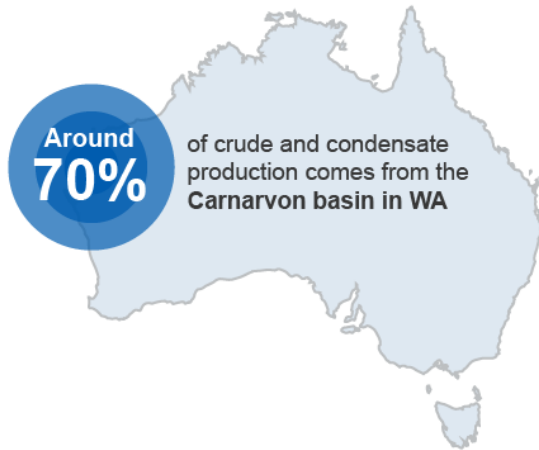


Oil

Resources and Energy Quarterly June 2018



Australia's production of crude and condensate peaked in 2000, at

41,300 ML



Around **17%** of refinery feedstock is domestically produced. On average 83% is imported.

Australia's refinery production



Automotive gasoline



Diesel



Aviation turbine fuel



LPG

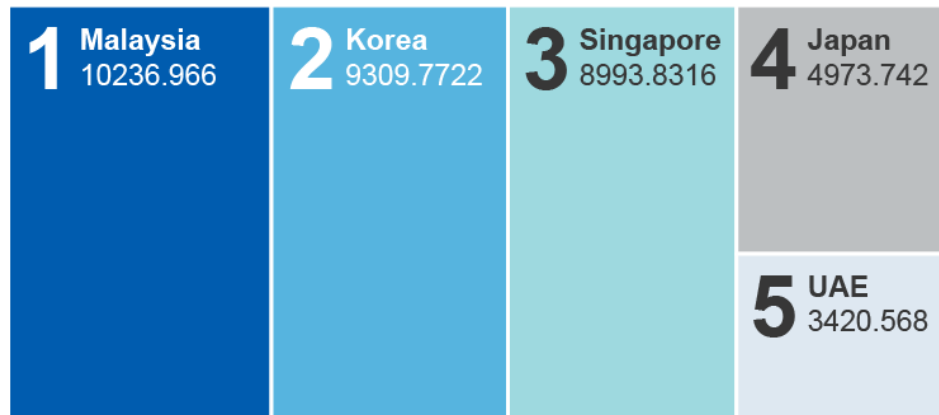


Fuel oil



Other

Top import petroleum sources 2016-17 million litres.



Note: excludes natural gas imports

Historic price snap shot:

Brent crude oil in the last five years (US\$ per barrel)

Highest price



6/09/2013

2018 average



Lowest price



19/01/2016

8.1 Summary

- Geopolitical tensions and uncertainty around world production led to sharp oil price increases in the first half of 2018, which are expected to moderate over the outlook period. In 2018 the Brent spot price is forecast to average US\$70 a barrel.
- Higher condensate production from the new LNG projects is expected to support export volumes increasing from 230 thousand barrels a day in 2017–18 to 355 thousand barrels a day in 2019–20.
- The value of Australia’s crude and condensate exports is forecast to increase from \$7.1 billion in 2017–18 to \$11 billion in 2019–20, driven by higher volumes and higher prices.
- There are a number of risks to the outlook — production changes from OPEC and the US, as well low stock levels, could lead to volatility in forecast prices.

8.2 Prices

Geopolitical shocks lead to spike in oil prices

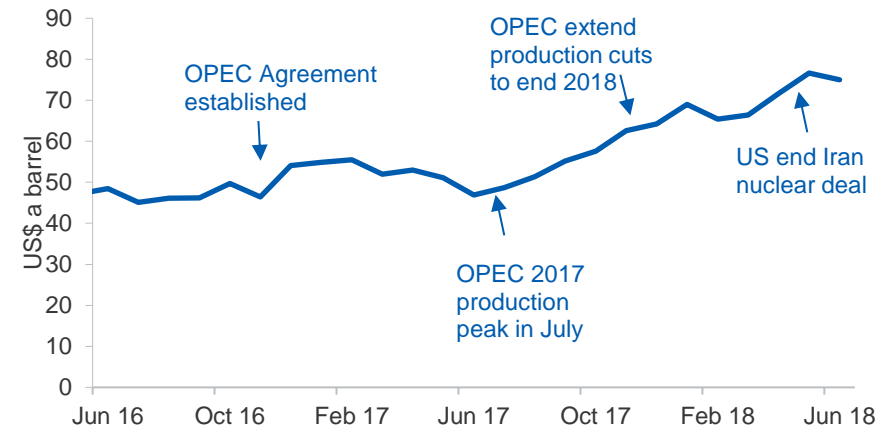
Lower OPEC production from Venezuela, geopolitical events including the conflict in Syria and renewed US sanctions prompted a jump in oil prices in the June 2018 quarter. In May, the Brent crude oil spot price reached US\$80 a barrel, the highest level in three years. In-line with higher prices, healthy consumption growth and continued output constraint from OPEC and Russia, oil stocks drawn down. The Brent spot price averaged US\$74 in the June quarter.

Uncertain outlook for oil prices

Prices are expected to moderate over the outlook period, as OPEC production controls are revised upwards to counter lower Iranian and Venezuelan output, and US production continues grow. The Brent oil spot price is expected to retreat slightly from recent highs to average US\$70 a barrel in 2018, US\$15 higher than 2017. The oil price outlook is very uncertain, however with the OPEC agreement due to expire at the end of

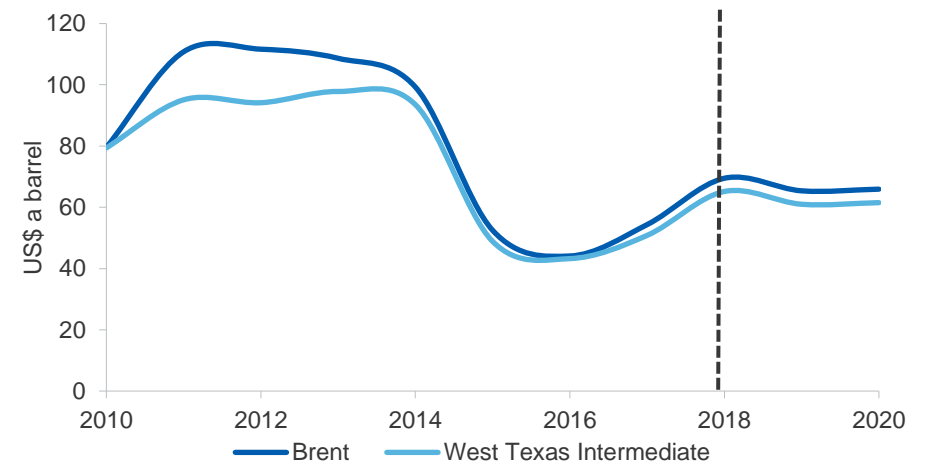
2018 and stagnating world consumption, prices are expected to moderate further, averaging US\$65–66 a barrel in 2019 and 2020.

Figure 8.1: Brent oil spot price



Source: Bloomberg (2018); Department of Industry, Innovation and Science (2018)

Figure 8.2: Annual oil prices



Source: Bloomberg (2018); Department of Industry, Innovation and Science (2018)

8.3 World oil consumption

World oil consumption is forecast to average 99 million barrels a day in 2018, 1.1 per cent higher than 2017. By the end of the outlook period, consumption is forecast to reach 101 million barrels a day in 2020. Marginal increases in world consumption will be supported by growing consumption in non-OECD economies, however high oil prices and volatility in oil prices may weigh on future consumption. Future oil consumption will be effected by lower than expected economic growth or reduced trade activity.

Non-OECD economic growth supports oil consumption

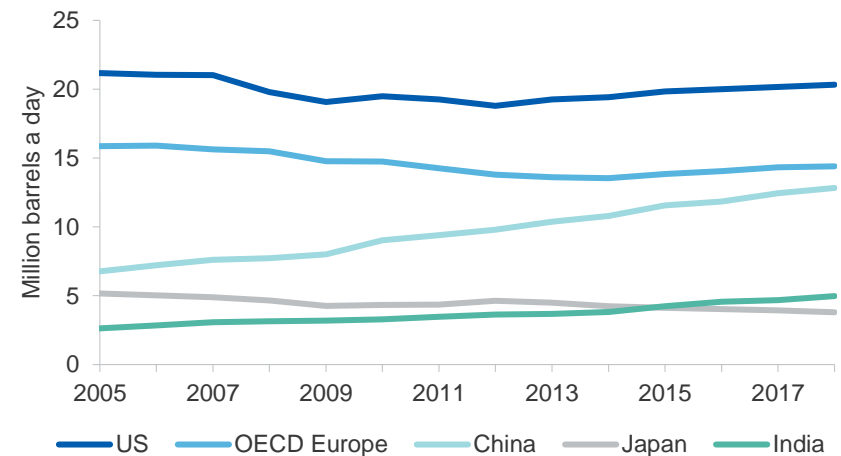
Strong economic conditions in non-OECD countries are expected to support oil consumption growth over the next two years. Consumption in China is forecast to increase by around 3.3 per cent a year, reaching 14 million barrels a day in 2020. Improved economic conditions, expanding vehicle fleets and higher air traffic in India are expected to contribute to oil consumption increasing by around 5.2 per cent a year, reaching 5.4 million barrels a day in 2020.

Recent increases in oil prices, if sustained, may have a dampening effect on future consumption growth. A number of countries have recently removed oil price subsidies, which may result in higher price exposure. Policy driven fuel-switching in heating use — substituting fuel-oil for gas — is increasing in China, the Middle East and in some European countries.

Economic activity important for continuing OECD consumption

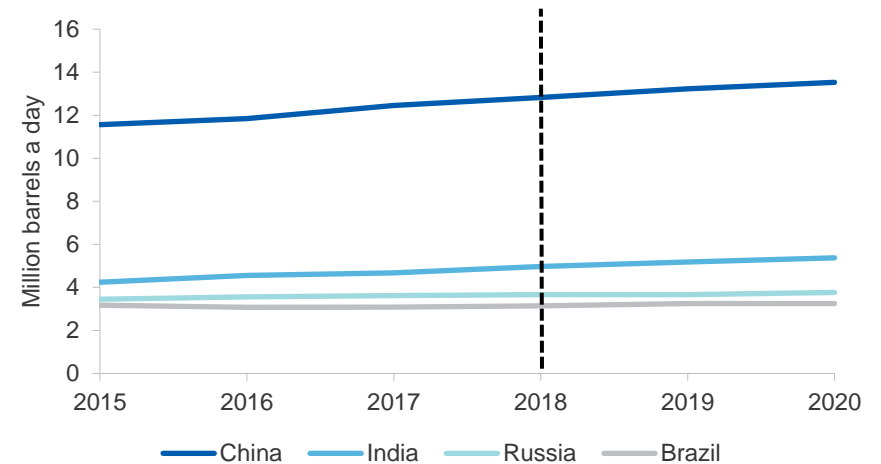
Oil consumption in major OECD economies is expected to continue at current levels, supported by firm economic growth. Although there is a general trend towards decarbonisation in many of these countries, the transport sector is the largest consumer of oil in most countries, and significant shifts in fuel sources and expected to take some time. Over the outlook period OECD consumption is expected to be stagnant — in 2020 consumption is forecast to be similar to current levels, at 48 million barrels a day.

Figure 8.3: Oil consumption in major countries



Source: International Energy Agency (2018)

Figure 8.4: Forecast consumption in major Non-OECD economies



Source: International Energy Agency (2018); Department of Industry, Innovation and Science (2018)

8.4 World oil production

Higher world oil production, supported by increased US and OPEC production, is expected over the outlook period. World oil production is forecast to increase by an average 2.1 per cent a year over the next two years, to reach 102 million barrels a day in 2020. At this rate, world production growth is expected to exceed consumption growth over the outlook period.

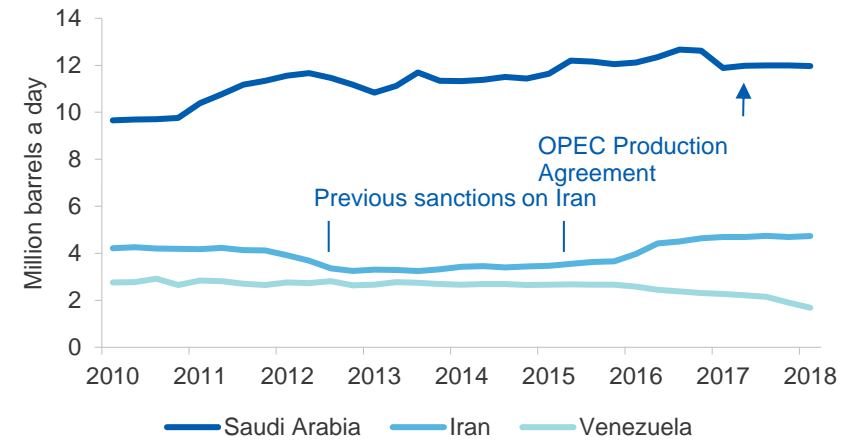
OPEC+ reaches agreement goal, however future production uncertain

The OPEC and Russia production agreement, which has been enacted since the start of 2017, has supported higher prices and achieved the target of lower oil stocks. The agreement was extended to 2018 and compliance has been very strong — total production below the target. Lower production was partly due to deteriorating Venezuelan output, which has fallen sharply in the last two years; 2018 production to June was 50 per cent lower than 2017, with no sign of recovery. To address concerns on future production shortages, particularly with future sanctions on Iran, OPEC and other agreement countries, including Russia, recently agreed to increase output. Producers agreed to increase production to achieve 100 per cent compliance, an additional 0.5 million barrels a day, to the market. This is expected to be a minimum amount, actual production increases may be higher.

Iran's oil production and trade sanctions

In May, the US Administration withdrew the United States from the Joint Comprehensive Plan of Action (JCPA) nuclear deal with Iran, resulting in sanctions set to be reimposed in the December quarter 2018. Iran's oil production had been steadily increasing since sanctions imposed in 2012 were lifted in 2014. Production reached 2.6 million barrels a day in the March 2018 quarter. Iran's production dropped by 940 thousand barrels a day between 2011 and 2013 when sanctions were previously imposed. The impact of renewed sanctions across Iran's major export partners is unclear, some partners including China, Russia and Turkey may find ways to continue imports. Trade with other partners has already started decreasing.

Figure 8.5: OPEC production and Iranian production under sanctions



Source: International Energy Agency (2018)

Infrastructure constraints limit strong US production increases

US oil production forecasts continue to be revised up, with strong expected growth in conventional crude production and liquids relating to shale gas. The US accounts for around 15 per cent of world production, and is expected to increase production by an average 8.0 per cent a year over the outlook period. Oil production is forecast to increase from 13 million barrels a day in 2017, to reach 17 million barrels a day in 2020.

Productivity in some major US basins is starting to stabilise, including in the Permian basin, which accounts for just under half of US oil production. However the number of oil rigs, and drilled but uncompleted wells, continues to grow. As a number of major pipelines reach full capacity, infrastructure constraints may limit ongoing increases or result in wells being shut down. Alternative, more expensive, transport facilities may be utilised, before development pipeline projects are completed towards the end of the outlook period. Logistical factors, like pipeline constraints, labour shortages and road congestion, as well as declining well productivity, is expected to weigh on future production growth.

8.5 Australia's production and trade

Export earnings growth supported by oil prices and condensate production

Higher oil prices and expanding volumes contributed to Australia's petroleum exports reaching \$2.0 billion in the March 2018 quarter, 45 per cent higher than in the same period last year.

Over the next two years, export earnings are forecast to continue increasing, in line with higher oil prices and condensate production related to the new LNG production facilities. Earnings are forecast to increase from \$7.1 billion in 2017–18 to \$11 billion in 2019–20.

Export volumes growth driven by condensate production

In the March quarter 2018, crude and condensate exports were around 248 thousand barrels a day, 21 per cent higher than in the same period last year. Export volumes are forecast to increase by around 24 per cent a year over the outlook period, from 230 thousand barrels a day in 2017–18 to 355 thousand barrels a day in 2019–20. Significant new condensate production from western and Northern Australia, which is primarily directed to export markets, will account for this growth in volumes.

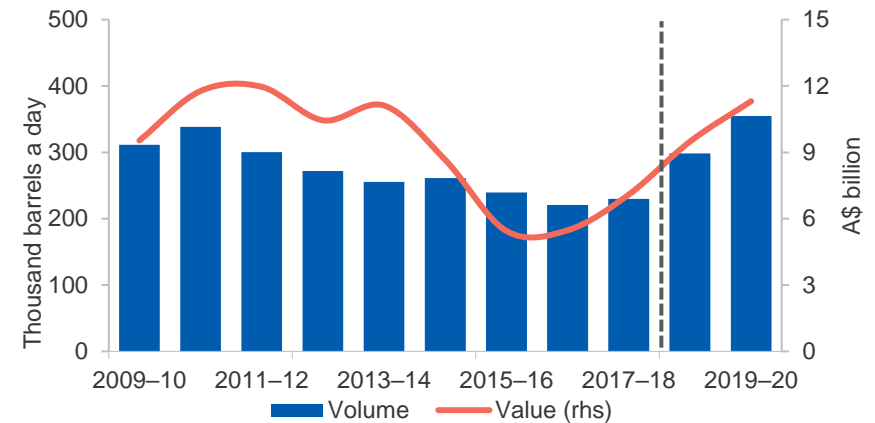
Lower crude oil production outweighed by higher condensate production

Australia's crude and condensate production averaged 282 thousand barrels a day in March 2018 quarter. This was an annual increase of 5.3 per cent; a strong increase in condensate production offset the impact of lower crude oil production.

Around 80 per cent of Australia's condensate is produced in the Carnarvon Basin in offshore Western Australia, where production from the Gorgon LNG and Wheatstone LNG operations has expanded in the last year. The majority of Australia's crude production is also in the Carnarvon basin, which showed an annual decrease of 7.8 per cent in the March 2018 quarter.

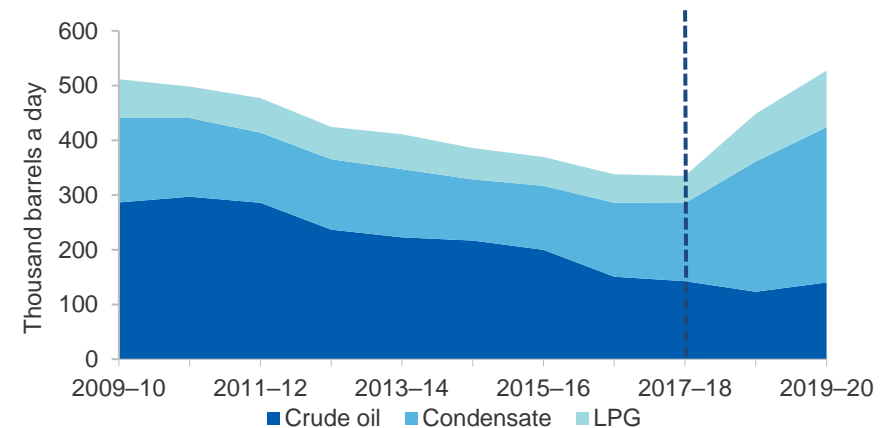
These production trends are expected to continue, production is forecast to increase from 292 thousand barrels a day in 2017–18 to 437 thousand barrels a day in 2019–20.

Figure 8.6: Australia's petroleum export volumes and values



Source: ABS (2018); Department of Industry; Innovation and Science (2018)

Figure 8.7: Australia's petroleum production outlook



Source: EnergyQuest (2018); Australian Petroleum Statistics (2018); Department of Industry, Innovation and Science (2018)

This significant increase in output is due to the expected commissioning of the LNG projects in Western Australia and the Northern Territory. Although there have been some project delays, all projects are expected to be operational by the end of 2018, with a combined condensate capacity of 165 thousand barrels a day. The largest producer of condensate will be the Ichthys LNG project, expected to start operating around the middle of this year, adding 100 thousand barrels a day of condensate capacity. These projects mark the end of significant production increases; declining crude production is expected to be the major feature going forward. However, one project in the pipeline is Woodside's Greater Enfield project, which has a capacity of 40,000 thousand barrels a day and is expected to come online in the middle of 2019.

Exploration expenditure

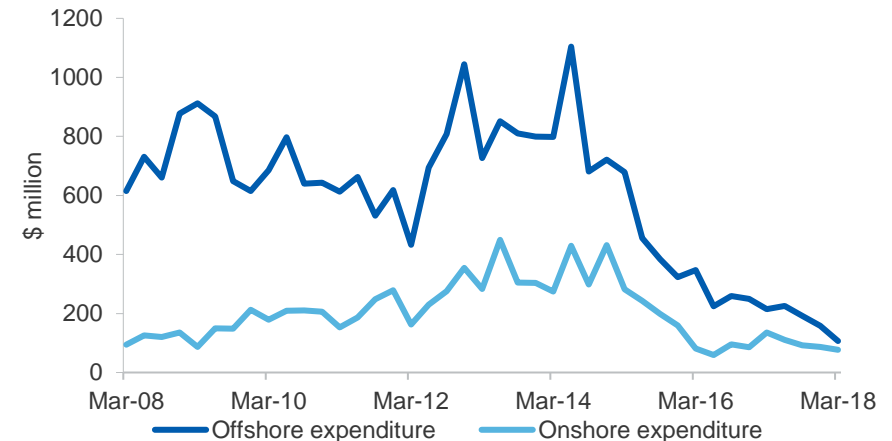
Australia's petroleum exploration expenditure was \$183 million in the March 2018 quarter, 48 per cent lower than the same period last year. Lower oil prices have contributed to the trend of declining exploration activity.

Australia's petroleum refinery activity

In the March quarter 2018, refinery production was equivalent to 484 thousand barrels a day, 9.3 per cent higher than in the same period last year. Total refined product imports were 667 thousand barrels a day in the March quarter 2018, little changed from the same quarter in 2017. The imported share of total refinery products has historically been around 62 per cent of total consumption.

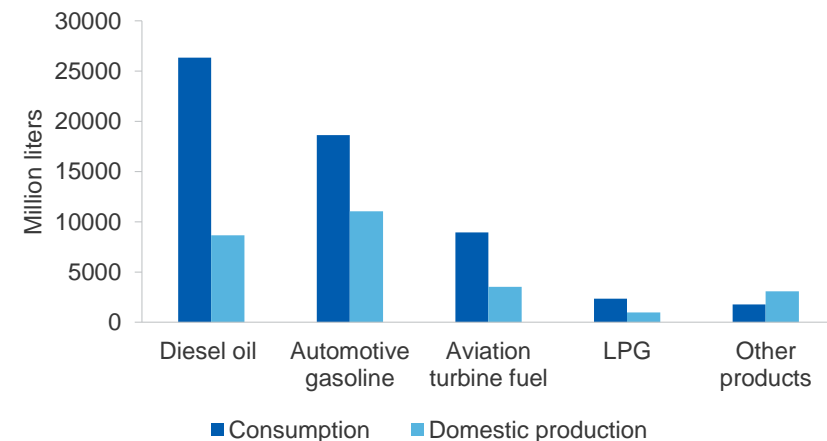
Over the outlook period, refinery production is expected to remain steady, aside from routine maintenance and downtime. There is some capacity investment in storage facilities being undertaken at Shell's Altona refinery over the outlook period, however in addition to this, Australia's refineries will need to make significant investment decisions around facility turnaround maintenance beyond the outlook period. In 2019–20, refinery production is forecast to average 469 thousand barrels a day.

Figure 8.8: Petroleum exploration expenditure



Source: ABS (2018) Mineral and Petroleum Exploration Expenditure, 8412.0

Figure 8.9: Consumption and production of refined products, 2016–17



Notes: Consumption relates to sale of products

Source: Australian Petroleum Statistics (2018)

Table 8.1: Oil outlook

World	Unit	2017	2018 ^f	2019 ^f	2020 ^f	Annual percentage change		
						2018 ^f	2019 ^f	2020 ^f
Production ^a	mb/d	97.4	99.6	101.5	102.3	2.2	1.9	0.8
Consumption ^a	mb/d	97.8	98.9	100.2	101.2	1.1	1.4	1.0
WTI crude oil price								
· Nominal	US\$/bbl	50.8	65.2	61.0	61.5	28.2	-6.4	0.9
· Real ^b	US\$/bbl	52.0	65.2	59.7	59.1	25.3	-8.4	-1.0
Brent crude oil price								
· Nominal	US\$/bbl	54.3	69.5	65.4	65.9	27.9	-5.9	0.8
· Real ^b	US\$/bbl	55.6	69.5	64.0	63.3	24.9	-7.9	-1.0
Australia	Unit	2016–17	2017–18 ^f	2018–19 ^f	2019–20 ^f	2017–18 ^f	2018–19 ^f	2019–20 ^f
Crude and condensate								
Production ^a	kb/d	283	292	354	437	3.4	21.0	23.5
Export volume ^a	kb/d	221	230	299	355	4.1	29.9	18.8
· Nominal value	A\$m	5,476	7,088	9,484	11,311	29.4	33.8	19.3
· Real value ^g	A\$m	5,583	7,088	9,266	10,797	27.0	30.7	16.5
Imports ^a	kb/d	351	378	368	363	7.9	-2.9	-1.2
LPG production ^{ac}	kb/d	52	50	87	104	-4.4	75.3	19.4
Refined products								
· Refinery production ^a	kb/d	471	488	479	469	3.6	-2.0	-1.9
· Export volume ^{ad}	kb/d	18	17	17	17	-7.3	0.4	0.6
· Import volume ^a	kb/d	616	644	653	667	4.6	1.4	2.1
· Consumption ^d	A\$m	1,004	1,077	1,044	1,059	7.3	-3.1	1.5

Notes: **a** Number of days in a year is assumed to be exactly 365; **b** in 2018 calendar year dollars; **c** Primary products sold as LPG; **d** Domestic sales of marketable products; **f** forecast; **g** in 2017–18 financial year Australian dollars. A barrel of oil equals 158.987 litres Source: ABS (2018), cat. No. 5464.0; International Energy Agency (2018); Department of Industry, Innovation and Science (2018)