CARBON LIFECYCLE OF LNG AND DOMESTIC GAS SUPPLY

March 2009

Key Points

- Domestic gas supply represents the most greenhouse and energy-efficient use of Australia's natural gas reserves.
- Domestic gas supply is over 92% energy efficient, with less than 8% of energy lost in the supply chain. This compares to only 74% energy efficiency for LNG.
- On a per gigajoule basis, LNG produces 20% more greenhouse emissions over its lifecycle than domestic pipeline gas.

Background

- Domestic gas supply represents the most greenhouse and energy-efficient use of Australia's natural gas reserves.
- Domestic gas supply is over 92% energy efficient, with less than 8% of energy lost in the supply chain.
- Transport through the Dampier to Bunbury Natural Gas Pipeline, the longest gas transmission system in Australia, consumes less than 3% of the energy.[1]
- LNG is only 74% energy efficient, with 26% of the energy consumed in the LNG supply chain.
- The LNG production chain requires gas to be liquefied, shipped long distances in tankers, and then regasified before it can be used as a fuel.

[1] 2009 DomGas Alliance study.

- On a per gigajoule basis, LNG produces 20% more greenhouse emissions over its lifecycle than domestic pipeline gas.

- A 2007 Carnegie Mellon University study found LNG generated almost 25% more greenhouse emissions over its lifecycle compared to domestic natural gas. The study also found that the upper band of emissions associated with LNG approached that of coal. [2]

- A 2006 Climate Mitigation Services found that liquefaction and transporting of natural gas in LNG tankers accounted for around 21% of the total lifecycle emissions of LNG.[3]

- Given domestic gas is the most greenhouse and energy-efficient fossil fuel, it is vital that Australia's greenhouse policy framework promotes domestic gas supply and use.

- Australian industry and electricity generators are also in the main extremely energy efficient compared to their international counterparts. This reinforces the global greenhouse benefits of domestic gas supply.

- Australia's current greenhouse policies however discourage the supply and use of domestic gas.

- The proposed CPRS recognises that LNG is greenhouse intensive and provides LNG producers with 60% assistance towards emissions generated from the production of LNG for export. Producing domestic gas for use within Australia will, on the other hand, attract the full carbon penalty.

- By providing a financial incentive for producers to export natural gas, the CPRS could distort investment, discourage domestic gas supply and increase gas and electricity prices.

- It could also lead to higher global emissions as Australia's clean energy reserves are exported as greenhouse-intensive LNG, while local industry resorts to coal.

- From a greenhouse policy perspective, it is illogical to compensate coal, mandate renewable energy use and incentivise gas exports, while ignoring domestic gas – the most greenhouse and energy-efficient fossil fuel.

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[2] Jaramillo, Griffin and Matthews, 'Comparative Life-Cycle Air Emissions of Coal, Domestic Natural Gas, LNG and SNG for Electricity Generation', *Environ. Sci. Technol.* 2007, 41, 6290-6296.

[3] Heede, R., 'LNG Supply Chain Greenhouse Gas Emissions for the Cabrillo Deepwater Port: Natural Gas from Australia to California', Climate Mitigation Services Study, May 2006.

ATTACHMENT

DomGas Alliance (2009) [4]

For every 100 GJ of energy in the supply chain:

	Energy Delivered	Energy Consumed	Total	Energy efficiency
Dom Gas	92.3 GJ	7.4 GJ	100 GJ	92.3 %
LNG	73.7 GJ	26.3 GJ	100 GJ	73.7 %

Lifecycle greenhouse emissions for:

1 GJ LNG: 67 kg $CO_{2\text{-eq}}$

1 GJ domestic gas: 56 kg $CO_{2\text{-eq}}$

1 GJ of LNG generates almost 20% more greenhouse emissions over its lifecycle than domestic pipeline gas.

Carnegie Mellon Study (2007)

Lifecycle emissions (lb $CO_{2\text{-e}}$ per megawatt hour)

	Dom Gas	LNG	Coal
Midpoint	1250	1600	2100
Upper Band	1600	2400	2550

[4] The 2009 DomGas Alliance analysis drew on a number of data sources including the 2006 Climate Mitigation Services Study. For the purpose of the Alliance's analysis, domestic gas refers to domestic gas supplied through the Dampier Bunbury Natural Gas Pipeline.

The DomGas Alliance

The DomGas Alliance was formed in 2006 in response to a serious shortage of gas supply for new developments in WA. Membership includes current and prospective gas users and gas infrastructure investors.

Alliance members represent around 80 percent of Western Australia's domestic gas consumption and gas transmission capacity, including smaller industrial and household users of gas. The Alliance also represents a significant proportion of prospective demand for additional gas supplies.

Members include: Alcoa of Australia, Alinta, Burrup Fertilisers, Dampier Bunbury Pipeline, ERM Power / NewGen Power, Fortescue Metals Group, Horizon Power, Newmont Australia, Synergy and Verve Energy.

The Alliance works closely with State and Federal Governments and other industry stakeholders to promote diversity, affordability and security of gas supply for industry and households in WA.

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