Aluminium

Major Australian bauxite deposits (Gt)
- Deposit
  - Operating mine
  - <0.01
  - 0.02–0.03
  - 0.04–0.09
  - 0.10–0.20
  - 0.21–0.44
  - >0.45

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

Key consumer markets for primary aluminium
- 57% China
- 8% United States
- 3% Germany
- 3% Japan
- 3% India
- 2% South Korea

Australia's aluminium
- World's no.1 bauxite producing nation
- Largest alumina exporter 18m tonnes in 2019
- World's 2nd alumina producer 20m tonnes in 2019
11.1 Summary

- The global aluminium industry is facing challenging conditions caused by the impacts of COVID-19, with slowing demand, increasing supply, and rising inventory levels. Aluminium prices are forecast to fall by 8.3 per cent in 2020, to average US$1,643 a tonne, before recovering to US$1,726 a tonne by 2022.
- Annual Australian output is expected to be broadly steady over the outlook period, at 1.6 million tonnes of aluminium and 20 million tonnes of alumina.
- The total value of Australian exports of aluminium, alumina and bauxite is forecast to fall by 20 per cent in 2019–20, to nearly $13 billion, and 2.8 per cent in 2020–21, to $12 billion, due to low aluminium and alumina prices and declining bauxite export volumes.

11.2 Prices

Aluminium and alumina prices declined sharply in the first half of 2020

The London Metal Exchange (LME) spot price for primary aluminium has fallen by 11 per cent in 2020, to US$1,578 a tonne on 17 June 2020 — compared to an average of US$1,757 a tonne in the second half of 2019. Prices have been affected by the COVID-19 pandemic and growing supply from China — Chinese primary aluminium producers have taken advantage of lower input costs (lower alumina and fuel prices) to ramp up their production. This increased production has resulted in a rise in aluminium inventories on the LME and Shanghai Futures Exchange (SHFE) (Figure 11.1). LME stocks have risen since February 2020, due to increasing supply and slowing demand, while SHFE stocks rose in the first three months of 2020, but have fallen since April 2020.

The aluminium LME spot price is forecast to decrease by 8.3 per cent in 2020, to an average US$1,643 a tonne (Figure 11.2), as additional aluminium capacity from new and existing aluminium smelters in China adds to downward pressure on aluminium prices.

The free on board (FOB) Australian alumina price has decreased by 6.6 per cent in 2020, to US$257 a tonne on 17 June 2020 — compared to an average of US$291 a tonne in the second half of 2019 — due to a surplus of alumina output (around 870,000 tonnes) from 2019.

The FOB Australian alumina price is estimated to fall by 19 per cent in 2020, to US$272 a tonne (Figure 11.2), as more alumina refineries are expected to return to full capacity following the easing of COVID-19 related restrictions.

Aluminium and alumina prices expected to rise in 2021 and 2022

The LME aluminium spot price is forecast to increase by 4.0 per cent, to average US$1,709 a tonne in 2021, and to rise by a further 1.0 per cent in 2022, to average US$1,726 a tonne (Figure 11.2). The forecast rise in the primary aluminium price is sensitive to the assumption that the world economy recovers from the COVID-19 pandemic over the outlook period, and that governments and central banks implement further economic stimulus measures over the outlook period (see Chapter 2 macroeconomic outlook).
Recovering Chinese aluminium consumption is expected to be a driver of the recovery in aluminium prices, however, they are not expected to return to 2018 and 2019 levels, as aluminium demand was slowing before the spread of the COVID-19 pandemic.

The FOB Australian alumina price is forecast to rise at an average annual rate of 2.9 per cent between 2021 and 2022, to US$289 a tonne by 2022 (Figure 11.2). A forecast increase of world aluminium production at an average annual rate of 2.8 percent in 2021 and 2022 is expected to provide support to alumina prices.

**Figure 11.2: World aluminium and alumina prices**

![Graph showing world aluminium and alumina prices from 2012 to 2022.](image)


### 11.3 Consumption

Global aluminium, alumina and bauxite consumption rose in the first three months of 2020

Global primary aluminium consumption increased by 5.5 per cent year-on-year in the first three months of 2020, to nearly 16 million tonnes, driven by growing aluminium consumption from China — the world’s largest aluminium consuming country. COVID-19 restrictions reduced aluminium recycling activity, and the fall in aluminium collection activity led to a spike in the use of primary aluminium as a substitute for scrap aluminium. As a result, primary aluminium consumption in China rose by 5.8 per cent year-on-year in the first three months of 2020, to nearly 9 million tonnes.

Offsetting the rise in primary aluminium consumption in China, is the fall in aluminium use in the automotive industry due to COVID-19 lockdown measures. Global automotive makers have cut production at plants across Europe, North America and Asia. Volkswagen — the world’s largest car producing company — closed all of its plants for a few weeks in April and May 2020. General Motors — the largest US automaker — also closed its plants over this period. Car sales fell sharply across the world, as the loss of jobs and income reduced consumer spending on discretionary items. Car sales in China fell by 42 per cent year-on-year in the first three months of 2020, to around 3.7 million units, and in Europe, they dropped by 23 per cent, to 3.5 million units.

World primary aluminium consumption is forecast to increase by 2.7 per cent in 2020, to 64 million tonnes (Figure 11.3), propelled by a 2.1 per cent rise in aluminium consumption in China. Car sales are expected to recover, and could be supported by changing consumer preferences, with people preferring to travel by car rather than by bus or other forms of public transport. On the production side, European automakers such as BMW and Volkswagen restarted their production in May 2020, as COVID-19 lockdowns and precautions were eased.

The COVID-19 pandemic has provided global primary aluminium producers with a new source of demand, due to the rising consumption of disposable face masks. It is estimated that around 116 million units of face masks are produced every day, which in turn, consume around 1,305 tonnes of aluminium for making metal nose clips. It is estimated that this will add an additional 39,000 tonnes of primary aluminium demand to world consumption in 2020.
The COVID-19 pandemic is expected to impact the world aircraft manufacturing industry for several years. With border lockdowns, the demand for commercial airline travel has dropped in 2020 and it may take years to return to pre-COVID-19 levels. This decline is expected to impact aircraft production — as grounded airline fleets reduce the demand for new planes — and aluminium demand as a whole.

World alumina usage increased by 0.5 per cent year-on-year in the first three months of 2020, to nearly 29 million tonnes. The rise came as Chinese aluminium smelters ramped up production after COVID-19 lockdowns (see Section 11.4 production). Over this period, China’s alumina consumption rose by 1.3 per cent year-on-year, to nearly 17 million tonnes. However, demand for alumina from Western Europe and South America fell by 3.7 and 2.5 per cent, to 1.5 million and 548,000 tonnes, respectively, due to lower aluminium production.

World alumina demand is estimated to increase by 1.2 per cent in 2020, to nearly 119 million tonnes (Figure 11.4). An expected rise in global primary aluminium production in 2020 is likely to provide some support for alumina demand. China is expected to contribute to the growth, as Chinese aluminium smelters ramp up their production to maximise the benefit of low alumina and fuel prices. Outside of China, aluminium production in Russia, India and the Middle East is expected to return to at least half of pre-COVID-19 levels.

World bauxite usage increased by 0.1 per cent year-on-year in the first three months of 2020, to 76 million tonnes, driven by a slight increase in bauxite consumption in China. Over this period, China consumed nearly 32 million tonnes of bauxite, up 1.6 per cent year-on-year, as the domestic bauxite supply chains were disrupted at the height of the COVID-19 pandemic in January and February 2020 (see Section 11.4 production).

World bauxite consumption is estimated to increase by 4.0 per cent in 2020, to 311 million tonnes, driven by increased alumina production from China — the world’s largest alumina producing country.

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

World primary aluminium demand is forecast to increase at an average annual rate of 2.4 per cent between 2021 and 2022, to 68 million tonnes by 2022 (Figure 11.3). The growth is expected to be driven by increased demand for aluminium in the transport, construction and consumer sectors. Advanced and developing economies are expected to continue with economic stimulus policies such as infrastructure spending. In 2021 and 2022, global industrial production growth, strongly correlated with aluminium demand, is expected to recover from a sharp fall in 2020. The global economic recovery is expected to support demand for cars, houses and electrical equipment, and thus aluminium consumption.

A significant driver of aluminium demand is expected to come from cars, particularly energy efficient vehicles and electric vehicles, which contain a higher proportion of aluminium components. Automakers across the world are working to replace internal combustion engines with electrical engines,

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)
and are seeking to reduce vehicles’ weight by increasing the use of aluminium, which is 10 to 40 per cent lighter than steel.

Despite slowing economic growth, the Chinese government’s infrastructure projects and ambitious initiatives for promoting electric vehicle production are expected to bolster demand for aluminium. These initiatives are likely to at least partly offset the impacts of the COVID-19 pandemic on the country’s economy. China’s primary aluminium consumption is expected to continue to grow strongly over the next two years, reaching 38 million tonnes in 2022.

World alumina consumption is forecast to rise at an average annual rate of 1.9 per cent in 2021 and 2022, to 123 million tonnes in 2022 (Figure 11.4). Alumina demand is driven by primary aluminium production, which is forecast to increase by 2.8 per cent a year between 2021 and 2022.

World bauxite consumption is forecast to grow at an average annual rate of 4.0 per cent between 2021 and 2022, to 337 million tonnes by 2022. This is expected to be driven by new alumina capacity in China and India.

**Figure 11.4: World aluminium production and alumina consumption**

Global primary aluminium production has been largely unaffected by the COVID-19 lockdowns. Production increased by 2.0 per cent year-on-year in the March quarter 2020, to 16 million tonnes, propelled by higher output in China — the world’s largest aluminium producer. China produced 9.1 million tonnes of primary aluminium over this period, up by 2.1 per cent year-on-year, as Chinese primary aluminium producers ramped up their production.

Over this period, primary aluminium production in the Middle East rose by 9.6 per cent year-on-year to 1.5 million tonnes, driven by production ramp-up at the 1 million tonnes per year SALCO aluminium smelter in Iran. Production in Europe fell by 0.5 per cent year-on-year in the March quarter 2020, to 1.9 million tonnes, due to COVID-19 related lockdowns.

Rio Tinto has closed one of the aluminium production lines at its 340,000 tonnes a year Tiwai aluminium smelter in New Zealand, to comply with government restrictions to contain the spread of COVID-19. Production at Norsk Hydro’s 470,000 tonnes per year Albras aluminium smelter in Brazil has been cut by 25 per cent, as an electrical fire incident in early March 2020 forced the shutdown of one of the plant’s four production lines.

Primary aluminium production in China is expected to continue rising over the rest of 2020. New and existing Chinese aluminium smelters are likely to take advantage of low input costs (alumina and fuel prices) and a post-COVID-19 industrial recovery to ramp up production. Chinalco’s 500,000 tonnes per year Yunnan Aluminium smelter started production in May 2020. Chalco’s Guangxi 2 million tonnes per year alumina refinery is expected to start production in the September quarter 2020. China’s aluminium output in 2020 is forecast at 37 million tonnes (up 4.3 per cent).

Russia is expected to produce around 4 million tonnes of primary aluminium in 2020. Indian primary aluminium production is expected to remain steady at 3.7 million tonnes in 2020, on an assumption of consistent performance from their aluminium smelters. As a result, world
primary aluminium production is forecast to increase by 3.2 per cent in 2020 to 66 million tonnes (Figure 11.4).

World alumina supply decreased by 0.8 per cent year-on-year in the March quarter 2020, to 30 million tonnes, due to 7.0 per cent (1.2 million tonnes) decline in Chinese alumina output, in response to collapsing alumina prices and cheap imported alumina from overseas. Production in Australia — the world’s second largest alumina producer — has remained largely unchanged in the March quarter 2020 (with average monthly production of 1.7 million tonnes), as all Australian refineries have remained in operation during the COVID-19 lockdowns. Over this period, Russian alumina production is estimated to have increased by 5.8 per cent year-on-year, to 948,000 tonnes.

World alumina supply is forecast to increase by 0.1 per cent in 2020, to over 121 million tonnes, driven by higher production in China and Australia. China’s alumina production is forecast to increase by 2.0 per cent in 2020, to 69 million tonnes, as the disruption in China’s bauxite supply is expected to ease in the second-half of 2020. Australia’s production is expected to increase slightly (up 0.2 per cent to over 20 million tonnes), as strong production performance from Rio Tinto’s Gladstone operation is likely to continue.

World bauxite supply increased by 3.6 per cent year-on-year in the March quarter 2020, to 90 million tonnes, as global bauxite miners increased their production to accommodate the rise in bauxite imports from China — the domestic bauxite supply chains were disrupted at the height of the COVID-19 pandemic in China in January and February 2020.

China’s bauxite imports increased by 10 per cent year-on-year in the first three months of 2020, to 28 million tonnes. Over this period, production in Guinea rose by 1.9 per cent year-on-year, to around 27 million tonnes.

For 2020, world bauxite supply is forecast to rise by 3.5 per cent, to 357 million tonnes, driven by higher production in Guinea (up 27 per cent to 80 million tonnes) — the world’s second largest producer (Figure 11.5).

Aluminium, alumina and bauxite output set to rise over the outlook period
World primary aluminium production is forecast to increase at an average annual rate of 2.8 per cent between 2021 and 2022, to reach about 69 million tonnes by 2022 (Figure 11.3). The gains will be driven by additional capacity in China, Iran and Vietnam. In China, more greenfield aluminium smelters are anticipated, located in regions (such as Yunnan province) where power is cheap and abundant. The 396,000 tonnes per year Baiyinhua aluminium smelter is expected to start production in late 2020 or early 2021. Guizhou Zhongzhongyuan Mining’s 500,000 tonnes 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 tonnes per year SALCO aluminium smelter ramping up production over the outlook period. 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.

A risk to global primary aluminium supply is the rising power costs that have the potential to impact the viability of the aluminium industry around the world. Rio Tinto is conducting strategic reviews of their Tiwai Point aluminium smelter in New Zealand and ISAL aluminium smelter in Iceland. The reviews will determine the viability of those operations, including any possible production curtailment or business closure.

World alumina supply is forecast to rise at an average annual rate of 1.8 per cent between 2021 and 2022, to 126 million tonnes by 2022. This growth is expected to be driven by China, India and Cameroon. In China, greenfield alumina refineries are expected to be constructed in order to comply with the Chinese government’s stricter environmental regulations. Aluminium Corporation of China’s 1 million tonne per year Chalco Hebei Huanghua greenfield 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, through operating efficiencies. 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 remain steady at around 20 million tonnes per year.

\[\text{Figure 11.5: World bauxite production}\]

![World bauxite production](image)

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

World bauxite output is forecast to grow at an average annual rate of 2.4 per cent over the outlook period, reaching 374 million tonnes by 2022 (Figure 11.5). The gains are expected to be driven by newly added capacity in Guinea, where production is rapidly rising. Guinea’s bauxite output is forecast to grow at an average 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.

11.4 Australia’s exports and production

March quarter 2020 mixed for aluminium, alumina and bauxite output

Australia’s primary aluminium production increased by 1.8 per cent year-on-year in the March quarter 2020, to 391,000 tonnes. The increase is attributed to a 3.2 per cent year-on-year rise in Boyne Island aluminium smelter in Queensland and a 4.4 per cent year-on-year rise in Bell Bay aluminium smelter in Tasmania.

Australia’s alumina output was unchanged in the March quarter 2020, at nearly 5 million tonnes, with no production losses related to the COVID-19 lockdown.

Australia’s bauxite production fell by 4.6 per cent year-on-year in the March quarter 2020, to 24 million tonnes. The fall was due to the temporary shutdown of Metro Mining’s Bauxite Hills operation in Queensland for maintenance. In contrast, production at Rio Tinto’s Weipa bauxite operations (including Amrun bauxite project) in Queensland increased by 10 per cent, to 8.7 million tonnes, driven by the successful production ramp-up at Amrun in 2019.

Lower aluminium and alumina prices cut export earnings in 2019–20

Australia’s aluminium, alumina and bauxite exports declined by 16 per cent year-on-year in the March quarter 2020, to $3.0 billion. The decline was due to softening prices for aluminium and alumina (see Section 11.2 Prices), and lower aluminium export volumes, partially offset by higher export volumes of alumina and bauxite.

Falling aluminium and alumina prices are expected to have had a negative impact on Australian aluminium and alumina exports in the June quarter 2020. Export values are estimated to have declined by 19 per cent year-on-year, to about $3.0 billion. As a result, Australia’s aluminium, alumina and bauxite exports are estimated to have declined by 20 per cent to nearly $13 billion in 2019–20.

Resources and Energy Quarterly June 2020
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 2.8 per cent in 2020–21 and 0.7 per cent in 2021–22, to $12 billion. The fall is expected to be driven by a decline in bauxite export volumes. Over this period, bauxite export volumes are forecast to decrease at an average annual rate of 7.2 per cent, to 34 million tonnes by 2021–22.

Australian bauxite exports could be affected by the rise of Guinea as a major producer and exporter of bauxite. Guinea has overtaken Australia as China’s largest supplier of bauxite, accounting for 44 per cent of China’s total bauxite imports in March 2020. Over the last few years, Chinese and European companies have invested heavily in Guinea to build up the country’s bauxite production capacity.

Figure 11.6: Australia’s aluminium exports and production

Steady aluminium, alumina and bauxite production over the outlook

Australia’s aluminium production is forecast to remain at around 1.6 million tonnes a year out to 2021–22 (Figure 11.6). Australia’s alumina production is expected to remain at around 20 million tonnes per annum over the outlook period (Figure 11.7). Australia’s bauxite production is forecast to remain at 105 million tonnes per year out to 2021–22 (Figure 11.8).

In June 2020, Alcoa Australia has applied to the Western Australia Environmental Protection Authority (WA EPA) to increase alumina production at its Pinjarra refinery from 5 to 5.25 million tonnes a year. The company has also applied to the WA EPA to increase bauxite production at its Huntly mine (annual production of 26 million tonnes).

Figure 11.7: 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)
Revisions to the outlook

The forecast for Australia’s aluminium, alumina and bauxite exports earnings have been revised down by $718 million, to $12 billion in 2020–21, and by $757 million to $12 billion in 2021–22, from the March 2020 Resources and Energy Quarterly.

The downward revision has been driven by a weaker price outlook. The forecast for the LME aluminium spot price has been revised down by 3.3 per cent (or US$56 a tonne of aluminium) in 2020, and the FOB Australian alumina prices has been revised down by 16 per cent (or US$50 a tonne), from the March 2020 Resources and Energy Quarterly. The revision reflects a sharper than expected fall in aluminium and alumina prices in the first half of 2020.
Table 11.1: Aluminium, alumina and bauxite outlook

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<th>2021f</th>
<th>2022f</th>
<th>2020a</th>
<th>2021f</th>
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<tr>
<td>Total value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- nominal</td>
<td>A$m</td>
<td>15,811</td>
<td>12,693</td>
<td>12,339</td>
<td>12,249</td>
<td>-19.7</td>
<td>-2.8</td>
<td>-0.7</td>
</tr>
<tr>
<td>- real&lt;sup&gt;e&lt;/sup&gt;</td>
<td>A$m</td>
<td>16,108</td>
<td>12,693</td>
<td>12,100</td>
<td>11,759</td>
<td>-21.2</td>
<td>-4.7</td>
<td>-2.8</td>
</tr>
</tbody>
</table>

Notes: c LME cash prices for primary aluminium; d In 2020 calendar year US dollars; e In 2019–20 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).

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