

10 April 2012

Senator Christine Milne

Deputy Leader of the Australian Greens Party

Via email: *senator.milne@aph.gov.au*

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**LPG AUSTRALIA
LIQUEFIED NATURAL GAS (LNG)
FACT SHEET**

Reference: A. Meeting – Senator Milne and LPG Australia Senior Executives dated
21 February 2012

LPG Australia appreciates the opportunity to provide you and the Australian Greens Party with a short overview of the LNG Industry and, specifically, the advantages of Liquefied Natural Gas (LNG) over diesel fuel.

What is LNG?

LNG is a clear, colourless, non-toxic liquid that is produced when natural gas is cooled to -161°C at atmospheric pressure. It is stored and transported in cryogenic vessels. When consumed in an internal combustion engine LNG is re-vaporised and burnt as natural gas vapour.

LNG – Strengths and Benefits

LNG demonstrates the following benefits:

- a. **Environment** – Natural gas is a low-carbon burning fuel. When used in modern truck engines, LNG can produce significantly less carbon dioxide, particulate matter and nitrogen oxides. Natural gas engines are also noticeably quieter than diesel powered engines.
- b. **Price** – Supply of LNG to Heavy Duty Vehicles (HDV) and the remote power generation market is typically more competitive than diesel and pricing is more stable when compared to diesel which is affected by the global oil market and exchange rate movements.
- c. **Supply** – Australia has an abundant supply of natural gas and world scale investments in LNG production for the export market. There are around 60 years¹ of current production from the proven

¹ BP Statistical Review of World Energy 2011

natural gas reserves in Queensland, South Australia, Victoria and Western Australia and many more years in gas fields still to be tested and developed. Small scale LNG production for the domestic market uses proven and efficient technology to liquefy natural gas close to the local markets.

- d. **Energy Diversity & Security** – The HDV, rail and mining industries are largely reliant on diesel fuel to conduct their operations. An expansion of the use of natural gas in these market sectors will increase energy diversity throughout Australia and reduce the exposure of those industries to global supply and price shocks. This is against a backdrop of the major oil refiners closing down refining capacity across Australia and oil self sufficiency forecast to reduce to less than 30% by 2020². Through an expanded use of natural gas, Australia could significantly improve its energy security and its balance of trade.
- e. **International Developments** – Within the HDV market sector, Australian operators are reliant on major international engine manufacturers to deliver engines that are powered by alternate fuels. The rapidly growing availability of natural gas in USA and Europe is now seeing Original Equipment Manufacturers (OEMs) announcing developments in their engine platforms that include natural gas options. This will flow into the Australian market and allow a more rapid take up of natural gas within this sector.

LNG Product Data

The table below compares key LNG and diesel data:

Comparison	LNG	Diesel
Density (kg/litre)	0.410	0.840
Energy density (MJ/kg)	54.4	45.4
CO2e (contained) (kg/GJ)	53.6	70.3
Liquefaction temperature	-163 °C	Ambient
Storage	Cryogenic vacuum insulated tanks	Standard bulk tanks

Existing Markets

Currently, three strategic markets exist for LNG in Australia:

- a. **Remote Power Market:** LNG is delivered from the production facility in bulk via B-double or road train tankers to onsite storage and vapourised to supply natural gas to the power generation facility.
- b. **Heavy Duty Vehicles:** Trucks are powered by either dedicated gas or dual fuel (diesel and gas) engines. LNG is supplied from refuellers at the fleet depot or the network of refuellers on high volume

² Liquid Fuels Vulnerability Assessment, October 2011 prepared by ACIL Tasman for Department Resources, Energy, Tourism.

routes, which are in turn filled by LNG road tankers from the production facility. Dual fuel aftermarket conversions are available now.

- c. **Industrial:** LNG is an alternative to LPG and other heating fuels. Bulk deliveries are made to an onsite storage facility which vapourises the LNG to supply natural gas to the heaters, boilers or furnaces.

Dedicated LNG Truck refuelling
at an LNG Facility, WA

Industrial Facility, WA

Future Markets

Currently, the LNG industry is developing three future markets:

- a. **Mine Vehicles:** Vehicle manufacturers are now being encouraged by major international mining houses to produce LNG powered mine haul vehicles. It is anticipated that this equipment will become available by 2015.
- b. **Locomotives:** Some LNG locomotives are currently operating in the USA. It is understood that the major locomotive manufacturers are currently working on bringing a LNG powered locomotive to market by 2016.
- c. **Marine Vessels:** Scandinavian ferry and offshore service vessel operators have embraced the use of LNG with 30 vessels already in service and by 2013 there will be as many as 50. There are four LNG powered vessels on order for use outside of Scandinavia with one ferry being fabricated by Incat in Tasmania. As marine fuel specifications are tightened around the world and in Australia (expected by 2015), the demand for LNG powered vessels will rise dramatically.

LNG Infrastructure

Outside of major export production facilities, LNG infrastructure to service the domestic market continues to be developed within Australia. This includes:

a. Production Facilities:

- 1) Dandenong, Victoria: 100 tonnes per day (tpd);
- 2) Karratha, Western Australia: 200 tpd;
- 3) Kwinana, Western Australia: 175 tpd; and
- 4) Westbury, Tasmania: 50tpd.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Michael Carmody', with a large loop at the start and a small flourish at the end.

Michael Carmody
Chief Executive Officer

Distribution: Senator Milne – Deputy Leader of the Greens
For Information:
LPG Australia Board of Directors
LPG Australia Advisory Council
Mr Dorian Devers – Elgas
LPG Australia Secretariat