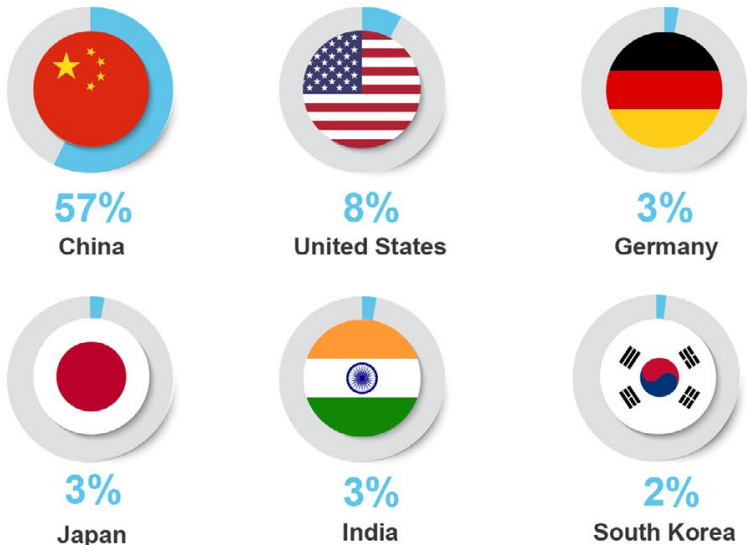


Aluminium

Major Australian bauxite deposits (Gt)



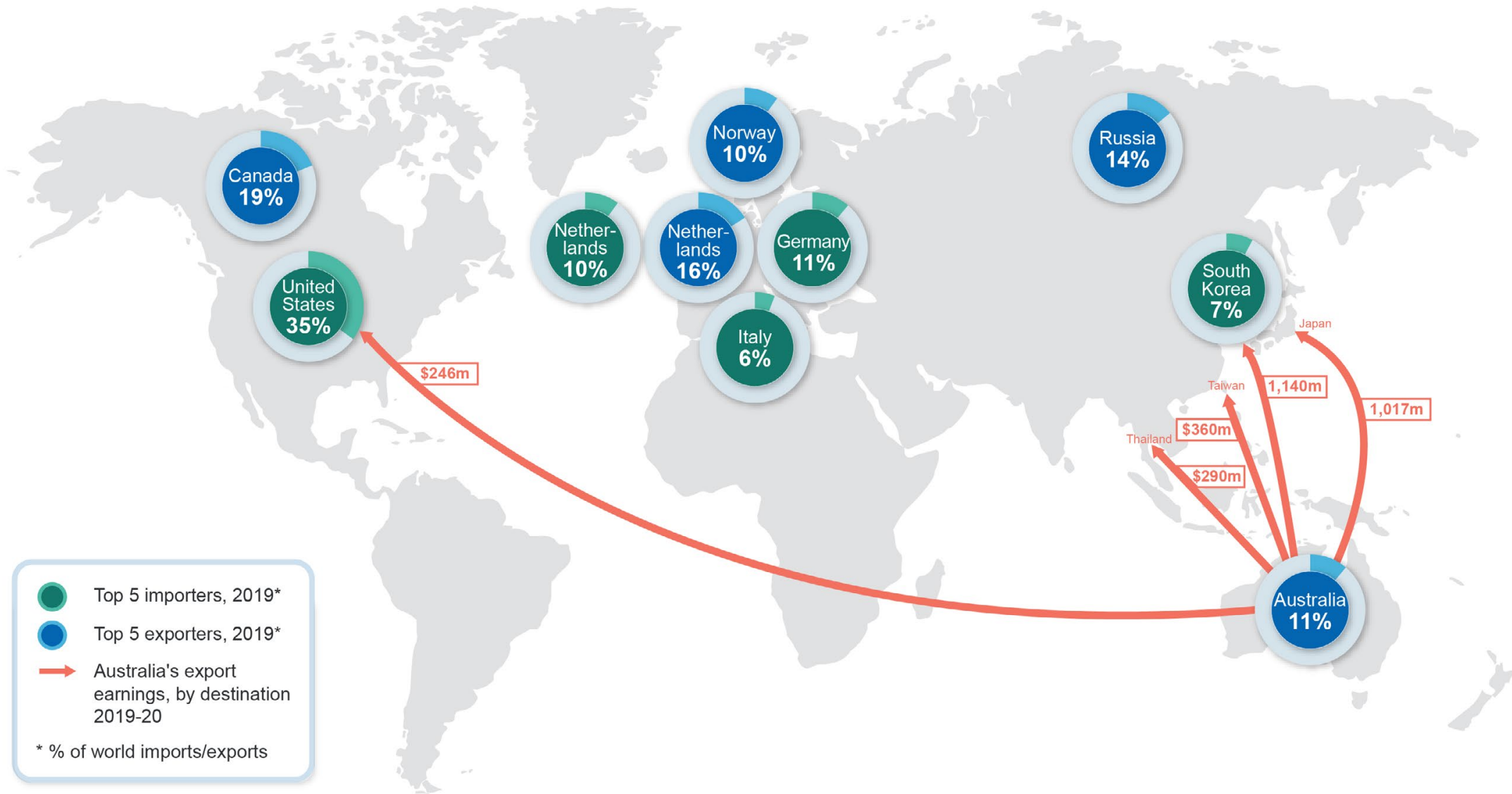
Aluminium



- Bauxite is refined to recover alumina and smelted to make aluminium
- 2-3 tonnes of bauxite is required to produce one tonne of alumina
- China is the world's largest producer & consumer of primary aluminium
- Each electric vehicle contains 0.25 tonne of aluminium

Australia's aluminium





11.1 Summary

- Growing demand is expected to drive aluminium prices higher in 2021 and 2022, to an average of US\$1,880 and US\$1,960 a tonne, respectively. Alumina prices are also forecast to rise over the outlook period, to an average of US\$289 a tonne in 2022.
- Annual Australian output is expected to be broadly steady over the outlook period, remaining at around 1.6 million tonnes of aluminium and 20 million tonnes of alumina (see [Australia section](#)).
- The total value of Australian exports of aluminium, alumina and bauxite is forecast to fall by 7.1 per cent in 2020–21 to \$12 billion as bauxite volumes decline, then hold steady in 2021–22.

11.2 Prices

Aluminium and alumina prices rose in the December quarter 2020

The London Metal Exchange (LME) spot price for primary aluminium traded higher in the December quarter, averaging US\$1,896 a tonne. The speedy recovery of the China's economy from the COVID-19 pandemic has driven primary aluminium demand and prices to above pre-COVID-19 levels. This increased consumption has contributed to a fall in LME aluminium inventories (Figure 11.1). SHFE stocks have fallen since April 2020, as China's demand has recovered. Other factors contributing to higher prices include large scale strategic primary aluminium stockpiling by China's primary aluminium producers and traders. LME off-warrant stocks have risen since data was first released in February 2020 (Figure 11.1).

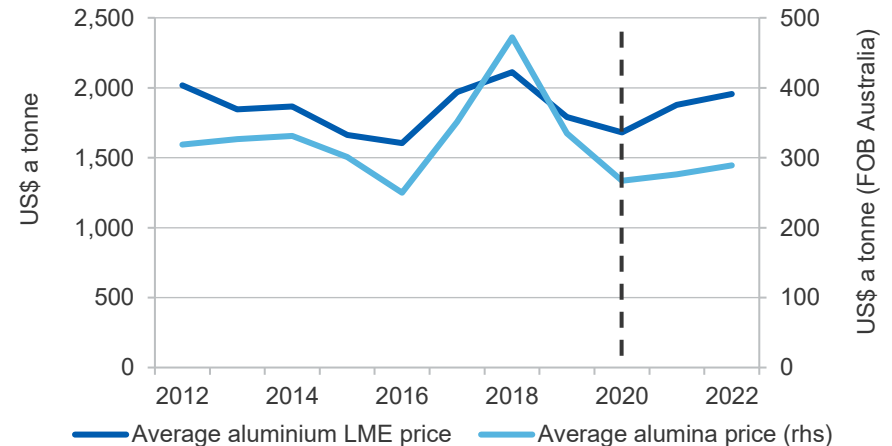
China's winter production curtailment policy — first implemented in the 2017–18 winter to reduce air pollution in major northern cities — is expected to be relaxed in the 2020–21 winter season, in order to boost economic activity. The relaxation is likely to raise aluminium output and create headwinds for aluminium prices. As a result, the aluminium price is estimated to average US\$1,681 a tonne in 2020, down 6.2 per cent from 2019 (Figure 11.2).

Figure 11.1: Exchange aluminium stocks



Source: London Metal Exchange (2020); World Bureau of Metals Statistics (2020)

Figure 11.2: World aluminium and alumina prices



Source: LME (2020) spot prices; Metals Bulletin (2020) Alumina monthly price; Department of Industry, Science, Energy and Resources (2020).

The free on board (FOB) Australian alumina price was also higher in the December quarter 2020, averaging US\$276 a tonne. The rise was driven by increased primary aluminium production in China.

China's aluminium producers are expected to continue to ramp up production in the short term. This increased production is likely to support alumina demand and prices. As a result, the FOB Australian alumina price is estimated to average US\$267 a tonne in 2020, a decline of 20 per cent — and 2.0 percentage points less than the September 2020 *Resources and Energy Quarterly* forecast.

Aluminium and alumina prices expected to rise in 2021 and 2022

The LME aluminium spot price is forecast to increase by 12 per cent to average US\$1,878 a tonne in 2021, and to rise by a further 4.1 per cent in 2022 to average US\$1,955 a tonne in 2022 (Figure 11.2). Recovering world aluminium demand — as the impacts of the COVID-19 pandemic recede — is expected to be a major driver of the rise in aluminium prices. Higher Chinese demand is expected to be a significant driver of rising world demand.

The FOB Australian alumina price is forecast to rise by 3.4 and 4.6 per cent in 2021 and 2022, to average US\$276 and US\$289 a tonne, respectively. (Figure 11.2). The price gain is expected to be driven by a rise in world aluminium production — forecast to increase at an average annual rate of 2.4 per cent in 2021 and 2022.

11.3 Consumption

Aluminium, alumina and bauxite usage rose in the September quarter

World primary aluminium consumption rose by 2.2 per cent year-on-year to 16 million tonnes in the September quarter 2020, driven by a 15 per cent year-on-year rise in consumption in China — the world's largest aluminium consuming country. Car sales in China rose by 14 per cent year-on-year in the September quarter 2020 to 6.9 million units, as China's commuters shifted to car use to minimise the risk of COVID-19 infection.

Primary aluminium consumption in other major primary aluminium consumers fell in the September quarter 2020. These falls included the US (down by 7.1 per cent year-on-year), Germany (down by 39 per cent year-on-year), India (down by 40 per cent year-on-year) and Japan (down by 14 per cent) (Figure 11.4).

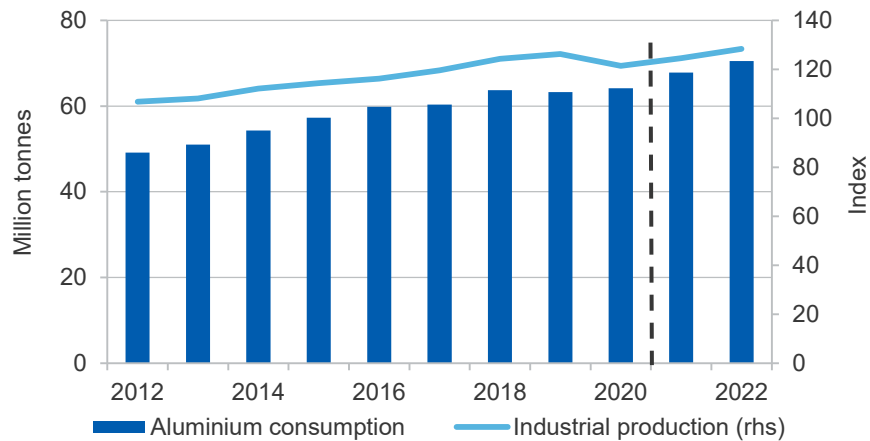
The impact of the COVID-19 pandemic on the global automotive industry has led to adverse impacts on global aluminium usage. Car sales fell across the world (except China), as the loss of jobs and income reduced consumer spending on discretionary items. Global car sales decreased by 3.4 per cent year-on-year in the September quarter 2020, to 18 million units. Car sales in Europe fell by 2.3 per cent year-on-year to 4.1 million units, and in the North America by 9.9 per cent to 4.6 million units.

World primary aluminium consumption is estimated to rise by 1.5 per cent to 64 million tonnes in 2020 (Figure 11.3), driven by a 6.2 per cent rise in aluminium consumption in China. Car sales are expected to recover, supported by changing consumer preferences as a result of the COVID-19 pandemic: people appear to be preferring to travel by car rather than by bus or other forms of public transport, though an increase in remote working has also reduced some car usage.

World alumina consumption increased by 1.1 per cent year-on-year in the September quarter 2020, to 30 million tonnes. The rise came as China's aluminium smelters ramped up production to meet increased aluminium demand (see *Section 11.4*). Over this period, China's alumina consumption rose by 2.0 per cent year-on-year to nearly 17 million tonnes. Demand for alumina from Europe and America fell by 1.9 and 0.7 per cent, to 3.5 and 2.3 million tonnes, respectively, due to lower aluminium production. World alumina consumption is estimated to have risen by 1.4 per cent in 2020 to 120 million tonnes (Figure 11.5). Higher global primary aluminium production has driven alumina demand.

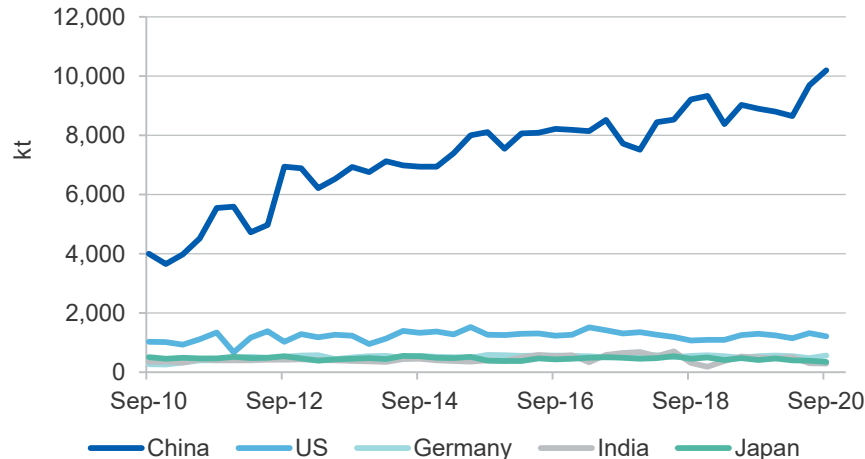
China is expected to contribute significantly to growth in alumina usage over the outlook period, as China's aluminium smelters ramp up their

Figure 11.3: World aluminium consumption and industrial production



Source: International Aluminium Institute (2020); Netherland CPB (2020); Oxford Economics (2020); World Bureau of Metal Statistics (2020); Department of Industry, Science, Energy and Resources (2020)

Figure 11.4: Top 5 primary aluminium consuming countries



Source: International Aluminium Institute (2020); World Bureau of Metal Statistics (2020)

production to maximise the benefits of low alumina and energy prices. Outside of China, alumina consumption is expected to rise in Canada, Brazil, Bahrain and Vietnam.

World bauxite consumption increased by 3.7 per cent year-on-year in the September quarter 2020 to 77 million tonnes, driven by an increase in bauxite consumption in China. China consumed nearly 32 million tonnes of bauxite in the September quarter, up 1.6 per cent year-on-year. World bauxite consumption is expected to increase by 2.5 per cent to 308 million tonnes in 2020, driven by increased alumina production in China — the world's largest alumina producing country.

Aluminium, alumina and bauxite demand set to increase in 2021 and 2022

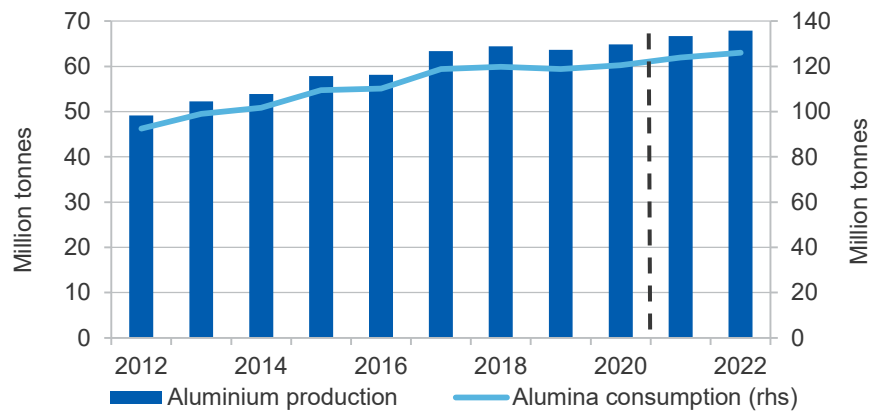
In 2021 and 2022, global industrial production growth — traditionally strongly correlated with aluminium demand — is expected to recover from a sharp fall in 2020. The global economic recovery is expected to support the demand for cars, houses and electrical equipment, and thus aluminium.

In China, primary aluminium consumption from ultra-voltage transmission lines projects — aluminium is used in steel core aluminium wires and cables — is expected to rise over the outlook period. Improving the capacity of the grid sector is a key priority in the latest 5-year plan released in October 2020.

World primary aluminium demand is forecast to grow by 5.7 per cent in 2021 and by 3.9 per cent in 2022, reaching 70 million tonnes by 2022 (Figure 11.3). The growth is expected to be driven by increased demand from the transport, construction and consumer durables sectors. Advanced and developing economies are expected to continue with economic stimulus measures, such as increased infrastructure spending.

World alumina consumption is forecast to grow by 2.8 per cent in 2021 and by 1.8 per cent in 2022, reaching 126 million tonnes in 2022 (Figure 11.3). Alumina demand is driven by primary aluminium production, which

Figure 11.5: World aluminium production and alumina consumption



Source: International Aluminium Institute (2020); AME (2020); World Bureau of Metal Statistics (2020); Department of Industry, Science, Energy and Resources (2020)

is forecast to increase at an average annual rate of 2.4 per cent between 2021 and 2022.

World bauxite usage is forecast to grow by 3.8 per cent year-on-year in 2021 and by 5.3 per cent in 2022, reaching 336 million tonnes by 2022. This is expected to be driven by new alumina capacity in China and India.

11.4 Production

Aluminium, alumina and bauxite output rose in the September quarter

World aluminium production increased by 0.8 per cent year-on-year in the September quarter of 2020 to 16 million tonnes, due to higher output in China. Production in China — the world’s largest aluminium producer — rose by 8.1 per cent year-on-year over the same period, to 9.6 million tonnes. China’s primary aluminium producers raised output in response to government stimulus measures on infrastructure and construction.

Primary aluminium output in the Middle East rose by 1.5 per cent year-on-year in the September quarter 2020 to 1.4 million tonnes, driven by the ramp up of production at the 1.0 million tonnes per year SALCO aluminium

smelter in Iran. Over the same period, Indian output fell by 2.1 per cent year-on-year to 896,000 tonnes, due to COVID-19 containment measures.

Primary aluminium production in China is expected to continue rising over the short term. New and existing aluminium smelters in China are likely to take advantage of low input costs (alumina and fuel prices) and a post-COVID-19 industrial recovery to ramp up production. Some large aluminium smelters have moved their production out of the eastern province of Shandong — where aluminium production is powered by coal-fired power plants — to the western province of Yunnan — where aluminium production is powered by hydropower supplies. In October 2020, Aluminium Corporation of China transferred a 135,000 tonne annual aluminium smelting capacity from Shandong Huayu aluminium smelter to Yunnan Aluminium for clean and cheap hydropower. As a result, world primary aluminium production is estimated to increase by 1.9 per cent in 2020 to 65 million tonnes (Figure 11.5).

World alumina supply increased by 0.9 per cent year-on-year in the September quarter 2020, to 32 million tonnes, driven by a 5.4 per cent (268,000 tonnes) rise in Australian alumina output (see *Section 11.4*) and a 5.7 per cent (995,000 tonnes) rise in China’s alumina output. Production at Norsk Hydro’s Alunorte refinery in Brazil — the largest alumina refinery outside China — declined by about 880,000 tonnes in the September quarter 2020, due to extended maintenance at the Paragominas bauxite mine supplying the refinery.

World alumina supply is estimated to have increased by 1.8 per cent to over 126 million tonnes in 2020, driven by higher production in Brazil. Norsk Hydro’s 6.4 million tonne per year Alunorte refinery has ramped up production since early October 2020, following the completion of maintenance work at its Paragominas bauxite mine on 8 October 2020.

World bauxite output rose by 7.9 per cent year-on-year in the September quarter 2020 to nearly 90 million tonnes, propelled by a 3.8 per cent (1.0 million tonnes) rise in bauxite production in Australia — the world’s largest bauxite producer — and a 68 per cent (7.5 million tonnes) rise in bauxite

production in Guinea. World bauxite supply is estimated to have risen by 2.1 per cent in 2020, to 363 million tonnes (Figure 11.6).

Aluminium, alumina and bauxite output set to rise over the outlook period

World primary aluminium production is forecast to grow by 2.9 per cent in 2021 and by 1.8 per cent to 68 million tonnes in 2022 (Figure 11.5). The gains is expected to be driven by additional capacity in China, Iran, Norway and Vietnam.

In China, it is expected that around 2.4 million tonnes of new primary aluminium capacity is expected to be added in 2021. More greenfield aluminium smelters are anticipated, located in regions where power is cheap and abundant (such as Yunnan province). Henan Shenhua's 900,000 tonne per year Yunnan aluminium project is expected to start commercial production in the March quarter 2021. The 396,000 tonne per year Baiyinhuo aluminium smelter is expected to start production in late 2020 or early 2021. Guizhou Zhengzhongyuan Mining's 500,000 tonne per year Weng'an aluminium project is expected to be commissioned in 2022.

Outside of China, Iran is implementing a plan to increase its annual aluminium production to 1.5 million tonnes by 2025, with the first phase (300,000 tonnes) of the 1 million tonne per year SALCO aluminium smelter ramping up production over the outlook period. In Norway, production at Hydro's Husnes aluminium smelter is forecast to increase by 105 per cent in 2021, to 195,000 tonnes, driven by the restart of its B line in November 2020. In Vietnam, the delayed Tran Hong Quan aluminium project (nameplate capacity of 436,000 tonnes per year) is expected to start production in early 2021.

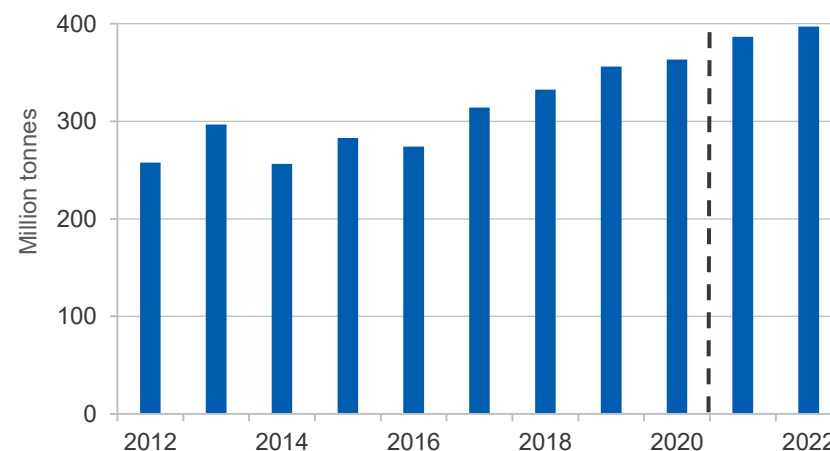
World alumina supply is forecast to grow by 0.3 per cent in 2021, and by 1.8 per cent to 129 million tonnes in 2022. This growth is expected to be driven by China, India and Cameroon.

In China, new alumina refineries are expected to be constructed, in order to comply with the government's stricter environmental regulations. Aluminium Corporation of China's 1 million tonne per year Chalco Hebei

Huanghua alumina refinery started production in 2020, and is expected to ramp up production to 4 million tonnes per year over the outlook period. In India, production at Vedanta's Lanjigarh refinery is expected to rise from 300,000 tonnes per year in 2020 to 1.8 million tonnes per year by 2022. In Cameroon, the 3 million tonnes per year joint-venture CAL alumina refinery project is expected to come online in 2022. Alumina production in Australia is expected to be steady at about 20 million tonnes per year.

World bauxite output is forecast to grow by 6.4 per cent in 2021 and by 2.8 per cent to 397 million tonnes in 2022 (Figure 11.6). The gains are expected to be driven by newly added capacity in Guinea, where production is rising rapidly. Guinea's bauxite output is forecast to grow at an average of 9.0 per cent a year in 2021 and 2022. The Compagnie des Bauxites de Guinée mine in Guinea, which expanded from 13 to 18 million tonnes per annum in 2019, is due to expand to 28 million tonnes by 2022. Emirates Global Aluminium is planning to ramp up output at its bauxite mine in Guinea, targeting 12 million tonnes per year towards the end of the outlook period.

Figure 11.6: World bauxite production



Source: Department of Industry, Science, Energy and Resources (2020)

11.5 Australia's exports and production

Weak aluminium, alumina and bauxite exports in the September quarter

Australia's aluminium, alumina and bauxite exports declined by 17 per cent year-on-year in the September quarter 2020, to \$2.8 billion. The decline was due to softening prices for aluminium and alumina (see *Section 11.2*), and lower aluminium export volumes (down 11 per cent year-on-year), partially offset by higher export volumes of alumina (up 4.1 per cent year-on-year) and bauxite (up 0.4 per cent year-on-year).

Australia's aluminium output increased by 0.9 per cent year-on-year to 401,000 tonnes in the September quarter 2020, propelled by a 2.4 per cent rise in Rio Tinto's Boyne Island aluminium smelter in Queensland.

Australia's alumina output increased by 5.4 per cent year-on-year in the September quarter 2020 to 5.2 million tonnes. The increase is attributed to a 14 per cent year-on-year rise in Rio Tinto's Queensland Alumina Refinery in Queensland, and an 8.0 year-on-year rise in Rio Tinto's Yarwun alumina refinery in Queensland.

Australia's bauxite output rose by 3.8 per cent year-on-year to nearly 28 million tonnes in the September quarter 2020. The rise was driven by a 6.0 per cent year-on-year rise in Rio Tinto's Gove operations in the Northern Territory, and a 3.5 per cent year-on-year rise in Rio Tinto's Weipa operations in Queensland.

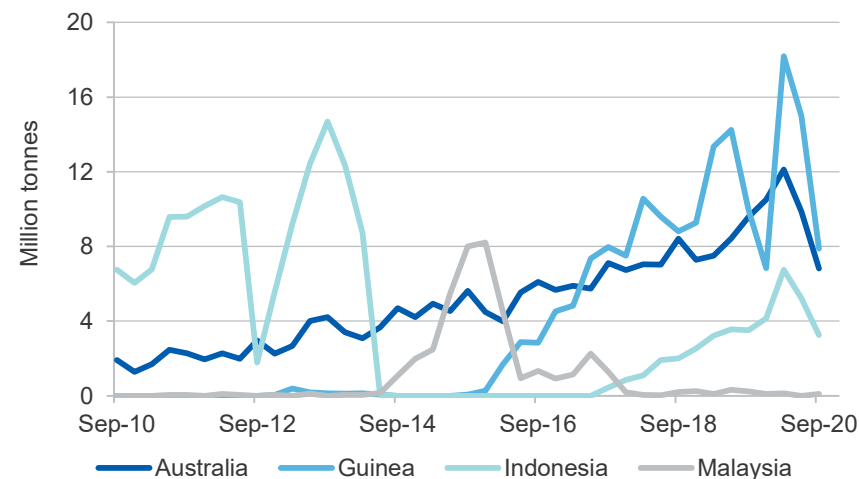
Exports to fall over the outlook period

Despite a forecast of improvement in aluminium and alumina prices in 2021 and 2022, Australia's aluminium, alumina and bauxite export earnings are forecast to fall by 7.1 per cent in 2020–21, to nearly \$12 billion, and then hold steady in 2021–22.

The fall in export earnings is expected to be driven by a decline in bauxite export volumes, which are forecast to fall at an average annual rate of 8.3 per cent, to 35 million tonnes by 2021–22.

Over the last few years, companies from China and Europe have invested heavily in Guinea to build up the country's bauxite production capacity. Guinea has overtaken Australia as China's largest supplier of bauxite since 2017 (Figure 11.7), accounting for 42 per cent of China's total bauxite imports in the September quarter 2020.

Figure 11.7: China's bauxite imports from major producers



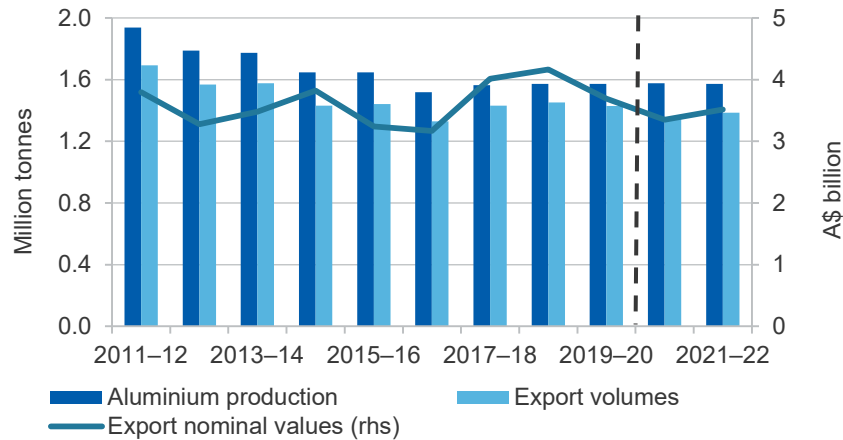
Source: Bloomberg (2020)

Steady aluminium and alumina production over the outlook period

Australia's aluminium production is forecast to remain at around 1.6 million tonnes a year out to 2021–22 (Figure 11.8). Australia's alumina production is expected to remain at around 20 million tonnes per annum over the outlook period (Figure 11.9).

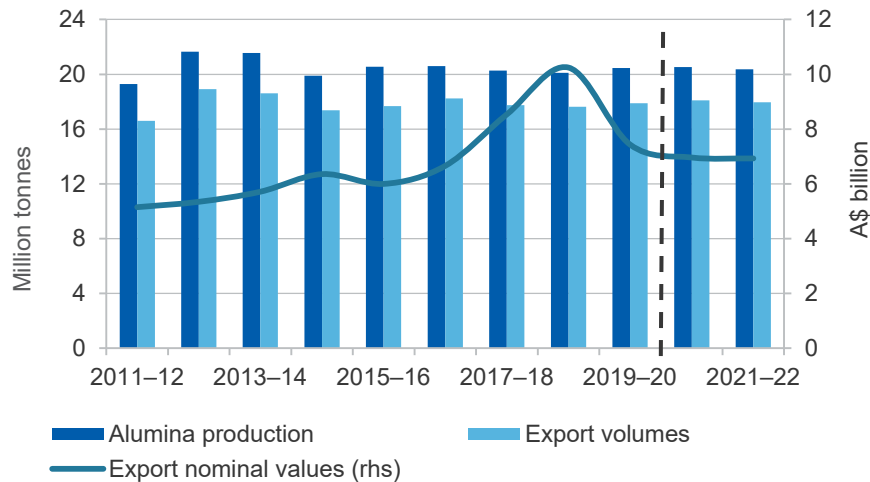
Australia's bauxite output is forecast to fall by 4.0 per cent in 2020–21 to 103 million tonnes, as production at Metro Mining's 6 million tonnes a year Bauxite Hills mine in Queensland is suspended from September 2020 to April 2021, due to the wet season shutdown. In 2021–22, bauxite output is forecast to rise by 2.8 per cent, to 106 million tonnes (Figure 11.10).

Figure 11.8: Australia's aluminium exports and production



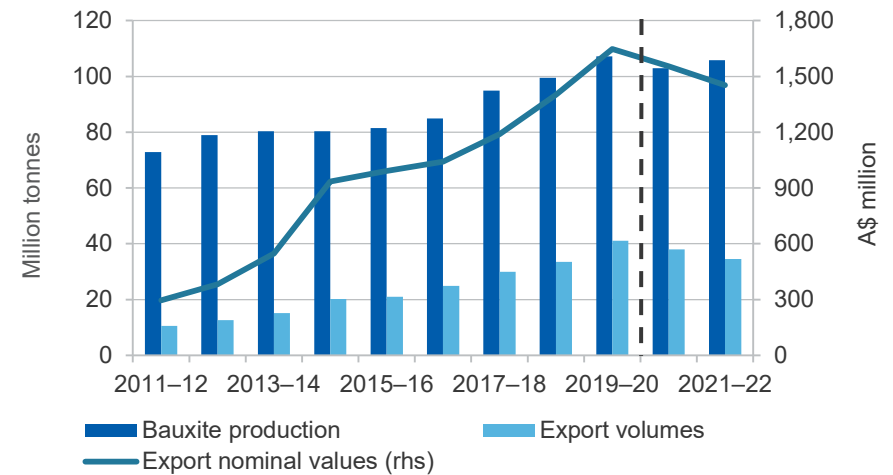
Source: Source: ABS (2020) International Trade in Goods and Services, 5368.0; Department of Industry, Science, Energy and Resources (2020)

Figure 11.9: Australia's alumina exports and production



Source: ABS (2020) International Trade in Goods and Services, 5368.0; Department of Industry, Science, Energy and Resources (2020)

Figure 11.10: Australia's bauxite exports and production



Source: ABS (2020) International Trade in Goods and Services, 5368.0; Department of Industry, Science, Energy and Resources (2020)

Revisions to the outlook for Australian exports

The forecast for Australia's aluminium, alumina and bauxite exports earnings has been revised up from the September 2020 Resources and Energy Quarterly — by \$256 million in 2020–21, and by \$205 million to \$12 billion in 2021–22. The revision reflects larger than expected rise in aluminium and alumina prices in the second half of 2020.

Table 11.1: Aluminium, alumina and bauxite outlook

World	Unit	2019	2020 ^s	2021 ^f	2022 ^f	Annual percentage change		
						2020 ^s	2021 ^f	2022 ^f
Primary aluminium								
Production	kt	63,635	64,853	66,725	67,938	1.9	2.9	1.8
Consumption	kt	63,224	64,153	67,839	70,484	1.5	5.7	3.9
Prices aluminium^c								
- nominal	US\$/t	1,792	1,681	1,878	1,955	-6.2	11.8	4.1
- real ^d	US\$/t	1,814	1,681	1,841	1,877	-7.4	9.6	1.9
Prices alumina spot								
- nominal	US\$/t	335	267	276	289	-20.1	3.4	4.6
- real ^d	US\$/t	339	267	271	278	-21.1	1.4	2.5
Australia	Unit	2018–19	2019–20	2020–21 ^f	2021–22 ^f	2019–20	2020–21 ^f	2021–22 ^f
Production								
Primary aluminium	kt	1,573	1,572	1,576	1,574	0.0	0.2	-0.2
Alumina	kt	20,103	20,451	20,529	20,361	1.7	0.4	-0.8
Bauxite	Mt	99.5	107.2	103.0	105.8	7.8	-4.0	2.8
Consumption								
Primary aluminium	kt	156	188	237	237	20.9	25.8	0.0
Exports								
Primary aluminium	kt	1,452	1,430	1,345	1,385	-1.5	-6.0	3.0
- nominal value	A\$m	4,166	3,691	3,352	3,514	-11.4	-9.2	4.8
- real value ^e	A\$m	4,259	3,724	3,352	3,456	-12.6	-10.0	3.1
Alumina	kt	17,619	17,876	18,082	17,948	1.5	1.2	-0.7
- nominal value	A\$m	10,245	7,431	6,959	6,926	-27.5	-6.4	-0.5
- real value ^e	A\$m	10,474	7,498	6,959	6,812	-28.4	-7.2	-2.1
Bauxite	kt	33,546	41,026	37,992	34,524	22.3	-7.4	-9.1
- nominal value	A\$m	1,401	1,648	1,554	1,452	17.7	-5.7	-6.5
- real value ^e	A\$m	1,432	1,663	1,554	1,428	16.1	-6.5	-8.1
Total value								
- nominal value	A\$m	15,811	12,770	11,865	11,892	-19.2	-7.1	0.2
- real value ^e	A\$m	16,165	12,884	11,865	11,697	-20.3	-7.9	-1.4

Notes: **c** LME cash prices for primary aluminium; **d** In 2020 calendar year US dollars; **e** In 2020–21 financial year Australian dollars; **f** Forecast; **s** Estimate

Source: ABS (2020) International Trade in Goods and Services, 5368.0; AME Group (2020); LME (2020); Department of Industry, Science, Energy and Resources (2020); International Aluminium Institute (2020); World Bureau of Metal Statistics (2020).