

Aluminium

Resources and Energy Quarterly September 2019

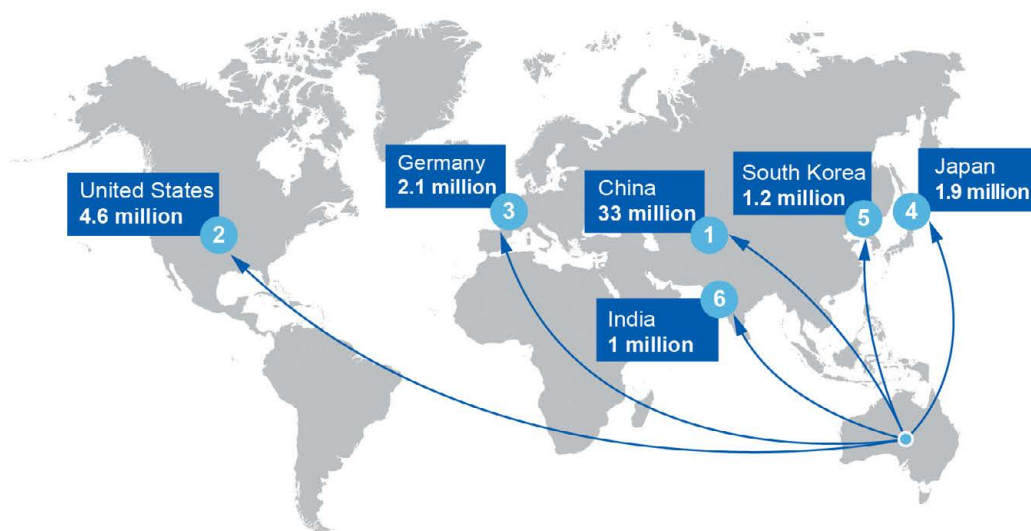
Australia's global ranking



3 stages of producing aluminium



Key consumer markets for aluminium (tonnes)

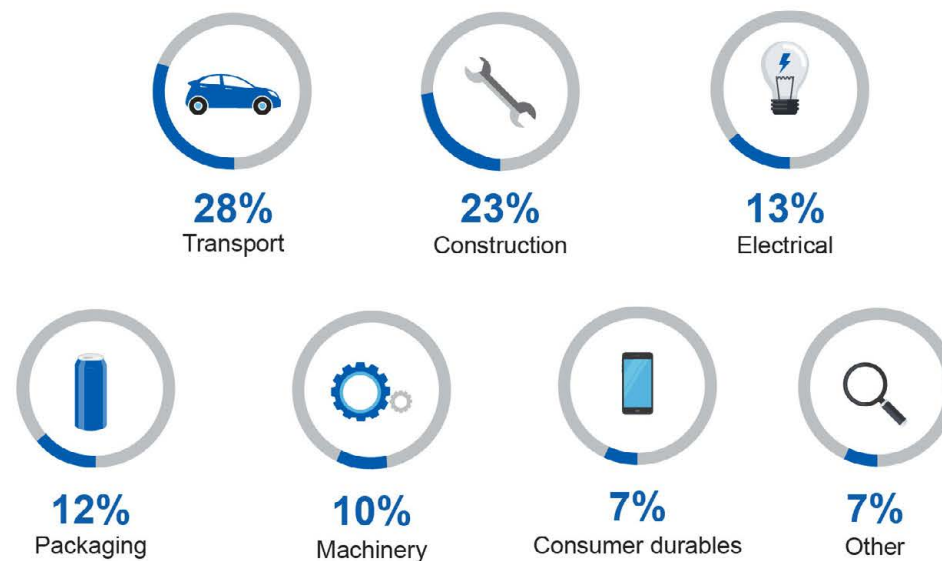


Major Australian alumina deposits (Gt)

- <0.01
- 0.02–0.03
- 0.04–0.09
- 0.10–0.20
- 0.21–0.44
- >0.45
- Deposit
- Operating mine



Global uses of aluminium



11.1 Summary

- Trade tensions between the US and China, and growing aluminium supply are expected to drive aluminium prices lower in 2020 and 2021, to average US\$1,700 and US\$1,615 a tonne, respectively. Alumina prices are also forecast to fall over the outlook period, to average US\$330 a tonne in 2021.
- With no planned expansions to smelter or refinery capacity in Australia until after 2020–21, annual output is forecast to remain steady at 1.6 million tonnes for aluminium and 20 million tonnes for alumina over the outlook period.
- Due to lower forecast prices, the total value of Australian exports of aluminium, alumina and bauxite is expected to fall to \$13 billion in 2020–21, after reaching a peak of \$16 billion in 2018–19.

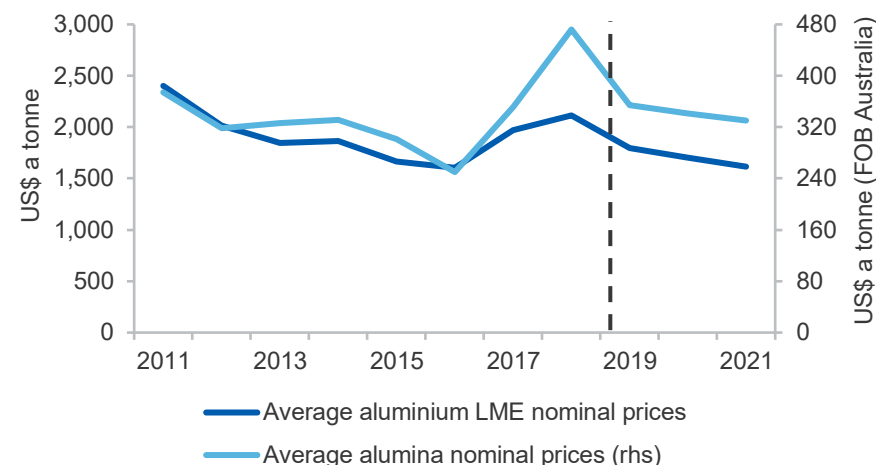
11.2 Prices

Aluminium and alumina prices fell sharply in the September quarter 2019

The London Metal Exchange (LME) spot price for aluminium fell by 15 per cent year-on-year in the September quarter 2019, averaging US\$1,766 a tonne. Escalating trade tensions between the US and China continued to dampen aluminium demand from China — the world's largest aluminium consumer. The fiscal stimulus measures the Chinese government has implemented since October 2018 to offset the impacts of trade tensions with the US have not provided a boost to aluminium demand and global aluminium prices. The price fall was largely contained by the continued inventory drawdown (Figure 11.2) and decreased aluminium production. The LME spot price is expected to remain under pressure for the rest of 2019, and is forecast to fall by 15 per cent in 2019, from an average US\$2,111 a tonne in 2018 to an average US\$1,793 a tonne in 2019.

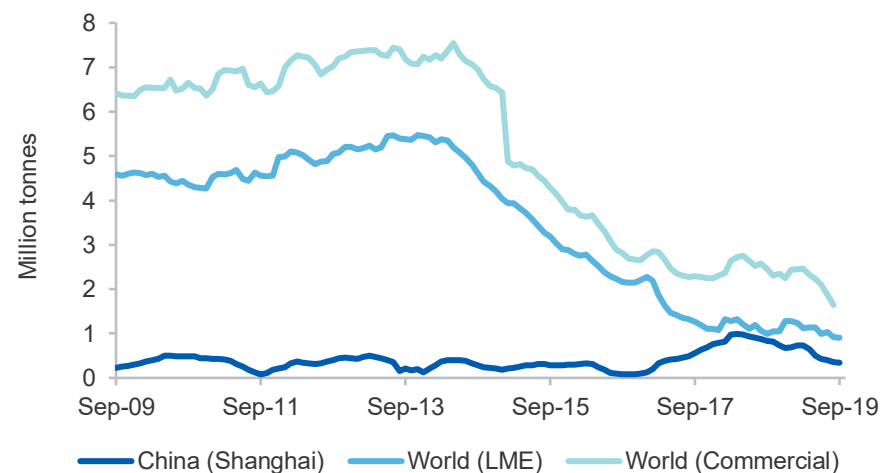
The free on board (FOB) Australian alumina price was also lower in the September quarter 2019, dropping by 44 per cent year-on-year to average US\$302 a tonne. The price fall was attributed to the US-China trade tensions and higher supply, helped by the start of production at the 2 million tonnes per year Al Taweelah refinery in the United Arab Emirates

Figure 11.1: World aluminium and alumina prices



Source: LME (2019) spot prices; Metals Bulletin (2019) Alumina monthly price; Department of Industry, Innovation and Science (2019).

Figure 11.2: Aluminium stocks



Source: Bloomberg (2019); World Bureau of Metal Statistics (2019)

(UAE) in April 2019. The FOB Australian alumina price is forecast to decrease by 25 per cent in 2019 to average US\$355 a tonne. Supply is expected to outpace demand, and the trade tensions between the US and China are expected to continue for the remainder of 2019, placing downward pressure on the alumina price.

Aluminium and alumina prices to fall in 2020 and 2021

The LME aluminium spot price is forecast to decrease by 5.2 per cent to average US\$1,700 a tonne in 2020, and by a further 5.0 per cent in 2021 to average US\$1,615 a tonne (Figure 11.1). Prices are expected to decline on the back of growing aluminium production — forecast to increase at an annual average rate of over 3.0 per cent over the outlook period — and weaker aluminium consumption — forecast to decrease at an annual average rate of 1.6 per cent a year between 2020 and 2021.

China's winter production curtailment policy — implemented over the last two winters to improve air quality — is expected to cease in December 2019. Production curtailments have slowed down local industrial production and economic growth. This removal is likely to add more aluminium output and create some headwinds to aluminium prices. Adding further pressure is the impact of US-China trade.

The FOB Australian alumina price is forecast to fall by 3.7 per cent to average US\$342 a tonne in 2020, and then average US\$330 a tonne in 2021 (Figure 11.1), driven by growing global supply. Norsk Hydro's 6.2 million tonnes per year Alunorte alumina refinery in Brazil — the world's largest — resumed full production in July 2019, following the Brazilian regulators and courts' decision to lift output restriction in May 2019.

11.3 Consumption

Falls in global aluminium and alumina consumption in the first half 2019

Global aluminium consumption fell by 4.6 per cent year-on-year over the first half of 2019, to nearly 31 million tonnes. Both escalating trade tensions between the US and China, and slowing global economic growth, softened the demand for aluminium. China — the world's largest aluminium consumer — consumed 17 million tonnes of aluminium in the

first half of 2019, a fall of 5.3 per cent year-on-year. Over this period, sales in the Chinese automotive sector (one of the country's largest aluminium consumers) fell by 12 per cent year-on-year, to 12 million units.

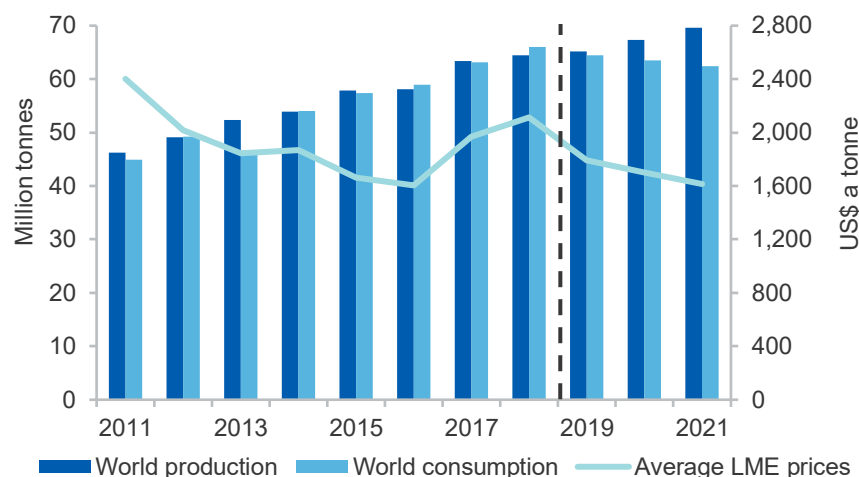
Trade tensions between the US and China seem unlikely to be resolved this year, and are expected to flow on to lower business and investment confidence and to a slowdown in global economic growth. Global industrial production — a leading indicator for aluminium demand — is forecast to increase at a slower pace, averaging annual growth of 1.1 per cent in 2019. As a result, global aluminium consumption is forecast to fall by 2.0 per cent in 2019, to 64 million tonnes (Figure 11.3).

World alumina usage declined by 1.8 per cent year-on-year in the first half of 2019 to 58 million tonnes, driven by lower global aluminium production (down by 0.7 per cent year-on-year). Aluminium output in China — the world's largest aluminium producer — fell by 0.4 per cent year-on-year in the first half of 2019, as concerns about the trade tensions with the US discouraged Chinese aluminium smelters from raising output. Operational issues in the Albras Aluminium smelter in Brazil and the Becancour Aluminium smelter in Canada also drove weaker demand for alumina.

The return to full production of the Albras and Becancour aluminium smelters, and new aluminium capacity additions from China, are expected to lift the demand for alumina in the second half of 2019. However, this expected growth in alumina consumption is likely to be constrained by the escalating trade tensions between the US and China. As a result, world alumina consumption is forecast to grow modestly in 2019, by just 0.3 per cent, to 120 million tonnes.

World bauxite usage rose by 4.1 per cent year-on-year in the first half of 2019 to 176 million tonnes, propelled by increased alumina production in Australia — the world's second largest alumina producer — and the UAE. World consumption of bauxite is forecast to rise by 0.3 per cent in 2019 to 120 million tonnes. The expected growth is supported by the return to full production of the 6.5 million tonnes per year Alunorte alumina refinery in Brazil in the second half of 2019, and the production ramp-up at the 4 million tonnes per year Al Taweelah alumina refinery in the UAE.

Figure 11.3: World aluminium production, consumption and prices



Source: International Aluminium Institute (2019); AME (2019); World Bureau of Metal Statistics (2019); Department of Industry, Innovation and Science (2019)

New aluminium capacity fuels increased demand for alumina and bauxite

World primary aluminium demand is forecast to fall at an average annual rate of 1.6 per cent in 2020 and 2021, to 62 million tonnes by 2021 (Figure 11.3). The decline is expected to be driven by slowing demand from the global automotive industry. Despite the Chinese government's infrastructure projects designed to offset the impacts of trade tensions with the US, and ambitious initiatives for promoting electric vehicle production to improve air quality, economic uncertainties are expected to discourage consumers from purchasing vehicles in China. In the US, higher vehicle prices (driven by higher import tariffs) and weaker consumer confidence are expected to negatively impact consumer demand for vehicles.

World alumina consumption is forecast to increase at an average annual rate of 0.8 per cent in 2020 and 2021, to reach 122 million tonnes by 2021 (Figure 11.4). Alumina demand is driven by primary aluminium production, which is forecast to increase at an average annual rate of 3.4 per cent between 2020 and 2021. Despite slowing economic growth, China is

expected to remain the world's largest (and growing) source of alumina demand, accounting for 57 per cent (or 70 million tonnes) of world alumina consumption in 2021. The US is expected to see a gradual increase in demand over the outlook period. Russia, India and the UAE are also expected to remain large sources of demand for alumina.

World bauxite consumption is forecast to rise at an average annual rate of 0.8 per cent in 2020 and 2021, to over 120 million tonnes by 2021, driven by new alumina capacity from China and Indonesia (see section 11.4).

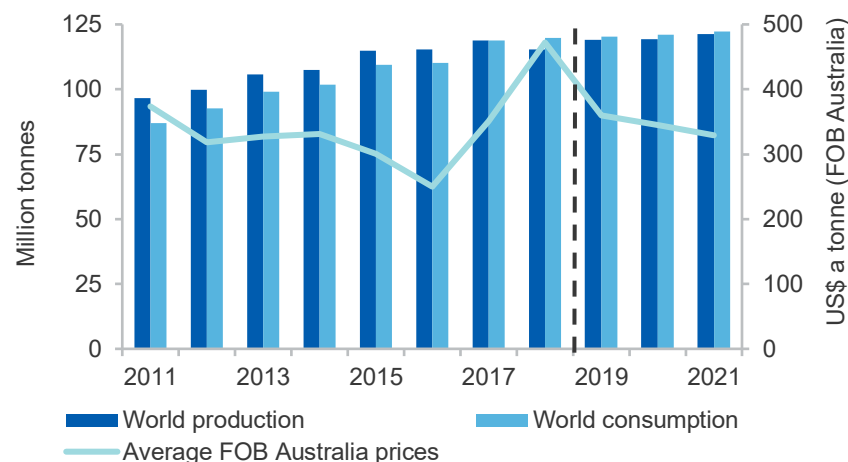
11.4 Production

World production of aluminium, alumina and bauxite to rise in 2019

World aluminium production decreased by 0.7 per cent year-on-year in the first half of 2019 to nearly 32 million tonnes, due to lower output in China, Brazil and Canada. Production in China — the world's largest aluminium producer — decreased by 0.4 per cent year-on-year in the first half of 2019, to nearly 18 million tonnes. Trade tensions with the US and the Chinese government's stricter environmental regulations have put a brake on production growth in China. In Brazil, Albras Aluminium has curtailed 50 per cent of its annual capacity of 460,000 tonnes since mid-April 2018. Its raw material supplier, Alunorte, has been operating at half-capacity since March 2018, due to restrictions imposed by Brazilian environmental authorities amid concerns of water contamination. In Canada, Alcoa's 438,000 tonnes a year Becancour aluminium smelter operated at only 15 per cent of its capacity, due to an 18-month lock-out of unionised workers.

Global aluminium supply is forecast to increase by 1.2 per cent in 2019, to reach 65 million tonnes (Figure 11.3). The rise will be driven by increases in Chinese aluminium capacity, originating from the ramp-up of new aluminium smelters. These include the 500,000 tonnes per year East Hope Guyang aluminium smelter, and the 300,000 tonnes per year Guangxi Baikuang Bose-Wenshan aluminium smelter. Outside of China, Alcoa's Becancour aluminium smelter in Canada restarted smelting capacity on 26 July 2019, following a successful negotiation between the company and the unions on a pay dispute.

Figure 11.4: World alumina production, consumption and prices



Source: International Aluminium Institute (2019); AME (2019); World Bureau of Metal Statistics (2019); Department of Industry, Innovation and Science (2019)

However, the 130,000 tonnes per year Mostar aluminium smelter in Bosnia closed operations in August 2019, after failing to secure a bail-out deal from the government and potential investors. The Bosnian government is hoping to reopen the smelter, but is facing substantial challenges with long-running power supply issues.

World alumina supply rose by 8.0 per cent year-on-year in the first half of 2019, to 60 million tonnes (Figure 11.4), driven by the addition of new refineries and output expansions at existing alumina refineries. In Australia, Alcoa's Western Australia alumina refining operations (Kwinana, Pinjarra and Wagerup) recorded a production increase of 3.3 per year-on-year in the first half of 2019, to 4.6 million tonnes. The 2 million tonnes per year Al Taweelah alumina refinery in the UAE started production in April 2019.

World alumina supply is forecast to rise by 3.2 per cent in 2019 to 119 million tonnes, driven by the ramp-up of new and existing alumina refineries. The Alunorte alumina refinery in Brazil resumed full production

in July 2019, bringing 3 million tonnes per year of alumina production capacity back online. The Al Taweelah alumina refinery in the UAE is expected to reach at least 70 per cent of its capacity by the end of 2019, as the bauxite supply from Guinea is due to commence in the December quarter.

World bauxite production increased by 4.2 per cent year-on-year in the first half of 2019 to 176 million tonnes, propelled by a 7.3 per cent rise in bauxite production in Australia — the world's largest bauxite producer. The addition of new capacity at Rio Tinto's Amrun bauxite project and Metro Mining's Bauxite Hills project in Queensland, and higher output at Worsley's Boddington mine in Western Australia contributed to higher output in Australia.

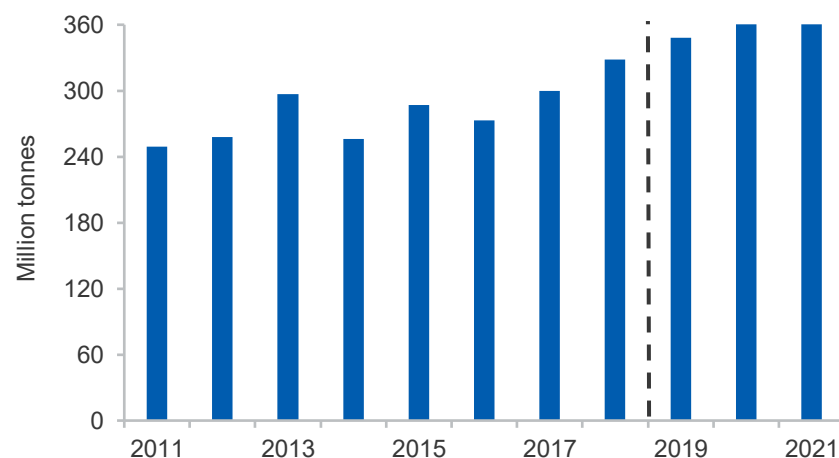
World bauxite production is forecast to increase by 5.9 per cent in 2019 to nearly 348 million tonnes, driven by the production ramp-up at the Amrun bauxite project in Western Australia. Emirates Global Aluminium's 12 million tonnes a year Guinea Alumina Corporation bauxite project commenced production in the early first half of 2019, and is expected to ramp up production in the December quarter of 2019.

World production of aluminium, alumina and bauxite to continue to rise

World aluminium production is forecast to rise by 3.3 per cent in 2020 and by a further 3.5 per cent in 2021, to reach 70 million tonnes in 2021 (Figure 11.3). The gains will be driven by new additional capacity from China, Iran and Indonesia. In China, Baoshan Iron and Steel is expected to test production at its 300,000 tonnes per year aluminium project by mid-2020. Inner Mongolia Mengtai Group commenced construction of its 200,000 tonnes a year aluminium alloy project in June 2019. Phase one capacity of 100,000 tonnes is expected to come online in 2020. Iran is implementing its plan to increase its annual aluminium production to 1.5 million tonnes by 2025, with the 300,000 tonnes per year SALCO aluminium smelter due to commence production in 2020. In July 2019, PT Indonesia Asahan Aluminium (Inalum) announced plans to increase production at the Asahan aluminium smelter in Indonesia from 250,000 to 2.0 million tonnes per year by 2035.

World alumina production is forecast to increase by 0.2 per cent in 2020 to above 119 million tonnes, and by a further 1.6 per cent in 2021, to reach 121 million tonnes (Figure 11.4). The growth is expected to be driven by China, India and Indonesia. In India, with improved bauxite sourcing, Vedanta is planning to increase production capacity at its Lanjigarh refinery to 2.7 million tonnes in the short term, and to 6.0 million tonnes in the medium term. In China, the Qiya Aluminium Group's 2.4 million tonnes per year Qiya Linfen alumina refinery is expected to commence production in 2020. In Indonesia, the 1.2 million tonnes per year joint-venture Mempawah alumina refinery project (Chalco from China and two local Indonesian companies) is expected to come online in 2020.

Figure 11.5: World bauxite production



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

World bauxite production is forecast to increase by 7.7 and 1.8 per cent in 2020 and 2021, to 375 and 381 million tonnes, respectively (Figure 11.5).

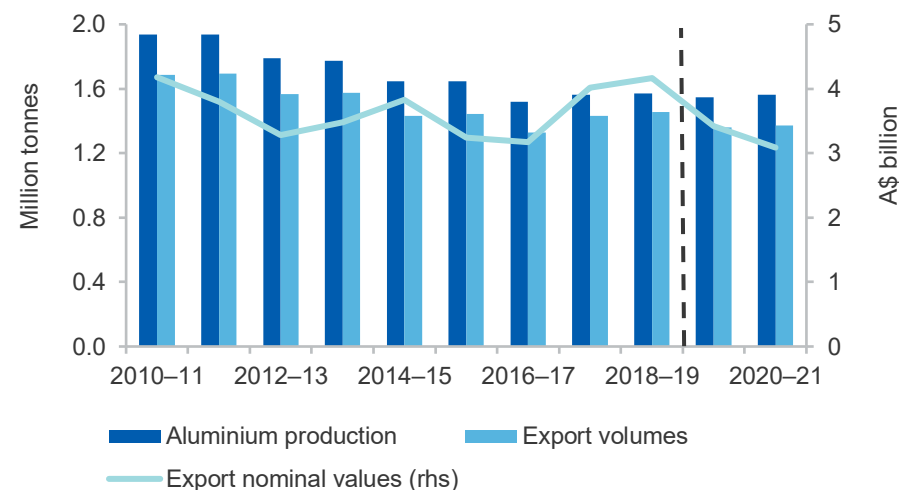
The gains are expected to be driven by newly added capacity in Australia — the world's largest bauxite producer — and Guinea. With a growing investment pipeline, Guinea is likely to overtake China as the world's second largest bauxite producer by the end of the outlook period.

11.5 Australia's exports and production

Strong aluminium, alumina and bauxite exports earnings in 2018–19

Australia's aluminium, alumina and bauxite exports rose by 15 per cent in 2018–19, to a record high of almost \$16 billion. The increase was driven by higher volumes of aluminium and bauxite exports and a twelve-year high in alumina prices, which averaged US\$540 a tonne in the September quarter of 2018. The spike in the alumina prices was due to supply concerns, primarily in China, the curtailment of production at the Alunorte refinery in Brazil and workers striking at Alcoa's Australian operations. Higher aluminium export volumes (up 1.7 per cent) were mainly driven by increased exports to the US (up 326 per cent to 281,000 tonnes), due to the tariff-exempt status that the US Administration granted to Australia. Environmental priorities in China had flow-on effects to Australian bauxite exports to China. In 2018–19, Australia's bauxite export volumes to China increased by 12 per cent, to nearly 33 million tonnes.

Figure 11.6: Australia's aluminium exports and production



Source: ABS (2019) *International Trade in Goods and Services*, 5368.0; Department of Industry, Innovation and Science (2019)

Lower alumina prices lead to weaker export outlook to 2020–21

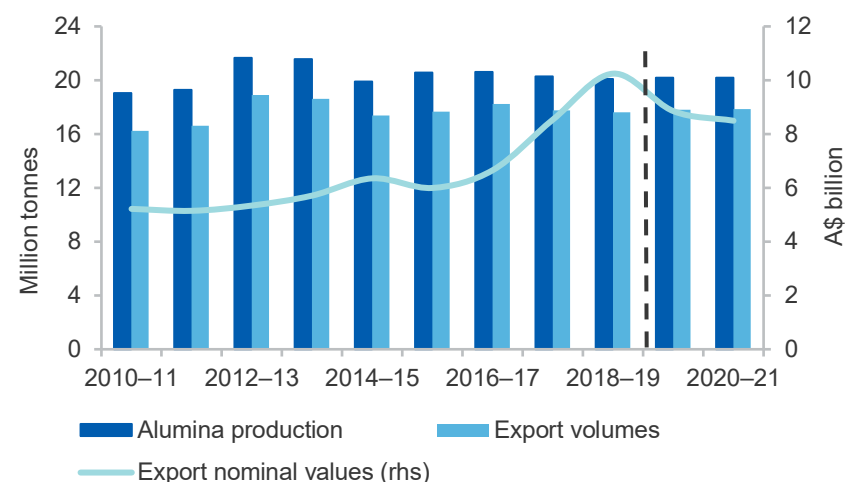
After reaching a record high of \$16 billion in 2018–19, Australia's aluminium, alumina and bauxite export earnings are forecast to fall by 13 per cent in 2019–20, and by a further 4.8 per cent in 2020–21 to \$13 billion in 2020–21. The decline is due to the impact of an expected softening of prices for aluminium and alumina over the outlook period, which will only be partially offset by the impact of increased export volumes of bauxite.

Growing global supply is expected to soften alumina prices over the outlook period. Alunorte alumina refinery in Brazil — the world's largest — has returned to full production capacity in the second half of 2019, and is expected to add over 3 million tonnes per year to the global alumina output.

Bauxite export volumes are forecast to rise at an annual average rate of 4.1 per cent a year, reaching 36 million tonnes by 2020–21. The majority (over 97 per cent) is expected to be shipped to China, where alumina refiners continue to rely on imported materials from Australia and Guinea to replace their depleted and poor quality bauxite. Despite an expected rise in export volumes, Australia's bauxite exports are expected to contribute around 10 per cent (or \$1.4 billion) to Australia's total aluminium, alumina and bauxite exports.

The risk to Australian bauxite exports is the influx of bauxite exports to China from Guinea. In June 2019, Guinea accounted for 52 per cent of China's total bauxite imports whereas Australia only accounted for 32 per cent of China's total bauxite imports. It is likely that the Malaysian Government will relax its ban on bauxite mining in Pahang — an area that accounts for 70 per cent of Malaysia's bauxite production — in 2020. The decision is expected to add pressure to Australian bauxite exporters, as another major bauxite supplier enters the Chinese bauxite market.

Figure 11.7: Australia's alumina exports and production



Source: ABS (2019) International Trade in Goods and Services, 5368.0; Department of Industry, Innovation and Science (2019)

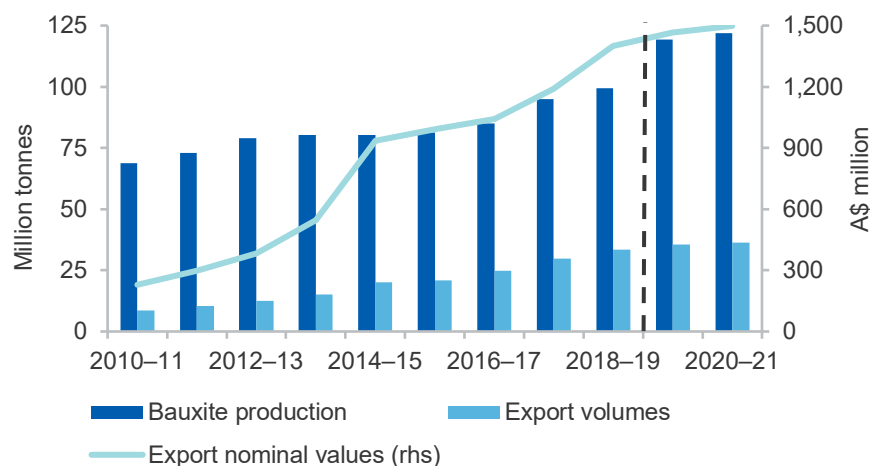
Australia's aluminium exports are not expected to return to the strength of 2017–18 and 2018–19, where export earnings reached over \$4.0 billion a year. Exports to Japan are expected to fall as the construction for the 2020 Tokyo Olympics comes to an end. Aluminium exports to South Korea are also expected to drop as slowing economic growth dampens the production and sale of vehicles. Similarly, aluminium shipments to the US are expected to fall over the outlook period. In June 2019, the US Administration agreed to Tesla's request to waive 10 per cent tariffs for one year on imported aluminium from Japan, used in the manufacture of battery cells at Tesla's Nevada Gigafactory.

Steady aluminium production, slight fall in alumina production, but moderate growth in bauxite production in 2018–19

Australia's aluminium production grew by 0.5 per cent in 2018–19 to around 1.6 million tonnes, driven by a 1.7 per cent rise in Portland Aluminium's production, with production from other aluminium smelters remaining broadly unchanged. Over this period, Australia's bauxite production increased by 4.7 per cent to over 99 million tonnes, propelled by the addition of new capacity at Rio Tinto's Amrun bauxite project and

Metro Mining's Bauxite Hills project in Queensland, and higher output (up 5.7 per cent, to 18 million tonnes) at Worsley's Boddington mine in Western Australia. However, Australia's alumina production fell by 0.9 per cent in 2018–19, to around 20 million tonnes, impacted by several cyclones in Queensland.

Figure 11.8: Australia's bauxite exports and production



Source: ABS (2019) *International Trade in Goods and Services*, 5368.0; Department of Industry, Innovation and Science (2019)

Amrun's return to full capacity to drive strong growth in bauxite output

With no planned expansions to smelter or refinery capacity in the short-term, annual output is forecast to remain at 1.6 million tonnes of aluminium and 20 million tonnes of alumina through to 2020–21.

Australia's bauxite production is forecast to grow by 18 and 2.1 per cent in 2019–20 and 2020–21, to 119 and 121 million tonnes, respectively. The Amrun bauxite project is expected to reach full production capacity of 23 million tonnes per year in late 2019.

Revision to the outlook

The outlook for aluminium prices in 2020 and 2021 has been revised down by 8.8 and 20 per cent, respectively, from the June 2019 *Resources and Energy Quarterly*. An unexpected escalation of trade tensions between the US and China is the main driver of this revision.

The outlook for global aluminium consumption in 2020 and 2021 has been revised down by 8.2 and 13 per cent, to 64 and 62 million tonnes, respectively, from the June 2019 *Resources and Energy Quarterly*. A faster than expected deterioration in trade relations and industrial production has contributed to this revision.

Table 11.1: Aluminium, alumina and bauxite outlook

						Annual percentage change		
World	Unit	2018	2019 ^f	2020 ^f	2021 ^f	2019 ^f	2020 ^f	2021 ^f
Primary aluminium								
Production	kt	64,408	65,173	67,327	69,653	1.2	3.3	3.5
Consumption	kt	66,028	64,475	63,533	62,417	-2.4	-1.5	-1.8
Prices aluminium ^c								
- nominal	US\$/t	2,111	1,793	1,700	1,615	-15.1	-5.2	-5.0
- real ^d	US\$/t	2,158	1,793	1,662	1,545	-16.9	-7.3	-7.0
Prices alumina spot								
- nominal	US\$/t	472	356	342	330	-24.5	-4.0	-3.5
- real ^d	US\$/t	482	356	334	316	-26.1	-6.2	-5.5
Australia	Unit	2017–18	2018–19	2019–20 ^f	2020–21 ^f	2018–19 ^f	2019–20 ^f	2020–21 ^f
Production								
Primary aluminium	kt	1,564	1,573	1,548	1,561	0.5	-1.6	0.9
Alumina	kt	20,280	20,103	20,198	20,193	-0.9	0.5	0.0
Bauxite	Mt	95.0	99.4	119.3	121.7	4.7	20.0	2.0
Consumption								
Primary aluminium	kt	172	156	185	234	-9.6	18.6	26.7
Exports								
Primary aluminium	kt	1,431	1,451	1,362	1,373	1.5	-6.2	0.9
- nominal value	A\$m	4,013	4,171	3,416	3,087	3.9	-18.1	-9.6
- real value ^e	A\$m	4,167	4,260	3,416	3,015	2.2	-19.8	-11.7
Alumina	kt	17,746	17,619	17,803	17,839	-0.7	1.0	0.2
- nominal value	A\$m	8,537	10,245	8,852	8,494	20.0	-13.6	-4.0
- real value ^e	A\$m	8,864	10,464	8,852	8,295	18.1	-15.4	-6.3
Bauxite	kt	29,880	33,546	35,533	36,307	12.3	5.9	2.2
- nominal value	A\$m	1,190	1,401	1,467	1,498	17.7	4.7	2.1
- real value ^e	A\$m	1,236	1,431	1,467	1,463	15.8	2.5	-0.3
Total value								
- nominal value	A\$m	13,740	15,816	13,735	13,080	15.1	-13.2	-4.8
- real value ^e	A\$m	14,266	16,155	13,735	12,774	13.2	-15.0	-7.0

Notes: ^c LME cash prices for primary aluminium; ^d In 2019 calendar year US dollars; ^e In 2019–20 financial year Australian dollars; ^f Forecast.

Source: ABS (2019) International Trade in Goods and Services, 5368.0; AME Group (2018); LME (2019); Department of Industry, Innovation and Science (2019); International Aluminium Institute (2019); World Bureau of Metal Statistics (2019)