

Understanding the East Coast Gas Market

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Abstract

Wholesale gas prices on the east coast have become linked to LNG export prices since 2015. This is because local gas producers can now sell into international markets through the 3 Queensland LNG export terminals. Wholesale prices will continue to be influenced by LNG export prices as long as this option is available. Contracted prices apply to the bulk of east coast gas demand and production. Contracted gas prices are likely to remain structurally higher than their pre-2015 levels over coming decades, reflecting higher marginal costs of domestic production.

Introduction

East coast wholesale (spot) gas prices increased sharply from around 2015, and in subsequent years averaged roughly double the level in the first half of the decade (Graph 1). Prices in new longer-term contracts, which underpin supply to large users such as firms and energy retailers, also increased strongly as legacy contracts expired. Wholesale prices fell sharply during 2020, while contracted prices for 2021 decreased to \$6–10/GJ (ACCC 2021).

In this article we explore developments in the east coast gas market and the key drivers of domestic gas prices. We begin with some background on the

demand and supply of gas on the east coast, including how the market is structured. We then consider the main arguments put forward to explain price developments since 2015 and assess their relative importance. We conclude with the outlook for domestic gas demand, supply and prices in light of our findings. Possible policy changes and technological advancements that could impact demand and supply going forward are also noted.

Demand and supply in the east coast gas market

There are 3 main end uses for natural gas:

- industrial uses, including chemical processing;
- residential and commercial uses (e.g. cooking and heating by households and businesses); and
- electricity generation via gas-fired power plants.

A fourth category of demand is export demand. Gas is super-cooled to become liquid ('liquefied natural gas' or LNG) so it can be economically transported to other countries to supply those 3 end uses (Cassidy and Kosev 2015).

Prior to 2015, gas demand on the east coast was roughly split 40/30/30 across industrial, residential and commercial, and electricity generation (Graph 2). Since then, the development of Queensland's LNG export capacity has led to a significant increase in gas demand, with these export projects accounting for almost three-quarters of total demand for gas on the east coast in recent years. Over the same period domestic usage of gas has decreased somewhat; some gas-fired electricity generation has been replaced by renewable energy sources, while higher gas prices have prompted a demand response from some industrial gas users. In aggregate, ABS input-output tables indicate that gas accounted for less than 2 per cent of total costs for even the most gas-intensive manufacturing sub-industries in 2017/18 (glass and glass products, and basic chemical manufacturing). Nonetheless, for some firms gas can comprise a much larger share of total costs

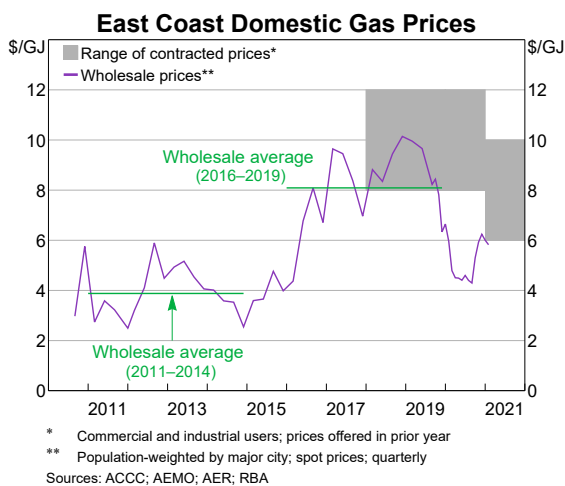
(such as plastics, ceramics, fertiliser and explosives manufacturers).

Traditionally, 'conventional' projects produced gas as a by-product of oil production. Unconventional deposits (including coal seam gas (CSG)) typically do not contain oil, and so involve higher production costs; these deposits account for 90 per cent of the east coast's known remaining gas reserves. The shift towards CSG production has therefore increased the marginal cost of production on the east coast. Analysis conducted for the Australian Competition and Consumer Commission (ACCC) indicates that the median cost of production from CSG deposits is around 35 per cent higher than remaining conventional deposits (Core Energy and Resources 2018). New sources of east coast supply have also been constrained by state government restrictions on onshore exploration and development in New South Wales, Victoria and Tasmania. In line with these developments, wholesale gas prices in 2021 are estimated to be around \$7-8/GJ (ACCC 2020), significantly higher than the \$3-5/GJ range observed prior to 2015.^[1]

Market structure

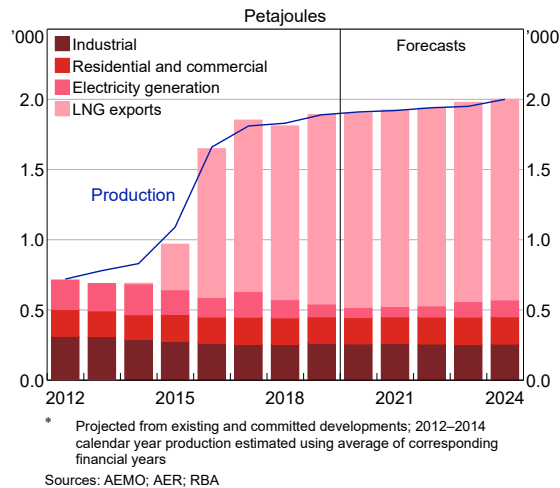
The east coast gas market is heavily contract based, with only a small share of production traded on the wholesale (spot) market. This is because long-term contracts provide producers the confidence to invest in new gas supply, and large gas users the

Graph 1



Graph 2

East Coast Gas Demand and Production*



confidence to invest in new gas-consuming projects.

Domestic gas contracts can range from 1–10 years in length, with terms at the shorter end of this range becoming more prevalent recently as prices have risen. There is limited information regarding the commercial terms underlying these contracts. While pricing arrangements can be diverse, liaison and public information indicates that fixed price contracts are not uncommon. Contracted gas prices usually incorporate a premium over wholesale (spot) prices due to the certainty and longevity of supply being provided. Wholesale prices reflect any excess demand and supply of gas in the domestic market at a particular point in time. Because these volumes are small, wholesale prices can be volatile.

LNG export contracts are much longer than those in the domestic market, at around 20 years in length. This underpins the very large capital costs associated with constructing new LNG plants and export facilities. Pricing under LNG export contracts is typically linked to oil prices with a lag of around 3 months (Cassidy and Kosev 2015). The remaining capacity at LNG plants can be used to produce ‘spot’ or un-contracted cargoes. Similar to wholesale domestic prices, spot LNG prices reflect excess demand and supply of LNG at a point in time. Spot cargoes sold into Asian markets are typically priced off the Japan Korea Marker (JKM).

Understanding pricing developments since 2015

The increase in both wholesale and contracted gas prices on the east coast since 2015 has attracted a lot of attention. Regulators, energy market contacts in the Reserve Bank’s liaison program^[2] and market commentators generally attribute the increase in domestic gas prices to one or more of the following:

- the development of the 3 Queensland LNG projects linking domestic prices to international prices;
- insufficient domestic gas supply; or
- increases in domestic gas production costs.

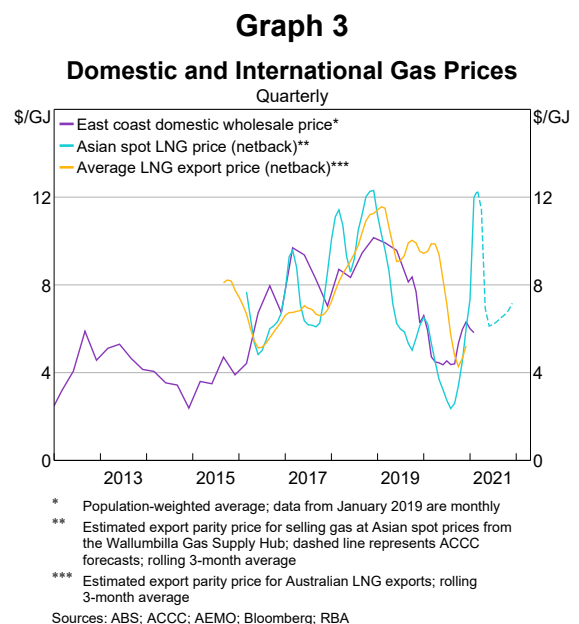
When assessing the relative importance of these factors it is important to clarify which market – the

wholesale or contract market – is being referred to. We find the first argument does the most to explain price developments in the domestic *wholesale* market since 2015. The third argument is likely to be driving structurally higher prices in the domestic *contract* market. While wholesale prices only apply to a very small proportion of total gas production on the east coast, data for this market are more readily available so we will start there.

Wholesale gas prices

We compare wholesale gas prices with estimates of the prices a local producer could obtain by instead selling their gas as LNG to international buyers. This is called a ‘netback’ price, which is the price an LNG seller receives minus the costs of liquefying the gas and transportation (shipping) required to get the gas to the buyer. As illustrated in Graph 3, movements in wholesale prices have moved broadly in line with estimated LNG netback prices since 2015. In particular, it appears that wholesale prices are most closely correlated with *spot* international LNG prices. The strong divergence in pricing outcomes between spot and average LNG export prices in 2019 provides the clearest support for this, as wholesale prices more closely followed the spot LNG price.

Evidence suggests that the development of the 3 Queensland LNG export projects has created a link between domestic east coast gas prices and



international gas prices. This link was created because there is spare export capacity at the LNG projects – giving local gas producers the option to sell into international markets. In aggregate these projects had around 15 per cent spare capacity available in 2018/19 and 2019/20, which was equivalent to around two-fifths of domestic demand in 2019.

However, the development of LNG export terminals does not *necessarily* link domestic prices to international prices. The Western Australian experience provides an example of this. Despite several large LNG export projects being developed in Western Australia over the past 5 years domestic gas prices in the state have remained low and seemingly uncorrelated with international prices. Liaison and public information indicate that Western Australian gas prices are around half the levels observed on the east coast since 2015. Lower gas prices in Western Australia are widely attributed to the state government’s domestic gas reservation policy. The policy requires LNG project owners to make gas equivalent to 15 per cent of exports available to the domestic market (domestic gas plants must typically be constructed as part of the LNG export project), increasing supply in the WA domestic gas market. The reservation policy also prevents gas from domestic-facing projects from being sold overseas (McGowan 2020), so international and domestic prices remain unlinked, and only domestic demand and supply determine local prices. With domestic gas demand remaining little changed in recent years many contacts have described the WA domestic market as ‘oversupplied’.

Contracted prices

The lack of data regarding the domestic contract market makes it harder to draw strong conclusions about the drivers of recent price developments. However, the ACCC’s inquiry into gas supply arrangements in Australia and information from the Bank’s liaison program provide some indications.

Increases in domestic production costs are likely to affect contracted domestic gas prices more than wholesale prices. Liaison contacts note that longer-run production costs and contract terms,

particularly around length and reliability requirements, are key determinants of contracted prices. As discussed above, increases in production costs have lifted the estimated cost of new domestic gas supply to around \$7–8/GJ (including transportation costs).

LNG export prices might also affect contract prices to a small extent. A few liaison contacts note an increase in the number of domestic gas contracts linked to oil prices in recent years (on which contracted LNG export prices are based). This could potentially arise when LNG producers can sell their undeveloped ‘gas in the ground’ via contract into either the export or domestic market.

Outlook

The outlook for east coast gas prices will depend on the evolution of supply and demand. Our findings suggest that contracted gas prices on the east coast are likely to remain structurally higher than their pre-2015 levels over the coming decade, reflecting higher marginal costs of domestic production.

Supply

Options to increase gas supply on the east coast include developing new deposits near major demand centres in southern states, upgrading pipeline infrastructure to facilitate the flow of gas from other states, or importing gas from overseas.

- While Victoria has announced that its ban on onshore conventional gas exploration and development will be lifted from July 2021 (Symes 2020), liaison suggests it could take several years for exploration to commence and even longer for new production to start.
- With regards to new pipelines, the focus appears to be on boosting capacity to transport gas from northern states (e.g. Northern Territory and Queensland) to southern states. This includes proposals to connect gas basins in the Northern Territory to South Australia and Queensland, as well as expanding existing capacity to transport gas from Queensland to southern states (Macdonald-Smith 2020). Liaison over recent years suggests a West-East gas pipeline from Western Australia is unlikely to

be viable. Recent Australian Government announcements designed to increase domestic gas supply appear to involve both the development of additional pipeline infrastructure and gas basins.^[3]

- LNG import terminals have also been put forward as a way to increase the supply of gas to the east coast, with 5 projects currently under consideration (Rystad 2021). This would involve purchasing LNG from the international market and converting it to gas here in Australia for use domestically. The key drivers for LNG import terminals appear to be security and flexibility of supply rather than price, with final prices for imported gas expected to be greater than \$8/GJ over the medium term.^[4]

Demand

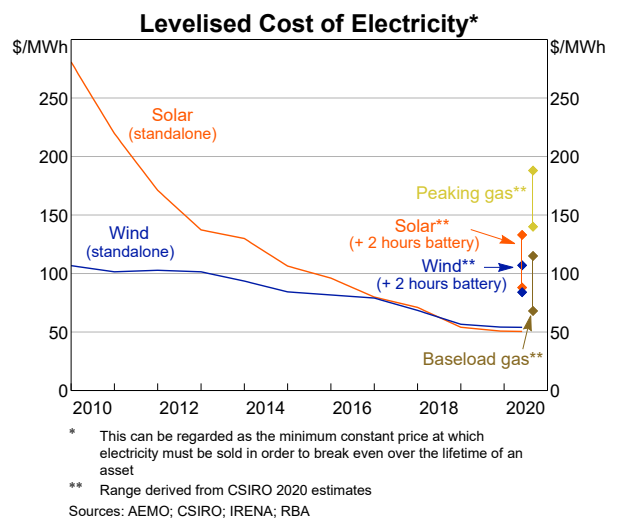
As noted earlier, industrial demand accounts for the largest portion of domestic gas usage on the east coast. With east coast gas prices likely to remain structurally higher than pre-2015 levels, it seems unlikely that industrial gas consumption will increase materially going forward.

Another substantial source of east coast gas demand is for gas-fired electricity generation. Gas-fired generation appears to have been the largest marginal source of dispatchable (i.e. on-demand) electricity in the National Electricity Market (NEM) over the past decade, with gas generation costs highly correlated with movements in wholesale electricity prices. However, this position as the largest marginal supplier is being challenged by investment in renewable energy and storage such

as batteries and pumped-hydro-power (Graph 4) (De Atholia, Flannigan and Lai 2020). Future changes in costs to batteries, other dispatchable sources of renewable energy, and a shift in investor preferences towards low- or no-emissions technologies, could pose downside risks to domestic demand for gas-fired electricity generation.

With regards to external demand, many of Australia’s major LNG customers, such as China, South Korea and Japan, have recently pledged to reduce their greenhouse gas emissions to net zero by 2050 in line with Paris Agreement targets. These, and other changes in the international regulatory environment, will influence demand for Australian gas exports in the longer term and thus wholesale domestic prices. ✖

Graph 4



Footnotes

- [*] The authors are from Economic Analysis Department.
- [1] Marginal gas production costs in Queensland and Victoria are estimated to be around \$5.5/GJ, with transportation costs comprising the remainder. Data from another source, Rystad Energy (2020), indicates that only around 15 per cent of currently under-development and discovered gas fields on the east coast will have a break-even production cost below \$4/GJ by 2030. This does not include transportation costs.
- [2] For more information on the liaison program, please see *The RBA's Business Liaison Program(2014)*
- [3] Announcements included the creation of a National Gas Infrastructure Plan and Australian Gas (trading) Hub as well as the development of Strategic Gas Basin Plans for the Beetaloo, North Bowen and Galilee basins. See Coorey (2020), Prime Minister of Australia (2020a, 2020b).
- [4] Final prices for imported gas will depend on the international LNG price, the exchange rate, transportation costs and re-gasification costs at Australian import terminals. Futures contracts indicate spot Asian LNG prices will remain above US\$5/MMBtu over the next 5 years. Assuming an international LNG price (including shipping) of US\$5/MMBtu, AUD/USD exchange rate of 0.75 and re-gasification cost of A\$1.5/GJ yields a final price of around A\$8/GJ. Re-gasification cost estimates from Department of Industry, Innovation and Science (2018).

References

- ACCC (Australian Competition and Consumer Commission) (2017), 'Gas Inquiry 2017-2025', Interim Report, September, viewed 29 January 2021. Available at <<https://www.accc.gov.au/publications/serial-publications/gas-inquiry-2017-2025/gas-inquiry-september-2017-interim-report>>.
- ACCC (2020), 'Gas Inquiry 2017–2025', Interim Report, July, viewed 29 January 2021. Available at <<https://www.accc.gov.au/publications/serial-publications/gas-inquiry-2017-2025/gas-inquiry-july-2020-interim-report>>.
- ACCC (2021), 'Gas Inquiry 2017–2025', Interim Report, January, viewed 03 March 2021. Available at <<https://www.accc.gov.au/publications/serial-publications/gas-inquiry-2017-2025/gas-inquiry-january-2021-interim-report>>.
- AEMO (2019), '2019 Gas Statement of Opportunities', August, viewed 29 January 2021. Available at <<https://www.aemo.com.au/energy-systems/gas/gas-forecasting-and-planning/gas-statement-of-opportunities-gsoo/2019-gas-statement-of-opportunities>>.
- Cassidy N and M Kosev (2015), 'Australia and the Global LNG Market', RBA *Bulletin*, March.
- Coorey P (2020), 'PM backs gas-fired power station in NSW', *Australian Financial Review*, 14 September, viewed 28 January 2021. Available at <<https://www.afr.com/politics/federal/morrison-steps-on-the-gas-20200914-p55val>>.
- Core Energy and Resources (2018), 'Gas Production Cost Estimates | Eastern Australia' for 'ACCC Gas Market Enquiry', November, viewed 29 January 2021. Available at <<https://www.accc.gov.au/system/files/Core%20Energy%20report%20for%20ACCC%20-%20November%202018.pdf>>.
- De Atholia T, G Flannigan and S Lai (2020), 'Renewable Energy Investment in Australia', RBA *Bulletin*, March.
- Department of Industry, Innovation and Science (2018), 'Resources and Energy Quarterly', June, viewed 29 January 2021. Available at <<https://publications.industry.gov.au/publications/resourcesandenergyquarterlyjune2018/documents/Resources-and-Energy-Quarterly-June-2018.pdf>>.
- Graham P, J Hayward, J Foster and L Havas (2020), 'GenCost 2019-20', CSIRO, December, viewed 29 January 2021. Available at <<https://publications.csiro.au/publications/publication/Plcsirop201952>>.

- Macdonald-Smith A (2020), 'Jemena eyes partners for \$5b-plus northern gas push', *Australian Financial Review*, 11 November, viewed 29 January 2021. Available at <<https://www.afr.com/companies/energy/jemena-eyes-partners-for-5b-plus-northern-gas-push-20201109-p56cri>>.
- McGowan M (2020), 'Revised policy to secure domestic gas supply and create jobs', 17 August, viewed 29 January 2021. Available at <<https://www.mediastatements.wa.gov.au/Pages/McGowan/2020/08/Revised-policy-to-secure-domestic-gas-supply-and-create-jobs.aspx>>.
- Prime Minister of Australia (2020a), 'Gas-fired recovery', 15 September, viewed 29 January 2021. Available at <<https://www.pm.gov.au/media/gas-fired-recovery>>.
- Prime Minister of Australia (2020b), 'National Energy Address – Tomago, NSW', 15 September, viewed 29 January 2021. Available at <<https://www.pm.gov.au/media/national-energy-address-tomago-nsw>>.
- RBA (2014), 'The RBA Business Liaison Program', *RBA Bulletin*, September.
- Rystad Energy (2020), 'Could a gas-focused recovery from Covid-19 reduce Australia's supply crunch?', November, viewed 29 January 2021. Available at <<https://www.rystadenergy.com/clients/articles/upstream/2020/australia-gas-recovery/>>.
- Rystad Energy (2021), '2021 Australian Energy Outlook: 5 things to look out for', February, viewed 4 February 2021. Available at <<https://www.rystadenergy.com/clients/articles/upstream/2020/australia-gas-recovery/>>.
- Symes J (2020), 'Onshore conventional gas restart a green light for Jobs', 16 June, viewed 10 February 2021. Available at <<https://www.premier.vic.gov.au/onshore-conventional-gas-restart-green-light-jobs>>.