to the Arrow LNG Plant from Round Hill.

GLADSTONE HARBOUR VIEW

Visual simulation looking north to the Arrow LNG Plant from Gladstone Harbour.

Prepared by AECOM Design and Planning Australia

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THE EIS PROCESS

Commonwealth EPBC Act Assessment Process	Queensland SDPWO Act Assessment Process	Public Consultation
Lodge Referral with Commonwealth under EPBC Act (Arrow)	Lodge Initial Advice Statement and request for 'significant project'	Information available via freecall 1800 038 856, Arrow website or project email (ongoing consultation throughout EIS process)
Decision on Controlled Action (DSEWPC)	Coordinator-General's decision Declaration of Significant Project (DEEDI) EIS required	Information sessions and community displays Stakeholder briefings
Review of EIS and Coordinator-General's Assessment Report by DSEWPC and Commonwealth Minister (DSEWPC)	Draft Terms of Reference prepared and publicly notified (DEEDI)	Public may lodge submissions on draft Terms of Reference with DEEDI
	Finalise Terms of Reference (DEEDI)	
	EIS prepared in accordance with Final Terms of Reference (Arrow)	Information sessions and community displays Stakeholder briefings
	EIS submitted to DIP (Arrow)	
	Review of EIS against Final Terms of Reference (DEEDI)	
	Decision to proceed to public notification EIS advertised and exhibited (DEEDI) Public advisory agency review of EIS	Information sessions and community displays Stakeholder briefings Public may lodge submissions on EIS with DEEDI
	Supplementary report to address public submissions (Arrow)	
Review of EIS and Coordinator-General's Report by DSEWPC and Commonwealth Minister (DSEWPC)	Evaluation of EIS and preparation of Coordinator-General's Assessment Report, including any conditions and recommendations on the project	Coordinator-General's Assessment Report available to the public and Arrow
Decision and conditions issued by Commonwealth Minister for Environment (DSEWPC)	Application for Environmental Authority(s) for petroleum activities (Arrow)	
	Issue of Environmental Authority(s) for petroleum activities (DERM)	

THE EIS PROCESS

DEEDI
Department of Employment, Economic Development and Innovation

DSEWPC
Commonweatlth Department of Sustainability, Environment, Water, Population and Communities

EIS
Environmental Impact Statement

EPBC Act
Commonwealth Environment Protection and Biodiversity Conservation Act 1999

SDPWO Act
State Development and Public Works Organisation Act 1971 (Qld)

DERM
Queensland Department of Environment and Resource Management

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ARROW LNG PLANT

THE ARROW LNG PLANT WILL PLAY AN IMPORTANT ROLE IN MEETING GROWING INTERNATIONAL DEMAND FOR CLEANER BURNING FUELS.

The proposed liquefied natural gas (LNG) facility on Curtis Island will be supplied with coal seam gas (CSG) from Arrow Energy reserves located in the Surat Basin in south east Queensland and the Bowen Basin in central Queensland. It will produce up to 18 million tonnes per annum (mtpa) of LNG and includes the phased construction of up to four trains or processing plants. Stage 1 includes the construction of two trains of around 4mtpa of LNG each.

The project involves:

- construction of a gas pipeline to Curtis Island
- construction of a liquefaction facility where CSG will be converted to LNG and stored for shipment to growing LNG markets
- construction of marine facilities on the mainland
- construction of jetties, offloading facilities and an LNG carrier terminal on Curtis Island
- potential localised dredging at marine facilities.

The project is supported by a dredging program, being managed by the Gladstone Ports Corporation (GPC), to extend shipping lanes to berth pockets and develop swing basins for LNG carriers to load and manoeuvre. The GPC's Western Basin Dredging Project has been granted separate approval through its Environmental Impact Statement.

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LNG SAFETY

Liquefied natural gas (LNG) facilities and transport methods have an excellent safety record. LNG has been safely produced and delivered around the world for more than 40 years.

The potential risks associated with LNG are successfully mitigated by the following elements that provide multiple layers of protection for LNG production and transport:

- primary containment
- secondary containment (including double hull ships)
- safeguard systems
- separation distances (safety and security zones).

Arrow Energy will integrate these elements with industry standards, regulatory compliance and best management practices to form a strong foundation for safety and security for the Arrow LNG Plant.

LNG PRODUCTION

An LNG plant is technically classified as a major hazard facility under Government guidelines, similar to other facilities producing and handling flammable gases and liquids. LNG production facilities adhere to strict international standards that provide criteria for sites, layout, equipment fabrication and installation, construction and operation. The facility's design, safety monitoring systems and operator training will help ensure that in the unlikely event of an incident the consequences are minimised.

LNG STORAGE

LNG is stored in specialised, sealed, non-pressurised tanks at -162°C and is 600 times smaller in volume as a liquid, than in its gaseous state.

The LNG tanks are fully contained. The primary containment is designed for low temperatures, while the secondary containment ensures any potential leaks or spills are contained and isolated.

LNG SHIPPING AND BOATING

THE TRANSPORT OF LNG IS A CRITICAL PART OF THE ARROW LNG PROJECT.

Liquefied natural gas (LNG) is transported in large, specially designed ships. These ships are double hulled and are typically about 300m long and 40m wide. The double hulls provide two complete solid structures between the sea and the structure of the containment tanks.

LNG SHIPPING SAFETY

LNG has been shipped around the world for more than 40 years. A significant amount of research has gone into minimising safety risks. The proposed Arrow LNG Plant on Curtis Island will be underpinned by both of Arrow Energy's parent companies, Royal Dutch Shell and CNPC, and their extensive expertise and experience in established LNG technology and safe shipping.

Through the planning and application of stringent safety procedures, Arrow Energy aims to continue the outstanding safety record of LNG shipping.

LNG SHIPPING IN GLADSTONE HARBOUR

It is estimated that when the Arrow LNG Plant reaches peak production, there will be up to 240 vessel visits to Gladstone Harbour per year, or about four per week.

To minimise impact on other vessels in the harbour from LNG shipping, Arrow Energy will work closely with the Gladstone Ports Corporation on the precise scheduling of visits.

The establishment and enforcement of fixed safety zones around ships at berth, and moving safety zones around LNG ships accessing the harbour, are an important measure which protects the safety of other harbour users.

Fixed safety zones will not impede the passage of recreational boat traffic, including between South Passage Island and the terminal jetty on Curtis Island.

As part of the Environmental Impact Statement (EIS), a detailed examination of all potential impacts associated with shipping is being undertaken. To ensure these issues are addressed, Arrow Energy will be conducting ongoing consultation with all potentially affected stakeholders during and beyond the EIS process.

WHAT IS AN EIS?

Environmental Impact Statements (EIS) are prepared for major development projects to assess the environmental, social and economic impacts of the proposed activities.

Prior to Governments issuing approval for major projects, regulatory authorities must be satisfied the project's potential impacts have been assessed and that appropriate measures are in place to remove or reduce the impacts. Preparing an EIS is generally considered the most appropriate assessment method.

An EIS will:

- identify potential adverse and beneficial impacts of a project
- ensure practical and workable solutions to protect existing values
- identify environmental management measures
- ensure community and stakeholder issues are taken into account.

Detailed environmental and social studies are undertaken throughout the EIS process to identify environmental values, review proposed activities, and recommend measures to remove or minimise potential impacts. These studies include:

- air quality, climate change and greenhouse gases
- terrestrial, aquatic and marine flora and fauna
- coastal processes and hydrodynamics
- river, stream and marine water quality
- social, economic and community impacts
- health, safety and hazards
- traffic and transport
- noise, vibration and visual amenity
- historic places or areas that hold cultural heritage significance.

SPECIALIST ASSESSMENT SCOPE

Desktop assessment

↓

Field investigations and consultation

↓

Modelling and impact assessment

↓

Conclusions and recommendations

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