Aluminium

Resources and Energy Quarterly December 2019

Australia's global ranking

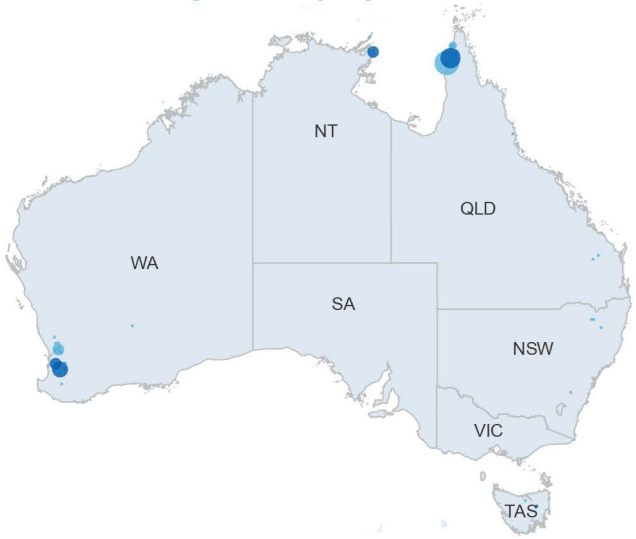
- 1st — Alumina exporter
- 1st — Bauxite producer
- 2nd — Alumina producer

3 stages of producing aluminium

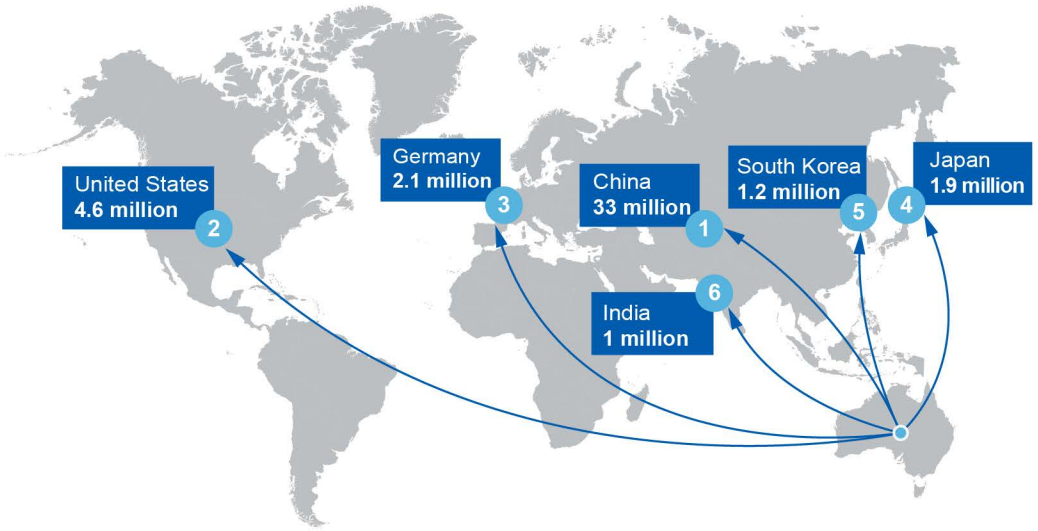
1. **Mining** bauxite ore
2. **Refining** to recover alumina
3. **Smelting** to make aluminium

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



Key consumer markets for aluminium (tonnes)



Global uses of aluminium

- **28%** Transport
- **23%** Construction
- **13%** Electrical
- **12%** Packaging
- **10%** Machinery
- **7%** Consumer durables
- **7%** Other

11.1 Summary

- Rising aluminium supply and slowing aluminium demand 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 decline over the outlook period, to average US$312 a tonne in 2021.
- After reaching a peak of $16 billion in 2018–19, the total value of Australian exports of aluminium, alumina and bauxite is expected to fall to $14 billion in 2020–21, due to lower forecast prices.
- With no planned expansions to smelter or refinery capacity until after 2020–21, annual Australian output is likely to be steady over the outlook period, at 1.6 million tonnes of aluminium and 20 million tonnes of alumina.

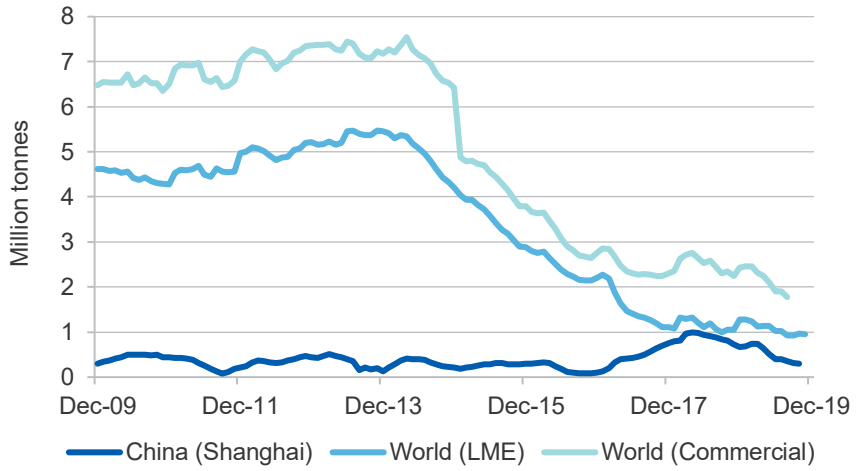
11.2 Prices

Aluminium and alumina prices fell in the December quarter 2019

The London Metal Exchange (LME) spot price for aluminium traded lower in the December quarter of 2019, averaging US$1,718 a tonne. Slowing world economic growth has continued to dampen aluminium demand, especially from China — the world's largest aluminium user. Falling input costs — alumina prices dropped by around 29 per cent in 2019 — also contributed to lower aluminium prices. The price fall was largely contained by an ongoing inventory drawdown (Figure 11.1) and lower aluminium output. The LME spot price is estimated to average US$1,790 a tonne in 2019, down 15 per cent from a 2018 average of US$2,110 a tonne.

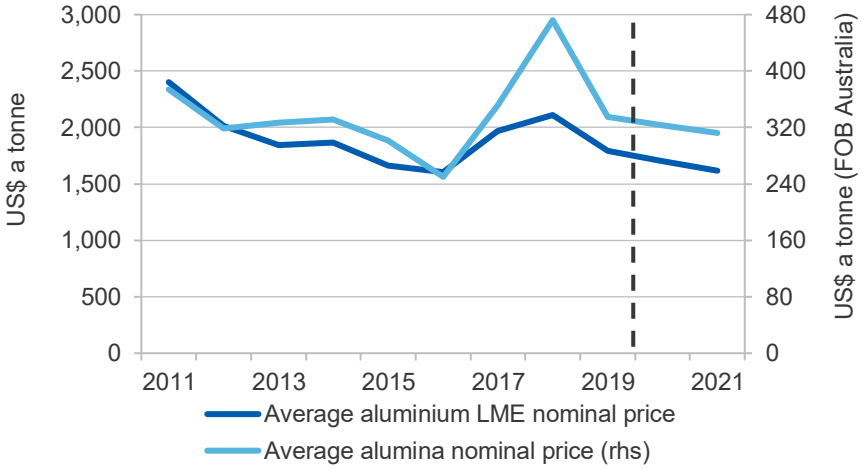
The free on board (FOB) Australian alumina price was also lower in the December quarter of 2019, averaging US$283 a tonne. The price decline was driven by rising supply — with the return to full production of Brazil's Alunorte refinery, after 19 months of restricted operation — and lower aluminium demand. The FOB Australian alumina price is estimated to average US$335 a tonne in 2019, a decline of 29 per cent. Supply is forecast to outrun demand in 2020, pushing down the alumina price.

Figure 11.1: Aluminium stocks



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

Figure 11.2: World aluminium and alumina prices



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

Aluminium and alumina prices to fall in 2020 and 2021

The LME aluminium spot price is forecast to decrease by 5.1 per cent to average US$1,700 a tonne in 2020, and fall by a further 5.0 per cent in 2021 to average US$1,615 a tonne (Figure 11.2). Prices are expected to decline on the back of growing aluminium production — which is forecast to increase at an annual average rate of over 3.8 per cent over the outlook period — and weaker aluminium consumption — expected to decrease at an average rate of 1.2 per cent a year in 2020 and 2021.

China's winter production curtailment policy — implemented over the last two winters to improve air quality — is expected to be softened in the 2019–20 winter season against a backdrop of slowing industrial production and economic growth. The relaxation is likely to raise aluminium output and create some headwinds for aluminium prices. Adding further pressure is the impact of falling input costs, with alumina prices forecast to continue to fall over the outlook period.

The FOB Australian alumina price is forecast to fall by 3.5 per cent to average US$323 a tonne in 2020, and then average US$312 a tonne in 2021 (Figure 11.2). The price decline is expected to be driven by growing global alumina supply — due to the return to full production of Alunorte — and slowing global aluminium demand — due to lower global car sales. Slowing demand growth from the world automotive sector is having a considerable impact on global aluminium demand and prices.

11.3 World consumption

Falls in global aluminium/alumina demand in the September quarter 2019

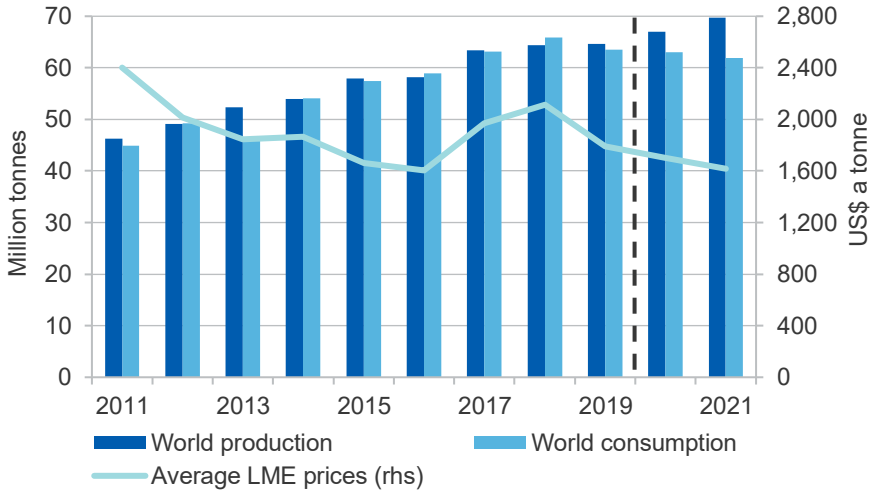
Global aluminium consumption fell by 6.2 per cent year-on-year in the September quarter of 2019, to nearly 16 million tonnes. Both trade tensions between the US and China, and slowing global economic growth, have resulted in softer demand for aluminium. China — the world's largest aluminium consumer — consumed 9 million tonnes of aluminium in the September quarter, a fall of 6.8 per cent year-on-year.

Over the September quarter, sales in the Chinese automotive sector (one of the country's largest aluminium consumers) fell by 5.5 per cent year-on-year to 5.8 million units. The fall in car sales in China was due to the withdrawal of government subsidies for cheap and low quality new energy vehicles — hybrids and electric cars.

Global industrial production — a leading indicator for aluminium demand — is forecast to increase at a slower pace, averaging annual growth of 1.0 per cent in 2019. As a result, global aluminium consumption is estimated to fall by 3.8 per cent in 2019, to 63 million tonnes (Figure 11.3).

World alumina usage declined by 3.0 per cent year-on-year in the September quarter 2019 to over 29 million tonnes, driven by lower global aluminium production (down by 2.2 per cent year-on-year). Aluminium output in China — the world's largest aluminium producer — fell by 3.6 per cent year-on-year in the September quarter of 2019, as concerns about the trade tensions with the US discouraged Chinese aluminium smelters from raising output.

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)

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 December quarter of 2019. However, this expected growth in alumina usage is likely to be outweighed by the negative impact of the US-China trade tensions. As a result, world alumina demand is estimated to fall by 0.8 per cent in 2019 to 120 million tonnes.

World bauxite usage rose by 4.4 per cent year-on-year in the September quarter to 84 million tonnes, propelled by increased global alumina production (up 4.3 per cent year-on-year). The growth was driven by the resumption of full production at the Alunorte alumina refinery in Brazil and the production ramp-up at the 4 million tonnes per year Al Taweelah alumina refinery in the UAE.

New aluminium capacity fuels increased demand for alumina and bauxite

World primary aluminium demand is forecast to fall at an average annual rate of 1.2 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. New energy vehicle sales in China — the world's largest car market — are expected to fall over the outlook period following the Chinese government's decision to scale-back electric vehicle subsidies in March 2019. Outside of China, economic uncertainties are expected to discourage consumers from purchasing vehicles. 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 0.9 per cent in 2020 and 2021, to reach 121 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 3.8 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 56 per cent (or 69 million tonnes) of world alumina demand in 2021. US demand is expected to rise gradually over the outlook period. Russia, India and the UAE are also expected to remain large sources of demand.

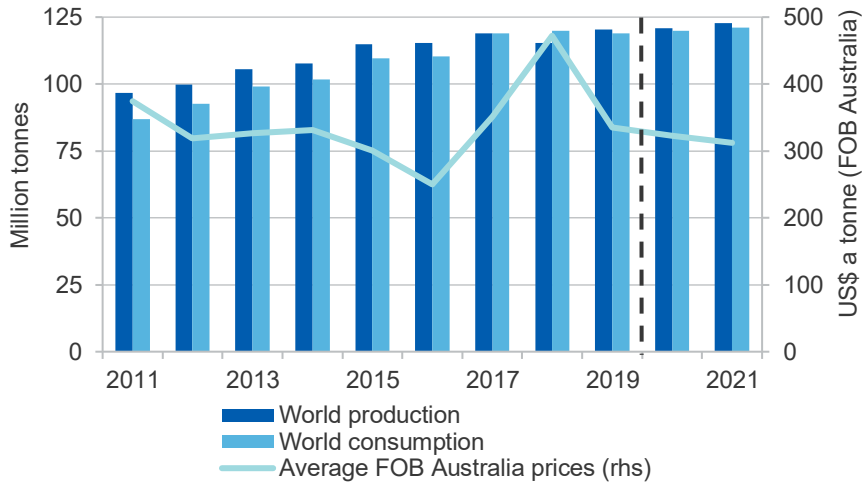
World bauxite consumption is forecast to rise at an average annual rate of 5.7 per cent in 2020 and 2021, to nearly 340 million tonnes by 2021, driven by new alumina capacity in China and Indonesia.

11.4 World production

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

World aluminium production decreased by 2.2 per cent year-on-year in the September quarter of 2019 to nearly 16 million tonnes, due to lower output in China. Production in China — the world's largest aluminium producer — decreased by 3.6 per cent year-on-year over the same period to nearly 9 million tonnes. There were unexpected outages in the sector, due to flooding at Hongqiao's aluminium smelter in Shandong Province, and an explosion at Xinfa's aluminium smelter in Xinjiang region. Trade tensions with the US and the Chinese government's stricter environmental regulations have put a brake on production growth in China.

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)

Global aluminium supply is estimated to increase by 0.4 per cent in 2019, to reach 65 million tonnes (Figure 11.3). The rise is expected to 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.

To offset slowing economic growth, the Chinese government has softened production cut enforcements with no official production cut targets for the 2019–20 winter season — 860,000 and 600,000 tonnes per annum of smelting capacity were cut in the 2017–18 and 2018–19 winter periods. The softening stance on environmental protection is likely to increase China's aluminium output, which is forecast to grow by 5.0 per cent year-on-year in the December quarter of 2019.

World alumina supply rose by 4.3 per cent year-on-year in the September quarter, to nearly 31 million tonnes. The Alunorte alumina refinery in Brazil operated at half of its 6.3 million tonne per annum capacity between March 2018 and June 2019, due to restrictions imposed by Brazilian environmental authorities amid concerns of water contamination. The refinery's return to full production is expected to bring three million tonnes per year of alumina capacity back online.

The two million tonnes per year Al Taweelah alumina refinery in the UAE has produced 600,000 tonnes of alumina since commencing production in April 2019. It is expected that Al Taweelah will produce another 400,000 tonnes by the end of the year, bringing its production for 2019 to around one million tonnes. As a result, world alumina supply is estimated to rise by 4.5 per cent in 2019 to 120 million tonnes (Figure 11.4).

World bauxite production increased by 4.4 per cent year-on-year in the September quarter to nearly 84 million tonnes, propelled by an 8.0 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 contributed to higher output in Australia.

World bauxite production is estimated to increase by 5.5 per cent in 2019 to 346 million tonnes, driven by the production ramp-up at the Amrun bauxite project in Western Australia. Aluminium Corporation of China's 12 million tonnes a year Boffa bauxite mine in Guinea is expected to start production in December 2019.

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

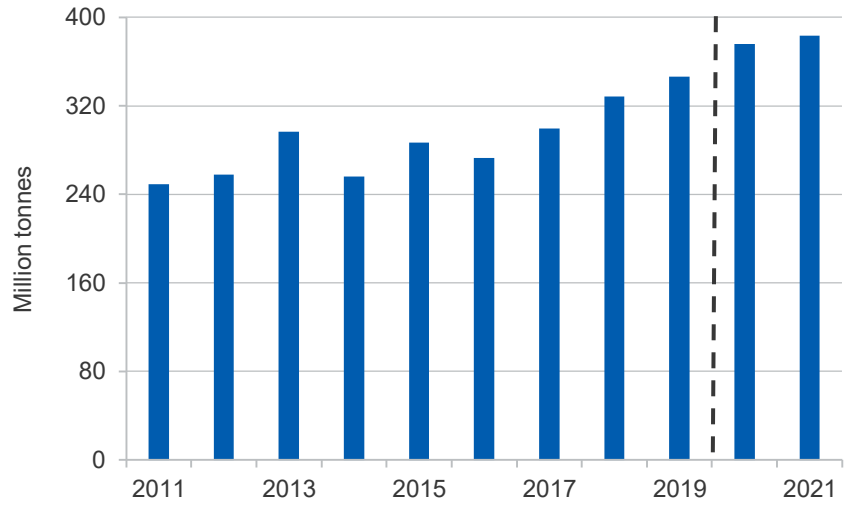
World aluminium production is forecast to rise by 3.6 per cent in 2020 and by a further 4.0 per cent in 2021, to reach 70 million tonnes in 2021 (Figure 11.3). The gains will be driven by new additional capacity from China, Iran and Indonesia. In China, Baoshan Iron and Steel is expected to test production 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 0.3 per cent in 2020 to 121 million tonnes, and by a further 1.6 per cent in 2021, to reach 123 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.

World bauxite production is forecast to increase by 8.5 and 2.1 per cent in 2020 and 2021, to 376 and 384 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.

Figure 11.5: World bauxite production



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

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.

The Malaysian government is expected to issue bauxite mining licences to local mining companies in January 2020. The decision marks a full resumption of bauxite mining activity in Malaysia, after a mining ban was put in place in early 2016 over unregulated mining and water contamination. Before the ban, Malaysia produced over 24 million tonnes of bauxite in 2015, and accounted for 8.4 per cent of global bauxite output.

11.5 Australia's exports and production

Steady aluminium production, slight fall in alumina production, but moderate growth in bauxite production in the September quarter 2019

Australia's aluminium production was largely unchanged (397,000 tonnes) in the September quarter 2019. Over this period, Australia's bauxite production increased by 8.0 per cent year-on-year to over 26 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.

Australia's alumina production fell by 1.4 per cent in the September quarter, to around 4.8 million tonnes, with output impacted by maintenance activities. Production at Rio Tinto's Yarwun decreased by 9.8 per cent year-on-year in the September quarter to 671,000 tonnes, due to an extended 35-day shutdown for planned five-year maintenance. Production at Queensland Alumina Limited — a joint-venture between Rio Tinto and Rusal — fell by 11 per cent year-on-year in the September quarter to 836,000 tonnes, due to maintenance activities.

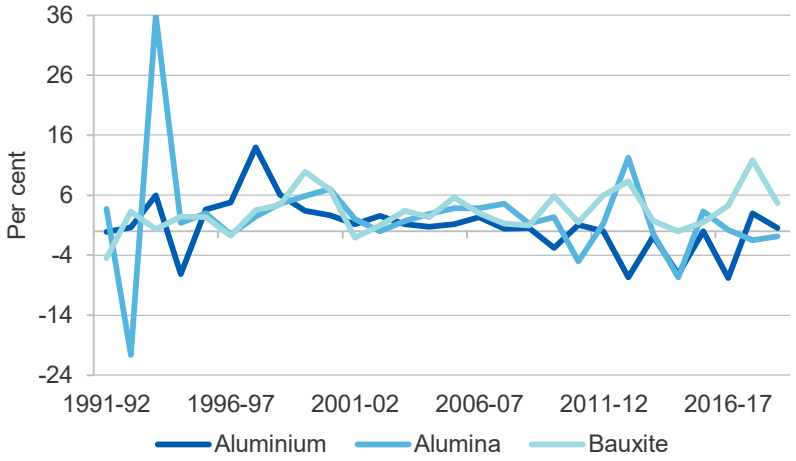
New capacity to drive strong growth in bauxite output

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. The US-based Alcoa has announced a review of its global aluminium operations — possibly including the Portland Aluminium smelter in Victoria. Rio Tinto has also announced a review of its aluminium smelter in New Zealand.

Australia's bauxite production is forecast to grow by 19 and 5.5 per cent in 2019–20 and 2020–21, to 118 and 124 million tonnes, respectively, driven by the full production capacity at Amrun (23 million tonnes per year) and Bauxite Hills (6 million tonnes per year). On 13 November 2019, Metro Mining received an approval from the Northern Australia Infrastructure Facility for a loan of $47 million to carry out the stage 2 expansion at the Bauxite Hills mine, which will raise the production rate to 6 million tonnes of bauxite a year.

Figure 11.6 shows Australia's annual production growth for aluminium, alumina and bauxite from 1991–92 to 2018–19. Aluminium and alumina production growth has been sluggish, with years of negative growth. In contrast, bauxite production growth has been more stable and accelerated in recent years, driven by stronger demand from China and the ramp up of new capacity.

Figure 11.6: Australia's aluminium, alumina and bauxite production – annual growth



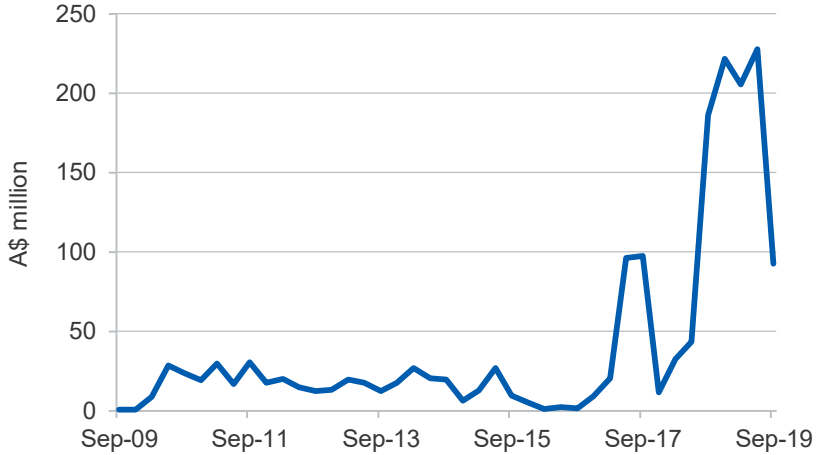
Source: Department of Industry, Innovation and Science (2019)

Weak aluminium, alumina and bauxite exports in September quarter

Australia's aluminium, alumina and bauxite export earnings fell by 16 per cent year-on-year in the September quarter 2019 to $3.4 billion, fuelled by lower aluminium (down 9.2 per cent year-on-year) and alumina (down 24 per cent year-on-year) prices. The fall in export earnings was partially contained by increased export volumes of aluminium (up 3.1 per cent year-on-year), alumina (up 3.5 per cent year-on-year) and bauxite (up 24 per cent year-on-year).

Australian primary aluminium exports to the US fell by 51 per cent year-on-year in the September quarter 2019 to A$92 million, due to lower export volumes (down 42 per cent year-on-year) (Figure 11.7).

Figure 11.7: Australia's primary aluminium exports to the US



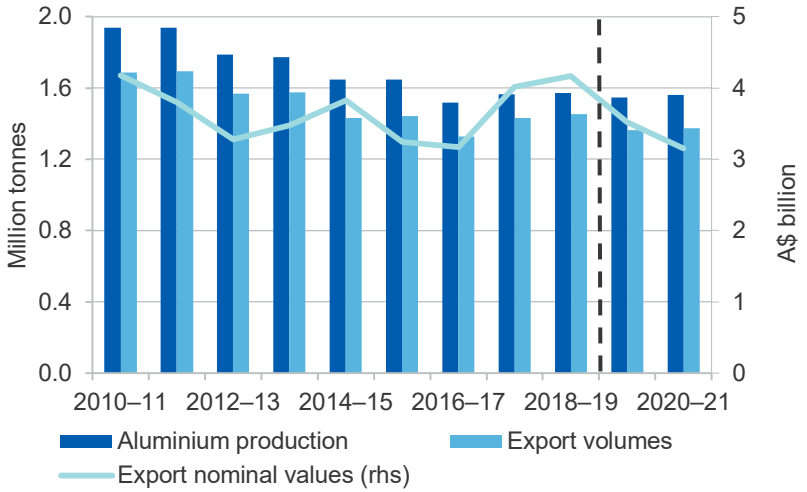
Source: ABS (2019) International Trade in Goods and Services, 5368.0

Lower aluminium and alumina prices lead to weaker export outlook

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 to $14 billion in 2019–20, and by a further 5.8 per cent in 2020–21 to $13 billion in 2020–21 (Figure 11.8 and 11.9). The decline is due to the impact of an expected softening of prices for aluminium and alumina — due to growing supply — over the outlook period, which will only be partially offset by the increased export volumes of alumina and bauxite.

Bauxite export volumes are forecast to rise by 13 per cent in 2019–20 to 38 million tonnes (Figure 11.10). The majority of Australia's bauxite (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 domestic bauxite. Australia's bauxite exports are expected to contribute around 11 per cent (or $1.5 billion a year) to Australia's total aluminium, alumina and bauxite exports.

Figure 11.8: Australia's aluminium exports and production



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

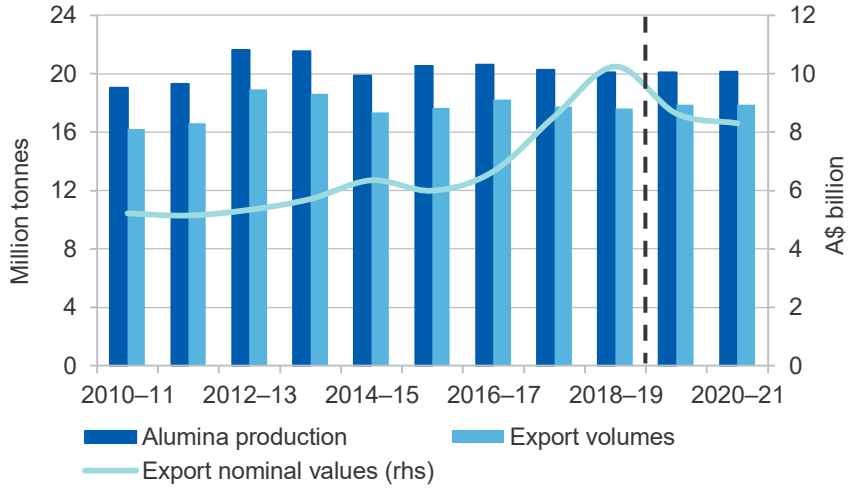
Australia's bauxite exports are expected to contribute about 11 per cent (or $1.5 billion a year) to total aluminium, alumina and bauxite exports.

The Malaysian government's decision to remove bauxite mining ban is expected to add pressure to Australian bauxite exporters, as another major bauxite supplier enters the Chinese bauxite market. Malaysia was previously a key bauxite supplier to China, exporting nearly 3.5 million tonnes a month around the end of 2015.

Following the export ban on raw nickel ores, the Indonesian government is likely to bring forward the ban on exports of raw bauxite — initially planned for 2022 — to 2020. In 2018, Indonesia produced over 10 million tonnes of bauxite and exported 8.6 million tonnes of bauxite to the world. The Indonesian government implemented a similar ban in 2014, which reduced the country's bauxite production by 99 per cent in just one year.

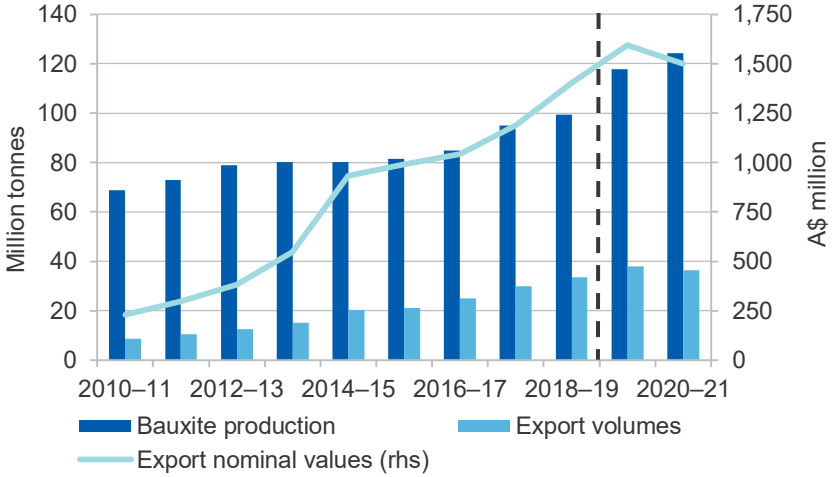
Australian bauxite exporters are likely to benefit from this export ban, with less competition for the Chinese bauxite import market.

Figure 11.9: Australia's alumina exports and production



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

Figure 11.10: Australia's bauxite exports and production



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

Revision to the outlook

The outlook for alumina price in 2020 and 2021 has been revised down by 5.5 per cent per year from the September 2019 *Resources and Energy Quarterly*, due to a larger than expected fall in the FOB Australian alumina price in the December quarter 2019.

Table 11.1: Aluminium, alumina and bauxite outlook

						Annual percentage change		
World	**Unit**	**2018**	**2019[s]**	**2020[f]**	**2021[f]**	2019[s]	**2020[f]**	**2021[f]**
Primary aluminium								
Production	kt	64,408	64,664	66,971	69,670	0.4	3.6	4.0
Consumption	kt	66,028	63,490	63,036	61,928	-3.8	-0.7	-1.8
Prices aluminium[c]								
- nominal	US$/t	2,111	1,792	1,700	1,615	-15.1	-5.1	-5.0
- real[d]	US$/t	2,148	1,792	1,665	1,550	-16.6	-7.1	-7.0
Prices alumina spot								
- nominal	US$/t	472	335	323	312	-29.2	-3.5	-3.3
- real[d]	US$/t	480	335	316	300	-30.4	-5.5	-5.3
Australia	**Unit**	**2017–18**	**2018–19**	**2019–20[f]**	**2020–21[f]**	**2018–19**	**2019–20[f]**	**2020–21[f]**
Production								
Primary aluminium	kt	1,564	1,573	1,547	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	119.0	121.0	4.7	19.7	1.7
Consumption								
Primary aluminium	kt	172	156	185	234	-9.6	18.6	26.7
Exports								
Primary aluminium	kt	1,431	1,451	1,362	1,374	1.5	-6.2	0.9
- nominal value	A$m	4,013	4,168	3,516	3,152	3.9	-15.6	-10.4
- real value[e]	A$m	4,150	4,240	3,516	3,094	2.2	-17.1	-12.0
Alumina	kt	17,746	17,619	17,862	17,898	-0.7	1.4	0.2
- nominal value	A$m	8,537	10,245	8,635	8,301	20.0	-15.7	-3.9
- real value[e]	A$m	8,828	10,422	8,635	8,147	18.1	-17.1	-5.7
Bauxite	kt	29,880	33,546	37,984	36,307	12.3	13.2	-4.4
- nominal value	A$m	1,190	1,401	1,595	1,498	17.7	13.8	-6.0
- real value[e]	A$m	1,231	1,425	1,595	1,471	15.8	11.9	-7.8
Total value								
- nominal value	A$m	13,740	15,813	13,747	12,952	15.1	-13.1	-5.8
- real value[e]	A$m	14,208	16,087	13,747	12,711	13.2	-14.5	-7.5

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; **s** Estimate.

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