Gladstone LNG Project Fisherman’s Landing
The **shared vision** of HQC and LNG Limited

Australian Gas: Global Gas Series: October 31 2011
Corporate Overview – ASX:LNG
October/November 2011

► Market Cap: ~ A$ 90 million (267.7 million shares at A$ 0.35/ share)

► Capital Structure: Shares on issue (million) 267,699,015
Options on issue (million) 6,680,000
Performance rights (million) 2,250,000

► Cash Reserves: ~A$ 17 million (as at 18 October, no debt)

► Strategic Investments: ~A$ 14 million (as at 18 October) strategic shareholdings in ASX: MEL and OBL

► Top 20 Shareholders: ~ 60% ownership

► Major Shareholders: HQC (19.89%) - wholly owned by CNPC
Copulos Group (10.10%)
Dart Energy Limited (5.37%)

► Company Directors: Non-Executive Chairman: Richard Beresford
Managing Director /Joint Chief Executive Officer: Maurice Brand
Executive Director /Joint Chief Executive Officer: Cathy Wang
Executive Director /Chief Financial Officer: Norman Marshall
Executive Director /Chief Technical Officer: Paul Bridgwood
Non-Executive Director: Leeanne Bond
Non-Executive Director: Gavin Zhang
Who is China National Petroleum Corporation (CNPC)?

- China’s largest oil (54% share) and gas (82% share) producer and supplier
- Top 5 global oil and gas company, with over 1.6 million employees
- Ranked 10 in revenue amongst 2010 Fortune Global 500 companies
- Oil and gas assets and interest in 29 countries and presence in almost 70 countries
- Businesses covering petroleum exploration & production, natural gas & pipelines, refining & marketing, oilfield services, engineering construction, equipment manufacturing, R&D, capital management, finance and insurance services

Who is China Huanqiu Contracting & Engineering Corporation (HQC)?

- Wholly owned by CNPC, with over 9,500 employees
- Technology focussed engineering, procurement, construction, consulting, R&D, manufacturing and project management group
- HQC has delivered more than 2,000 projects over its 50 years of operation
- Executed and delivered Guangdong LNG receiving terminal; Jiangsu LNG receiving terminal near Shanghai; Dalian LNG receiving terminal
- EPC contractor for the Tangshan LNG receiving terminal near Beijing
- EPC contractor for the Ansai LNG plant (500,000 tpa) in China using own technology
LNGL Business Model

- Identify, develop and retain ownership of mid scale LNG plants in the 1 to 3 mtpa range, e.g. 3 mtpa Gladstone LNG Project Fisherman’s Landing

- Develop and patent leading edge LNG technology such as the OSMR liquefaction process and boil off gas technology, e.g. License and receive fees from the Gladstone LNG Project Fisherman’s Landing

- Leverage gas supply into LNG Project opportunities, e.g. strategic shareholding in Metgasco Limited

- Leverage the global capabilities of HQC, e.g. identify midscale LNG global projects with HQC
Gladstone LNG Project Fisherman’s Landing

Project Description

- 3 mtpa LNG plant to be located on Fisherman’s Landing, an existing reclaimed site on the mainland, Port of Gladstone
- Project utilises existing Berth #5 and other port infrastructure
- Key approvals and licences in place
- 3.8 mtpa LNG plant nameplate capacity (3 mtpa is the guaranteed capacity)
- HQC supporting gas supply and delivery plan
- HQC finalising EPC proposal for the LNG Plant; CNPC (or affiliate) to potentially be LNG off-taker
- Project financing being developed with HQC for the first LNG train

Project Schedule Targets

- Finalise gas supply arrangements
- Commence construction in 2012
- 30 month construction schedule
- First LNG export in 2014/2015
Gladstone LNG Project Fisherman’s Landing
Gladstone LNG Project Fisherman’s Landing

2 TRAINS x 1.5 Mtpa = 3 Mtpa
Liquefaction Technology Comparison

Cascade Process

- Propane
- Natural Gas
- Ethylene
- Methane

C3/MR Process

- Propane
- Natural Gas
- Mixed Refrigerant

Dual MR Process

- Mixed Refrigerant #1
- Natural Gas
- Mixed Refrigerant #2

OSMR Process

- Ammonia
- Natural Gas
- Mixed Refrigerant
LNG Liquefaction Technologies

- Large Scale LNG Plants (>3 mtpa)
  - ConocoPhillips – Cascade Process
  - APCI – C3/MR Process

- Mid Scale LNG Plants (1-3 mtpa)
  - LNG Limited - OSMR® Process, but option to upscale >mtpa

- Small Scale LNG Plants (<1 mtpa)
  - Black & Veatch – PRICO – SMR Process
  - Hamworthy - N² Expansion
The OSMR® LNG plant fuel gas usage is < 7%, for a low inert - methane rich Feed gas. This is 30% better than conventional LNG plants. The OSMR® process incorporates three separately proven features.
1. Aero-derivative Gas Turbines

- Improves fuel efficiency of gas turbine by 25%.
- No gear box, no helper motor, single-stage (no inter-stage cooler/scrubber).
- Smaller foot print and weight.
- Higher reliability and availability.
- Compact modular design reduces installation and commissioning time and ensures ease of maintenance.
- Aero-derivatives used in Darwin LNG Project in Australia and proposed for Floating LNG projects.

For OSMR 1.5 mtpa LNG Plant:
- Gas Turbine: 2 x GE PGT25+G4 (site rating: 33.5 MW )
- Compressor : 2 x GE BCL805 (polytrophic efficiency: 87.7% )
2. Combined Heat and Power (CHP) Plant

- Waste heat recovery using a OTSG from Gas Turbine exhausts.
- Steam Turbine drivers for Ammonia Refrigeration Compressors.
- Steam Turbine driven power generation.
- Process Steam for heating:
  - Amine re-boiler
  - Mol. Sieve regen gas heater
  - Fuel gas heater
- Auxiliary boiler - End Flash Gas utilized as fuel.

Steam Turbines for OSMR 1.5 mtpa LNG Plant:
- Ammonia Compressor: 2 x 7.5 MW
- Power Generator: 1 x 7.5 MWe

CHP plants have been used in the Power industry for several decades.
3. Ammonia Auxiliary Refrigeration

- Ammonia is commonly used for
  - Industrial and commercial refrigeration
  - Direct inlet air cooling of gas turbines in power industry

- In the OSMR® Process
  - Refrigeration power is provided by CHP plant so is substantially “free”
  - Cools MR and feed gas streams to increase LNG production by 20% - substantially “free”
  - Direct Cooling of GT inlet air to improve GT power output by 15%
Why Ammonia?

- Higher latent heat allows smaller flow rates:

<table>
<thead>
<tr>
<th></th>
<th>Ammonia</th>
<th>Propane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass Flow Ratio</td>
<td>1.0</td>
<td>1.90</td>
</tr>
<tr>
<td>Volume Flow Ratio</td>
<td>1.0</td>
<td>1.30</td>
</tr>
<tr>
<td>Power Input</td>
<td>1.0</td>
<td>1.20</td>
</tr>
</tbody>
</table>

- Low swept volume in compressors, small piping and pumps.
- Higher heat transfer coefficients (twice as propane), reduces Cold Box and Condenser sizes.
- At -5°C/45°C, Ammonia has a higher Compression Co-efficient of Performance than Propane, requiring 20% less power
- Existing ammonia facility at Fisherman’s Landing
At mid-scale, the best features of the large and small scale LNG plants can be implemented.
# Gladstone LNG Project Fisherman’s Landing vs Gladstone Curtis Island CSG-LNG Projects

## LNG Plant Capex and $/tpa (2 trains)

<table>
<thead>
<tr>
<th></th>
<th>QCLNG</th>
<th>GLNG</th>
<th>APLNG</th>
<th>LNG Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (mtpa)</td>
<td>8.5</td>
<td>7.8</td>
<td>9.0</td>
<td>3.8</td>
</tr>
<tr>
<td>CAPEX (Billion US$)</td>
<td>10.2</td>
<td>8.8</td>
<td>10.0</td>
<td>1.7</td>
</tr>
<tr>
<td>Cost (Billion $/tpa)</td>
<td>1.20</td>
<td>1.12</td>
<td>1.11</td>
<td>0.45</td>
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## Greenhouse Gas Emissions Intensity (tonne CO₂ / tonne LNG)

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</thead>
<tbody>
<tr>
<td>Process/Power Plant CO₂</td>
<td>n/a</td>
<td>0.313</td>
<td>0.279</td>
<td>0.178</td>
</tr>
<tr>
<td>Feed Gas CO₂</td>
<td>n/a</td>
<td>0.034</td>
<td>0.032</td>
<td>0.035</td>
</tr>
<tr>
<td>Total Plant CO₂ Emissions</td>
<td>0.238</td>
<td>0.347</td>
<td>0.311</td>
<td>0.213</td>
</tr>
<tr>
<td>Compared to FL-LNG</td>
<td>1.12</td>
<td>1.63</td>
<td>1.46</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Source: Project Environment Impact Study submissions to EPA.

## Fuel Gas Consumption (tonne of CH₄/ tonne LNG)

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<th>APLNG</th>
<th>LNG Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Gas Consumption (t CH₄/ t LNG)</td>
<td>n/a</td>
<td>0.101</td>
<td>0.091</td>
<td>0.063</td>
</tr>
<tr>
<td>Compared to FL-LNG</td>
<td>-</td>
<td>1.60</td>
<td>1.43</td>
<td>1.00</td>
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</tbody>
</table>

Source: Estimated based on Turbine Emissions from Project Environment Impact Studies.
Patent Applications Submitted

Patents Granted

OSMR* Process patents have been granted in Australia and OAPI*
BOG Treatment Process patents have been granted in China, OAPI* and South Africa

*OAPI is African Intellectual Property Organisation member states include Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Cote d'Ivoire, Equatorial Guinea, Gabon, Guinea, Guinea-Bissau, Mali, Mauritania, Niger, Senegal and Togo
Gas Supply and Delivery Plan
Gas Hubs: Wallumbilla Gas Hub

- Existing gas hub for gas delivery from Cooper, Eromanga and Surat Basins
- Proposed gas hub for future gas supply from Gunnedah and Clarence Moreton basins
- Accessible gas hub for developing gas supply companies
- Existing Jemena gas pipeline can be expanded to deliver 180 PJ/pa (3mtpa) to Gladstone in 2014/2015
Gas Hubs:
Callide Gas Hub

- Delivery point for existing Jemena to Gladstone gas pipeline
- Proposed delivery point for six new pipelines
- Provides an access point for short and long term gas supply
Metgasco has plans to supply gas to Ipswich (near Brisbane)

Gas supply to Ipswich may be delivered to Gladstone via pipelines or able to be swapped with existing gas producers in order to allow first LNG in 2014/5

Metgasco has adequate 3P reserves for at least one 1.5 mtpa LNG Train (2,542 PJ 3P reserves)

Metgasco has the largest uncontracted 3P reserve base on the east coast of Australia

Metgasco gas reserves compliments other gas supply options

LNG Ltd and Metgasco entered into a MOU to undertake a joint review of gas supply to the Gladstone LNG Project Fisherman’s Landing

LNG LTD is the largest shareholder in Metgasco
LNG Outlook: Asia drives demand

World LNG Demand (mtpa)

2020

2010

In Conclusion

- LNG Limited (LNGL) is an Australian mid-scale LNG developer and Technology provider
- LNGL, together with HQC (subject to finalising gas supply) plan to reach FID for Gladstone LNG Project Fisherman’s Landing in 2012 and to produce LNG for export in the 2014/2015 fiscal year
- The Capex for the downstream LNG project is ~ US$450 tpa compared with the Curtis Island project of over US$ 1000 tpa
- LNGL holds the patented OSMR® LNG process technology that offers both low Capex and high efficiency
- LNGL, HQC and its strategic partners, are committed to deliver the Gladstone LNG Project Fisherman’s Landing to showcase all its partners’ capabilities
Our Logo:
We chose the red ant as our logo because it is distinctive and bold and represents strength, energy, hard work and perseverance – characteristics we aim to make trademarks of our corporate culture.
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GLADSTONE LNG PROJECT
FISHERMAN’S LANDING