Oil

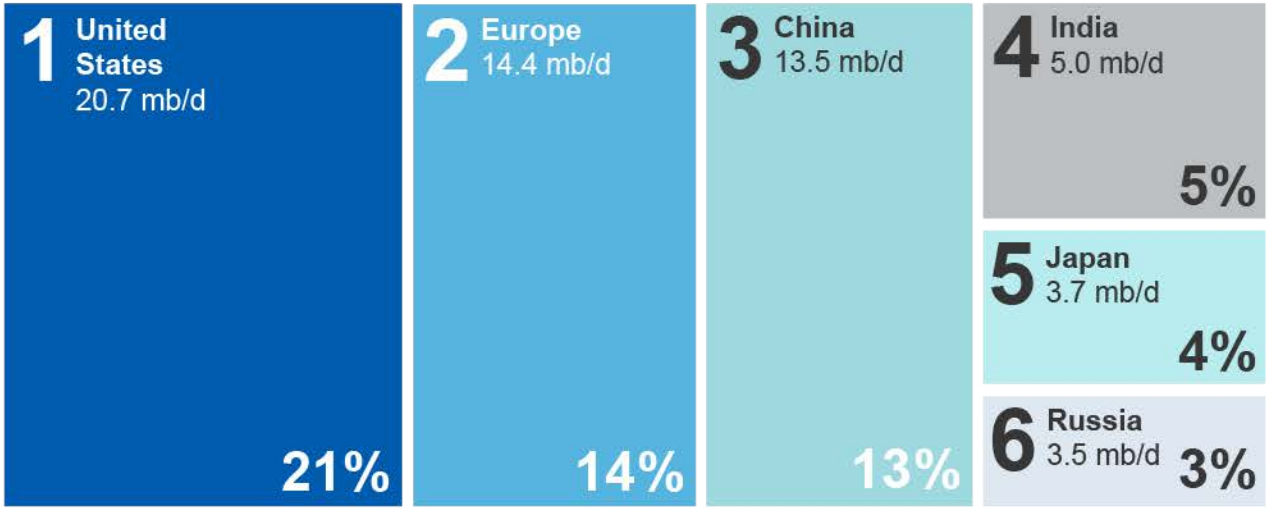
Resources and Energy Quarterly June 2019

Around **18%**
of refinery feedstock is domestically produced, the remainder is imported

In the last 5 years the Brent spot price ranged from
US$26 – US$111
a barrel, and averaged
US$60 a barrel

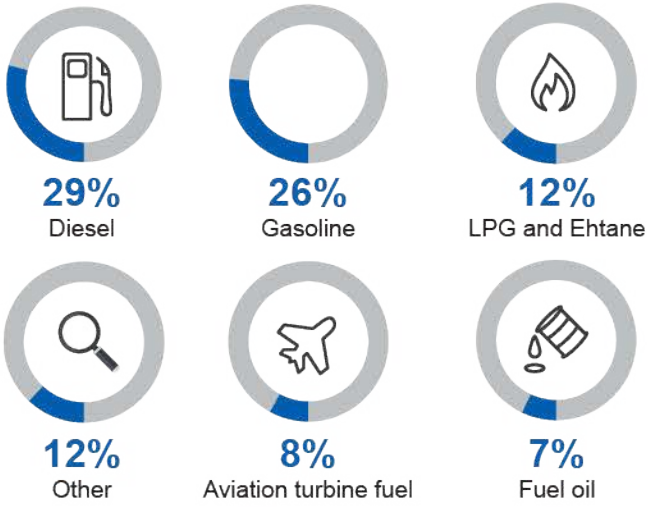
Australia's crude oil, condensate and LPG resources (PJ)

Key consumer markets of oil products (2019 forecast)



Note: Measured in million barrels per day.

World consumption of oil products



8.1 Summary

- After steady price increases over the first five months of the year, oil markets have entered a period of volatility in June 2019, reflecting uncertainty over global economic conditions and oil supply prospects.
- Australia's oil export volumes are forecast to peak during the outlook period, an additional benefit of new LNG projects coming online.
- Earnings from oil exports are forecast to continue their upward trend, rising from $9.3 billion in 2018–19 to $12.0 billion in 2019–20, before falling slightly to $11.2 billion in 2020–21. The 2019–20 peak reflects expected volume growth, a higher expected oil price and the impact of a weak Australian dollar.

8.2 Prices

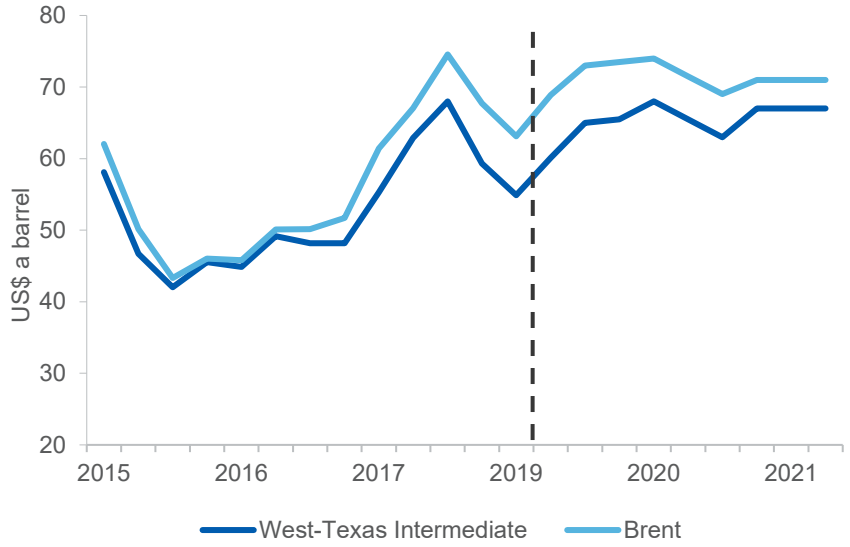
Demand and supply uncertainty in short term

The price of oil saw steady growth through the year until the middle of May, with the Brent crude benchmark rising from US$53 a barrel on 1 January to peak at US$74 on 16 May 2019.

Price growth was supported by the curtailment of supply under a production agreement, called the 'Vienna Agreement', between OPEC, Russia, Kazakhstan, Mexico and seven other countries (collectively referred to as 'OPEC+'). By May, over-compliance with that agreement, as well as unplanned outages in Venezuela and Iran, decreased total world oil production by more than twice as much as was expected, despite continued growth in US output (Figure 8.2).

From late May, oil prices plunged by 18 per cent. The change in sentiment stemmed from fears about the state of the global economy, heightened risks over US trade tension with China, Mexico and Iran, and data showing that US stockpiles of oil, gasoline and distillate had risen by 40 million barrels since the start of the year. Should OPEC+ members decide not to continue the Vienna Agreement in early July, oil prices could be lower than forecast.

Figure 8.1 Historical and forecast oil prices



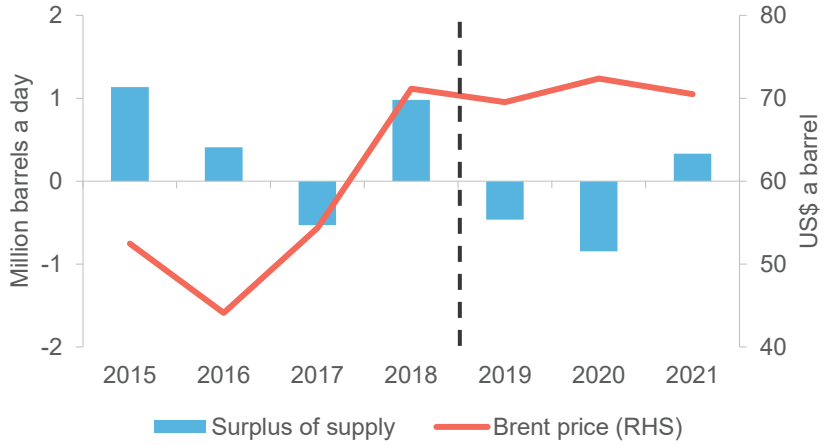
Source: Bloomberg (2019); Department of Industry, Innovation and Science (2019)

Recent attacks on tankers in the Gulf of Oman have caused the cost of shipping insurance to rise. A further heightening of tensions in the Middle East could drive oil prices higher.

The introduction of a low-sulphur bunker fuel standard for international shipping in 2020 may put upward pressure on the price of crude oils that refineries use to meet the standard, and downward pressure on crude grades typically used to make the (current standard) high sulphur fuel oil (Box 8.1).

Improving global economic growth in 2021 would help to support prices after markets adjust to the new shipping paradigm. The Brent crude benchmark price is forecast to average US$71 a barrel over the outlook period (Figure 8.1).

Figure 8.2: Global oil supply, demand and price forecasts



Source: Bloomberg (2019); Department of Industry, Innovation and Science (2019); International Energy Agency (2019).

8.3 World oil consumption

Global oil consumption growth is expected to increase at an average annual rate of 1.3 per cent over the outlook period, from 99 million barrels a day in 2018 to 103 million barrels a day in 2021. This is slower than the average growth of the last three years, reflecting the impacts of slower economic growth. Consumption growth is far less volatile than production.

Oil consumption to grow in emerging Asia and Australia

Non-OECD countries are expected to account for all of the growth in global oil consumption over the outlook period, with consumption forecast to reach 55 million barrels a day in 2021, up from 51 million in 2018.

Consumption in China is expected to reach 14 million barrels a day in 2021, increasing at an average annual rate of 2.8 per cent. In India, the 2021 forecast is 5.4 million barrels a day, with 4.2 per cent annual growth.

By contrast, consumption by the OECD nations is expected to remain steady at 48 million barrels a day over the outlook period, as energy efficiency improves. While Australia is part of the OECD, its consumption of oil products over the past decade has more closely resembled the non-OECD trend. Australia consumed 1.1 million barrels of oil in 2018. In the absence of policy change, Australia's consumption of oil products is expected to grow at an annual rate of 1.6 per cent to 2021.

Since the March 2019 *Resources and Energy Quarterly,* the forecast for global oil consumption has been revised down by 0.2 million barrels a day due to continued trade tensions and a weakening global economy.

Box 8.1: Higher fuel quality standards to reduce shipping pollution

On 1 January 2020, new International Maritime Organisation shipping fuel quality standards come into force which will reduce air pollution, reshape the global oil refining sector and may disrupt oil markets.

From this date, shipping will run on bunker fuel with a maximum 0.5 per cent sulphur content — a major change to current standards which allow up to 3.5 per cent sulphur. Rather than switching to low-sulphur fuel, some shipping operators may choose to switch to natural gas or to install emission scrubber equipment. All options are likely to increase the cost of shipping, but current bunker fuels cause shipping emissions to be highly toxic and a major source of air pollution.

The change is not expected to affect the total amount of oil consumed, but will likely alter the composition of demand. As up to 3 million barrels a day of fuel demand is expected to shift from high-sulphur fuel oil to low-sulphur fuels, some sour/heavy crude oil grades currently used to produce high sulphur fuel oil will likely see demand decline. As new and reconfigured refineries ramp up to meet the new standard, sweet light crudes such as the Brent and WTI benchmarks are likely to be in greater demand.

Adjustment in the global oil refining industry will require investment, and will take time. Volatility is likely in the meantime, with some analysts estimating a temporary increase in the Brent benchmark price of up to US$7 a barrel for part of 2020.

Sources: International Energy Agency, 2019, *Oil 2019: Analysis and Forecasts to 2024*; S&P Global Platts, 2019, *Turning Tides: The Future of Fuel Oil after IMO2020.*

8.4 World oil production

Despite US growth, world production has been constrained by the production-limiting efforts of OPEC+ and the impact of US sanctions.

Since the March 2019 *Resources and Energy Quarterly*, the immediate supply outlook has deteriorated materially, with forecast 2019 production levels revised down from 100.7 to 100.0 million barrels a day. Total output growth is forecast to remain muted through 2020 and to recover strongly during 2021, with production at 104 million barrels a day (Figure 8.3).

The OPEC+ supply agreement required each participant to reduce their output against an October 2018 benchmark, and the following analyses changes since that month for consistency. In the seven month period from October 2018 to May 2019, global oil production decreased by more than OPEC+ expected.

OPEC+ cuts production and unplanned outages materialise

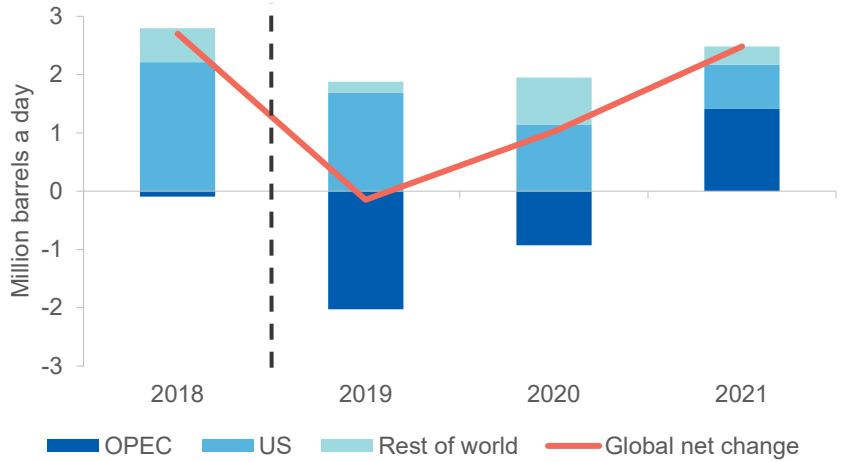
By the end of May 2019, the change in OPEC+ total oil (crude and natural gas liquids) production was –2.8 million barrels a day compared with October 2018. This large reduction in output was the combination of voluntary cuts and involuntary outages and represents a substantial 5 per cent loss of supply from this group of 24 producer nations.

Voluntary cuts (comparing October 2018 to May 2019 production) were achieved by key nations Saudi Arabia (–0.9 million barrels a day), Russia (–0.3 million barrels a day) and the United Arab Emirates (–0.1 million barrels a day). Russian voluntary production cuts commenced a little later than the Persian Gulf producers due to weather conditions, and continued falling through May and June. Stabilisation of Russian output is expected by July as contamination in the Druzhba pipeline is progressively resolved.

Involuntary cuts have mainly affected the OPEC members exempt from the Vienna Agreement: Iran (–0.9 million barrels a day) and Venezuela (–0.5 million barrels a day). The outlook for these producers is worsening.

Iran is the 6th largest producer of oil in the world. Since May 2019, as part of its 'maximum pressure' campaign against Iran, the US has promised to impose penalties on parties who buy Iranian oil — including those in countries previously granted exemptions from US sanctions. With Iran's output in recent years providing over 4 million barrels a day, a major fall risks upward pressure on oil prices. The US has indicated an expectation that OPEC will increase output to make up for lost Iranian supply.

Figure 8.3: Annual change in forecast world oil production by region



Source: International Energy Agency (2019); Department of Industry, Innovation and Science (2019)

Venezuela also faces US sanctions, along with a political and economic crisis which has crippled the country's oil production. Venezuela has the world's largest proven oil reserves and in the decade to 2015 its oil production averaged almost 3 million barrels a day. Production has fallen every year since 2015, the decline accelerated in 2018, and is now below 1 million barrels a day, with improvement unlikely over the outlook period.

OPEC+ is expected to meet in early July to consider a new production agreement. At the time of writing, it is expected that OPEC+ will agree to hold production at current levels, effectively extending the Vienna Agreement to the end of 2019. This expectation is supported by the current weakness in oil prices, the declining world economic outlook, the impact of geo-political factors, and the rate of increase in US shale output

(for more detail on US oil production, see Box 8.1 in the March 2019 *Resources and Energy Quarterly,* on page 75).

OPEC output to 2021 is forecast to remain below 2018 levels, with Saudi Arabia's return to normal production and a slow recovery of Iran's output. Venezuela's production is expected to take longer to recover.

Middle East producers face additional risks relating to the escalating threat of sabotage, and of military conflict. US forces were deployed to the region in early May, and a number of oil tankers were damaged in the Gulf of Oman on 12 May and 13 June 2019. The US stated it believed Iran to be responsible for the attacks on tankers.

Rapid US growth continues

US oil output increased by 0.7 million barrels a day between October 2018 and May 2019. The annual growth rate of US output is expected to be 11 per cent through 2019 and the country is expected to dominate supply growth over the outlook period on the back of a long period of investment in exploration, wells and infrastructure (Figure 8.3).

US production is forecast to reach 19.1 million barrels a day in 2021, up from 15.5 million barrels a day in 2018.

8.5 Australia's production and trade

Export earnings grow strongly on output surge

Higher crude and condensate export volumes, higher prices and a weak Australian dollar combined to drive export earnings up to an estimated $9.3 billion in 2018–19, a 34 per cent increase on the previous financial year.

The outlook for crude and condensate remains strong, with production forecast to increase at an average annual rate of 10 per cent, from 338,000 barrels a day in 2018–19 to 409,000 barrels a day in 2020–21.

Annual export earnings from crude and condensate are forecast to rise from $9.3 billion in 2018–19 to $12.0 billion in 2019–20, due to rising export volumes and higher prices (Figure 8.4).

Compared with the previous year, a 51 per cent increase in condensate production — primarily from new offshore LNG projects — more than offset the ongoing decline in crude production (Figure 8.5). The effects of this compositional change in oil production is illustrated in Box 8.2.

Box 8.2: Australia exports oil to the Middle East

The composition of Australia's oil exports is changing, with condensate exports growing strongly this year while crude oil exports have declined. For the most part, Australian exports are destined for Asian refineries and petrochemical processors — Singapore and Thailand are typically the major buyers.

However in the March quarter 2019, Australian producers exported 330.3 million litres of condensate to the United Arab Emirates (UAE). This was roughly one-tenth of Australia's total petroleum exports over the quarter.

Until now, the UAE has been exclusively a source of imported crude oil for Australia. Our refineries currently import 83 per cent of the crude oil they process, and the UAE is our second biggest source of refinery feedstock. Since different forms of oil are used by different types of facility to produce a range of end products, this relationship could continue: Australia importing crude oil from the UAE while the UAE imports condensate from Australia.

In 2018–19, Australia is estimated to have exported 257,000 barrels a day, or 76 per cent of its crude and condensate production.

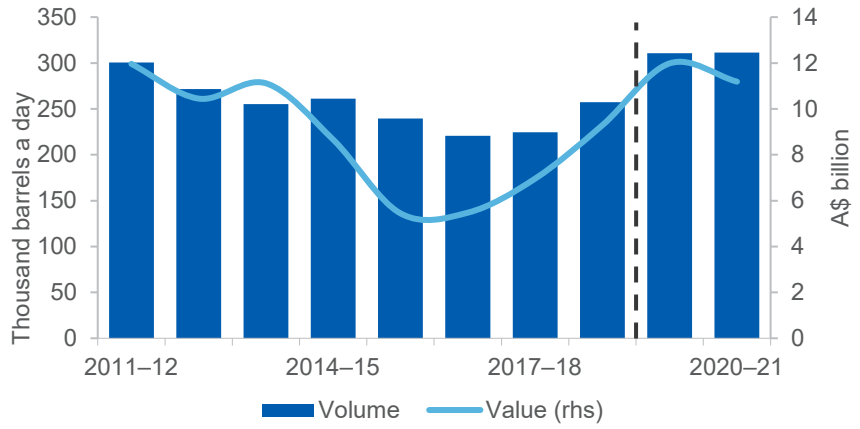
Source: Australian Petroleum Statistics (2019).

Crude oil production hits the bottom

The long decline in domestic crude oil production appears to have bottomed in 2018–19, at an estimated 109,000 barrels a day. Crude production in 2020–21 is forecast to be 24 per cent higher than this.

In Carnarvon, at Woodside's Vincent and Enfield fields, production has temporarily ceased in preparation for the Greater Enfield expansion —

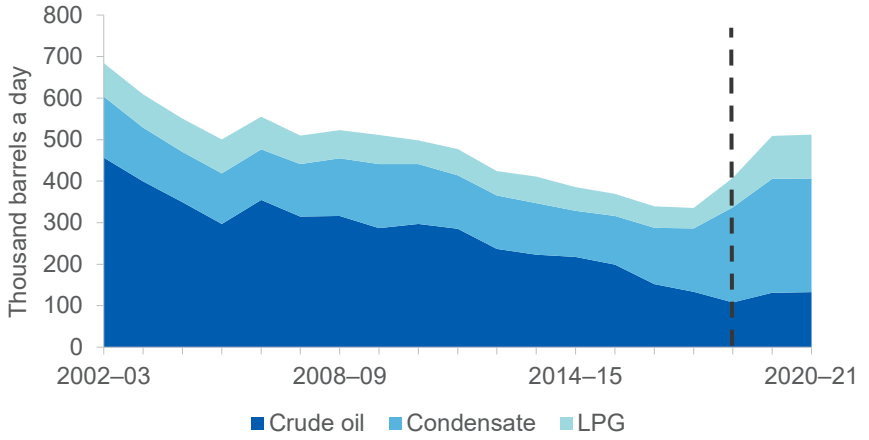
Figure 8.4: Australia's annual oil exports



Notes: Includes crude oil and condensate, but excludes LPG.

Source: ABS (2018); Department of Industry, Innovation and Science (2019).

Figure 8.5: Composition of Australia's petroleum production



Source: EnergyQuest (2019); Australian Petroleum Statistics (2019); Department of Industry, Innovation and Science (2019).

which is expected to come online in 2019–20. Santos' offshore Mutineer Exeter ceased operating last year. BHP's Pyrenees operations are back online, after planned maintenance in 2018, but production levels since then have been below expectations. In Bonaparte, Jadestone's Montara field restarted in January after maintenance, and almost doubled its production in the March quarter 2019, year-on-year.

Condensate and LPG production up strongly

Condensate output is forecast to grow 10 per cent a year, from 230,000 barrels a day in 2018–19 to 274,000 barrels a day in 2020–21.

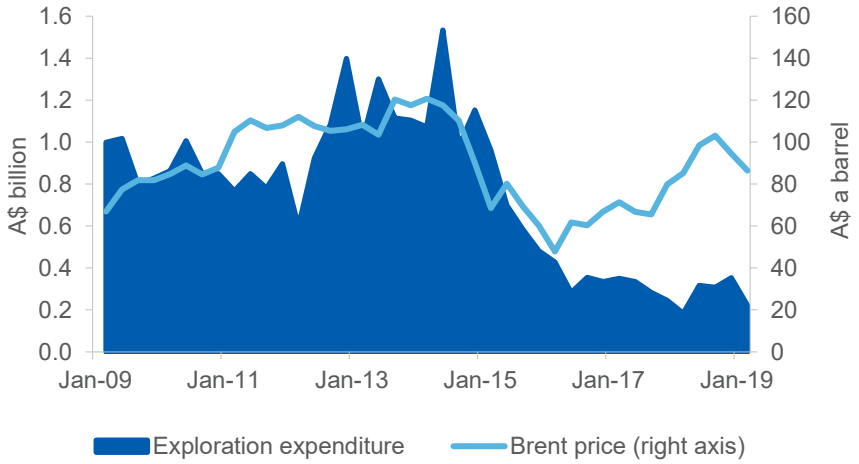
In late 2018, new condensate production came online off the Western Australian coast — in the Browse Basin — with the start-up of Train 1 at INPEX's Ichthys facility. Ichthys has a nameplate capacity of 100,000 barrels a day of condensate, and has ramped up quickly, producing at over 50 per cent of capacity in the March quarter 2019. Also in the Browse Basin, Shell's Prelude facility has commenced operations, producing around 25 per cent of its nameplate capacity of 36,000 barrels a day. The output of both is expected to increase further through 2019.

As a result of Ichthys coming online, LPG production in the March quarter 2019 was higher year-on-year despite Esso's Gippsland Basin joint venture in the Bass Strait producing only half its usual output. By 2020–21, Australian LPG output is expected to reach 106,000 barrels a day — an annual growth rate of 25 per cent since 2018–19.

Exploration expenditure low, but trend could be turning

Petroleum exploration expenditure was $223 million in the March quarter 2019, up 21 per cent year-on-year. Exploration expenditure has fallen for over a decade, and this quarter's result provides a preliminary indication that 2018 may have been the bottom. High oil prices in Australian dollar terms (Figure 8.6) may be motivating a modest return of confidence in the oil and gas industry.

Figure 8.6: Australian petroleum exploration and oil price



Source: ABS (2019) Mineral and Petroleum Exploration Expenditure, cat. 8412.0, Bloomberg (2019).

Australia's refinery production steady

Australia's refinery production was 498,000 barrels a day in the March quarter 2019, unchanged from 2018. To meet Australian demand, an estimated 60 per cent of refined product was imported in 2018–19, including 70 per cent of diesel and 36 per cent of automotive gasoline.

Australian refinery production is expected to average around 492,000 barrels a day over the outlook period to 2020–21. Imports of refined fuels are likely to increase to meet expected growth in Australian consumption.

Revisions to the outlook

Australia's forecast oil export earnings have been revised down by $145 million in 2018–19 and up by $650 million in 2019–20, compared to the forecast in the March 2019 *Resources and Energy Quarterly*. Both periods have slightly lower expected export volumes and the 2019–20 revision reflects temporarily higher forecast oil prices as a result of new shipping fuel standards, and weak world production growth.

Table 8.1: Oil outlook

						Annual percentage change		
World	**Unit**	**2018**	**2019[f]**	**2020[f]**	**2021[f]**	**2019[f]**	**2020[f]**	**2021[f]**
Production[a]	mb/d	100.1	100.0	101.0	103.5	-0.1	1.0	2.5
Consumption[a]	mb/d	99.1	100.4	101.8	103.1	1.3	1.4	1.3
WTI crude oil price								
– Nominal	US$/bbl	65.1	61.3	66.4	66.5	-5.8	8.3	0.2
– Real[b]	US$/bbl	66.6	61.3	64.9	63.6	-7.9	5.8	-2.0
Brent crude oil price								
– Nominal	US$/bbl	71.2	69.5	72.4	70.5	-2.3	4.1	-2.6
– Real[b]	US$/bbl	72.8	69.5	70.7	67.4	-4.4	1.7	-4.7
Australia	**Unit**	**2017–18**	**2018–19[s]**	**2019–20[f]**	**2020-21[f]**	**2018–19[f]**	**2019–20[f]**	**2020-21[f]**
Crude and condensate								
Production[a]	kb/d	286	338	409	409	18.3	21.0	0.1
Export volume[a]	kb/d	225	257	311	311	14.5	20.8	0.2
– Nominal value	A$m	6,958	9,288	11,984	11,186	33.5	29.0	-6.7
– Real value[g]	A$m	6,994	9,288	11,703	10,662	30.9	26.0	-8.9
Imports[a]	kb/d	386	386	354	352	-0.2	-8.3	-0.6
LPG production[ac]	kb/d	50	70	103	106	41.6	46.9	2.7
Refined products								
– Refinery production[a]	kb/d	494	499	487	485	1.1	-2.5	-0.4
– Export volume[ad]	kb/d	18	16	17	12	-8.9	3.7	-24.9
– Import volume[a]	kb/d	645	649	662	697	0.7	1.9	5.4
– Consumption[e]	kb/d	1,040	1,072	1,090	1,105	3.0	1.6	1.4

Notes: **a** The number of days in a year is assumed to be 365, and a barrel of oil equals 158.987 litres; **b** In 2019 calendar year US dollars; **c** Primary products sold as LPG; **d** Excludes LPG; **e** Domestic sales of marketable products, including imports; **f** Forecast; **g** In 2018–19 financial year Australian dollars; **s** Estimate.

Sources: ABS (2019) cat. 5368.0, International Energy Agency (2019), EnergyQuest (2019), US Energy Information Administration (2019), Department of Environment and Energy (2019), Department of Industry, Innovation and Science (2019).