Gas markets – a bridge too far?

Graeme Bethune\textsuperscript{A} and Rick Wilkinson\textsuperscript{A,B}

\textsuperscript{A}EnergyQuest, Level 30, 91 King William Street, Adelaide, SA 5000, Australia. 
\textsuperscript{B}Corresponding author. Email: rwilkinson@energyquest.com.au

\textbf{Abstract.} The energy market is becoming more globalised and renewables are changing the supply and demand balance. Gas has been suggested as the bridging fuel to the new energy world – but is it a bridge too far? This presentation examines the global gas context and its impact on the Australian east coast gas markets, trends in energy supply options and sign posts for new directions. When the first liquefied natural gas (LNG) train started on Curtis Island, the gas producers had access to more than just the domestic market. The new overseas markets are also interconnected, so the Henry Hub, Brent oil and Chinese gas demand all have an influence on Australia’s east coast gas market. Potential LNG import terminals and net back pricing are changing the domestic gas market. The energy market is moving to renewables. This is not just an anomaly that will correct itself, but is based on lower renewable costs and distribution challenges. Moving relatively small amounts of energy long distances is a major challenge for Australia. Infrastructure, market hubs and sourcing strategies need to compensate for these challenges, and investment is needed to keep pace with the changes. Capital is a global commodity seeking the optimum return for the risk, but unconventionals, such as coal seam gas, are capital hungry. Government policies and support can be the key determinant for not only new investment but sustaining investment to meet existing gas supply contracts. Smart gas buyers will need to be agile and use deeper portfolio approaches for gas supply.

\textbf{Keywords:} gas demand, gas supply, infrastructure, LNG, LNG imports, reserves, resources.

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\textbf{Introduction}

Australia connected to the international gas market 30 years ago, when the first North West Shelf liquefied natural gas (LNG) cargo left Australia in 1989. Darwin LNG cargoes started in 2006, and the Queensland Curtis Island LNG cargoes commenced in December 2014, connecting the last of Australia’s three gas networks to the LNG world.

In 2019, Australia is passing Qatar to become the world’s largest LNG exporter. Most of this LNG is shipped to Asian destinations, and Australia is becoming a key energy supplier to Asia. Australia’s share of LNG imports by the three largest importing countries is significant (37% of China’s, 34% of Japan’s and 22% of Korea’s) and this is supported by large investment from these countries (with other Asian and multi-national companies) in Australian petroleum resources. What this means is that Australia is closely bound through these sales and investments to these countries and multi-national companies – a bridge to the world’s economies and our energy futures.

So, what is the state of the bridge and where is it leading?

\textbf{The east coast reserves challenge}

With more than 114 trillion cubic feet (Tcf) of proven and probable (2P) gas reserves and a total domestic market of \~1127 petajoules per annum (PJ/year) (in 2017), Australia has more than a century of domestic reserves cover, and an LNG export industry is a logical gas market development.

For the east coast, this picture is not so clear. Approximately 90%, or 38 Tcf, of the east coast’s 2P gas reserves are coal seam gas (CSG). This should meet the needs of the six LNG trains on Curtis Island. However, nearly 44% of these reserves do not have a production well or proven production history within the relevant production licences. This is an additional uncertainty for the CSG 2P reserves.

\textbf{Supply and demand}

Western Australia’s gas industry is based on very large resources and long distances from markets (classic stranded gas resources), which are well suited to LNG development.

The Northern Territory is similar to Western Australia in this respect, although the Darwin LNG plant needs additional gas to extend its operational life beyond the next few years as Bayu-Undan field reaches its final stages.

East coast Australia on the other hand is quite different. The Curtis Island projects are connected to, and dwarf, the domestic market. EnergyQuest has made a detailed assessment of the east coast reserves, and likely production profiles, and compare this to
the likely east coast domestic demand of ~760 PJ/year and the LNG demand of ~1240 PJ/year.

This analysis shows that current east coast 2P reserves will not meet demand by 2026 and several options will need to be considered:

- Increase exploration and bring on unknown, low cost and large volume gas resources;
- Import LNG;
- Decrease demand;
  - Shut down one or two LNG trains; and/or
  - Destroy gas demand with higher gas prices.

**Regional implications**

As the east coast forecast short fall of gas supply approaches, largely driven by Gippsland Basin decline, increased supply from Queensland will support the southern states, and the proposed LNG import terminals are likely to become more attractive. Without LNG import terminals or entirely new gas reserves being commercialised, the flow south from Queensland may reach as much as 140 PJ/year in 2025, before dropping rapidly as the CSG fields decline. The existing pipeline infrastructure cannot move 140 PJ/year south without more investment.

**Infrastructure and investment**

Just to maintain CSG production at current levels requires the drilling of 1000 to 1400 wells per year. With the associated infrastructure, this is an ongoing investment in the order of $2 to 3 billion per year. At least one-third of the CSG to LNG capital is yet to be spent. This is unlike any of the other LNG projects in Australia, where the drilling of production wells is usually completed for the commissioning of the project.

This has important implications for potential government interventions, such as domestic gas reservation or a more aggressive application of the Australian Domestic Gas Security Mechanism by the Federal government. Apart from the impact of diverting LNG from receiving countries like China and Japan, where Australian LNG is a major part of their imports, forcing the diversion of gas destined for LNG exports to a lower priced domestic market may also challenge the ongoing investment to maintain current gas flows. Or more bluntly, why would a company continue to invest billions of dollars of project capital where the government intervenes to lower the project return? It is not a reasonable assumption that the same capital will be invested for a lower return domestic market. This becomes less of an issue as domestic gas prices rise to LNG net back levels.

Investment in pipeline infrastructure to deliver more gas across longer distances also faces challenges. First, today there are no low cost 2P gas reserves to supply a pipeline long-term for southern markets. Beetaloo in the Northern Territory, is still a long way from being appraised and economic.

Second, CSG from the Surat Basin can meet some of the southern shortfall to 2026, but the period before the decline of the CSG fields is only a few years away and not sufficient to underwrite the pipeline investments, unless Shell diverts feedstock gas for the second QGC train to the domestic market. EnergyQuest considers that one, and possibly two, LNG trains are likely to be shut down before their project term is completed.

Third, the proposed LNG import terminals create demand uncertainty about how much gas is required from the north.

**Strategies for the new gas market**

Upstream explorers and producers have an opportunity with high gas prices and an east coast market facing severe shortages. Technical innovation to lower costs and tap the more difficult fields and new unconventionals is required. Also, smarter commercial deals with gas buyers to lower the risk and increase options should be doable. The Jemena deal with Senex, where processing is provided by a third party, is a good example. Also, the sharing of QGC processing infrastructure by Arrow Energy lowered the capital threshold for its project.

Gas buyers need to use a portfolio approach to ensure supply uncertainty but capture low cost opportunities when they arise. Longer termed gas will be more expensive in the east coast but will provide the base supply certainty. LNG importing or net backs should be considered as a part of the portfolio options. The west coast has low gas prices, which will support longer term gas contracts.

Infrastructure investors are in a more difficult position, as gas volumes are generally small for the distances shipped and the future of supply and demand remains uncertain. Once a project has reserves to ship to a market, then investors seem to be found.

LNG import terminals could have some positive impacts for the market, including:

- Ready peak supply capacity near demand centres,
- Competition for long-distance pipelines,
- Ability to write long-term gas supply contracts,
- Arbitrage opportunities to import low priced LNG, and
- Flexibility to increase volumes with more shipments.

**Conclusions**

There are several key points from this analysis:

- Australia is the largest LNG exporter in the world and a major player connected to the global energy market.
- Gas supply in the east coast is struggling to meet demand and will fall short by 2026 without a major shake-up or break through, such as a bold new gas exploration success, importing LNG or demand destruction.
- At least one, and possibly two, LNG trains on the east coast will shut down before the full term of their projects, either because of feed stock shortages or diversion of gas to the domestic market.
- Investment in infrastructure is challenging while the supply and demand outlooks are uncertain.
- LNG imports to New South Wales and Victoria may have positive impacts and may support the gas industry as supply falls short of demand.
- Smarter players in the industry need to manage more risks and options to meet their business objectives.
This may be the basis for a bridge, but the other side of the river is still hidden from view.

**Conflicts of interest**

EnergyQuest is an independent and privately-owned consultancy.