8. Oil

Resources and Energy Quarterly September 2018

Around 70% of crude and condensate production comes from the Carnarvon basin, offshore from WA.

Australia’s production of crude and condensate peaked in 2000, at 41,300 ML.

Around 23% of refinery feedstock is domestically produced. On average 76% is imported.

Share of Australia’s refined product consumption produced domestically:

- 33% Diesel
- 42% LPG
- 59% Automotive gasoline
- 40% Aviation turbine fuel
- 67% Fuel oil

In 2017–18, around 70% of Australia’s imported petroleum came from:

1. Korea 9874
2. Malaysia 9772
3. Singapore 9619
4. Japan 5076

17% 17% 17% 9%

UAE 3994

7%

Historic price snapshot:
Brent crude oil in the last five years (US$ per barrel)

Highest price: $117 (6/09/2013)
2018 average: $72
Lowest price: $26 (19/01/2016)

Note: excludes natural gas imports. Measured in million litres.
8.1 Summary

- Oil prices are expected to remain around current levels over the outlook period, with world production being carefully managed by OPEC. The Brent spot price is forecast to average US$72 a barrel in 2020.
- Australia’s export volumes are expected to increase from 226 thousand barrels a day in 2017–18 to a forecast 331 thousand barrels a day in 2019–20, supported by rising condensate output at new LNG projects.
- The value of Australia’s crude and condensate exports is set to increase from $7.0 billion in 2017–18 to a forecast $11 billion in 2019–20, driven by higher volumes and steady prices.
- Trade tensions and any downturn in world economic activity pose a risk to oil consumption and the oil price outlook.

8.2 Prices

Oil markets settle with OPEC compliance

Oil prices were broadly stable over the September quarter 2018 — a break from the volatility witnessed over the past four years. An adjustment to the OPEC+ production agreement gave markets confidence around output levels. The agreed adjustment allowed members to raise output to offset unexpected lower output from other members. The Brent spot price is estimated to be US$75 a barrel in the September quarter. This was little changed from the previous quarter, and 45 per cent higher than the same period in 2017, as shown in Figure 8.1.

Oil prices expected to stabilise around current levels

Over the outlook period, oil prices are expected to maintain recent price gains, see Figure 8.2. Markets are expected to be balanced over the short term, as higher production is countered with modest consumption growth. The Brent oil spot price is forecast to average US$72 a barrel in 2018, US$15 a barrel higher than in 2017. Prices are expected to stay around this level over the outlook period, however there are significant risks: world supply shortages due to sanctions on Iran, uncertainty around production from OPEC producers Libya and Nigeria. Any downturn in economic activity will weigh on prices.
8.3 World oil consumption

World oil consumption is forecast to average 99 million barrels a day in 2018, 1.2 per cent higher than in 2017. Marginal growth over the outlook period is expected, with consumption forecast to reach 101 million barrels a day in 2020. Consumption growth is expected to occur primarily in non-OECD economies — most significantly China and India (Figure 8.3).

Non-OECD economic growth supports oil consumption growth

Non-OECD countries account for around half of world oil consumption. Over the next two years, non-OECD consumption is forecast to grow by around 2.3 per cent per year to reach 54 million barrels a day in 2020. Consumption in China is forecast to increase by around 3.3 per cent a year, to reach a forecast 13.8 million barrels a day in 2020. The most significant growth rate is expected in India, where consumption is forecast to increase at an average rate of almost 5 per cent a year, to reach 5.2 million barrels a day in 2020.

Consumption growth is sensitive to price, and higher oil prices over the last year have weighed on potential consumption growth. Some countries, including Indonesia, removed oil price subsidies in recent years are now acting to shelter consumers from current higher prices. Ongoing high prices could have a negative impact on consumption growth. As such, it is expected OPEC and other major producers will act to keep prices within an acceptable range.

Economic activity important for continuing OECD consumption

Over the outlook period, OECD consumption is expected to be flat — in 2020 consumption is forecast to be similar to current levels, at 48 million barrels a day.

Consumption growth is expected to be balanced by energy efficiency improvements, particularly with tighter emissions controls in transport and shipping (see Figure 8.4). Heightened trade tensions, which may weigh on manufacturing and trade activity, pose a risk to oil consumption growth.
8.4 World oil production

World oil production is expected to increase materially in 2018, after two years of little aggregate change. A slight adjustment to the OPEC production agreement has prompted higher production from Russia, Kuwait and the UAE, while US production continues to grow despite infrastructure constraints.

World oil production is forecast to increase by an average 1.5 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 the end of the outlook period.

OPEC+ continues to comply with adjusted production agreement

The 2017 production agreement, established between OPEC, Russia, Mexico and eight other countries (collectively known as OPEC+) has been upheld in 2018. The agreement targets a 1.8 million barrel a day combined decrease in production. In July 2018, the OPEC+ agreement was adjusted in response to concerns about production shortages; OPEC production had been lower than the target amount, leading to a fall in inventories. The adjusted agreement allows individual countries to increase production, to bring combined OPEC+ production closer to the target level, rather than falling short. This change has helped alleviate concerns about falling Venezuelan production and the future reductions in Iran’s output (see Figure 8.5). At this stage, it is unclear how significant the impact of the US sanctions on Iran will be. The restrictions, due to come into full effect in November, have prompted some countries to cease imports of Iranian crude, while other countries are seeking exemptions. Over the outlook period it is expected OPEC, and in particular Saudi Arabia, will control production to maintain current price levels.

Continued US production growth

US production is expected to increase considerably over the next two years, as production from shale plays continues to grow. Output is forecast to increase to almost 17 million barrels a day in 2020. Infrastructure constraints and stagnating productivity may weigh on growth.
8.5 Australia’s production and trade

Export earnings growth supported by oil prices and condensate production

Australia’s petroleum exports grew to $7.0 billion in 2017–18, 27 per cent higher than the previous year. This increase was mostly attributable to the rise in oil prices.

Over the next two years, export earnings are forecast to continue growing, as oil prices maintain recent gains and condensate production ramps-up as new LNG projects come online. Export earnings are forecast to reach $11 billion in 2019–20, as shown in Figure 8.7.

Export earnings have been revised down by $65 million since the June Resources and Energy Quarterly, due to downward revisions to production forecasts outweighing the positive contribution of higher export prices.

Continued volumes growth supports exports

The volume of Australia’s petroleum exports totalled 226 thousand barrels a day in 2017–18, increasing by 2.6 per cent over the year.

Export volumes are forecast to increase by around 20 per cent a year over the outlook period, reaching 331 thousand barrels a day in 2019–20. Higher condensate production from the LNG projects, which will primarily be directed to export markets, is expected to support this growth.

Lower crude oil production outweighed by higher condensate production

Australia’s crude and condensate production averaged 286 thousand barrels a day in 2017–18, a marginal increase on the previous year.

Total petroleum production is forecast to increase over the outlook period, despite declining crude oil production from mature fields. New condensate production from the Ichthys, Wheatstone and Prelude projects is expected online before the end of 2018. As production from these projects ramps up, Australia’s total crude and condensate production is forecast to reach 401 thousand barrels a day in 2019–20 (see Figure 8.8). Woodside’s Greater Enfield project, with a capacity of 40 thousand barrels a day, is expected to be producing by mid-2019. LPG production and export capacity is also set to increase, as discussed in box 8.1.

Figure 8.7: Australia’s petroleum export volumes and values

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

Figure 8.8: Australia’s petroleum production outlook

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

Australia’s petroleum exploration expenditure was $1.0 billion in 2017–18, 25 per cent lower than the previous year. Lower oil prices have contributed to subdued exploration activity. In the September quarter, there was news of a 186 million barrel discovery in the Dorado oil field, in the North West Shelf.

Australia’s refinery production

Australia’s refinery production was 494 thousand barrels a day in 2017–18, up 4.8 per cent over the year, as refineries maintained strong operating rates. Refined product imports also increased slightly, up 3.4 per cent over the year, to reach 645 thousand barrels a day in 2017–18. Over the outlook period, refinery production is forecast to average 475 thousand barrels a day in 2019–20. To address growing consumption, imports are forecast to increase at an average annual rate of 1.6 per cent.

Box 8.1: Looking into LPG

LPG (liquefied petroleum gas) is made up of propone and butane. Around 70 per cent of Australia’s LPG is naturally occurring and is co-produced at gas fields. The remainder is produced as part of the crude oil refining process.

Australia’s LPG production exceeds domestic consumption. Australia’s LPG production was around 50 thousand barrels a day in 2017–18, around 80 per cent of which is exported. In Australia, LPG is used in light vehicle transportation, forklifts, household appliances and heating. Around 2.4 billion litres of LPG was consumed in 2016–17.

Australia’s LPG production is expected to increase over the next few years as new capacity comes online. The largest of these new projects is Inpex’s Ichthys project, which is expected to add annual capacity of 1.6 million tonnes, almost doubling Australia’s LPG output potential. Another development is Origin’s prospective LPG import terminal currently being considered in South Australia. This project could provide a diversified fuel source and stored capacity for Origin’s Quarantine power station.
Table 8.1: Oil outlook

<table>
<thead>
<tr>
<th>World</th>
<th>Unit</th>
<th>2017</th>
<th>2018&lt;sup&gt;f&lt;/sup&gt;</th>
<th>2019&lt;sup&gt;f&lt;/sup&gt;</th>
<th>2020&lt;sup&gt;f&lt;/sup&gt;</th>
<th>2018&lt;sup&gt;f&lt;/sup&gt;</th>
<th>2019&lt;sup&gt;f&lt;/sup&gt;</th>
<th>2020&lt;sup&gt;f&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production&lt;sup&gt;a&lt;/sup&gt;</td>
<td>mb/d</td>
<td>97.4</td>
<td>99.1</td>
<td>100.8</td>
<td>101.9</td>
<td>1.7</td>
<td>1.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Consumption&lt;sup&gt;a&lt;/sup&gt;</td>
<td>mb/d</td>
<td>97.9</td>
<td>99.0</td>
<td>100.4</td>
<td>101.4</td>
<td>1.1</td>
<td>1.4</td>
<td>1.1</td>
</tr>
<tr>
<td>Annual percentage change</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WTI crude oil price</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Nominal</td>
<td>US$/bbl</td>
<td>50.8</td>
<td>67.4</td>
<td>67.3</td>
<td>66.0</td>
<td>32.6</td>
<td>−0.1</td>
<td>−1.9</td>
</tr>
<tr>
<td>· Real&lt;sup&gt;b&lt;/sup&gt;</td>
<td>US$/bbl</td>
<td>52.1</td>
<td>67.4</td>
<td>65.8</td>
<td>63.9</td>
<td>29.4</td>
<td>−2.3</td>
<td>−3.0</td>
</tr>
<tr>
<td>Brent crude oil price</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Nominal</td>
<td>US$/bbl</td>
<td>54.3</td>
<td>72.4</td>
<td>72.8</td>
<td>71.5</td>
<td>33.2</td>
<td>0.5</td>
<td>−1.7</td>
</tr>
<tr>
<td>· Real&lt;sup&gt;b&lt;/sup&gt;</td>
<td>US$/bbl</td>
<td>55.7</td>
<td>72.4</td>
<td>71.1</td>
<td>69.1</td>
<td>30.0</td>
<td>−1.7</td>
<td>−2.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude and condensate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production&lt;sup&gt;a&lt;/sup&gt;</td>
<td>kb/d</td>
<td>283</td>
<td>286</td>
<td>333</td>
<td>401</td>
<td>1.2</td>
<td>16.5</td>
<td>20.2</td>
</tr>
<tr>
<td>Export volume&lt;sup&gt;a&lt;/sup&gt;</td>
<td>kb/d</td>
<td>221</td>
<td>226</td>
<td>275</td>
<td>331</td>
<td>2.6</td>
<td>21.4</td>
<td>20.4</td>
</tr>
<tr>
<td>· Nominal</td>
<td>A$m</td>
<td>5,476</td>
<td>6,963</td>
<td>9,682</td>
<td>11,376</td>
<td>27.2</td>
<td>39.1</td>
<td>17.5</td>
</tr>
<tr>
<td>· Real value&lt;sup&gt;g&lt;/sup&gt;</td>
<td>A$m</td>
<td>5,710</td>
<td>7,123</td>
<td>9,682</td>
<td>11,107</td>
<td>24.8</td>
<td>35.9</td>
<td>14.7</td>
</tr>
<tr>
<td>Imports&lt;sup&gt;a&lt;/sup&gt;</td>
<td>kb/d</td>
<td>351</td>
<td>386</td>
<td>391</td>
<td>373</td>
<td>10.0</td>
<td>1.5</td>
<td>−4.8</td>
</tr>
<tr>
<td>LPG production&lt;sup&gt;ac&lt;/sup&gt;</td>
<td>kb/d</td>
<td>52</td>
<td>50</td>
<td>82</td>
<td>111</td>
<td>−4.3</td>
<td>66.0</td>
<td>34.5</td>
</tr>
<tr>
<td>Refined products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Refinery production&lt;sup&gt;a&lt;/sup&gt;</td>
<td>kb/d</td>
<td>471</td>
<td>494</td>
<td>483</td>
<td>475</td>
<td>4.8</td>
<td>−2.3</td>
<td>−1.6</td>
</tr>
<tr>
<td>· Export volume&lt;sup&gt;ad&lt;/sup&gt;</td>
<td>kb/d</td>
<td>18</td>
<td>18</td>
<td>17</td>
<td>18</td>
<td>−3.5</td>
<td>−1.3</td>
<td>1.5</td>
</tr>
<tr>
<td>· Import volume&lt;sup&gt;a&lt;/sup&gt;</td>
<td>kb/d</td>
<td>616</td>
<td>645</td>
<td>666</td>
<td>670</td>
<td>4.6</td>
<td>3.3</td>
<td>0.7</td>
</tr>
<tr>
<td>· Consumption&lt;sup&gt;d&lt;/sup&gt;</td>
<td>kb/d</td>
<td>1,006</td>
<td>1,042</td>
<td>1,077</td>
<td>1,093</td>
<td>3.6</td>
<td>3.3</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Notes: a Number of days in a year is assumed to be exactly 365.25; b in 2018 calendar year dollars; c Primary products sold as LPG; d Domestic sales of marketable products; f forecast; g in 2018–19 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).