Global LNG trade in 2018 was 313.8 million tonnes, an 8.3 per cent (or 24 million tonne) increase from 2017.

Since 2000, global LNG trade has grown at an average annual rate of 6.5 per cent. Most LNG trade is made through long and medium-term contracts (contracts with a duration of longer than four years). In 2018, long and medium-term contracts accounted for 68 per cent (214.5 million tonnes) of global LNG trade.

The share of LNG trade made through spot and short-term contracts is growing, accounting for 32 per cent (99.8 million tonnes) of total LNG trade in 2018, the highest share on record.

Source: International Group of LNG Importers (GIIGNL).

Australia was the second largest LNG exporter in 2018, accounting for 21 per cent of global exports. Western Australia by itself accounted for 14 per cent of global exports and 68 per cent of Australia’s exports in 2018.

Qatar was the largest LNG exporter in 2018, accounting for 24 per cent of global exports. Qatar has been the world’s largest LNG exporter since 2006.

Malaysia was the third largest LNG exporter in 2018, accounting for 8 per cent of global exports.

The USA accounted for 7 per cent of global LNG exports in 2018. The USA’s share of global LNG exports will increase over the next few years as new projects become operational.

Asia accounted for 76 per cent (238.6 million tonnes) of global LNG imports in 2018. The five largest LNG importers in 2018 – Japan, China, South Korea, India and Taiwan – are all in Asia.

Europe (16 per cent), the Americas (5 per cent) and the Middle East and Africa (3 per cent) made up the balance of global LNG imports in 2018.

Japan was the largest LNG importer in 2018 at 82.5 million tonnes. Japan’s LNG imports peaked in 2014 at 89.2 million tonnes.

China was the second largest LNG importer in 2018 at 54.0 million tonnes. China’s LNG imports grew by 38 per cent in 2018.
Western Australia’s LNG export capacity

Western Australia has an established and reliable LNG export industry. The State’s first LNG project, the North West Shelf, will celebrate 30 years of LNG exports in 2019.

High gas prices in the 2000s prompted major investment in Western Australia’s LNG industry. Western Australia currently has five operating LNG export projects: the North West Shelf, Pluto, Gorgon, Wheatstone and Prelude. The State’s total LNG export capacity is 50 million tonnes a year.

Western Australia’s LNG projects are underpinned by large gas reserves, which provides LNG buyers with security of supply. Additional gas reserves in the Canarvon and Browse Basins are available to increase production in the future.

Western Australia’s LNG projects are located relatively close to Asia, comparing favourably to the shipping distances from Qatar (with the exception of India).

The shipping distance from Western Australia’s projects to Japan is around 3,400 nautical miles or about 8 days travel, with similar shipping distances to South Korea, China, Taiwan and India.

The expansion of the Panama Canal, completed in late-June 2016, provides for a shorter trade route for LNG exports from the USA to Asia. However, shipping to Asia from the US Gulf Coast still takes more than twice the time of shipping from Western Australia.

Western Australia’s LNG projects have low operating costs, giving them the capacity to maintain continuity of supply as prices vary.

Most long-term LNG contracts for supply to Asia have prices linked to the oil price, so LNG prices in Asia generally move with the oil price (with a timing lag of a few months). This differs from gas prices in the USA, and Europe which respond to the regional gas market.

The average price of Japan’s LNG imports in May 2019 was US$10.3 per mmBtu, up 0.2 per cent on May 2018.

The average price of Japan’s LNG imports in 2018 was US$10.7 per mmBtu, up 24 per cent on 2017.

Note – Additions to LNG export capacity reflect the start-up of LNG trains during a particular year.

Source: JTSI estimates based on public company announcements.

LNG transport: shipping duration (days)

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Note – days shipping is based on a vessel at maximum speeds of 19.5 knots.

Source: Shipscene; International Group of LNG Importers (GIIGNL).

LNG/pipeline gas prices

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Note – days shipping is based on a vessel at maximum speeds of 19.5 knots.

Source: Shipscene; International Group of LNG Importers (GIIGNL).
Western Australia’s LNG sales rose 34 per cent to 43.7 million tonnes in 2018.

The value of Western Australia’s LNG sales rose 81 per cent to $27.0 billion in 2018.

In 2018, LNG accounted for 21 per cent of the State’s total minerals and petroleum sales ($127.4 billion).

Western Australia’s LNG projects also produce condensate, liquefied petroleum gas (LPG) and natural gas for Western Australia’s domestic market.

The WA Domestic Gas Policy requires LNG exporters to make gas available to Western Australian consumers equivalent to 15 per cent of their LNG exports. In 2018, LNG exporters supplied half Western Australia’s domestic gas needs.

Japan was Western Australia’s first LNG customer in 1989 and remains the State’s largest customer. Western Australia accounted for 30 per cent of Japan’s LNG imports in 2018.

In 2006, Western Australia became the first jurisdiction in the world to export LNG to China via the North West Shelf’s sales contract with Guangdong Dapeng LNG. Western Australia accounted for 17 per cent of China’s LNG imports in 2018.

Of Western Australia’s total LNG exports in 2018:
- Japan accounted for 56 per cent
- China accounted for 21 per cent
- South Korea accounted for 10 per cent
- Taiwan accounted for 5 per cent
- Singapore accounted for 4 per cent
- India accounted for 3 per cent

In 2018, Chevron (32 per cent), Woodside (18 per cent) and Shell (15 per cent) accounted for the largest shares of Western Australia’s LNG production by company.

Chevron has a one sixth share of the North West Shelf project and is the operator and largest stakeholder in the Gorgon and Wheatstone projects.

Woodside has a one sixth share of the North West Shelf project and a 90 per cent share of the Pluto project and is the operator of these projects.

Shell has a one sixth share of the North West Shelf project, a 25 per cent share of the Gorgon project and is the operator and largest stakeholder of the Prelude floating LNG project.
WA LNG PROJECT LIST (including associated infrastructure and developments) – as at 28 June 2019

<table>
<thead>
<tr>
<th>Project</th>
<th>Stakeholders</th>
<th>Capex (A$)</th>
<th>Capacity (mtpa)*</th>
<th>Start-up</th>
<th>Other Project Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pluto Train 1</td>
<td>Woodside (90%) Tokyo Gas (5%) Kansai Electric (5%)</td>
<td>15.0</td>
<td>4.9</td>
<td>2012</td>
<td>Pluto exported its first LNG cargo in May 2012. Xena 1 field commenced production in June 2015. Woodside plans to backfill and expand the Pluto LNG facilities with additional gas sourced from the Scarborough fields. Woodside entered FEED for Pluto Train 2 in December 2018. FID is targeted for 2020, and start up 2024.</td>
</tr>
<tr>
<td>North Rankin Redevelopment</td>
<td>see North West Shelf</td>
<td>5.0</td>
<td>n/a</td>
<td>2013</td>
<td>North Rankin Platform B will recover about 5 trillion cubic feet of gas from the North Rankin and Perseus fields.</td>
</tr>
<tr>
<td>Greater Western Flank (Phase 1) Development</td>
<td>see North West Shelf</td>
<td>2.5</td>
<td>n/a</td>
<td>Dec 2015</td>
<td>Phase 1 will recover 1.1 trillion cubic feet of gas to maintain North West Shelf output, via subsea tie-back to the existing Goodwyn A platform. Target fields in Phase 1 include Goodwyn GH and Tidepole.</td>
</tr>
<tr>
<td>Gorgon Trains 1-3</td>
<td>Chevron (47.3%) ExxonMobil (25%) Shell (25%) Osaka Gas (1.25%) Tokyo Gas (1%) JERA (0.417%)</td>
<td>55.0</td>
<td>15.6</td>
<td>Mar 2016</td>
<td>Gorgon exported its first LNG cargo in March 2016. Train 2 began production in October 2016. Train 3 began production in March 2017. Chevron is considering increasing Gorgon capacity by debottlenecking existing trains.</td>
</tr>
<tr>
<td>Julimar-Brunello Development</td>
<td>Woodside (65%) KUFPEC (35%)</td>
<td>1.4</td>
<td>n/a</td>
<td>Oct 2016</td>
<td>The Julimar and Brunello fields will feed 2.1 trillion cubic feet of gas to the Wheatstone LNG project. Phase 2 of the project to tie-back the Julimar field to the existing Brunello subsea infrastructure has progressed FEED activities in 2019, with FID targeted for 2019.</td>
</tr>
<tr>
<td>Persephone Development</td>
<td>see North West Shelf</td>
<td>1.1</td>
<td>n/a</td>
<td>Jul 2017</td>
<td>The Persephone Development will maintain Karratha Gas Plant output via subsea tie-back to the existing North Rankin complex.</td>
</tr>
<tr>
<td>Wheatstone Train 1 &amp; 2</td>
<td>Chevron (64.14%) KUFPEC (13.4%) Woodside (13%) PE Wheatstone (8%) Kyushu Electric (1.46%)</td>
<td>40.0^</td>
<td>8.9</td>
<td>Oct 2017</td>
<td>Train 1 commenced LNG production in October 2017. Train 2 commenced LNG production in June 2018.</td>
</tr>
<tr>
<td>Ichthys Train 1 &amp; 2</td>
<td>Inpex (66.245%) Total (26%) CPC (2.625%) Tokyo Gas (1.575%) Osaka Gas (1.2%) Kansai Electric (1.2%) JERA (0.735%) Toho Gas (0.42%)</td>
<td>27.2^</td>
<td>n/a</td>
<td>Oct 2018</td>
<td>Ichthys exported its first LNG cargo in October 2018. The project has two LNG trains at Darwin with a total capacity of 8.9 mtpa. All LNG production from Ichthys is attributed to the Northern Territory. Western Australia’s share of the project’s total capital expenditure is around 50 per cent.</td>
</tr>
<tr>
<td>Greater Western Flank (Phase 2) Development</td>
<td>see North West Shelf</td>
<td>2.8</td>
<td>n/a</td>
<td>Oct 2018</td>
<td>Phase 2 will recover 1.6 trillion cubic feet of gas to maintain North West Shelf output, via subsea tie-back to the Goodwyn A platform. Target fields in Phase 2 include Dockrell, Kreaat, Lady Nora, Pemberton and Sculptor-Rankin.</td>
</tr>
<tr>
<td>Prelude FLNG vessel</td>
<td>Shell (67.5%) Inpex (17.5%) KOGAS (10%) CPC (5%)</td>
<td>19.6^</td>
<td>3.6</td>
<td>Mar quarter 2019</td>
<td>The floating LNG vessel exported its first LNG cargo in June 2019. In addition to LNG, Prelude will produce 1.3 mtpa of condensate and 0.4 mtpa of LPG. The vessel will operate at the Prelude gas field for 25 years.</td>
</tr>
<tr>
<td>Gorgon Stage 2</td>
<td>see Gorgon</td>
<td>5.1</td>
<td>n/a</td>
<td>2022</td>
<td>In April 2018, Chevron announced investment in the second stage of the Gorgon project, which will help maintain supply to the project for the next 30 years. Drilling is expected to start in 2019.</td>
</tr>
</tbody>
</table>

Capex = capital expenditure; mtpa = million tonnes per annum (export capacity addition); FEED = front-end engineering and design; FID = final investment decision; FLNG = Floating LNG; n/a = not applicable.

Notes: * Capacity refers to the production capacity of LNG facilities in Western Australia.
^ JTSI estimate of capital expenditure in Australian dollar terms, taking into account the profile of capital expenditure and movements in the exchange rate across the construction period. For Ichthys, the estimate is the capital expenditure in Western Australia.
Western Australia’s natural gas reserves and resources

- Western Australia’s current and committed LNG projects source gas from offshore in the Carnarvon and Browse basins.
- The State’s domestic gas needs are supplied through production facilities located in the Carnarvon and Perth basins.
- The State also has onshore shale and tight gas resources in the Canning, Carnarvon and Perth basins.

Map of WA’s gas reserves and resources (trillion cubic feet) – as at 28 June 2019

LEGEND
- Gas pipeline
- Gas basin
  - Conventional gas reserves [2P]
  - Conventional gas resources [2C]
  - Shale gas resources [RRR]
  - Tight gas resources [GIIP]

Reserves are categorised by probability or likelihood of recovery
2P = reserves that are proved (90%) + probable (50%).
2C = contingent resources.

Contingent resources are known and recoverable, however are considered sub-economic at this point in time
RRR = DMIRS’s current, best estimates of risked, recoverable resources.
GIIP = Gas-initially-in-place, referring to the estimated total amount of gas contained within the basin, including volumes that are deemed sub-economic, and which may never be recovered.

Reserves and resources for the Bonaparte Basin show the net entitlement to Australia.

Note – map is indicative only. For more information on reserves and resources classification, see the Society of Petroleum Engineers’ Petroleum Resources Management System.

Sources: EnergyQuest EnergyQuarterly; and WA Department of Mines, Industry Regulation and Safety.