Uranium
Resources and Energy Quarterly September 2018

Australia holds 31% of the world's proven uranium reserves.

Australia is the 3rd largest producer of uranium in the world.

Uranium makes up 11% of global electricity generation.

There are 245 civil research reactors operating across 55 countries.

Australia produces and exports more than 7,000 tonnes of uranium every year.

More than 450 nuclear power reactors across 30 countries.

Major Australian uranium deposits (tonnes):
- <2,967
- 2,968–9,762
- 9,763–17,571
- 17,572–59,338
- >59,339

Deposit
Operating mine

Uranium required in 2017 (tonnes):
- USA: 17,847
- France: 9,216
- Russia: 7,767
- China: 7,757
- South Korea: 4,816
- Japan: 2,517

NT
QLD
WA
SA
NSW
VIC
TAS
9.1 Summary

- Uranium spot prices lifted sharply in July, and appear to be firming up after a long period of decline and stagnation. Prices are expected to retain their recent lift and rise gradually in the medium term, reaching US$28 a pound by 2020.
- Uranium production in Australia is expected to be largely steady at around 7,000 tonnes annually over the outlook period. However, there is potential for higher growth beyond the outlook period should further price recovery encourage a re-opening of the Honeymoon mine in South Australia.
- Slow growth in prices should support a gradual rise in Australia’s uranium export earnings, which are forecast to reach almost $700 million by 2019–20.

9.2 Prices

Prices stabilised in early 2018, and rose in July

Uranium spot prices appear to be slowly recovering in the wake of several significant production cuts from major producers in Kazakhstan and Canada. Prices rose from US$22.65 a pound in June to US$25.78 a pound in July and $US26.30 in August. While this price level remains unprofitable for most producers, it is the highest price since mid-2016, and well above the low point of US$18 a pound reached in late 2017. Prices are expected to largely hold onto the recent rise, and increase a little further over the medium term, averaging US$26.20 in 2019 and US$28.00 in 2020 (see Figure 9.1).

However, although production cuts are significant and potentially long-lasting, the uranium market remains awash in inventories. Inventory build-up will likely soften any significant price pressure in the short-term. New reactors in China, India and the Middle East will raise demand over the longer term, but this rise will be partially checked by efficiency gains among the newer reactors, and by the gradual emergence of new reactor technology which allows more spent fuel to be recycled.
9.3 World consumption

Nuclear power growth is moderate — but a new region is showing interest

Uranium use is projected to grow from 84,100 tonnes in 2018 to 94,300 tonnes by 2020, but conditions among individual countries are mixed, with growth concentrated in China (see Figure 9.3).

Conditions for nuclear generation remain difficult in the US, with six reactors closing since 2013 and several others moving towards early closure as high regulatory costs make them uncompetitive against cheap shale gas. Plant operators have warned that recent tariff threats targeting uranium would further reduce their competitiveness, with the US Department of Commerce launching an investigation as a result.

In the EU, Germany and Italy have shut down reactor constructions, with Germany aiming to shift away from nuclear energy by 2022. Partly offsetting this, France has re-committed to nuclear power, while Eastern European and Nordic nations continue to add new reactors incrementally.

In other countries, nuclear power deployment is accelerating, with more plants under construction across the world than at any time in the last 25 years. China, with 41 reactors, intends to build more than 200 more. China connected the largest reactor ever built in June, with the 1660 megawatts electric (MWe) Taishan unit 1 commencing generation in Guangdong province. One day later, the Sanmen unit 1 reactor commenced in Zhejiang. Shortly after this, the Sanmen 2 reactor was completed, and the Haiyang 1 reactor advanced into fuel loading. The Haiyang and Sanmen reactors are the first AP1000 units to be built.

New reactors are also being deployed in other parts of Asia: Russia and India are seeking to double their nuclear capacity, while capacity in the Middle East is expected to more than triple over the next 10 years.

In Japan, Kansai Electric and Kyushu Electric recommenced generation at two significant reactors in the September quarter. A further 18 reactors have applied to re-open, though approvals remain slow. Japan’s new energy plan, released in July, calls for nuclear energy to account for 20-22
per cent of power generation by 2030 — approximately equal to the share projected for renewable energy. The most significant phase-outs now appear to be targeting coal and oil, which are expected to decrease to 26 per cent and 3 per cent of generation (respectively) by 2030. The plan confirms that nuclear power remains ‘an important baseload power source that contributes to the stability of the long-term energy supply’.

9.4 World production

Production cuts are likely to last for some time

Global uranium production has been squeezed by a series of suspensions and production cuts in Canada, Niger, and Kazakhstan. This is expected to cut mine output by more than 10 per cent in 2018, to 62,100 tonnes.

Large producers appear to be doubling down on these production cuts, with Cameco extending its production pauses indefinitely at the McArthur River and Key Lake mines in Canada. The firm is seeking to draw down inventories and improve efficiency to support its cash flow. The pause means that production from the McArthur River mine — the largest uranium mine in the world — will be effectively nil in 2018.

Mined supply may rise in other places, however, with the Tanzanian government recently stepping up in its implementation of International Atomic Energy Agency (IAEA) recommendations, which include stronger regulatory infrastructure and proper legislation for safe mining and sales. Tanzania’s progress suggests it is prioritising efforts to become a significant uranium producer in the future.

Supply may lift from secondary sources as well. Canada’s SNC-Lavelin company has recently agreed to expand its supply of Natural Uranium Equivalent fuel to the Qinshan Phase III plant in China. This fuel is made up from depleted and recycled uranium, and further expansions in use of this fuel type could expand the secondary market in uranium. Nuclear generation continues to slowly pivot towards a more recycling-based, ‘closed loop’ approach, which should significantly cut waste and reduce future dependence on uranium mining.
9.5 Australia

Australia’s uranium exploration has virtually dried up

As Figure 9.6 shows, only $1.6 million was spent on uranium exploration in the June quarter 2018. This is the lowest spend since 2004, and reflects the impact of a long period of low prices as well as a recent state government ban on new uranium mines in Western Australia.

Uranium exploration is now largely confined to a few sites in South Australia, the Northern Territory, and Queensland. Recent price gains may create an incentive for wider exploration in subsequent quarters.

Production is expected to remain largely steady over the next two years

As Figure 9.7 shows, Australian production is expected to lift from 6,654 tonnes in 2017–18 to 7,140 tonnes in 2018–19 and 7,240 tonnes in 2019–20. This reflects a resumption of normal production at Olympic Dam, which previously reduced output during its 2017 mine upgrades.

Prospects for the restart of Boss Resources Honeymoon uranium project in South Australia have recently lifted, with the firm claiming it has de-risked the project commercially and technically. Efforts to restart production have begun, and will likely progress through 2019 and 2020. However, any eventual resumption will occur beyond the outlook period, and will depend on further gains in the uranium price.

Conditions for exporters remain difficult, but Australia is still well placed

Price growth should support export values in coming years, with earnings forecast to lift from $642 million in 2017–18 to $698 million by 2019–20 (see Figure 9.8). Export volumes are expected to edge back from 7,684 tonnes in 2017–18 (a result inflated by the timing of shipments) to 7,240 tonnes by 2019–20.

Although conditions remain tough, the recent price rise is the strongest sign of improvement in some years. Australia remains highly cost-competitive among uranium producers globally, and is well-placed to capture the gains should conditions continue to improve.
Table 9.1 Uranium outlook

<table>
<thead>
<tr>
<th>World</th>
<th>Unit</th>
<th>2017</th>
<th>2018(^f)</th>
<th>2019(^f)</th>
<th>2020(^f)</th>
<th>2018(^f)</th>
<th>2019(^f)</th>
<th>2020(^f)</th>
</tr>
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<tbody>
<tr>
<td>Production</td>
<td>kt</td>
<td>69.0</td>
<td>62.1</td>
<td>65.9</td>
<td>72.5</td>
<td>−10.0</td>
<td>6.1</td>
<td>10.0</td>
</tr>
<tr>
<td>Africa(^b)</td>
<td>kt</td>
<td>9.1</td>
<td>8.8</td>
<td>9.2</td>
<td>10.0</td>
<td>−3.4</td>
<td>4.8</td>
<td>8.6</td>
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<td>Canada</td>
<td>kt</td>
<td>15.6</td>
<td>8.2</td>
<td>11.8</td>
<td>16.8</td>
<td>−47.2</td>
<td>43.3</td>
<td>42.3</td>
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<tr>
<td>Kazakhstan</td>
<td>kt</td>
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<td>27.0</td>
<td>27.0</td>
<td>27.5</td>
<td>1.3</td>
<td>0.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Russia</td>
<td>kt</td>
<td>3.6</td>
<td>3.7</td>
<td>3.7</td>
<td>3.8</td>
<td>2.3</td>
<td>0.0</td>
<td>3.1</td>
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<tr>
<td>Consumption</td>
<td>kt</td>
<td>80.9</td>
<td>84.1</td>
<td>89.7</td>
<td>94.3</td>
<td>3.8</td>
<td>6.8</td>
<td>5.0</td>
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<tr>
<td>European Union 28</td>
<td>kt</td>
<td>22.9</td>
<td>22.5</td>
<td>23.5</td>
<td>23.3</td>
<td>−2.1</td>
<td>4.6</td>
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<tr>
<td>United States</td>
<td>kt</td>
<td>21.8</td>
<td>21.8</td>
<td>21.8</td>
<td>21.7</td>
<td>0.0</td>
<td>0.0</td>
<td>−0.7</td>
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<tr>
<td>China</td>
<td>kt</td>
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<td>12.9</td>
<td>16.3</td>
<td>21.1</td>
<td>24.0</td>
<td>26.3</td>
<td>29.1</td>
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<tr>
<td>Russia</td>
<td>kt</td>
<td>7.9</td>
<td>8.0</td>
<td>8.0</td>
<td>8.1</td>
<td>1.0</td>
<td>0.1</td>
<td>0.8</td>
</tr>
<tr>
<td>Japan</td>
<td>kt</td>
<td>1.3</td>
<td>1.6</td>
<td>1.9</td>
<td>1.9</td>
<td>25.0</td>
<td>18.8</td>
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<tr>
<td>Spot price</td>
<td>US$/lb</td>
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<td>23.7</td>
<td>26.2</td>
<td>28.0</td>
<td>9.3</td>
<td>10.8</td>
<td>6.9</td>
</tr>
<tr>
<td>real(^c)</td>
<td>US$/lb</td>
<td>22.2</td>
<td>23.7</td>
<td>25.6</td>
<td>27.1</td>
<td>6.6</td>
<td>8.3</td>
<td>5.7</td>
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<tr>
<td>Australia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mine production</td>
<td>t</td>
<td>7,295</td>
<td>6,654</td>
<td>7,140</td>
<td>7,240</td>
<td>−8.8</td>
<td>7.3</td>
<td>1.4</td>
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<td>Export volume</td>
<td>t</td>
<td>7,081</td>
<td>7,684</td>
<td>7,140</td>
<td>7,240</td>
<td>8.5</td>
<td>−7.1</td>
<td>1.4</td>
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<tr>
<td>− nominal value</td>
<td>A$m</td>
<td>596</td>
<td>642</td>
<td>675</td>
<td>698</td>
<td>7.8</td>
<td>5.1</td>
<td>3.4</td>
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<tr>
<td>− real value(^d)</td>
<td>A$m</td>
<td>621</td>
<td>657</td>
<td>675</td>
<td>681</td>
<td>5.7</td>
<td>2.7</td>
<td>1.0</td>
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<tr>
<td>Average price</td>
<td>A$/kg</td>
<td>84.2</td>
<td>83.6</td>
<td>94.5</td>
<td>96.4</td>
<td>−0.7</td>
<td>13.1</td>
<td>2.0</td>
</tr>
<tr>
<td>− real(^e)</td>
<td>A$/kg</td>
<td>87.8</td>
<td>85.5</td>
<td>94.5</td>
<td>94.1</td>
<td>−2.6</td>
<td>10.5</td>
<td>−0.4</td>
</tr>
</tbody>
</table>

Notes: b Includes Niger, Namibia, South Africa, Malawi and Zambia; c In 2018 US dollars; d in 2018–19 Australian dollars; f forecast.
Source: Australian Department of Industry, Innovation and Science (2018); Cameco Corporation (2018); Ux Consulting (2018) Uranium Market Outlook