



APEC ENERGY TRADE AND INVESTMENT TASK FORCE

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RISKS AND OPPORTUNITIES FOR LNG TRADE IN THE CURRENT CLIMATE CHANGE DEBATE

**Robert Pritchard
Executive Director
APGAS Limited**

APGAS Limited

PO Box A2129 Sydney South NSW 1235 Australia
Telephone: +612 9810 7322 Facsimile: +612 9810 7320
Email: info@apgasforum.com
www.apgasforum.com

Introduction – the Key Role of Natural Gas and LNG in Bolstering Energy Security and Addressing Climate Change in APEC

As the APEC Energy Trade and Investment Task Force already fully appreciates, LNG is a unique fuel with both stationary energy and transportation applications. It is a source of safe, clean energy, offering the lowest GHG emissions of any fossil fuel.¹

LNG is a long-distance transportation system for exporting natural gas that would otherwise remain stranded. It is not a product like LPG (which is a product of petroleum refining and has different uses). Liquefaction is not a chemical process; it is a capital-intensive², refrigeration process.³

LNG remains the most cost-effective means of exporting low-emissions energy to APEC energy-hungry economies, in accordance with UNFCCC principles.⁴ LNG is a proven and affordable existing technology, unlike future technological solutions, such as carbon capture and storage (CCS).

Natural gas is not just a "transitional fuel" – it has a pivotal long-term role as a balancing and backup fuel in power generation systems that use intermittent renewable energy, such as wind and solar.

LNG is presently the only major energy export that has the potential both to reduce the pace of growth of global GHG emissions and to alleviate energy security concerns.

Although the liquefaction and transportation stages of the LNG cycle are themselves emissions-intensive, the emissions saved in importing countries by displacing coal with natural gas in power generation can be up to nine times the emissions generated in the liquefaction and shipping stages, depending on the fuel mix used in the importing country.

These potential savings highlight the importance of maintaining a level global playing field for LNG trade amongst APEC economies and accelerating the expansion of the LNG industry.

APEC LNG Production Capacity

As shown in table 1, current APEC LNG production capacity is 96.9 mtpa. This is expanding relatively rapidly, compared with previous decades and is expected to increase by at least 30 mtpa when construction of the Pluto, Gorgon, Ichthys and PNG projects is completed over the next few years. There are various other projects at feasibility stage in Australia that could easily increase APEC capacity by much more than that over the next decade.

¹ "...natural gas offers the lowest GHG emissions of any fossil fuel and the acceleration of cross-border natural gas trade is a key strategy in making progress towards sustainability of the global economy and the global environment," APEC Energy Working Group, "Great Expectations: Cross-Border Natural Gas Trade in APEC Economies", Report by ResourcesLaw International, APEC Secretariat, Singapore, November 2004.

² LNG plant construction costs have risen significantly over the last several years. The capital cost of Woodside's Pluto single-train LNG plant currently progressing to completion in Australia is around A\$12 billion. The capital cost of Chevron's Gorgon 3-train LNG plant which recently commenced construction in Australia is around A\$43 billion.

³ When condensed by cooling into a liquid at minus 261°C, LNG occupies only 1/600th the volume of its gaseous state. Shortly after it reaches its destination, LNG is reconverted into its naturally gaseous state. LNG only "exists" in its liquefied state for about one month before being regasified.

⁴ It is a principle of the UNFCCC that "... policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost," Article 3 of the Convention.

Table 1: APEC LNG Plants as at November 2009

Economy	Project	Main Participants	Year Est	No of Trains	Capacity (mtpa)
Australia	North West Shelf	Woodside, Shell, BHP Billiton, BP, Chevron, MIMI	1989	2	16.3
			1992	1	
			2004	1	
			2008	1	
	Darwin	ConocoPhillips, ENI, Santos, Inpex, TEPCO, Tokyo Gas	2006	1	3
Brunei	Brunei	Brunei, Shell, Mitsubishi	1972	5	7.2
Indonesia	Arun	Pertamina, ExxonMobil, JILCO	1978	3	7
			1984	2	
			1986	1	
			1977	2	
	Bontang	Pertamina, VICO, JILCO, Total	1983	2	22
			1989	1	
			1993	1	
			1997	1	
			1999	1	
			2009	2	
Malaysia	Bintulu (MLNG Satu)	Petronas, Shell, Mitsubishi	1983	3	8.0
	Bintulu (MLNG Dua)	Sarawak Govt	1995	3	8.0
	Bintulu (MLNG Tiga)		2003	2	6.8
Russia	Sakhalin	Gazprom, Shell, Mitsui, Mitsubishi	2009	2	9.6
USA	Kenai	ConocoPhillips, Marathon Oil	1969	1	1.4
Total Present LNG Production Capacity					96.9

How LNG Trade is Conducted

The LNG industry is commercially quite complex due to the scale of projects, the need for extensive infrastructure, including ports, and the need to dovetail the development of new production projects with the development of new power stations.⁵

Most LNG is still sold under long-term contracts, typically 15 – 25 years, with fixed volumes and prices that may be adjusted for shifts in the prices of oil or competing fuels. Long-term contracts are needed by both sellers and buyers for security of revenues and security of supply respectively. At the same time, an LNG spot market and arbitrage market is progressively developing to provide certain flexibility for market participants.

The LNG export industry stands in marked contrast to all other trade-exposed, energy-intensive industries. The liquefaction process adds to supply costs – it does not add any economic value to the gas, although it certainly adds environmental value.

⁵ Most buyers of LNG are energy utilities that need to make 40-50 year, multi-billion dollar decisions to invest in gas-fired power stations, instead of coal or nuclear, before entering into long-term gas purchase agreements.

Current Risks Facing LNG Trade and Investment

There is now a lot more LNG "looking for a home" than ever before and this is a good thing for APEC energy security. However, the development of additional LNG production capacity continues to depend on buyers being prepared to enter into long-term contracts.

In addition, the imposition of a carbon cost on LNG production in any exporting country would constitute an unnecessary barrier to the reduction of global greenhouse gas emissions. LNG exports are especially vulnerable to carbon cost exposure because existing LNG projects are subject to long-term contract prices and because the start-up of new projects can take the best part of a decade from the time projects are submitted into the approval process.

As has been understood for some time, importers of LNG remain "free riders" so far as emission reduction benefits are concerned.⁶

The imposition of a carbon cost on LNG production in a single country could cause "carbon leakage" if, for no environmental benefit, it led to production relocating to another country that does not impose a carbon cost.⁷ Carbon leakage could drive investors elsewhere and distort trade and investment patterns.⁸

Although domestic cap-and-trade schemes are intended to reduce a country's domestic emissions, they can impede the objective of reducing global emissions and they can increase the risk of carbon leakage, unless the burden they impose on LNG exporters can be offset.⁹

The Asia-Pacific Gas Market Growth Project

The Asia-Pacific Partnership on Clean Development and Climate (APP) is an intergovernmental effort to accelerate the development and deployment of clean energy technologies. The seven members of the partnership are Australia, Canada, China, India, Japan, Republic of Korea and the US.

One recent APP initiative is the *Asia-Pacific Gas Market Growth Project*. The objectives of the project are to promote energy security, reduction in national air pollution and climate change in ways that promote sustainable economic growth and poverty reduction.

⁶ "Although there is still uncertainty about how carbon intensities will eventually be reduced and valued, producers of natural gas should endeavour to extract full value for its clean burning attributes. This is not presently occurring where LNG producers are "cleaning up" LNG prior to export and suffering the "carbon penalty" domestically. It will become necessary for energy buyers to recognise the value of the "fossil fuel of choice" and to share any future windfall gains from GHG emission reductions with the resource owner", APEC Energy Working Group, note 1 above.

⁷ It is acknowledged that this cannot be empirically proven due to its counterfactual nature (i.e., what would have happened in the absence of the cost).

⁸ As the Australian Minister for Climate Change said on 6 February 2008, "... The introduction of a carbon price ahead of effective international action can lead to perverse incentives for such industries to relocate or source production offshore. There is no point in imposing a carbon price domestically which result in emissions and production transferring internationally for no environmental gain."

⁹ According to European Commission MEMO/08/35, 23 January 2008, "In other sectors [than the power sector], allocations for free will be phased out progressively from 2013, resulting in no free allocation in 2020. However, an exception will be made for installations in sectors judged to be at significant risk of 'carbon leakage', meaning that they could be forced by international competitive pressures to relocate production to countries outside the EU that did not impose comparable constraints on emissions. This would simply increase global emissions without any environmental benefit."

The Australian Petroleum Production & Exploration Association (APPEA) led the APP project and engaged PricewaterhouseCoopers to undertake a study of APP gas markets. Their report was released in September 2009 and its key messages were:

- ***Producers and end users will continue to rely on each other to develop the market for natural gas and LNG.*** *Importing countries will rely on the supply side to manage large-scale projects and provide security of supply. Producers will rely on governments in the importing countries to reduce risk by improving domestic gas markets to a point where stable and predictable government policies, regulation and end user demand provide sufficient certainty for the projects to move forward.*
- ***There are substantial opportunities to grow gas markets in the APP economies:***
 - *Opportunities to grow gas penetration are the greatest in the electricity generation sector, particularly in countries that already have low gas penetration.*
 - *Growth of gas in the energy mix will have a positive impact on energy security, greenhouse gas emissions and air pollution. The long term economic impact is also positive.*
- ***Gas market growth must be underpinned by government policies and regulation that support market development and provide certainty for potential investors.*** *Key focus areas for the energy policy include clarity around issues related to the cost of carbon emissions and the preferred energy mix for the respective countries.*

What Should the APEC Task Force Do?

Further expansion of APEC LNG trade and investment will open up the pathway to a sustainable energy system in the APEC region and will help underwrite a clean energy future for APEC economies. APGAS therefore respectfully recommends to the Task Force:

- (i) The Task Force should seek the endorsement of APEC Energy Ministers for the vigorous expansion of LNG trade and investment and for the development of carbon trade between LNG exporters and importers in the APEC region.

More specifically, APEC LNG-importing countries could recognise the value that LNG brings to global emissions reduction by returning carbon credits to the exporting countries for the emissions produced during the liquefaction and transportation stages of the LNG supply chain.

With the development of additional production capacity, APEC LNG exporting economies will, in effect, be able to increase the export of emission reductions to other APEC economies, making a substantial, long-term contribution to addressing global climate change, as well as enhancing the energy security of APEC economies.

- (ii) The Task Force should recognise the importance of all economies aligning their climate policies in order to avoid policy fragmentation and reduce investment uncertainty.
- (iii) Finally, the Task Force should recognise the continuing importance of public education for the further expansion of LNG trade and investment.¹⁰

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- APGAS applauds the initiative of Chinese Taipei in this regard. See the APEC LNG Public Education website: <http://apecenergy.tier.org.tw/LNGPECS/index.asp>.
- Other information about LNG is available from APGAS: www.apgasforum.com and the US Center for LNG: www.lngfacts.org.