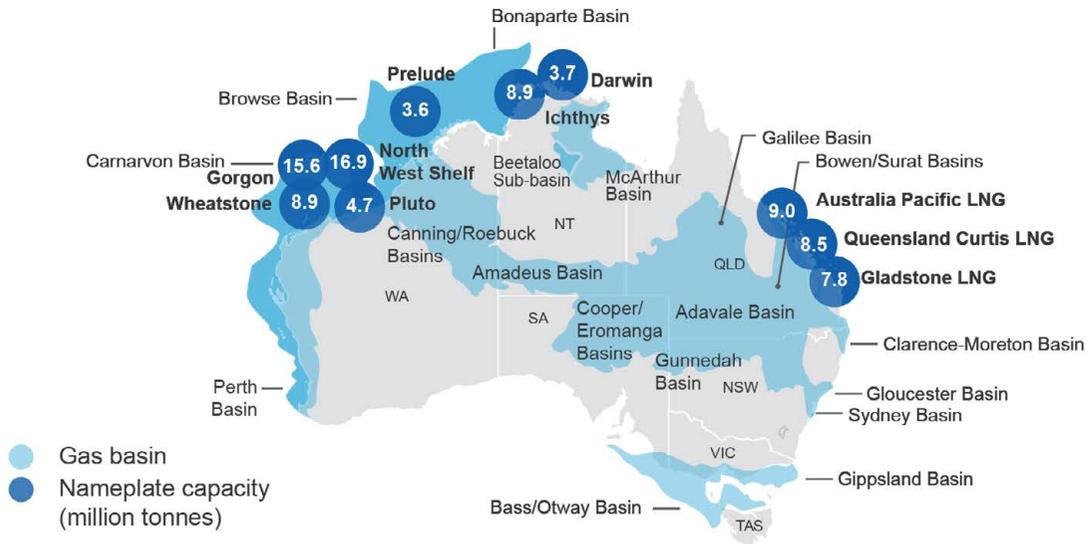


Gas

Australia's LNG projects and gas basins



Gas facts



LNG is produced by cooling natural gas to **-161°C**



LNG shrinks to **1/600th** the volume of natural gas



Natural gas is the **cleanest burning** fossil fuel



Natural gas accounts for **23%** of the world's primary energy mix

Global gas use by sector



20%
Industry



19%
Transport



22%
Residential



40%
Electricity

Australia's LNG



77m tonnes exported in 2019



Largest exporter in the world in 2019



Around **3/4** sold on **long-term** contracts

7.1 Summary

- Australian LNG export prices are expected to decline in 2020, before gradually rising then falling again, tracking oil price-linked contract prices (at which most Australian LNG is sold). Asian LNG spot prices are forecast to recover from current record lows as the market rebalances, before declining as a new wave of LNG projects ramp up.
- Australia's LNG export volumes are forecast to rise from 75 million tonnes in 2018–19 to 81 million tonnes in 2020–21, as the last two projects in Australia's recent wave of LNG investment ramp up, before edging back down to 80 million tonnes by 2024–25.
- The real value of Australia's LNG exports is forecast to decline from \$51 billion in 2018–19 to \$49 billion in 2019–20 and \$44 billion in 2020–21, and remain in the \$44 to \$47 billion range to 2024–25.

7.2 Prices

Asian LNG spot prices expected to recover from current record lows

A range of factors have continued to place downward pressure on Asian LNG spot prices. Global LNG capacity has rapidly expanded over the last two years, with projects ramping up in Australia, the US and Russia. At the same time, demand growth has been slowing from the traditional Asian buyers. Weak demand has been further exacerbated by a warmer-than-usual northern hemisphere winter, and the impacts of COVID-19 in China.

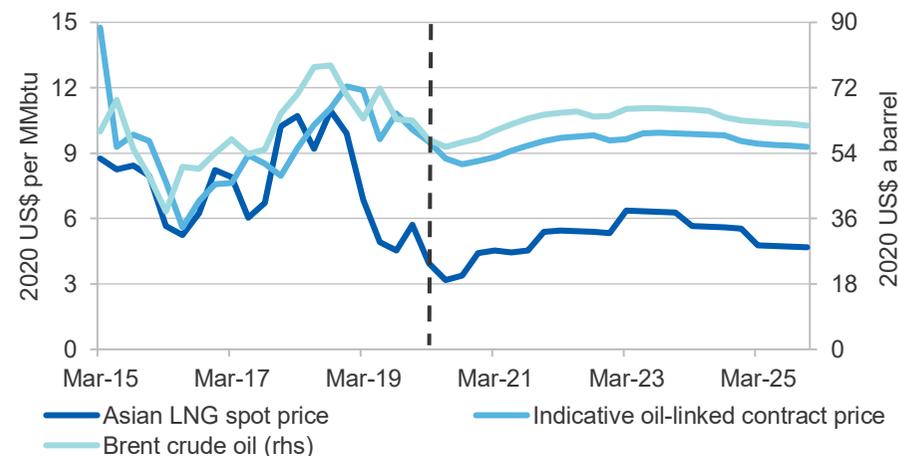
COVID-19 has reduced gas demand in China, with LNG imports more heavily affected than domestic gas production and pipeline imports. There were reports of some LNG cargoes destined for China being diverted, and some Chinese LNG buyers issuing force majeure notices to LNG suppliers (although some these were reportedly rejected), driving Asian LNG spot prices to a new record low of US\$2.68 per MMBtu in mid-February.

The Asian LNG spot price averaged US\$3.94 per MMBtu (A\$5.47/GJ) in the first two months of 2020, 31 per cent lower from the December 2019 quarter and 47 per cent lower year-on-year. Asian LNG spot prices are forecast to remain low over the first half of 2020, before lifting in the second half of the year (Figure 7.1), and average US\$3.70 per MMBtu

(A\$5.10/GJ) in 2020. This forecast is sensitive to how quickly China's economic activity recovers from the impacts of COVID-19 (see the *macroeconomic outlook* chapter). While Asian LNG spot prices are forecast to recover from the current record lows, ongoing overcapacity in global LNG markets is expected to constrain the extent of any price recovery over the next two years.

After 2021, rising demand is expected to gradually close the gap on expanding global production capacity and support a rise in the Asian LNG spot price. LNG spot prices are expected to increase to US\$6.30 per MMBtu (A\$8.30/GJ) in real terms in 2023, reflecting a tighter global market. In the final years of the outlook period, a new wave of LNG projects is expected to drive growth in LNG capacity (see Section 7.3). A surge in global LNG supply is expected to drive Asian LNG spot prices lower to US\$4.70 per MMBtu (A\$6.20/GJ) in real terms by 2025.

Figure 7.1: LNG prices, quarterly



Notes: The Argus Northeast Asian spot price is shown. LNG prices are DES (Delivered Ex Ship). DES prices include shipping and insurance. The long-term oil-linked contract price is indicative only, and is estimated at 14 per cent of the 3-month lagged Japan Customs-cleared crude oil price plus shipping.

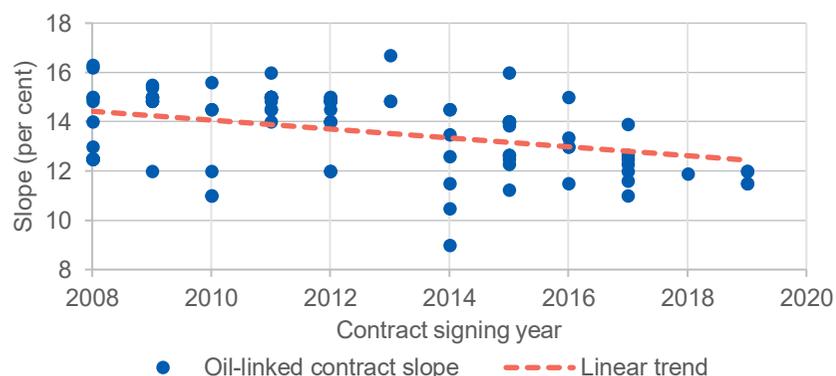
Source: Argus (2020); Bloomberg (2020); Department of Industry, Science, Energy and Resources (2020)

Asian LNG contract prices are forecast to decline

Most LNG traded in Asia is sold on long-term contracts (70 per cent in 2018). These contracts link the price of LNG to the price of oil (commonly the Japan customs-cleared crude, or JCC) with a time lag of several months. Figure 7.1 shows how the indicative oil-linked contract price has followed oil prices lower over the last six months. LNG contract prices are likely to fall further in 2020, reflecting the impacts of COVID-19 on oil prices (see the *oil* chapter).

After 2020, LNG contract prices in Asia are forecast to gradually rise and then fall, tracking the projected movements in oil prices. If the large differential between spot and long-term contract prices persists, contract prices may come under downward pressure. Buyers are reportedly pushing to have contract prices lowered during the periodic price reviews that are built into long-term supply agreements, reducing purchases on long-term contracts and increasing spot cargo purchases where their contract permits. In the longer term as contracts expire, low spot prices relative to oil-linked prices may encourage buyers to push for shorter, more flexible, or more favourably-priced contracts. The average oil-linked contract slope has been trending down over time (Figure 7.2).

Figure 7.2: Oil-linked contract slopes by signing year



Notes: The oil-linked contract slope measures the extent to which the LNG contract price changes with respect to oil price changes. Only shows contracts where data is available.
Source: BloombergNEF (2018) Global LNG contracts database; Nexant (2020) World Gas Model

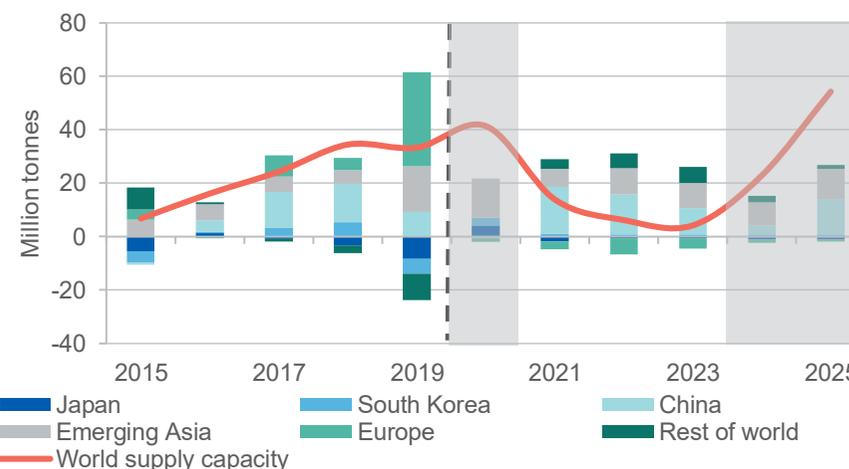
7.3 World trade

LNG trade has grown rapidly over the last few years, as the wave of projects commissioned between 2009 and 2015 have come online. In 2019, LNG trade totalled an estimated 348 million tonnes, an increase of 38 million tonnes, or 12 per cent, from 2018. Growth in global LNG supply capacity (of around 40 mtpa) has rapidly outpaced demand growth, and the supply glut will likely persist in the short-term.

In 2021, the global LNG market is expected to begin rebalancing, as demand growth absorbs new supply. Growth in supply capacity is expected to slow dramatically, while demand is expected to grow rapidly, driven by China and emerging Asia (Figure 7.3).

Growth in global LNG capacity is expected to begin accelerating in the final two years of the outlook period as a new wave of LNG projects come online. Global LNG trade is projected to reach the 460 million tonne mark by 2025, a third higher than current levels.

Figure 7.3: Annual change in LNG demand and world supply capacity



Notes: 2019 data is an estimate. Shaded areas indicate the years where oversupply is expected during the outlook period, i.e. where the annual growth in LNG supply capacity is greater than the annual growth in demand.
Source: Department of Industry, Science, Energy and Resources (2020); Nexant (2020) World Gas Model

7.4 World imports

Japan's LNG imports to receive a temporary boost, before falling

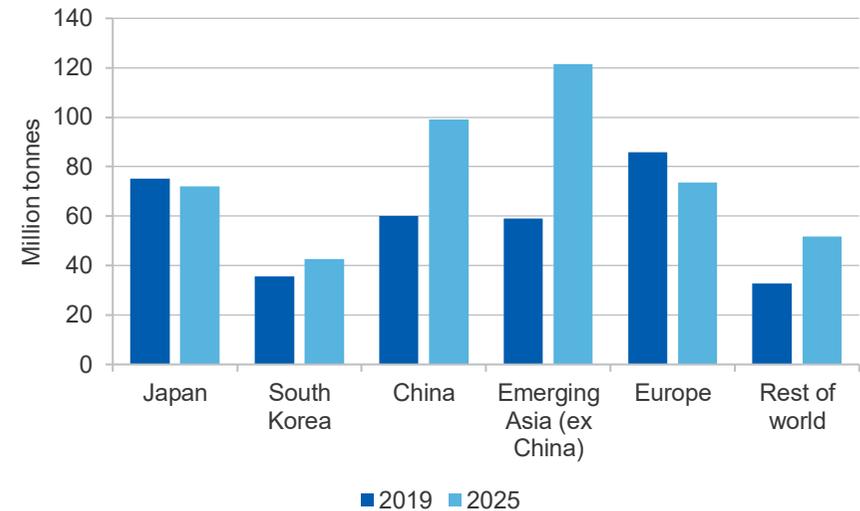
Japan imported an estimated 75 million tonnes of LNG in 2019, a decline of 7.5 per cent from 2018 due to the ongoing return of nuclear power generation, and relatively mild winter and summer seasons — reducing energy demand for heating and cooling.

Japan's LNG imports are forecast to increase to 77 million tonnes in 2020, supported by the temporary closure of nuclear reactors to complete security upgrades (see below). Japan's LNG imports are then forecast to ease back to 72 million tonnes by 2025 (Figure 7.4), and Japan is expected to lose its title as the world's largest buyer of LNG (held since the 1970s) to China by 2022. Overall Japanese energy demand is expected to fall slightly, due to subdued economic growth, a declining population and improvements in energy efficiency. The share of gas in energy usage is also expected to decline, as nuclear and renewable power sources take market share in the electricity generation sector in Japan.

The shrinking role for gas in Japan's energy mix is reflected in the country's 10 year energy plan. The share of gas in Japan's primary energy mix is expected to fall from 23 per cent in the 2017 Japanese fiscal year (JFY, April to March) to 18 per cent in JFY 2030 (Figure 7.5). The share of gas in electricity generation is expected to fall from 40 per cent to 27 per cent over the same period.

The major uncertainty in the outlook for Japan's LNG imports will be the pace of nuclear restarts, and the potential for additional nuclear power plant shutdowns. At the time of writing, nine of Japan's 42 nuclear reactors had gained approval to restart, and seven were in operation. Another 18 reactors have applications to restart with the Nuclear Regulation Authority, and further nuclear restarts appear likely over the next five years. However, there is no firm schedule for restarts, and there are significant risks of delays. The outlook for nuclear generation is further complicated by counterterrorism security measures. At least four nuclear reactors will be offline in 2020 to complete the upgrades to meet the new security requirements, which will likely provide a short-term boost to LNG demand.

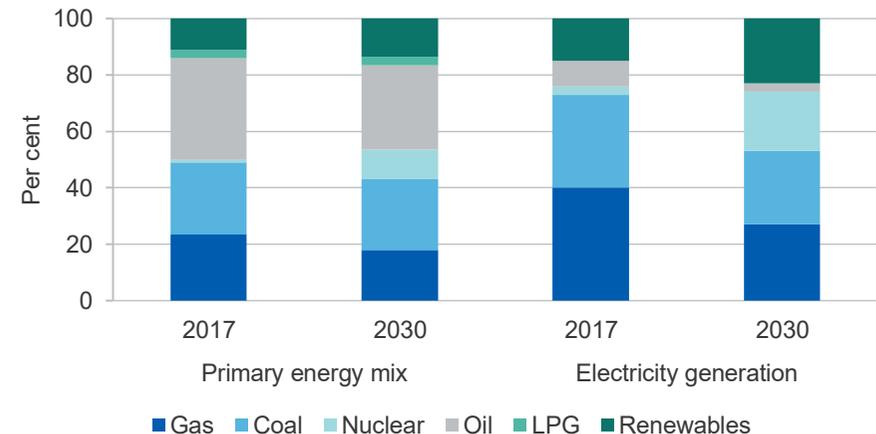
Figure 7.4: LNG import projections



Notes: 2019 data is an estimate.

Source: Nexant (2020) World Gas Model; Department of Industry, Science, Energy and Resources (2020)

Figure 7.5: Japan's future energy mix



Notes: Japanese fiscal years (April to March) 2017–18 and 2030–31

Source: Japan Agency for Natural Resources and Energy (2019)

China's LNG imports expected to grow, but at a slower pace

China — currently the world's second largest buyer of LNG — imported an estimated 60 million tonnes of LNG in 2019, an increase of 18 per cent from 2018. The pace of growth has slowed considerably from previous years, due to both weaker economic growth and the relaxation of policies to encourage coal-to-gas switching.

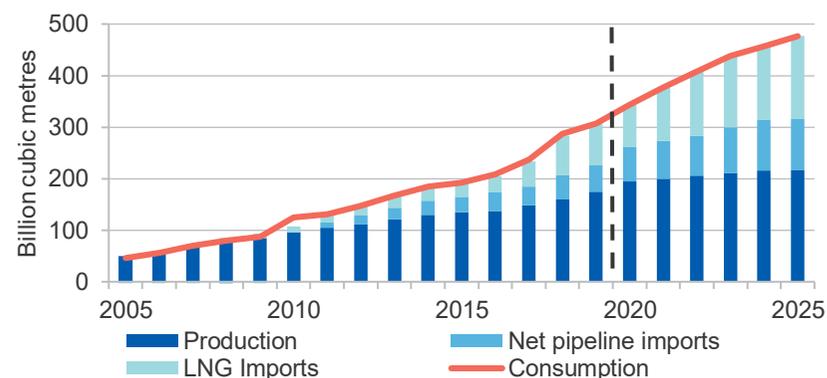
The start of 2020 saw a decline in China's imports of LNG of an estimated 7.1 per cent year-on-year in February. The impacts of COVID-19 have resulted in reduced gas demand in China's power and industrial sectors, with LNG more heavily affected than pipeline imports and domestic production. LNG cargoes have been delayed and diverted amidst rising inventories — already high due to a mild winter — and transportation bottlenecks, the latter due to road blocks and reduced trucking capacity. The impacts of COVID-19 may make it harder for China to meet the terms of the recent US-China Phase One trade deal (see Box 7.1).

Despite these short-term setbacks, China's LNG imports are projected to rise to 99 million tonnes by 2025 (Figure 7.4), overtaking Japan as the world's largest importer of LNG by 2022. LNG accounted for around 27 per cent of China's gas consumption in 2019, and is expected to continue to play a major role in meeting China's rapidly rising needs for gas. Growth in gas demand is expected to be driven by government policies to reduce air pollution and raise the share of gas in the overall energy mix, up from 7 per cent in 2018. The role of gas in China's energy mix will reportedly be a key theme in China's 14th Five Year Plan, which will be released later this year.

China's gas demand will also be met by growth in domestic gas production (57 per cent of gas consumption in 2019) and pipeline imports (16 per cent of gas consumption in 2019) (Figure 7.6). China produced 175 bcm of gas in 2019, an increase of 10 per cent from 2018. Domestic gas production will need to increase by 18 per cent this year in order for the country to meet the 2020 production target of 207 bcm. China faces difficulties — such as challenging geological conditions — in raising domestic output, and there is significant uncertainty over whether the target will be met.

China's pipeline gas imports were largely flat in 2019, at 49 bcm, but pipeline imports are expected to rise over the next few years. Russia's Power of Siberia pipeline to north-eastern China opened on 2 December 2019, and is expected to ramp up towards full capacity of 38 bcm by 2025. The Central Asia-China gas pipeline expansion, which would add 30 bcm to the existing 55 bcm of annual capacity, has faced ongoing delays and appears unlikely to proceed in the short to medium term. If the expansion proceeds, this may reduce the need for LNG imports in the future.

Figure 7.6: China's gas consumption by source



Source: Nexant (2020) World Gas Model, Department of Industry, Science, Energy and Resources (2020)

South Korea's LNG imports projected to rise

South Korea imported an estimated 35 million tonnes of LNG in 2019, a decrease of 14 per cent from 2018, driven by temporary factors. These factors include the return of nuclear generation capacity, after reactors were offline in 2018, and milder winter and summer seasons relative to 2018, reducing energy demand. South Korea's LNG imports are projected to rise over the outlook period to reach 43 million tonnes by 2025, driven by supportive government policies. In 2019, the South Korean government lowered consumption and import taxes on LNG and raised consumption taxes on coal. The South Korean government's third Basic Energy Plan envisages gas demand growing by 51 per cent between 2017 and 2040, as coal and nuclear in power generation is phased out.

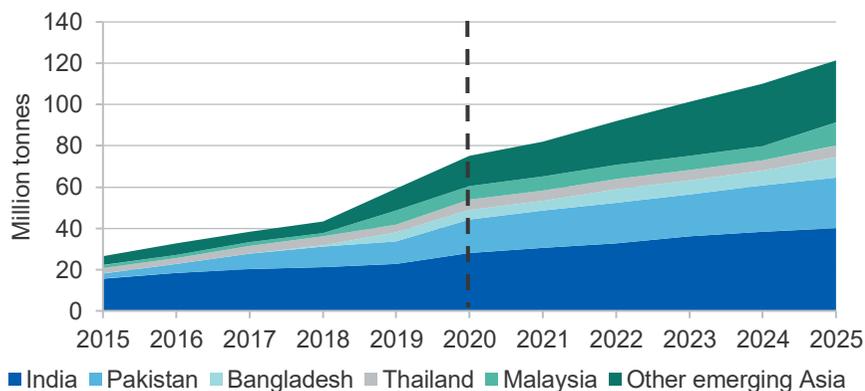
LNG to play a larger role in Taiwan's energy mix

Taiwan imported an estimated 16 million tonnes of LNG in 2019, an increase of 7.3 per cent from 2018. Taiwan's LNG imports are projected to increase to 22 million tonnes by 2025. Taiwan's energy plan envisages the share of gas in the energy mix rising from 34 per cent to 50 per cent by 2025. To support this growth, 6 mtpa of LNG import capacity is expected to be added to existing capacity of 16.5 mtpa. However, there is some uncertainty about achieving this target, given the history of significant delays to major infrastructure projects in Taiwan.

Emerging Asia will be a key driver of LNG demand growth

Outside of the traditional LNG buyers in Asia, emerging Asian economies are expected to make a substantial contribution to growing global LNG demand over the outlook period (Figure 7.7). These countries include already established buyers — such as India, Pakistan, Bangladesh and Thailand — and new markets — such as Sri Lanka, Vietnam and the Philippines. While these countries are relatively small importers of LNG individually, collectively they are expected to account for a significant share of global LNG demand, and are expected to import 121 million tonnes of LNG by 2025, making the collective region the world's second largest importer of LNG by 2025.

Figure 7.7: Projected LNG demand from emerging Asia



Source: Nexant (2020) World Gas Model, Department of Industry, Science, Energy and Resources (2020)

India is expected to account for a large share of the growth in emerging Asian demand, with LNG imports forecast to almost double from 23 million tonnes in 2019 to 40 million tonnes in 2025. The Indian government is aiming to lift the share of gas in its energy mix from around 6 per cent currently to 15 per cent by 2030, although the target is considered ambitious. The precise scale of growth in India's LNG imports over the next five years is subject to uncertainty, and depends on the pace of infrastructure development and the progress of policy reforms, which will impact on the domestic gas production and consumption balance. While India's domestic gas production is projected to grow, it is not expected to keep pace with demand; the country's gas sector is constrained by a range of challenges.

Growth in gas demand in other emerging Asian economies is expected to be largely driven by the power sector. While some of these countries have domestic gas reserves, production is either in decline or not keeping pace with consumption growth. As a result, LNG imports are projected to rise to fill this gap. Key risks to the outlook relate to infrastructure constraints, uncertainties regarding the profile of domestic gas production in some countries (notably in Thailand and Vietnam), and competition from cheaper coal and renewables.

Europe's LNG imports projected to decline from record highs

Europe imported an estimated 86 million tonnes of LNG in 2019, a record high, and 69 per cent higher than 2018 volumes. Europe — known as the 'destination of last resort' for LNG due to its extensive storage capacity — absorbed a large share of the increase in global LNG production in 2019.

However both storage capacity and opportunities for coal-to-gas switching are beginning to be stretched. Europe's LNG imports are projected to decline from current levels over the outlook period. European gas consumption is expected to remain relatively flat, and LNG imports are expected to face increasing competition from pipeline gas, offsetting the impacts of declining European gas production. The Nord Stream II gas pipeline, with a capacity of 55 bcmpa (40 mtpa), is expected to commence operations by late 2020 or early 2021.

7.5 World exports

The current wave of LNG capacity additions is drawing to a close

The rapid expansion in global LNG supply capacity seen over the last few years is expected to continue in 2020 — although at a slower pace — driven by the continued ramp up of new operations in the US, Australia and Russia. Growth in global LNG capacity is set to slow dramatically in 2021 as these projects finish ramping up (Figure 7.8).

A new wave of LNG projects is on the horizon

Growth in global LNG capacity is expected to begin accelerating again in the final years of the outlook period. A record 71 million tonnes of new capacity was approved in 2019, reflecting confidence about long-term LNG demand growth. Most projects that received final investment decisions (FIDs) in 2018 and 2019 are scheduled to come online in 2024 and 2025, driving a new wave of capacity additions. This second expansion in global LNG capacity is expected to outpace growth in demand, and lead to a fall in the average capacity utilisation rate of LNG operations.

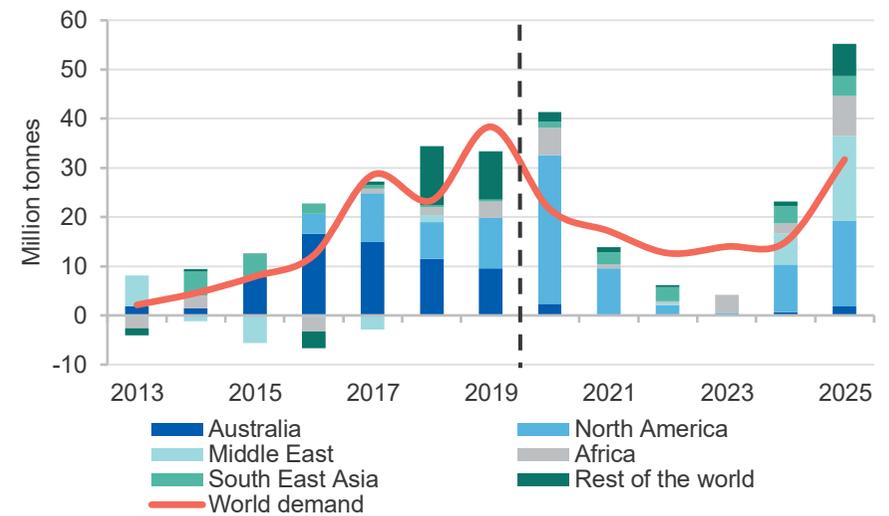
At the time of writing, there was around 143 million tonnes of LNG capacity that could come online by 2025, including projects currently under construction and pre-FID projects. The list of potential projects is dominated by the US, with a number of projects also being considered elsewhere around the world, discussed in further detail below.

Some project FIDs scheduled for 2019 were delayed, and postponements could persist in 2020. While the US-China Phase One trade deal may encourage more FIDs for US projects this year, the impacts of COVID-19 could further stall negotiations for projects in the US and elsewhere. Buyers are also reportedly reluctant to commit to long-term agreements against a backdrop of record low spot prices and the global supply glut.

The US is expected to be a key source of LNG export growth

US exports surged by 47 per cent to 34 million tonnes in 2019, underpinned by the ramp up of new LNG projects. Three new liquefaction facilities commissioned their first trains in 2019, and production is expected to continue to ramp up in 2020 and 2021.

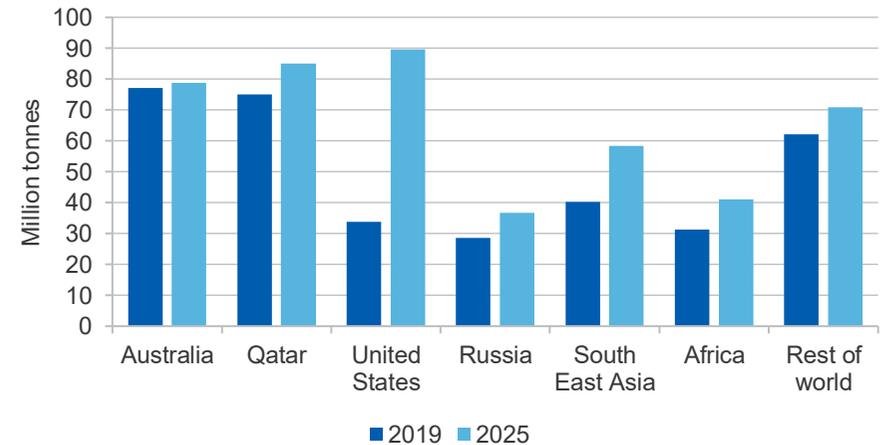
Figure 7.8: Annual change in LNG supply capacity and demand



Notes: Nameplate capacity is the theoretical maximum annual production capacity of an LNG plant. 2019 data is an estimate.

Source: Department of Industry, Science, Energy and Resources (2020); Nexant (2020) World Gas Model

Figure 7.9: LNG export projections



Source: Department of Industry, Science, Energy and Resources (2020); Nexant (2020) World Gas Model

Towards the end of the outlook period, US LNG exports are projected to reach 90 million tonnes — which will likely make the US the world’s largest LNG exporter (Figure 7.9) — as the second wave of LNG projects begin to ramp up. Two new LNG projects reached FID in 2019, including the 16.5 mtpa Golden Pass LNG project. All US LNG projects currently under construction are expected to be completed by 2025.

Qatar’s LNG exports expected to grow

Qatar exported an estimated 75 million tonnes of LNG in 2019, making it the world’s second largest exporter after Australia. In the short term, Qatar’s LNG exports are projected to remain steady at around 75 million tonnes, before beginning to grow from 2024 onwards. In November 2019, Qatar Petroleum announced plans to construct another two LNG ‘mega trains’, which is expected to boost exports to 85 million tonnes by 2025. Beyond the outlook period, the planned expansion could increase LNG production capacity by 64 per cent to 126 million tonnes by 2027.

Russia to increase its share of global LNG exports

Russia exported an estimated 29 million tonnes of LNG in 2019, more than double the previous year, reflecting growth from the Yamal LNG project which reached full capacity at the end of 2018. Russia’s LNG exports are projected to reach 37 million tonnes by 2025. The first train of the 19.8 mtpa Arctic LNG 2 project is expected to start by 2023, with the second and third train to start up by 2024 and 2026, respectively.

There is a strong pipeline of projects elsewhere in the world

Several LNG projects elsewhere in the world are also expected to contribute to the expansion of global LNG capacity. Petronas FLNG 2 in Malaysia and Tangguh LNG Train 3 in Indonesia are scheduled to start operations by the end of this year, and in 2022, Coral South FLNG and Tortue FLNG in Africa are scheduled to start. The Nigeria LNG expansion was approved in 2019, which is expected to start by 2025, and an FID is expected for the Rovuma LNG project in Mozambique this year. Other LNG projects in Africa face challenges relating to financing and cost-competitiveness, and are not expected to materialise in the short-term.

Box 7.1: US-China trade deal: Implications for Australian LNG

On 15 January 2020, the US and China signed a Phase One trade deal, which included a commitment from China to purchase US\$52 billion of energy products from the US in 2020 and 2021 (see Box 1.2). While LNG could contribute to this target, substantial uncertainty remains around the extent to which US LNG exports to China — which have halted since April 2019 — could rise. At the time of writing, the impacts of COVID-19 had resulted in weaker Chinese demand for LNG, which further complicates understanding of how China could meet the terms of the deal.

The 25 per cent tariff (increased from 10 per cent in June 2019) on US LNG imports to China remains in place, reducing the competitiveness of US LNG relative to other sources. However, the impacts of the tariff could be softened by an announcement by Chinese authorities in February that firms will be able to apply for tariff exemptions, subject to approval.

The impact of the trade deal on Australian LNG is tempered by the long-term LNG contracts between Australia and China (Table 7.1). An estimated 70 per cent of Australian LNG exports to China are sold on long-term contracts, leaving about 30 per cent of Australia’s LNG exports to China potentially impacted. This equates to around 8 million tonnes based on 2019 exports, or 10 per cent of Australia’s total LNG exports, much of which could be redirected to other destinations. In short, while the trade deal could result in greater competition, the direct impact on Australian LNG exports will likely be relatively contained in the short to medium term.

Table 7.1: Australia-China long-term LNG contracts

Project	Buyer	Volume	Start	End
NWS T1-T5	PetroChina	3.30 mtpa	2005	2030
Gorgon LNG	PetroChina	2.25 mtpa	2016	2036
Australian Pacific LNG	Sinopec	7.60 mtpa	2016	2036
Queensland Curtis LNG	CNOOC	3.60 mtpa	2014	2034

Source: Petroleum Economist (2018), GIIGNL (2019)

7.6 Australia

Australia's LNG capacity expansion is coming to an end

A wave of LNG investment in Australia saw over US\$200 billion invested in seven new LNG projects, which were commissioned between 2009 and 2012. The ramp up of these projects has seen Australia's LNG exports earnings reach \$49 billion in 2019, and export volumes reach 77 million tonnes (Figure 7.10), making Australia the world's largest LNG exporter in 2019.

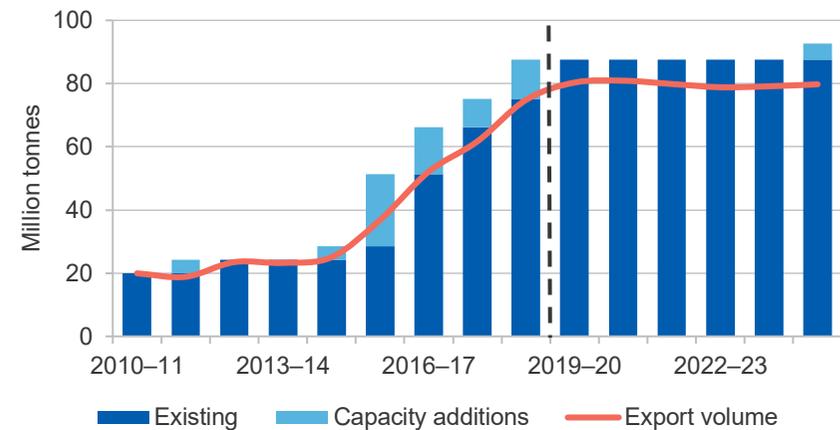
Australia's LNG export volumes to begin edging down after 2020–21

Prelude and Ichthys are the last two remaining projects that are ramping up production following the wave of LNG investment. The Prelude project — which shipped its first LNG cargo in June 2019 — is expected to ramp up over the course of 2019–20. Ichthys has ramped up faster than expected, and is already producing at close to full capacity.

Australia's LNG exports are expected reach 81 million tonnes in 2020-21, before edging down towards 79 million tonnes by 2022–23 (Figure 7.10). Production at the Darwin LNG plant is expected to halt after 2021, as gas from the Bayu-Undan field is exhausted. The Darwin operation will require backfill from the Barossa project to continue production, although infill drilling at Bayu-Undan may extend its lifespan and narrow the time between its closure and the start-up of the Barossa backfill project. An FID is expected for the Barossa project in the June quarter 2020, with first gas expected in 2023.

Production at the North West Shelf project is also likely to decline from around 2022 onwards. The development of Equus — which is on track for first gas by 2024 — is a potential source of gas for the North West Shelf project. However, due to timing issues, it is likely that there will be fall in production for a period of time. In the longer term, backfill resources for the North West Shelf project will likely come from the Browse Basin project fields of Calliance, Torosa and Brecknock. The FID for the Browse Basin project has been delayed from late 2020 to late 2021, with first production targeted for 2026.

Figure 7.10: Australia's LNG exports and export capacity



Source: ABS (2020); Department of Industry, Science, Energy and Resources (2020)

There is upside potential for Australia's LNG exports in the medium term

There are a number of projects in the pipeline that could see Australia's LNG export capacity rise towards the end of the outlook period and beyond (Table 7.2).

An FID is expected in 2020 for the Pluto LNG expansion project, with first production targeted for 2024. Building an additional train at the Pluto LNG plant forms part of Woodside's plans to develop the Scarborough gas field in the Carnarvon Basin, connecting the offshore resource to the Pluto LNG plant via a 430 kilometre pipeline. The expansion of Pluto LNG is expected to offset the impacts of the halt in production at the North West Shelf operation and enable a rise in Australian LNG export volumes to 80 million tonnes in 2024–25.

The Beetaloo sub-basin, a substantial shale gas resource in the Northern Territory, represents a longer-term opportunity for Australia. However, given exploration is only just commencing, it remains uncertain what proportion of the resource will be technologically and economically viable to extract.

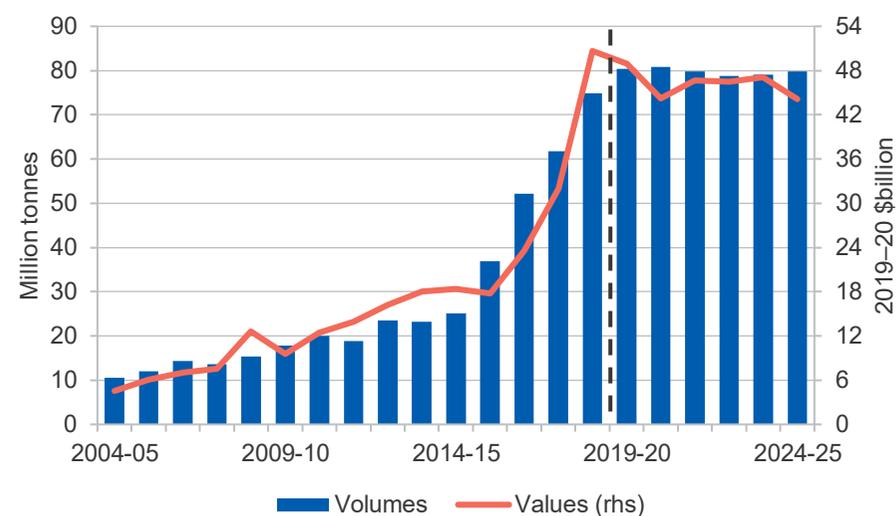
Australia's LNG export earnings projected to decline from record highs

Australia exported \$51 billion of LNG in 2018–19 in real terms, up from \$32 billion in 2017–18. Higher export earnings were driven by a recovery in oil prices relative to 2017–18, and growing export volumes, particularly from the Ichthys and Wheatstone (which began producing at full capacity in the second half of 2018) LNG projects.

The value of Australia's LNG exports is forecast to decline to \$49 billion in 2019–20 and fall back further to \$44 billion in 2020–21, in real terms, driven by declining oil-linked contract prices (at which most Australian LNG is sold).

Australia's LNG export earnings are projected to remain in the \$44 to \$47 billion range, in real terms, over the remainder of the outlook period to 2024–25 (Figure 7.11). The impacts of declining gas production from the North West Shelf and Darwin projects are expected to be offset by a modest uptick in oil-linked contract prices between 2021 and 2023, and the ramp up of the Pluto expansion in the final year of the outlook period.

Figure 7.11: Australia's LNG exports



Source: ABS (2020); Department of Industry, Science, Energy and Resources (2020)

Table 7.2: Selected Australian LNG projects

Project	Companies	State	Type	Capacity	Potential start date
Scarborough and Pluto Train 2	Woodside, Kansai Electric, Tokyo Gas, BHP	WA	Expansion	5 mtpa	2024
Barossa backfill to Darwin LNG	ConocoPhillips, Santos, SK, ENI, Inpex, Tokyo Electric Power, Tokyo Gas	NT	Sustaining	n/a	2024+
Crux backfill to Prelude FLNG	Shell, Nexus Energy, Osaka Gas	WA	Sustaining	n/a	2024+
Browse to North West Shelf	Woodside, BP, PetroChina, Shell, Japan Australia LNG	WA	Sustaining	n/a	2026+
Cash Maple Development	PTTEP Australasia	WA	New project	2 mtpa	2026+
Gorgon (Train 4)	Chevron, Shell, ExxonMobil	WA	Expansion	5.2 mtpa	2026+

Notes: mtpa is million tonnes per annum.

Source: Department of Industry, Science, Energy and Resources (2019) Resources and Energy Major Projects, December 2019 Resources and Energy Quarterly

Table 7.3: Gas outlook

World	Unit	2019	2020 ^f	2021 ^f	2022 ^z	2023 ^z	2024 ^z	2025 ^z	CAGR ^r
JCC oil price ^a									
– nominal	US\$/bbl	66.4	57.1	63.9	67.6	70.8	70.6	69.5	0.8
– real ^h	US\$/bbl	67.9	57.1	62.6	64.7	66.2	64.6	62.1	-1.5
Asian LNG spot price ^g									
– nominal	US\$/MMBtu	5.4	3.7	4.8	5.6	6.8	6.1	5.3	-0.4
– real ^h	US\$/MMBtu	5.6	3.7	4.7	5.4	6.3	5.6	4.7	-2.6
Gas production ^s	Bcm	4,041	4,116	4,196	4,292	4,394	4,481	4,550	2.0
Gas consumption ^s	Bcm	4,059	4,131	4,210	4,300	4,392	4,491	4,593	2.1
LNG trade ^{ds}	Mt	348	370	387	400	414	429	460	4.8
Australia	Unit	2018–19	2019–20 ^f	2020–21 ^f	2021–22 ^z	2022–23 ^z	2023–24 ^z	2024–25 ^z	CAGR ^r
Production ^b	Bcm	145.2	159.0	160.1	161.8	162.3	163.8	164.7	2.1
– Eastern market	Bcm	55.3	57.2	56.8	57.1	57.7	58.5	58.3	0.9
– Western market	Bcm	82.3	86.8	88.0	89.2	89.1	87.6	86.4	0.8
– Northern market ^c	Bcm	7.6	14.9	15.3	15.5	15.5	17.6	20.0	17.5
LNG export volume ^d	Mt	74.8	80.3	80.9	79.9	78.8	79.1	79.7	1.1
– nominal value	A\$m	49,727	48,650	45,093	48,568	49,606	51,522	49,508	-0.1
– real value ^e	A\$m	50,662	48,650	44,220	46,625	46,505	47,120	44,155	-2.3
LNG export unit value ^g									
– nominal value	A\$/GJ	12.6	11.5	10.6	11.5	11.9	12.3	11.8	-1.1
– real value ^e	A\$/GJ	12.8	11.5	10.4	11.1	11.2	11.3	10.5	-3.3
– nominal value	US\$/MMBtu	9.5	8.3	7.9	8.8	9.1	9.4	8.9	-1.0
– real value ^e	US\$/MMBtu	9.7	8.3	7.8	8.4	8.5	8.6	8.0	-3.2

Notes: **a** JCC stands for Japan Customs-cleared Crude; **b** Production includes both sales gas and gas used in the production process (i.e. plant use) and ethane. Historical gas production data was revised in the June quarter 2017 to align with Australian Petroleum Statistics; **c** Gas production from Bayu-Undan Joint Production Development Area is not included in Australian production. Browse basin production associated with the Ichthys project is classified as Northern market; **d** 1 million tonnes of LNG is equivalent to approximately 1.36 billion cubic metres of gas; **e** In 2019–20 Australian dollars; **f** Forecast; **g** 1 MMBtu is equivalent to 1.055 GJ; **h** In 2020 US dollars; **r** Average annual growth between 2019 and 2025 or 2018–19 and 2024–25; **s** 2020 is an estimate; **z** Projection.

Source: ABS (2020) International Trade in Goods and Services, 5368.0; Department of Industry, Science, Energy and Resources (2020); Company reports; Nexant (2020) World Gas Model