

# Gas

Resources and Energy Quarterly March 2019

LNG is natural gas cooled to **-162°C**

**2nd**

largest LNG exporter in the world

Australia exported **70 million tonnes** of LNG in 2018



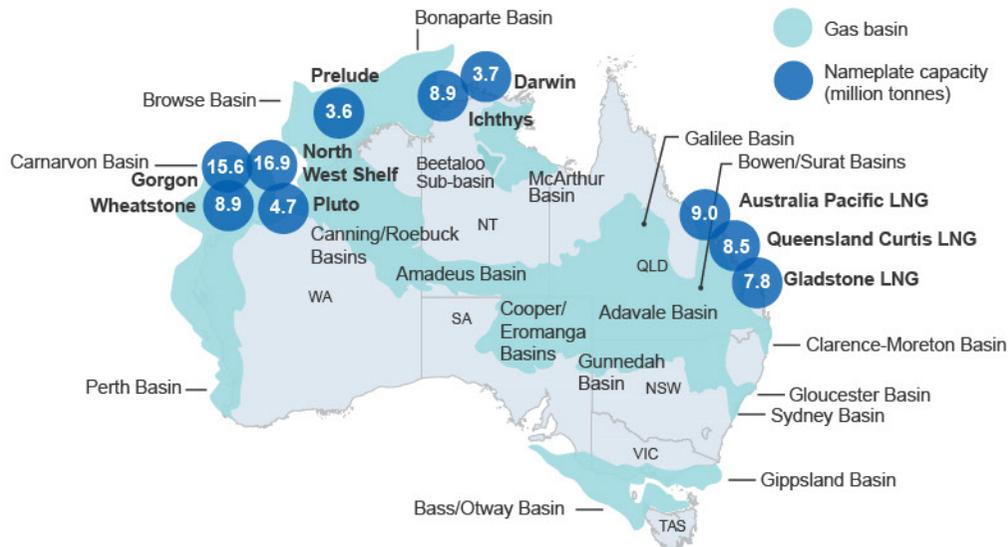
**22%** rise from 2017 export volumes



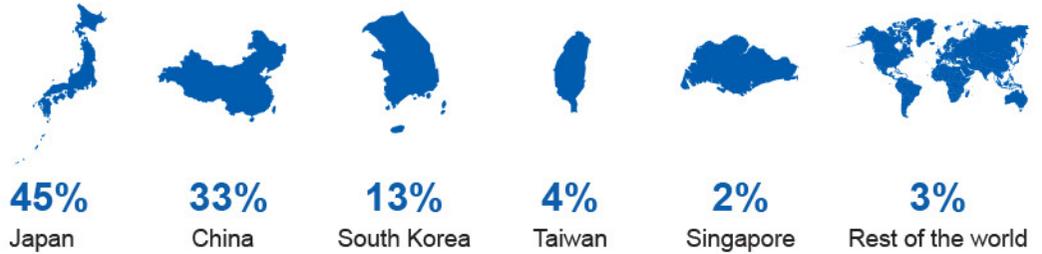
Combined nameplate capacity of Australia's 10 LNG projects is **88 million tonnes per annum**

Most Australian LNG is sold on oil-linked contracts

## Australia's LNG projects and gas basins



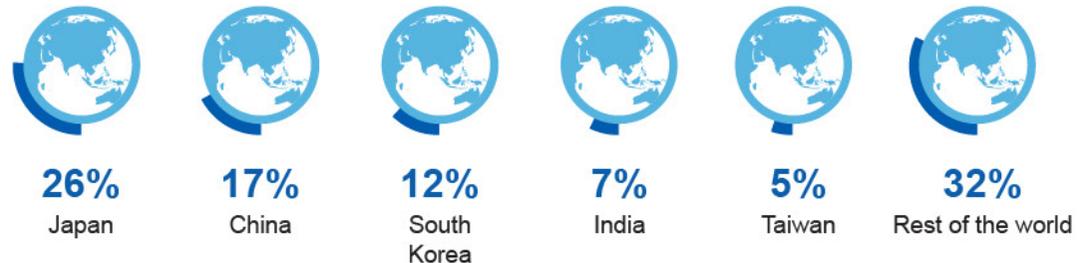
## Australia's LNG export earnings by destination, 2018



## Share of world LNG exports in 2018



## Share of world LNG imports in 2018



## 7.1 Summary

- The real value of Australia's LNG exports is forecast to increase from \$32 billion in 2017–18 to a peak of \$51 billion in 2019–20, before slowly declining as export volumes stabilise and prices ease. In 2023–24, real LNG export earnings are projected to be \$41 billion.
- Australia's LNG export volumes are forecast to increase from 62 million tonnes in 2017–18 to 82 million tonnes in 2019–20, as the final two projects in Australia's recent wave of LNG investment ramp up production. However, from the early 2020s, declining production at fields feeding two existing LNG projects could weigh on export volumes.
- LNG contract prices — at which most Australian LNG is sold — are forecast to edge down after 2018–19, as oil prices ease. LNG spot prices are also expected to decline in the short term, before recovering in the early 2020s as the global LNG market tightens.

## 7.2 Prices

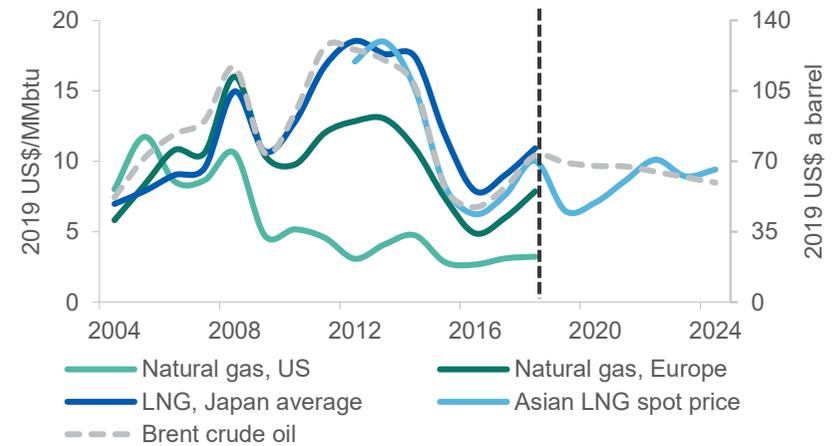
### LNG contract prices in Asia are forecast to moderate

Gas pricing arrangements vary from region to region. Most LNG in Asia is sold on long-term contracts, sometimes in excess of 20 years, where the price of LNG is linked to the price of oil by a time lag of several months. Oil-linked contract prices in Asia have been on the rise since 2016, reaching their highest level in three years in 2018. Figure 7.1 shows how the average price of LNG imported by Japan has followed oil prices higher over the past few years. Tracking oil prices, LNG contract prices in Asia are forecast to gradually decline over the five years to 2024.

### LNG spot prices are also expected to decline

LNG spot prices have also risen over the past few years. Rising spot prices have been driven by surging demand in Asia — particularly from China — and delays in bringing new LNG projects online. Rising oil prices have also contributed to higher LNG spot prices. Buyers have some flexibility in the volumes of LNG they purchase on long-term oil price-linked contracts, and higher oil prices thus increase the attractiveness of spot LNG cargoes relative to contracted volumes, pushing up LNG spot prices.

Figure 7.1: Global gas prices, annual



Notes: The Argus North East Asian spot price is shown. LNG prices are DES (Delivered Ex Ship). DES prices include shipping and insurance. US natural gas is the spot price at Henry Hub, Louisiana. European natural gas is from the Netherlands Title Transfer Facility (TTF).

Source: Argus (2019); Bloomberg (2019); World Bank (2019)

LNG spot prices in Asia averaged US\$10.00 per million British thermal units (MMBtu) in 2018 in real terms, and are expected to decline in 2019 and 2020, as oil prices ease and additions to global LNG supply capacity outstrip growth in LNG demand. LNG spot prices are forecast to decline to average US\$6.50/MMBtu and US\$7.10/MMBtu (in real terms) in 2019 and 2020, respectively.

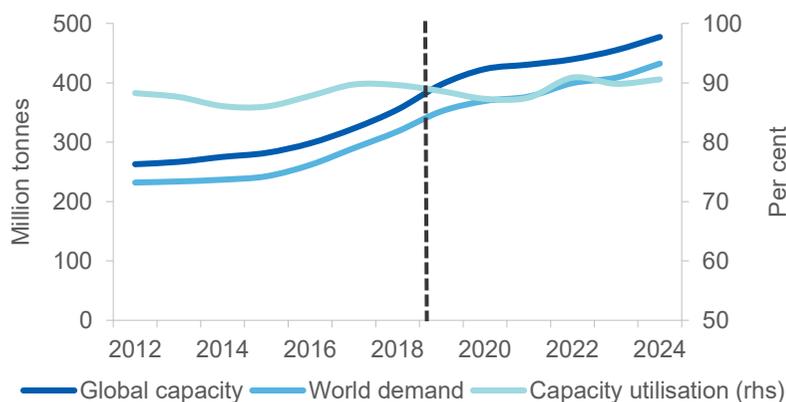
LNG spot prices began falling towards the end of 2018, just as the northern hemisphere winter was starting — a time at which spot prices would usually increase on the back of higher seasonal demand. The mild northern hemisphere winter, coupled with growing supply capacity from the United States, Russia and Australia, were contributing factors.

After 2020, LNG spot prices are expected to begin recovering. Supply growth looks likely to slow dramatically in the early 2020s, and demand is consequently expected to begin closing the gap on global production capacity. In 2024, LNG spot prices are forecast to average US\$9.40/MMBtu in real terms.

### 7.3 World trade

LNG trade has grown rapidly over the past few years, as the wave of projects commissioned between 2009 and 2015 have come online. In 2018, stronger than expected demand growth, coupled with delays in bringing new supply online, saw LNG markets tighten unexpectedly (see Box 7.1 in the September 2018 *Resources and Energy Quarterly*), putting upward pressure on prices. LNG trade totalled an estimated 318 million tonnes in 2018, up 10 per cent from 290 million tonnes in 2017.

**Figure 7.2: Global supply capacity (nameplate) and LNG demand**



Notes: Nameplate capacity is the maximum annual production capacity of an LNG plant.  
Source: Department of Industry, Innovation and Science (2019); Nexant (2019)

Over the next two years, however, the expansion in global LNG supply capacity is expected to outpace growth in LNG demand (Figure 7.2), leading to a fall in the average capacity utilisation rate of LNG operations. Supply growth will be driven by the completion and ramp-up of LNG projects in the United States, Australia and Russia.

From early next decade, the LNG market is expected to begin rebalancing, as demand growth absorbs the available capacity. Capacity growth is expected to slow dramatically from 2021, and demand is expected to increase rapidly driven by emerging Asia — especially China — and

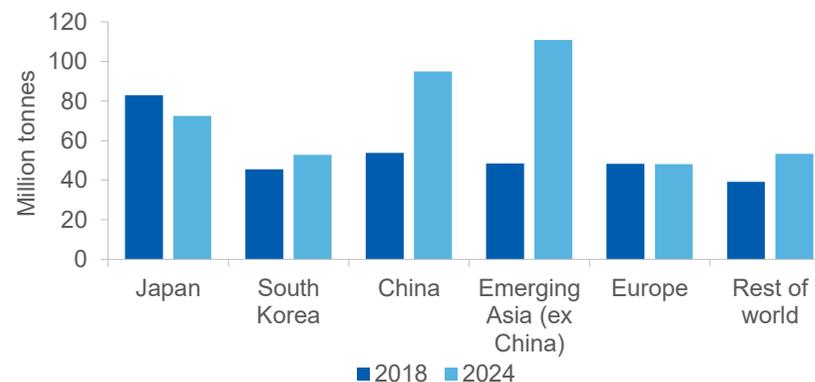
Europe. These supply-demand dynamics suggest that prices could rise rapidly in the early 2020s if new supply is not brought to market in a timely manner, or if demand increases more quickly than expected. Volatility in LNG spot prices in the early 2020s is a distinct possibility.

### 7.4 World imports

#### Nuclear restarts to reduce Japan's LNG imports

Japan sources almost all of its gas from LNG imports, and has been the world's leading buyer of LNG since the 1970s. Japan's LNG imports are projected to fall from 83 million tonnes in 2018 to 72 million tonnes in 2024 (Figure 7.3). Overall energy demand in Japan is expected to remain subdued, due to a declining population, improving energy efficiency and a sluggish economic growth outlook. At the same time, LNG is expected to face increasing competition in the electricity generation sector, which accounts for around two-thirds of Japan's gas consumption.

**Figure 7.3: LNG import forecasts**



Source: Department of Industry, Innovation and Science (2019); Nexant (2019)

Japan has plans to expand both nuclear and renewable power generation. The 2011 Fukushima disaster resulted in the closure of Japan's nuclear fleet, and the restart of several more reactors over 2018 is expected to weigh on LNG imports moving forward. At the time of writing, nine of Japan's 42 nuclear reactors had gained approval to restart and were in operation.

Further nuclear restarts appear likely over the next five years. Eighteen reactors have applications to restart with the Nuclear Regulation Authority. Of these, three are likely to restart between 2019 and 2020. Another three to six may restart by the end of the outlook period in 2024.

However, nuclear energy in Japan continues to face public opposition and legal challenges. There remain significant risks of delays and slippages in nuclear restarts.

### China to shape future developments in global LNG markets

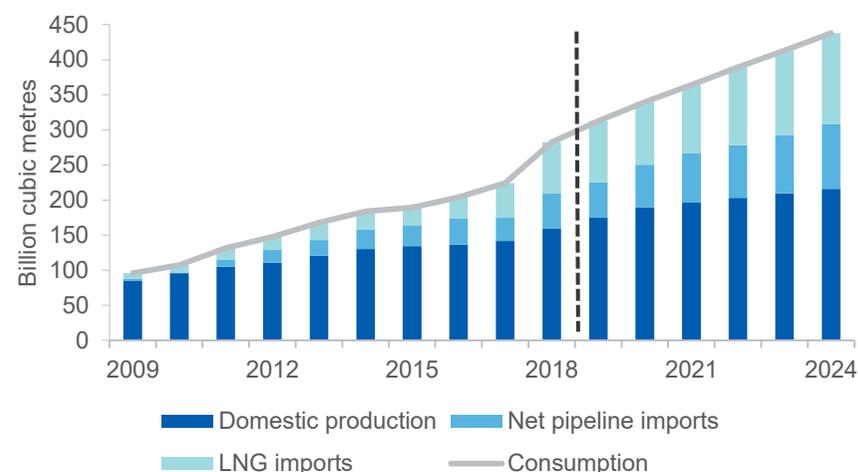
China has exerted a tremendous influence on LNG markets over the past few years. Over 2015 and 2016, sluggish growth in China's LNG demand helped to push the market into a period of overcapacity, which was reversed in 2017 as China's LNG demand soared. China's gas consumption continued to rise rapidly in 2018, driven by efforts to improve air quality. With pipeline gas imports and domestic production failing to keep pace with demand, LNG imports surged. China was the second largest LNG buyer in the world in 2018, importing 54 million tonnes of LNG (73 billion cubic metres) — triple the level recorded in 2015.

Strong growth in China's gas consumption is expected to continue over the outlook period. As part of the initiative to 'turn China's skies blue again', China is pushing coal-to-gas switching in industry and in buildings. Gas is also expected to play an increasing role in electricity generation and in transport. The Chinese government is aiming to raise the share of gas in the overall energy mix from 7.0 per cent in 2017 to a target range of 8.3–10 per cent in 2020, and to 15 per cent in 2030. In 2024, China's gas consumption is forecast to reach 438 billion cubic metres, up from around 280 billion cubic metres in 2018 (Figure 7.4).

LNG imports are likely to play a major role in servicing rising Chinese gas demand. While both domestic production and pipeline imports are forecast to grow, they are not expected to keep pace with rising domestic demand. On current projections, China will overtake Japan as the world's largest LNG importer in 2022. By 2024, China's LNG imports are forecast to reach 95 million tonnes (129 billion cubic metres).

China is targeting gas production of 207 billion cubic metres in 2020, up 30 per cent from around 159 billion cubic metres in 2018. This includes production targets for conventional and unconventional gas, including shale gas and coal bed methane. However, China faces challenges in lifting domestic output, including difficult geology, and is expected to fall short of its 2020 production target. Growth in conventional gas production in China has been slowing, while government production targets for unconventional gas have been continually revised down. These challenges are expected to persist over the remainder of the outlook period.

**Figure 7.4: China's gas consumption by source**



Source: Department of Industry, Innovation and Science (2019); Nexant (2019)

China currently imports pipeline gas from Central Asia and Myanmar. While imports from Myanmar should remain relatively steady, there are plans to expand the capacity of the Central Asia–China Gas Pipeline system from 55 billion cubic metres to 65 billion cubic metres by the end of 2019. China is also expected to begin importing gas from Russia via the Power of Siberia pipeline at the end of 2019, starting at 5 billion cubic metres in the first full year of operation in 2020 and reaching 38 billion cubic metres in 2025.

### South Korea's imports increased rapidly last year

South Korea was the world's third largest buyer of LNG in 2018. LNG imports reached 45 million tonnes, an all-time high, increasing for a second straight year after a period of stagnation. Increased imports were driven by a sharp fall in nuclear power generation, with reactors offline due to both regular maintenance and unexpected downtime.

South Korea's LNG imports are forecast to edge down in 2019, before climbing to 53 million tonnes in 2024. The return of nuclear power generation is expected to drive the short term decline in South Korea's LNG imports, but South Korea's long-term plan is to shift its energy mix towards renewables and gas, and away from nuclear and coal. Against this backdrop, the South Korean Government has stated that no new nuclear or coal-fired power stations will be built. The Government has also closed four coal-fired power plants since taking office in May 2017, and has plans to shut a further six by mid-2022. South Korea will also lower taxes on LNG imports and raise taxes on thermal coal imports further from 1 April 2019.

### LNG demand to increase amongst other emerging Asian economies

Several other emerging Asian economies are expected to contribute to rising LNG demand. India's LNG imports are forecast to increase from 22 million tonnes in 2018 to 39 million tonnes in 2024. The Government is aiming to lift gas' share of the energy mix to 15 per cent by 2030 from the current 5 per cent. While India's domestic gas production is forecast to grow, it is not expected to keep pace with demand. India has considerable gas resources, but the commercial potential of these resources remains uncertain.

The successful completion of pipeline import projects could cause India's LNG imports to fall below current projections. There are two potential pipeline projects that could deliver gas to India: the Turkmenistan-Afghanistan-Pakistan-India (TAPI) and the Iran-Pakistan-India (IPI) pipelines. However, both pipelines have been long delayed, and continue to face economic and geopolitical hurdles, such as financing arrangements and pipeline security.

There is also significant scope for increased LNG demand in other emerging Asian economies, such as Indonesia, Malaysia, Pakistan, Bangladesh, Thailand and potentially the Philippines, Vietnam and Myanmar. Pakistan is already a significant LNG buyer, with imports reaching an estimated 8 million tonnes in 2018, after the country experienced a domestic gas shortage. Individually, these countries are relatively small importers of LNG, but collectively they are expected make a substantial contribution to rising global LNG demand.

### Europe to increase demand in the short term, before LNG imports decline

In the short term, Europe is forecast to contribute to increasing LNG demand, with imports forecast to climb from an estimated 48 million tonnes in 2018 to 62 million tonnes in 2020. With gas consumption expected to remain relatively flat, LNG imports are expected to be driven by declining indigenous gas production. Gas production in Europe has been declining since 2000, mainly due to resource depletion in the North Sea and policy efforts to tackle the problem of seismic activity at the Groningen gas field in the Netherlands. These trends are expected to continue during the outlook period.

However, after 2020, Europe's LNG imports are expected to decline. With flat consumption, increasing pipeline imports are expected to start eating into LNG's share of European gas demand. Some uncertainty surrounds the fate of the controversial Nord Stream II gas pipeline, which has a capacity of 55 billion cubic metres per annum (equivalent to around 40 million tonnes of LNG). The pipeline, which connects Russian gas fields to the EU pipeline network at Germany's Baltic coast, is scheduled for completion in 2019, but has divided political opinion in Europe. The Southern Gas Corridor — the set of planned infrastructure projects from the Caspian to the European Union — is expected to make a more modest contribution to increasing pipeline gas flows to Europe.

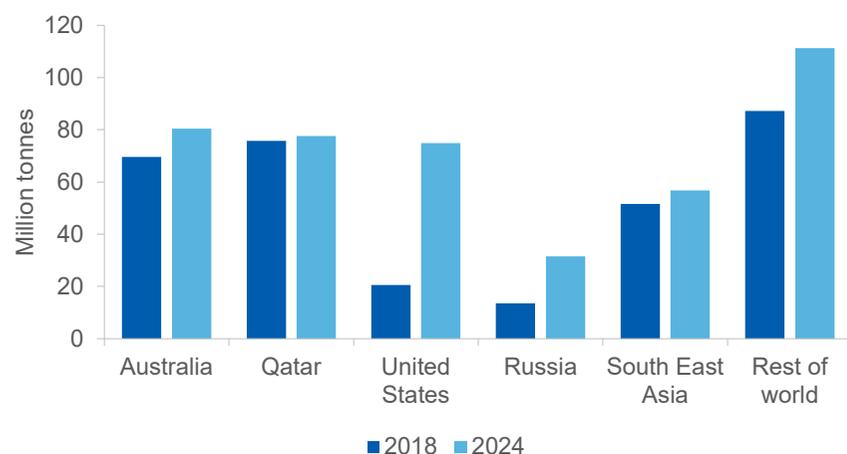
## 7.5 World exports

### A major capacity expansion will be completed around 2020

The next two years are expected to see a major expansion in global LNG supply capacity, driven primarily by the US, and supported by a continued ramp-up in Australia (see section 7.6) and Russia. This growing supply capacity is expected to keep LNG spot prices in Asia in check in the short term.

The combined nameplate capacity of US LNG projects is on track to triple to around 70 million tonne per annum (mtpa) in 2020. All six US plants are expected to be operational by the end of 2019, and production will continue to ramp up in 2020. This expansion in LNG infrastructure is expected to make the US the third largest LNG exporter in the world, behind Australia (where nameplate capacity will soon reach 88 mtpa) and Qatar (where nameplate capacity is expected to remain at 77 mtpa for the next few years).

Figure 7.5: LNG export forecasts



Source: Department of Industry, Innovation and Science (2019); Nexant (2019)

Russia's LNG export capacity is expected to reach 27 mtpa by the end of 2019. Yamal LNG — the country's second LNG project after Sakhalin — is currently in the process of ramping up production, after operations began at the third 5.5 million tonne train in late 2018, a year ahead of schedule. As average temperatures increase in the Arctic, the northern sea route appears to be emerging as a transport corridor between Russia and Asia. The Yamal project shipped a cargo of LNG to China via the northern sea route in November 2018 — reportedly the first ever shipment at that time of year, when the winter conditions normally inhibit transit.

### LNG markets to start rebalancing from the early 2020s

LNG markets are expected to begin tightening from the early 2020s. The last of the LNG projects commissioned between 2009 and 2015 is expected to reach full capacity around 2020, and there are long-lead times (usually of around 5 years) for new projects. In 2021, growth in global supply capacity is expected to drop to its lowest level since 2013, and slow growth could persist into 2022 if projects are delayed. The only additions to capacity are likely to come from new trains at existing projects in the US (Corpus Christi) and Indonesia (Tangguh).

However, between 2022 and 2024 (the final three years of the outlook period), growth in global supply capacity is likely to begin accelerating. After becoming an importer in 2015 — following a domestic gas crisis — Egypt is expected to regain its status as an LNG exporter in the early 2020s, buoyed by the development of new domestic supply, such as the giant Zohr field. Production is also expected to begin ramping up from the Coral FLNG project in Mozambique around 2022.

A number of projects that have recently received final investment decisions (FIDs) are also scheduled to come online in the second half of the outlook period. In October 2018, Shell took an FID on its 14 mtpa LNG Canada project in western Canada. LNG Canada was the first large greenfield LNG project sanctioned since Yamal in 2013, marking the revival of the LNG mega project. LNG Canada is scheduled to come online around 2024/2025.

In December 2018, BP announced an FID for the 2.5 mtpa floating LNG facility at its Tortue gas field off Mauritania and Senegal, and first gas is expected in 2022. In February 2019, Qatar Petroleum and ExxonMobil took an FID for the Golden Pass LNG export project in Texas. The facility will have a production capacity of around 16 mtpa, and construction is expected to take around five years. These recent FIDs paint a picture of growing confidence in the outlook for LNG demand amongst project developers.

Any further LNG projects sanctioned over 2019 could potentially start production towards the end of the outlook period, especially expansions to existing projects that tend to have shorter lead times than new projects.

At the time of writing, there was well over 200 million tonnes of liquefaction capacity that could potentially receive an FID in 2019, potentially making 2019 a record year for LNG project FIDs. The US and Qatar (discussed below) dominate the list of potential new projects. In Russia, the huge 19.8 mtpa Arctic 2 LNG project is under consideration, as well as an additional train at Sakhalin LNG. There are also a number of projects being considered in Africa.

#### Qatar's LNG exports are projected to remain largely unchanged

Qatar exported an estimated 76 million tonnes of LNG in 2018, making it the world's largest exporter of the liquefied fuel. According to International Energy Agency (IEA) data, Qatar's exports have ranged from 72–77 million tonnes a year since 2011, although other sources put the peak of Qatar's LNG exports at around 80 million tonnes.

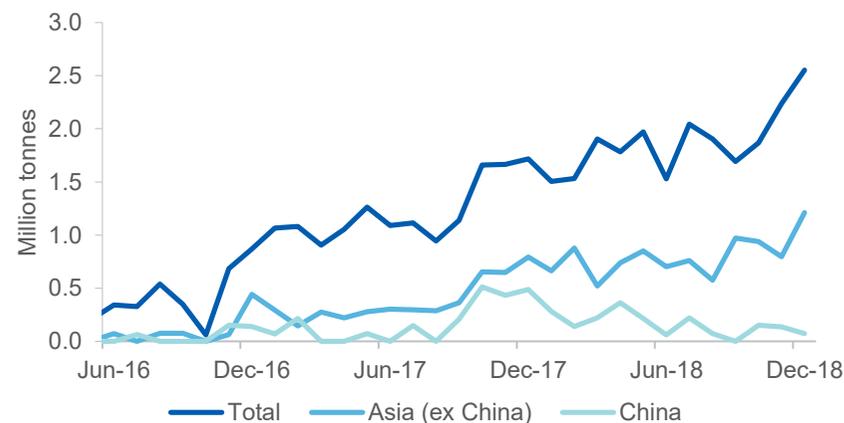
Qatar's LNG exports are projected to remain around 76 million tonnes, before ticking up to 78 million tonnes in 2024. Qatar has plans to increase LNG production capacity by 43 per cent to 110 million tonnes, but the majority of the ramp-up is expected to take place outside the outlook period for this report.

#### LNG has been caught up in US-China trade tensions

LNG trade has recently been caught up in trade tensions between China and the US. On 24 September 2018, China imposed a 10 per cent tariff on

imports of LNG from the US. The tariffs have encouraged a reorganisation of trade flows, with China bringing in more LNG from other sources, while US LNG exports have been directed to other markets (Figure 7.6). Cheniere Energy, the largest LNG exporter in the United States, has reportedly swapped cargoes that were to be sold to PetroChina with non-US origin volumes.

**Figure 7.6: US LNG exports by destination, monthly**



Source: Energy Information Administration (2019)

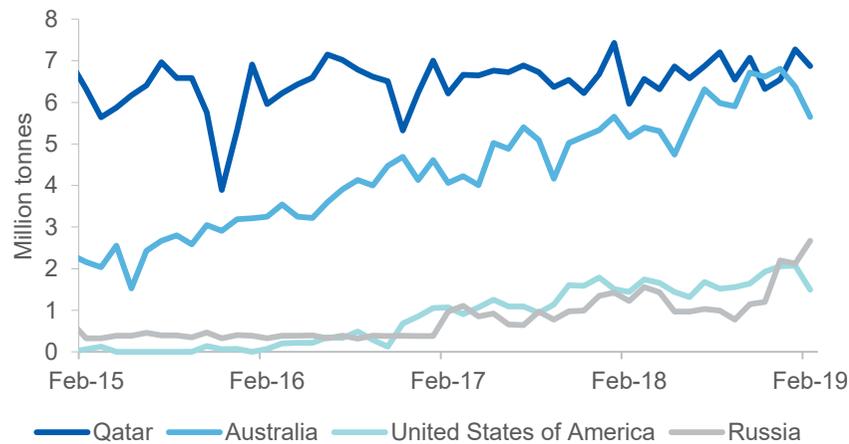
A longer-term risk is that escalating trade tensions discourage or delay FIDs for a second wave of US LNG projects. Given China is set to become the world's largest LNG buyer in the early 2020s, China will be looking for new sources of supply over the next few years and trade tensions may deter Chinese buyers from investing in new US LNG projects. US exporter Cheniere Energy and Chinese buyer Sinopec have reportedly held off signing a 20-year supply deal for 2 million tonnes of LNG per year (starting in 2023) due to trade tensions. However, another possibility is China could commit to taking more US LNG in order to help settle the current trade dispute with the US. US tariffs on steel imports have also complicated matters for LNG project developers in the US by raising the construction costs of LNG facilities and related pipeline infrastructure.

## 7.6 Australia

### Australia's LNG exports are surging

Australia has experienced an unprecedented wave of LNG investment over the past decade. Between 2009 and 2012, seven new LNG export projects were commissioned, at a cost of over US\$200 billion. The ramp-up of these projects has seen Australia's LNG exports climb to 70 million tonnes in 2018, and export earnings reached \$44 billion in real terms. In November and December 2018, Australia temporarily became the world's largest LNG exporter as Qatar's LNG production dipped, although Qatar had regained the top spot in early 2019 (Figure 7.7).

**Figure 7.7: Monthly LNG exports of key producers**



Source: Bloomberg (2019)

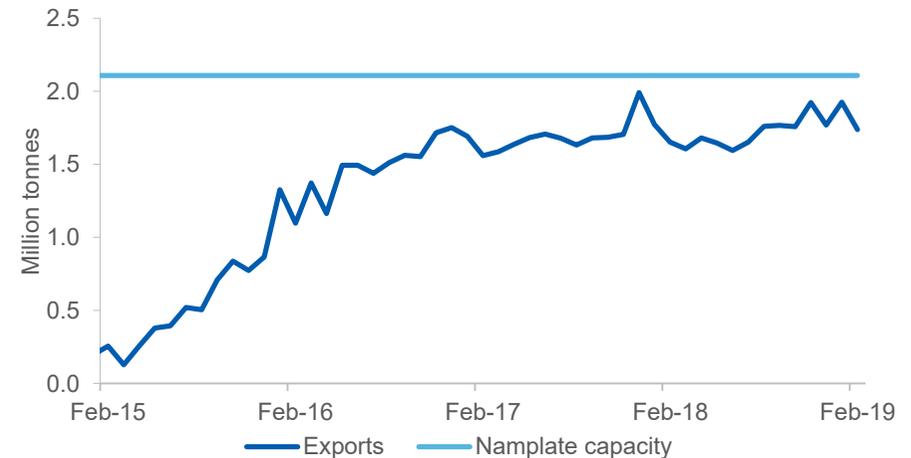
However, Australia's LNG sector has also experienced challenges. Cost overruns have plagued new projects in the west and the north. On the east coast, the three LNG projects based around coal seam gas (CSG) resources have run well below nameplate capacity over the past few years, although exports did tick up in late 2018/early 2019 (Figure 7.8). Production costs for CSG are higher than for conventional gas, due to the need to continually drill wells to sustain gas production.

### Higher prices and export volumes to boost LNG export earnings

Australia's real LNG export earnings are forecast to increase from \$32 billion in 2017–18 to \$51 billion in 2019–20, driven by higher prices and export volumes. Most Australian LNG is sold at prices set by the price of Japan Customs-cleared Crude (JCC) oil, and higher JCC prices over 2018–19 have already driven up LNG export prices compared to last year.

Australia's LNG exports are expected to increase rapidly in the short term (Figure 7.9). In 2017–18, Australia exported 62 million tonnes of LNG, and exports are forecast to climb to 82 million tonnes in 2019–20, driven by the Prelude, Ichthys and Wheatstone projects.

**Figure 7.8: LNG exports from Gladstone, Queensland**



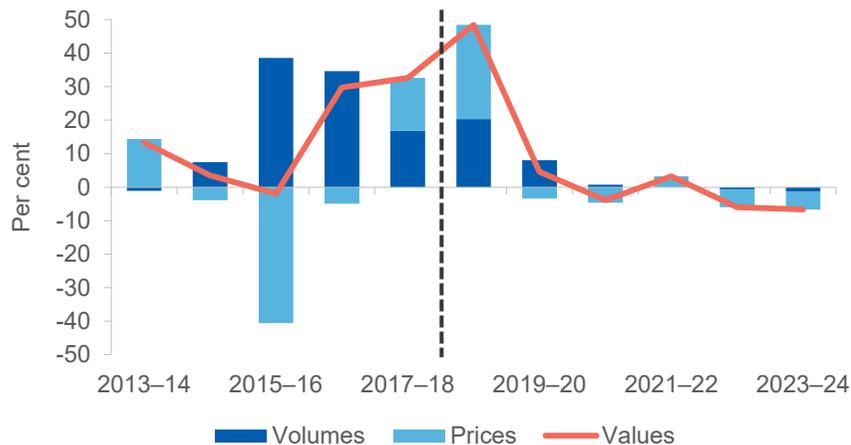
Source: Gladstone Port (2019)

Ichthys shipped its first LNG cargo from train 1 in October 2018, and train 2 is expected to come online in 2019. Shell's Prelude project began LNG production in late 2018, and the first shipment from the project is expected in coming months. Production at Wheatstone will be substantially higher in 2019–20 than in 2017–18, with the project having recently reached full capacity.

From 2020–21, however, the value of Australia’s LNG exports is expected to start a gradual decline, reaching \$41 billion in real terms in 2023–24. Lower prices are expected to reduce export earnings, as the JCC price declines from around US\$70 a barrel in 2019 to around US\$60 a barrel in 2024 in real terms.

Meanwhile, Australia’s LNG exports are expected to stabilise, and may even edge down after 2021–22. Production from existing fields at the Woodside-operated North West Shelf project is likely to decline in early 2020s. To what extent this can be offset by the development of new gas resources in the short term is unclear. The North West Shelf Joint Venture has signed a non-binding preliminary agreement with Chevron for the processing of its gas resources from the Clio-Acme fields through the North West Shelf project’s facilities. However, gas from Clio-Acme may not be available before 2023, and may be insufficient to arrest the decline from existing fields. There are other potential backfill options (such as Equus, see below), but timing issues make it difficult to prevent a fall in output at the North West Shelf project for a period.

**Figure 7.9: Growth in Australia’s real LNG export earnings, contributions from volumes and prices**

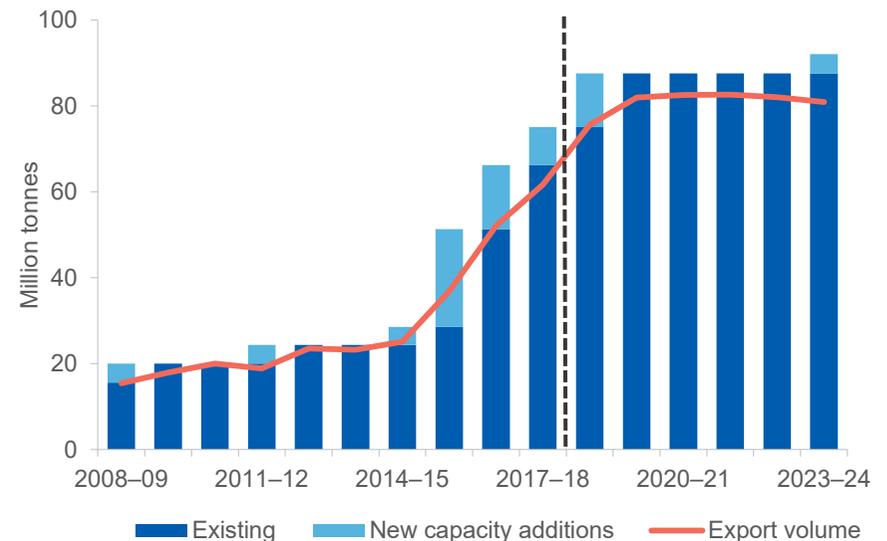


Source: ABS (2019); Department of Industry, Innovation and Science (2019)

Over the longer-term, the majority of backfill for the North West Shelf project is expected to come from the Brecknock, Calliance and Torosa fields (collectively known as the ‘Browse fields’) in the Browse Basin. The Browse Joint Venture is targeting an FID for the Browse project in 2020, with first production expected in 2026.

LNG production at the Darwin LNG plant, operated by ConocoPhillips, is also at risk of declining in the early 2020s. The project will require backfill from 2023, when gas supply from the Bayu-Undan field is expected to be exhausted. ConocoPhillips’ Barossa project and Eni’s Evans Shoal field are competing to provide backfill for Darwin LNG. ConocoPhillips is aiming to take an FID for its Barossa project at the end of 2019, but first gas is not expected until the December quarter 2023. ENI is aiming to start production at its Evans Shoal field by the end of 2022.

**Figure 7.10: Australia’s LNG exports and export capacity**



Source: ABS (2019); Department of Industry, Innovation and Science (2019)

Towards the end of the outlook period, Australia's LNG export capacity could receive a boost (Figure 7.10). Technical studies are underway for a second train at Woodside's Pluto project, which is likely to be in the 4–5 mtpa range. The additional train at the Pluto LNG project 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. An FID is being targeted for 2020, and start up for 2024. The project is not expected to increase Australia's LNG exports until after the end of the outlook period.

In addition, Western Gas, the owners of the Equus project, is currently proposing a standalone, near-shore small-scale LNG facility (1.5–2 mtpa), but have also flagged that the resource presents an opportunity for other resource owners with access to spare capacity in existing infrastructure. An FID is targeted for late 2019, with first gas planned from late 2023/early 2024.

#### [Australia to be the largest LNG exporter in the world for the next few years](#)

On current projections, Australia will edge past Qatar as the world's largest LNG exporter (on an annual basis) when exports reach 79 million tonnes in 2019. While Australia is expected to remain the largest LNG exporter in the world until 2024, both Qatar and the US should close the gap on Australia towards the end of the outlook period. Qatar's plans to lift export capacity to 110 mtpa are expected to be completed around 2024, and exports should build quickly thereafter. In the US, the Golden Pass LNG facility is also expected to start up in 2024, and there is also potential for other new US projects and expansions underpinned by low-cost shale gas production. Australia seems likely to be surpassed as the world's largest LNG exporter by both Qatar and the US sometime in the mid-2020s.

#### [Shale gas represents a long-term opportunity](#)

The discovery of substantial shale gas resources in the Beetaloo Sub-basin in the Northern Territory represents a longer-term opportunity for Australia. The Beetaloo has prospective shale gas resources of at least 222,000 petajoules. A recent estimate from Falcon Oil and Gas suggests this figure could be closer to 550,000 petajoules.

The Northern Territory government's gas strategy aims to create a gas-based manufacturing industry in Darwin, as well as increasing LNG exports from the Northern Territory. Inpex's Ichthys project has room for another four LNG trains, and Inpex's chief executive has flagged the possibility that the facility could be expanded down the track.

An additional train could also be added at Darwin LNG. A feasibility study for a second train at Darwin LNG was jointly funded by the Northern Territory Government, ConocoPhillips (which operates the facility), and several upstream resource owners.

**Table 7.1: Gas outlook**

World	Unit	2018	2019 <sup>f</sup>	2020 <sup>f</sup>	2021 <sup>f</sup>	2022 <sup>z</sup>	2023 <sup>z</sup>	2024 <sup>z</sup>	CAGR <sup>r</sup>
JCC oil price <sup>a</sup>									
– nominal	US\$/bbl	72.9	70.0	69.3	70.5	69.3	67.8	66.3	-1.6
– real <sup>h</sup>	US\$/bbl	74.7	70.0	67.7	67.4	64.8	62.1	59.4	-3.7
Gas production <sup>s</sup>	Bcm	3 813.5	3 924.3	3 984.8	4 026.6	4,132.9	4,188.2	4,275.1	1.9
Gas consumption <sup>s</sup>	Bcm	3 827.6	3 933.9	3 995.4	4 061.1	4,134.4	4,202.3	4,278.8	1.9
LNG trade <sup>ds</sup>	Mt	318.0	351.8	369.4	376.9	399.5	408.7	432.3	5.3
Australia	Unit	2017–18	2018–19 <sup>f</sup>	2019–20 <sup>f</sup>	2020–21 <sup>f</sup>	2021–22 <sup>z</sup>	2022–23 <sup>z</sup>	2023–24 <sup>z</sup>	CAGR <sup>r</sup>
Production <sup>b</sup>	Bcm	120.3	138.7	145.6	145.6	146.6	146.4	144.7	3.1
– Eastern market	Bcm	55.3	55.5	55.5	54.9	54.9	55.3	55.1	0.0
– Western market	Bcm	63.8	79.2	78.8	78.9	79.8	79.2	77.7	3.3
– Northern market <sup>c</sup>	Bcm	1.2	4.0	11.2	11.8	11.9	11.9	11.9	47.6
LNG export volume <sup>d</sup>	Mt	61.7	75.6	82.0	82.6	82.6	82.0	80.9	4.6
– nominal value	A\$m	30,907	50,182	52,550	50,577	52,265	49,212	46,060	6.9
– real value <sup>e</sup>	A\$m	31,523	50,182	51,318	48,205	48,585	44,619	40,732	4.4
LNG export unit value <sup>g</sup>									
– nominal value	A\$/GJ	9.5	12.6	12.1	11.6	12.0	11.4	10.8	2.2
– real value <sup>e</sup>	A\$/GJ	9.7	12.6	11.9	11.1	11.1	10.3	9.5	-0.2
– nominal value	US\$/MMBtu	7.8	9.6	9.4	9.1	9.4	9.3	9.2	2.8
– real value <sup>e</sup>	US\$/MMBtu	7.9	9.6	9.2	8.7	8.8	8.4	8.1	0.4

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 published by the Department of Environment and Energy; **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 2018–19 Australian dollars; **f** Forecast; **g** 1 MMBtu is equivalent to 1.055 GJ; **h** In 2019 US dollars; **s** 2018 is an estimate; **z** Projection; **r** Average annual growth between 2018 and 2024 or 2017–18 and 2023–24.

Source: ABS (2019) International Trade in Goods and Services, Australia, 5368.0; Department of Industry, Innovation and Science (2019); Company reports; Nexant World Gas Model (2019)