Aluminium

Australia's aluminium sector

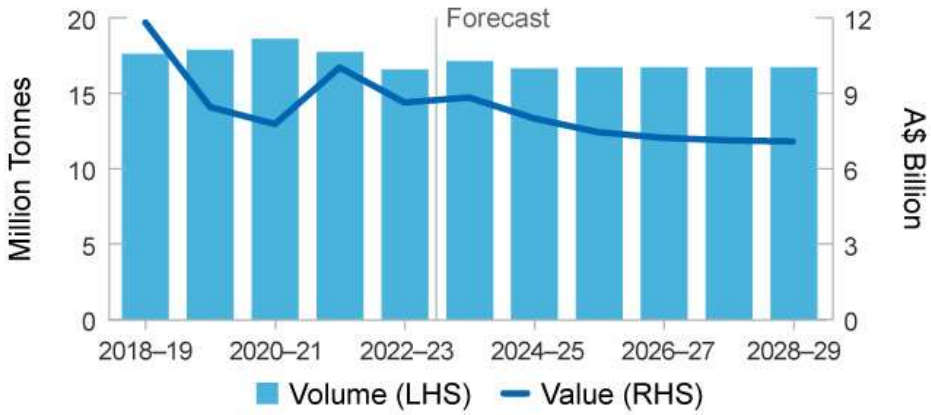
10%
of global primary aluminium exports are **Australian**

$17 billion
primary aluminium, alumina and bauxite **exported,** 2023

Over 98%
of Australian bauxite is **exported to China**

Major Australian bauxite deposits, Gt

Australian alumina exports



Outlook

Prices set to rise as energy efficient technology supports aluminimum demand

Australia is expected to be world's largest HPA* producer by 2025, with **49%** of global output

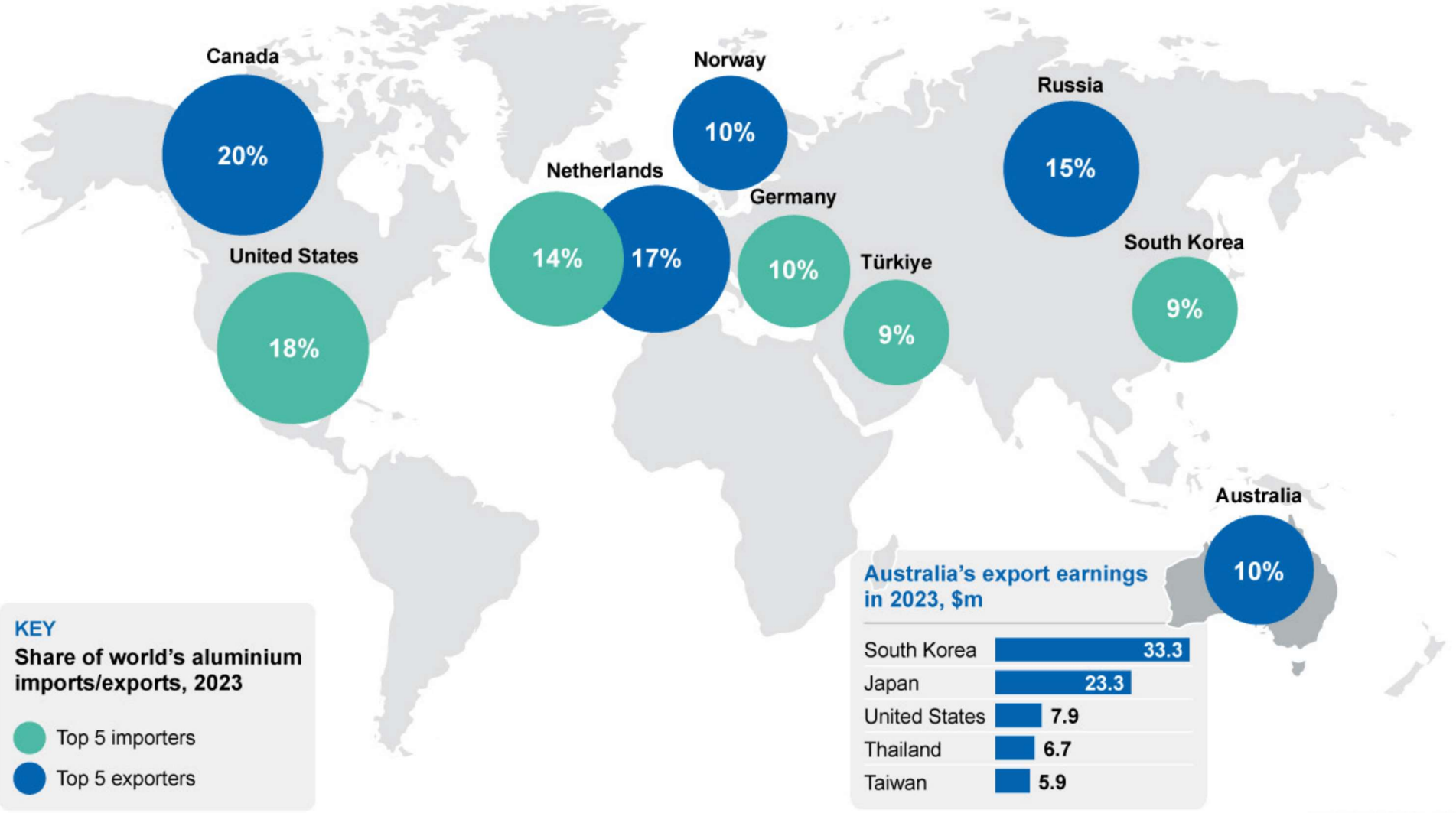
The Australian bauxite industry is on track to be a **$2 billion** export industry by 2026-27

Growing **global demand** for energy efficient cars and new tech support aluminium use & exports

*High Purity Alumina

SOURCE: DISR; OCE

Aluminium TRADE MAP



SOURCE: WBMS; ABS

11.1 Summary

- Aluminium prices are forecast to remain at 2023 levels in 2024, averaging US$2,300 a tonne. Increased Russian supply is expected to offset the impact of higher Chinese demand. Growing demand for new energy-efficient cars/technologies is expected to result in the aluminium price rising to US$2,437 a tonne by 2029 (in real terms).
- Australia's primary aluminium output is projected to be 1.6 million tonnes (Mt) a year. Alcoa's decision to curtail its Kwinana alumina refinery in WA by the end of the June quarter 2024 is likely to bring Australian alumina output below 19 Mt a year. Mine expansion and new mines are expected to boost Australian bauxite output to 122 Mt by 2029.
- The ramp up of high purity alumina output is expected to add about $1.5 billion a year to Australia's aluminium, alumina and bauxite (AAB) exports from 2025–26. Australian AAB exports are projected to reach $17 billion (in real terms) by 2028–29.

11.2 World consumption

China drove higher aluminium and alumina consumption

Rising primary aluminium demand from China pushed world primary aluminium demand up 1.7% year-on-year to nearly 70 Mt higher in 2023 (Figure 11.1). Over this period, consumption in China, the world's largest primary aluminium consuming country, rose by 4.2% year-on-year. A rise in the use of aluminium in China's automotive sector (helped by the Chinese government's stimulus package) contributed to a jump in Chinese aluminium demand in 2023.

In 2023, primary aluminium consumption also grew in India (up 36% year-on-year) and South Korea (up 5.0% year-on-year). The growth in primary aluminium consumption partly reflected increased aluminium use in new, energy-efficient car models. However, European consumption was hit by sluggish construction activity, leading to lower demand in Germany (-21%) and France (-13%). Demand from global automotive makers drove a 2.8% year-on-year rise in the use of secondary aluminium in 2023 (Figure 11.1). Secondary aluminium usage rose by 5.2% in China and 3.6% in the US.

Higher global primary aluminium production helped boost global alumina consumption to 1.5% to 136 Mt in 2023 (Figure 11.2). China remained the world's largest alumina consumer, accounting for 59% of global alumina consumption, and contributed most to this increase (up 3.0% year-on-year). Outside of China, alumina consumption in Brazil and Canada rose by 23% and 5.3% year-on-year in 2023, respectively.

Strong bauxite consumption from the United Arab Emirates (UAE) helped push global bauxite usage up by 0.3% year-on-year in 2023 to 361 Mt (Figure 11.3). Over this period, the UAE consumed nearly 11 Mt of bauxite, up 46% year-on-year, as the country's alumina production rose by 45% year-on-year in 2023.

Aluminium, alumina and bauxite demand to rise over the medium term

Demand for primary aluminium in 2024 is expected to be mainly driven by China, as strong electric vehicle manufacturing activity lifts demand. As a result, global primary aluminium consumption is forecast to increase by 2.8% in 2024, to 72 Mt (Figure 11.1).

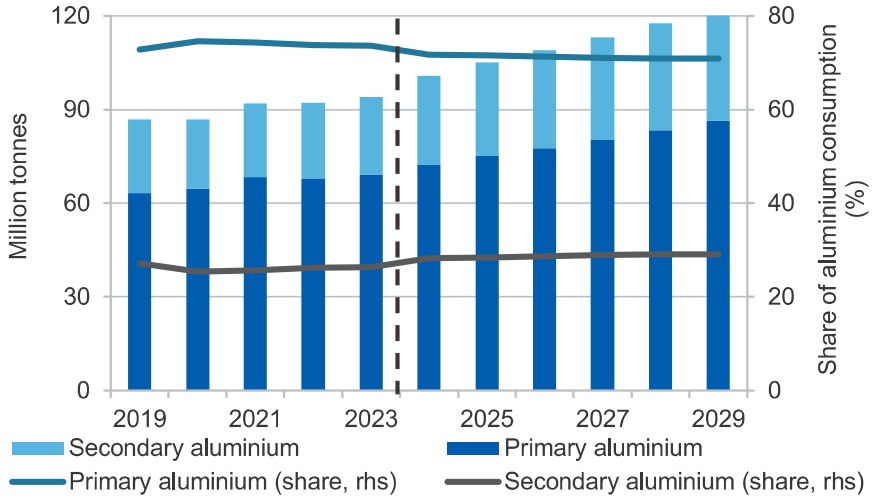
Beyond 2024, world primary aluminium consumption is projected to grow at an annual average rate of 3.7% to nearly 86 Mt by 2029 (Figure 11.1). China's green energy and electric vehicle sectors are expected to drive global primary aluminium demand over the outlook period.

World secondary aluminium demand is forecast to increase by 15% year-on-year in 2024 to 28 Mt (Figure 11.1). After 2024, world secondary aluminium demand is projected to increase at 4.5% a year over the outlook period (Figure 11.1), supported by rising primary aluminium prices and the use of low carbon aluminium.

In line with world primary aluminium production, world alumina usage is forecast to grow by 1.7% year-on-year in 2024 before growing at a slower rate through the rest of the outlook period (Figure 11.2).

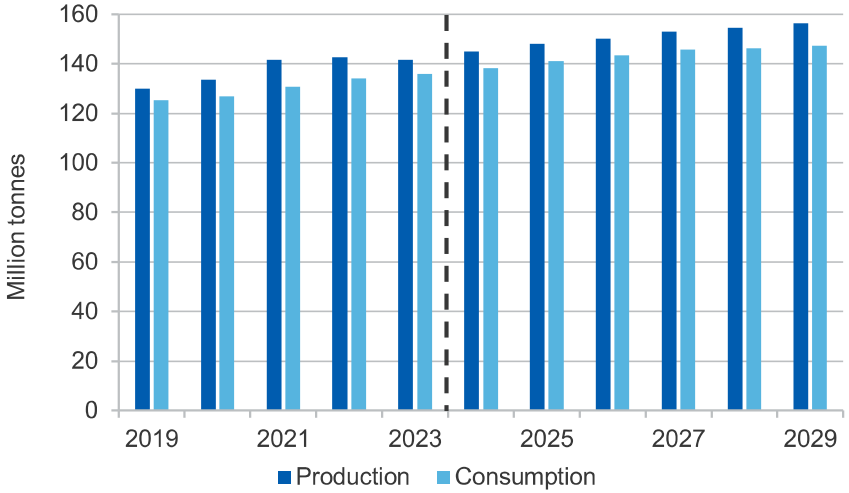
Bauxite demand is expected to rise by 0.3% in 2024, with more rapid growth projected through the rest of the outlook period (Figure 11.3)

Figure 11.1: World aluminium consumption



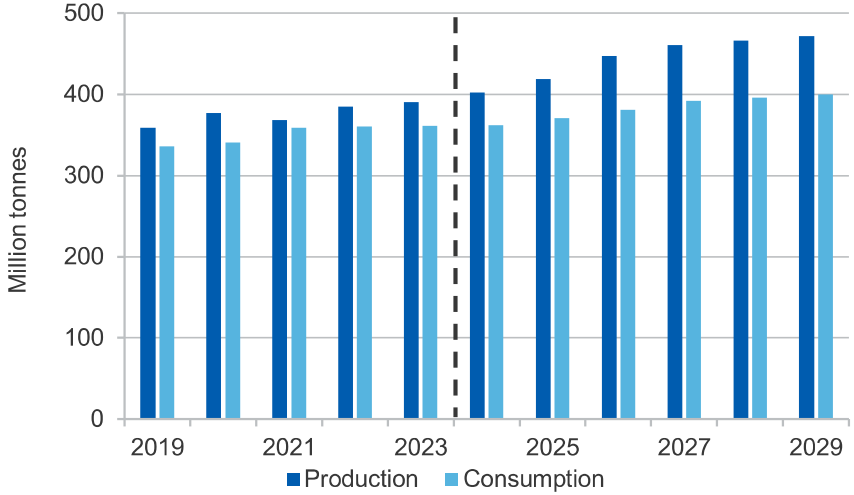
Source: World Bureau of Metals Statistics (2024); CRU (2024); Wood Mackenzie (2024); Macquarie Bank (2024); Department of Industry, Science and Resources (2024)

Figure 11.2: World alumina production and consumption



Source: World Bureau of Metals Statistics (2024); CRU (2024); Wood Mackenzie (2024); Macquarie Bank (2024); Department of Industry, Science and Resources (2024)

Figure 11.3: World bauxite production and consumption



Source: World Bureau of Metals Statistics (2024); Department of Industry, Science and Resources (2024)

New emerging economy aluminium and alumina consumers

India is expected to emerge as a major consumer of primary aluminium by the end of the outlook period, as the nation urbanises further. India's primary aluminium demand is projected to grow from 2.6 Mt in 2024 to 3.3 Mt in 2029.

By the end of the outlook period, Indonesia is expected to consume more alumina to accommodate its rising aluminium output. Indonesia's alumina demand is projected to rise from 433,000 tonnes in 2024 to 1.5 Mt in 2029.

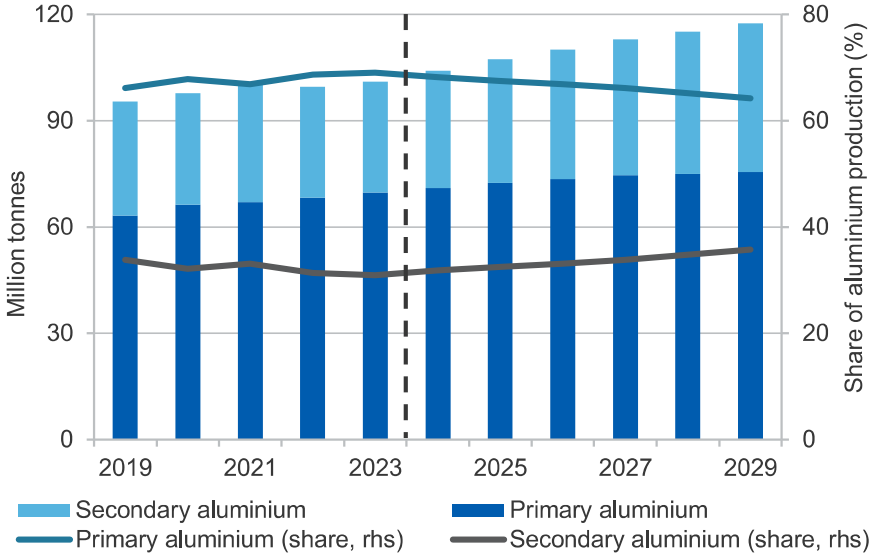
11.3 World production

Aluminium and bauxite output grew in 2023

In 2023, a 2.8% year-on-year rise in China's primary aluminium output drove a 1.6% year-on-year rise in global primary aluminium output, to nearly 70 Mt (Figure 11.4). China's primary aluminium producers raised output in response to the removal of power restrictions and improved power supply in the second half of 2023.

Amongst other major producers, primary aluminium output in the United Arab Emirates (UAE) rose by 5.9% year-on-year in 2023, driven by the ramp-up of production at Emirates Global Aluminium's Al-Taweelah smelter. Output also rose in Canada — by 8.0% year-on-year — driven by the ramp up of production at Rio Tinto's Kitimat aluminium smelter.

Figure 11.4: World aluminium production



Source: World Bureau of Metals Statistics (2024); CRU (2024); Wood Mackenzie (2024); Macquarie Bank (2024); Department of Industry, Science and Resources (2024)

In Europe, primary aluminium output fell in 2023 — including France (down by 29% year-on-year), Germany (down by 45%) and Bosnia (down by 56%). The aluminium smelting capacity that was curtailed in 2022 — due to high energy costs — remained largely offline in 2023.

World secondary aluminium production rose by 0.1% year-on-year to 31 Mt in 2023 (Figure 11.4). Over this period, Brazil's secondary aluminium production was 900,000 tonnes, up 10% year-on-year, while Italy's secondary aluminium output was 747,000 tonnes, up 4.2% year-on-year.

Lower Chinese and Australian alumina output (down by 0.3% and 3.9% year-on-year, respectively) drove a 0.8% year-on-year fall in global alumina output in 2023 to nearly 142 Mt (Figure 11.2).

In 2023, higher output in Guinea, Australia, Brazil, China and India led to a 1.3% year-on-year rise in global bauxite output to 390 Mt (Figure 11.3). In Indonesia, a ban on bauxite exports commenced in June 2023 reduced Indonesian bauxite production in 2023 by 71% to 6.4 Mt.

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

Production ramp-up in China and India is expected to boost world primary aluminium output by 1.7% year-on-year in 2024 to nearly 71 Mt (Figure 11.4). Growth in China and India is expected to be relatively robust, but weak primary aluminium demand in Europe is preventing curtailed capacity from coming back online.

After 2024, production ramp-up in China, Indonesia and the Middle East is expected to increase global primary aluminium output by 1.2% a year over the outlook period, reaching 75 Mt by 2029 (Figure 11.4). China's primary aluminium production is projected to reach 45 million tonnes by 2029, bringing it to the capacity cap introduced in 2017.

Outside of China, Indonesia's primary aluminium production is projected to rise from 336,000 tonnes in 2025 to 861,000 tonnes in 2029. Inalum's Kuala Tanjung aluminium smelter is expected to finish its expansion from 250,000 tonnes a year to about 275,000 tonnes a year by the end of 2024.

The Gulf Cooperation Council region (including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE) is expected to establish itself as a major aluminium producer over the outlook period. Saudi Arabia has made clear its aspiration to become one of the world's top ten aluminium producers. By the end of 2023, the country has invested US$12 billion in aluminium related projects to enhance its production capabilities.

World secondary aluminium output is forecast to increase by 5.8% year-on-year in 2024 to 33 Mt, driven by higher output from China (up by 6.1% year-on-year) and the US (up by 12% year-on-year). After 2024, world secondary aluminium output is projected to rise at 4.9% a year, reaching

42 Mt by 2029 (Figure 11.4). In December 2023, Emirates Global Aluminium in the UAE began the construction of a 170,000 tonnes a year aluminium recycling plant. The construction is to be completed in 2026.

World alumina output is forecast to grow by 2.4% year-on-year in 2024 to 145 Mt, driven by rising output from new/existing refineries in China, Brazil and Indonesia (Figure 11.2). After years of delay, Indonesia's 1 Mt a year Inalum alumina refinery is expected to come online in H2 2024.

After 2024, world alumina output is projected to rise by 1.4% a year over the outlook period, reaching 156 Mt by 2029 (Figure 11.2). The gains are forecast to be driven by India and Indonesia. Hindalco's phase one 3 Mt a year Aditya alumina refinery in Odisha, India is expected to start in 2027.

In Indonesia, eight alumina refineries with a combined production capacity of 8.5 Mt are expected to start production from 2024 and onwards. This will include China Aluminium Company and the Indonesian joint-venture partners' 2 Mt a year Mempawah alumina project.

Emirates Global Aluminium in the UAE is planning to build a 1 Mt a year alumina refinery in Guinea, but a start date has not been announced yet.

World bauxite output is forecast to grow by 3.3% in 2024 to 402 Mt (Figure 11.2). Growth has been affected in the short-term by an explosion at the main fuel depots in Guinea and by Indonesia's bauxite export ban, which is having short-term effects on production. After 2024, world bauxite production is projected to increase by 3.2% a year, reaching 464 Mt by 2029 (Figure 11.2). Australia and Guinea are expected to contribute most to this rise.

Emerging aluminium and alumina producers

In the inauguration speech for his second term in 2019, President Widodo committed to pushing for Indonesia's economic transformation from an exporter of raw materials to an exporter of highly competitive products through downstream industry. In line with the President's speech, the country's primary aluminium production is projected to increase from 249,000 tonnes in 2024 to 861,000 tonnes in 2029.

India is expected to get close to overtaking Brazil as the world's third largest alumina producer, after China and Australia, by the end of the outlook period. India's alumina production is projected to rise from 7.9 Mt in 2024 to over 11 Mt in 2029.

Green aluminium, alumina and bauxite

In December 2023, the International Aluminium Institute launched a new initiative that tracks and reports the progress in greenhouse gas reduction of its member companies.

Rio Tinto commenced the construction of a new solar farm and battery storage system for its Amrun bauxite operations in Queensland in December 2023, which is expected to be operational in 2025. Combined with the existing Weipa renewable power generation network, the solar farms are anticipated to reduce diesel consumption by 10 million litres a year and lower greenhouse gas emissions by 28,000 tonnes annually.

In January 2024, the Guinean Government announced a carbon tax on mining companies is under consideration to protect the local environment.

Alcoa announced in February 2024 that it will supply global cable producer Nexans with aluminium produced from the ELYSIS process — a revolutionary process that eliminates all direct greenhouse gas emissions from the traditional smelting process.

In China, the use of green power — wind, solar, hydro, geothermal, ocean, biomass and other forms of renewable energy — has increased rapidly in recent years. In 2015, thermal power accounted for 89% of energy used by Chinese aluminium smelters, and hydroelectric power about 10%. Currently, thermal power usage accounts for around 74% of production, while hydro power usage has increased to around 19%.

In early 2024, Rio Tinto agreed to buy all electricity from the 1.1GW Upper Calliope Solar Farm and 80% of Windlab's 1.4GW Bungaban wind energy project for 25 years to provide renewable power to its Gladstone operations in Queensland. These agreements make Rio Tinto the largest industrial buyer of renewable power in Australia.

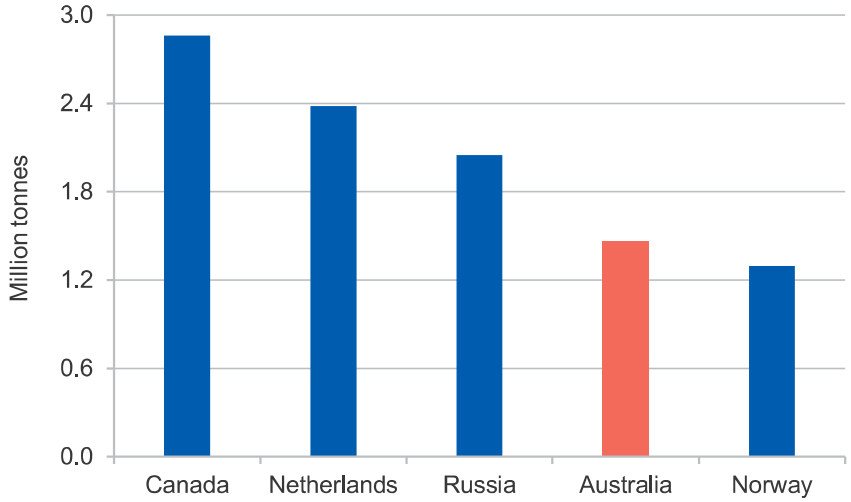
11.4 World trade

Weak aluminium, alumina and bauxite exports in 2023

Lower primary aluminium exports from Europe and West Asia led to a 3.1% fall in global primary aluminium exports in 2023. Primary aluminium exports declined from the Netherlands (- 9.9%), Sweden (-52%) and Turkiye (-33%). Falls in Europe and West Asia were offset in part by rising exports from Australia, Canada, the US, Russia and China. Russian primary aluminium exports rose by 11% in 2023 to over 2.0 Mt.

Figure 11.5 shows the top five global primary aluminium exporters in 2023. Australia ranked fourth and accounted for 10% of global primary aluminium exports. Higher secondary aluminium exports from European countries helped boost global secondary exports to 3.3 Mt in 2023, up 0.2% year-on-year. Falling energy costs in Europe increased primary aluminium output, leading European users to use less secondary aluminium as a substitute.

Figure 11.5: Top five global primary aluminium exporters, 2023



Source: World Bureau of Metal Statistics (2024); ABS (2024) International Trade in Goods and Services, 5368.0

Lower alumina exports from Australia — the world's largest alumina exporter — cut global alumina exports by 5.5% in 2023 (see the Australia section). Figure 11.6 shows the top 5 global alumina exporters in 2023. Australia ranked first, accounting for 42% of global alumina exports.

The Indonesian bauxite export ban which started in June 2023 cut global bauxite exports by 2.0% year-on-year in 2023 to 168 Mt. Figure 11.7 shows the top five global bauxite exporters in 2023. Australia ranked second and accounted for 22% of global bauxite exports.

Guinea's leading bauxite producer and exporter Societe Miniere de Boke plans to invest US$1 billion over the next five years in export infrastructure to boost Guinean bauxite exports that reached a record of 116 Mt in 2023.

China drove higher global bauxite imports

In 2023, lower primary aluminium imports from Europe and the US led to a 4.6% fall in world primary aluminium imports to 17 Mt (Figure 11.8).

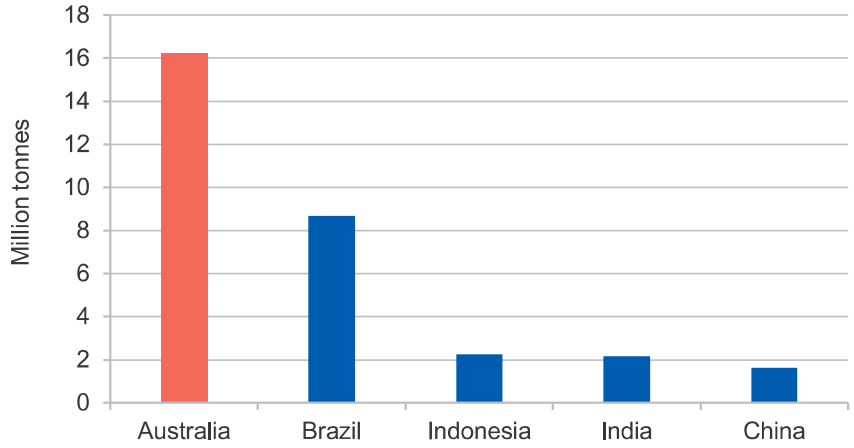
At the end of 2023, the US Government officially extended the suspension of tariffs on European Union (EU) steel and aluminium — a 25% import tariff on EU steel and a 10% tariff on EU aluminium introduced by the Trump Administration in January 2022 — until December 2025.

Higher imports by Germany and the Netherlands boosted world secondary aluminium imports, up 13% year-on-year in 2023 to 3.6 Mt (Figure 11.8). In Germany, secondary aluminium imports rose by 18% year-on-year to 535,000 tonnes in 2023. Over this period, secondary aluminium imports by the Netherlands increased by 16% year-on-year to 507,000 tonnes.

World alumina imports fell by 4.7% year-on-year in 2023 to 32 million tonnes, due to a 9.2% year-on-year fall in alumina imports from China. Imports fell due to higher Chinese alumina production (Figure 11.8).

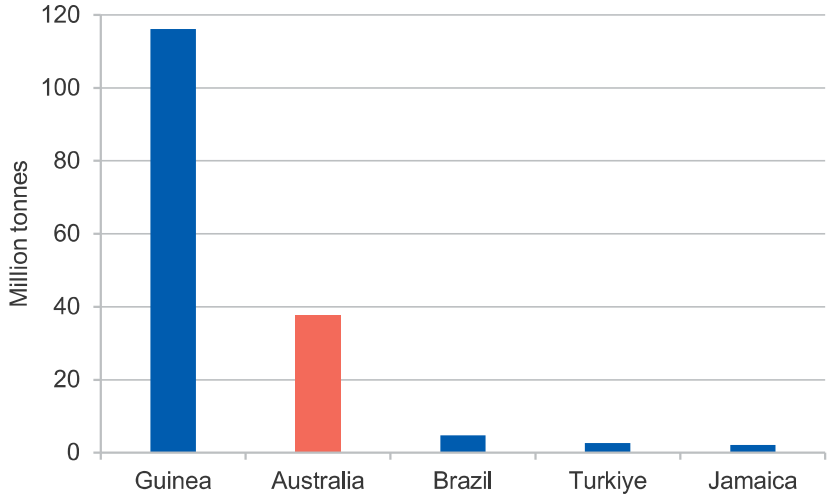
Higher bauxite imports from China — the world's largest bauxite importer — led to a 6.3% year-on-year rise in global bauxite imports to 161 Mt (Figure 11.8). China imported 142 Mt of bauxite in 2023, a 13% year-on-year rise from 2022.

Figure 11.6: Top five global alumina exporters, 2023



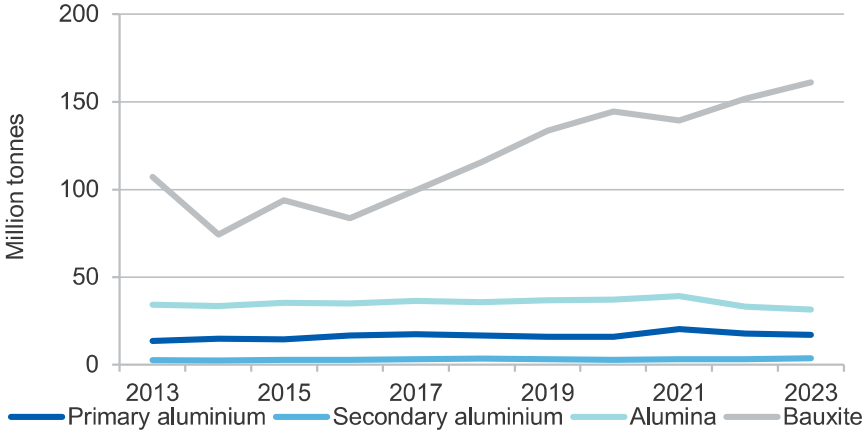
Source: World Bureau of Metal Statistics (2024); ABS (2024) International Trade in Goods and Services, 5368.0

Figure 11.7: Top five global bauxite exporters, 2023



Source: World Bureau of Metal Statistics (2024); ABS (2024) International Trade in Goods and Services, 5368.0

Figure 11.8: World aluminium, alumina and bauxite imports



Source: World Bureau of Metal Statistics (2024); Department of Industry, Science and Resources (2024)

European Union Carbon Border Adjustment Mechanism (EU CBAM)

On 14 July 2021, the European Commission released its draft regulation on the Carbon Border Adjustment Mechanism (CBAM). The draft regulation sets out the policy for the European Union (EU) to tax imports based on the greenhouse gases emitted to make them. The CBAM — the world's first carbon tax on imports — applies to EU imports of iron ore, steel, aluminium, cement, fertiliser, electricity and hydrogen.

After nearly two years of consultation, the EU's parliament approved the CBAM legislation on 18 April 2023. Starting in October 2023, European companies must report the emissions of their imported goods, including the indirect emissions released by the electricity generation that powers overseas factories. European importers will have to pay taxes on the emissions from 2026 and onwards.

The introduction of EU CBAM is unlikely to directly impact Australia's primary aluminium exports. The EU accounted for 0.03% ($1.6 million) of Australia's total primary aluminium exports in 2023. Over this period, Australia exported $5.2 billion of primary aluminium; 33% to South Korea, 23% to Japan, 8% to the US, and 7% to Taiwan.

However, the EU CBAM is likely to impact global primary aluminium trade from 2026 and onwards. Figure 11.9 shows major primary aluminium suppliers (Russia, Turkiye, the UAE, India and China) to the EU and their emission intensity. The EU CBAM is likely to have minimal impacts on Russian and Turkiyen primary aluminium exporters as Russia and Turkiye have a relatively low carbon footprint.

The EU CBAM is likely to have large impacts on Indian and Chinese primary aluminium exporters as India and China have a high carbon footprint. India does not have a carbon tax or emission trading scheme (ETS) that can be used as a partial offset for the EU CBAM. In China, the relocation of aluminium smelters to the Southern provinces, where cheap hydropower is available, is expected to bring down the emission intensity of Chinese primary aluminium producers and boost their competitiveness in exporting primary aluminium into the EU. As a result, primary aluminium exports from Russia and Turkiye to the EU are expected to remain the same or increase when the CBAM commences in 2026. In contrast, primary aluminium exports from India and China to the EU are expected to fall, unless the emission intensity is reduced in India and China.

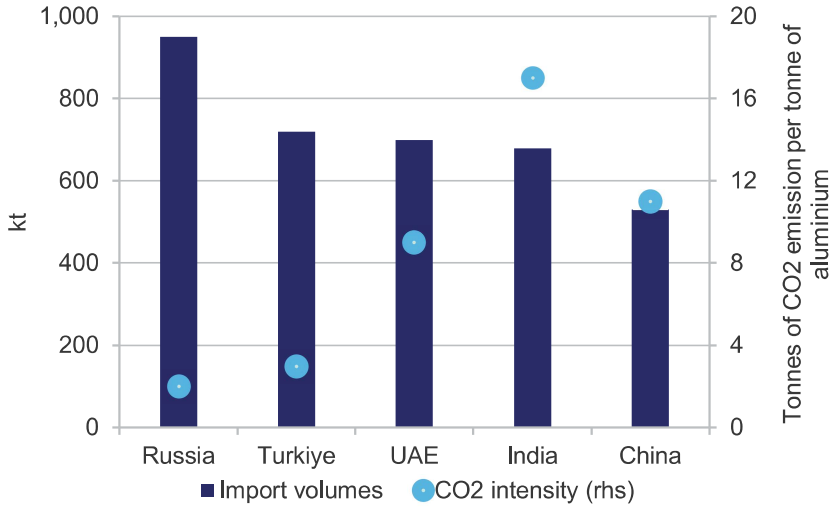
11.5 Prices

Aluminium prices fell sharply in 2023

Sluggish primary aluminium demand in Europe and the rise of Russian aluminium in the London Metal Exchange (LME)'s warehouses outweighed the impacts on aluminium prices of supply disruptions in China's Yunnan province. The LME spot price for primary aluminium fell by 19% year-on-year in 2023, averaging US$2,299 a tonne in real terms.

LME stock changes reflect the sluggish ex-China primary aluminium demand, rising from 407,325 tonnes in January 2023 to 549,050 tonnes in December 2023. Shanghai Future Exchanges aluminium stock changes reflect the supply issues in Yunnan, falling from 226,395 tonnes in January 2023 to 99,029 tonnes in December 2023. LME off-warrant stocks reflect the rise of Russian aluminium stocks, rising from 385,752 tonnes in January 2023 to 436,113 tonnes in December 2023 (Figure 11.11).

Figure 11.9: Major primary aluminium suppliers to the EU and emission intensity



Source: ING, *How the EU's carbon border tax will affect global metals trade (2 May 2023)*

The free on board (FOB) Australian alumina price fell by 9.2% year-on-year in 2023 to US$352 a tonne in real terms (Figure 11.10).

Prices remain unchanged in real terms in 2024

In 2024, Chinese primary aluminium demand is expected to strengthen amid stimulus policies and a push for energy efficient cars and technologies. Demand for aluminium in the Western markets is subject to the US Federal Reserve and the European Central Bank decisions on interest rates. A lower interest rate environment will boost higher aluminium demand. On the supply side, the level of Russian aluminium in LME warehouses and the possibility of an LME ban on Russian aluminium will push aluminium prices upward. The absence of new measures on Russian aluminium in the latest US sanctions on Russia announced on 23 February 2024 has put downward pressure on aluminium prices. On balance, the LME aluminium spot price is forecast to be unchanged in 2024, averaging US$2,299 a tonne in real terms (Figures 11.10).

An improvement in global demand and Kwinana's curtailment are expected to support alumina prices. The free on board (FOB) Australian alumina price is forecast to rise by 0.7% year-on-year in 2024 to average US$347 a tonne in nominal terms. As inflation remains high in Western economies, the real FOB Australian alumina price is forecast to fall by 1.5% year-on-year in 2024 to average US$347 a tonne (Figure 11.10).

Aluminium market distorted as buyers shun Russian aluminium

An influx of Russian primary aluminium into LME warehouses may not have the usual impact on LME primary aluminium prices. By the end of January 2024, Russia's share of LME on-warrant stock reached 90% (Figure 11.12). As more and more consumers opt not to purchase Russian primary aluminium, a further increase of Russian aluminium LME stocks is expected. However, these stocks may disguise underlying shortages.

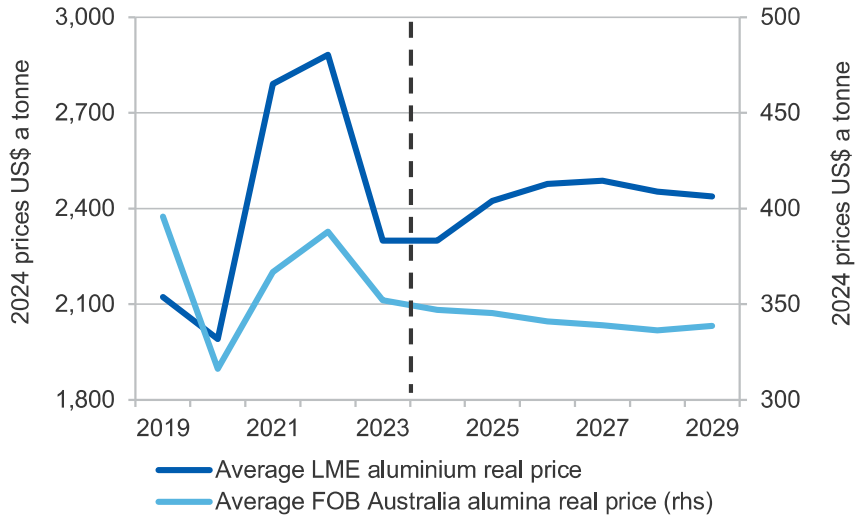
More sanctions on Russian aluminium

The prospects of more sanctions on Russian aluminium from Western countries are likely to cause some bifurcation of base metal markets and could raise the volatility of aluminium prices. Effective from 15 December 2023, the UK Government prohibited its citizens from acquiring, importing, supplying and delivering Russian origin metal, including aluminium. If any person or company buys LME warranted Russian primary aluminium, they can only hold and sell that metal, not take physical delivery or re-warrant in the LME system.

On 18 December 2023, the European Council imposed a new sanction package targeting imports of Russian aluminium wire, foil, tube and pipe. This new sanction has no direct impacts, as the LME only trades primary aluminium (unformed products). Nonetheless, European Aluminium has called for the sanctions to be extended to Russian primary aluminium.

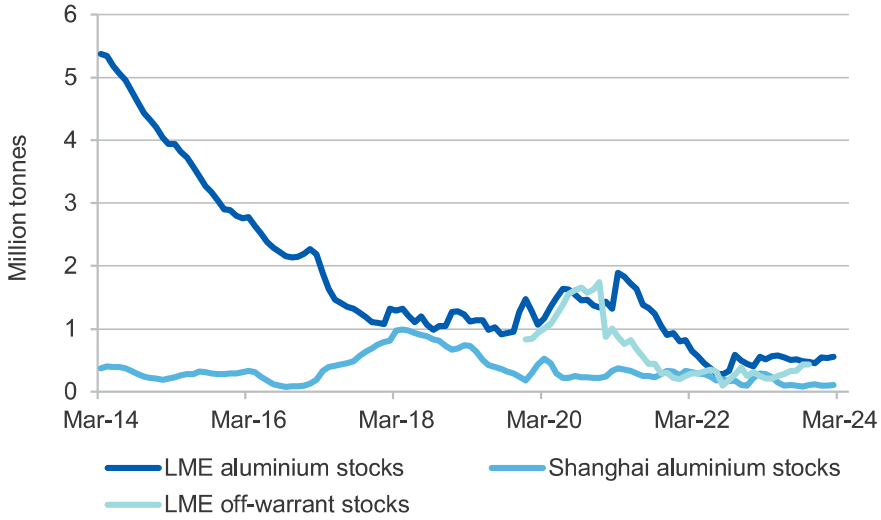
Western sanctions on Russian primary aluminium risk a build up of aluminium inventories in the short term. China has limited need for Russian aluminium shunned by Western nations. Indian and other nations accepting Russian exports are unlikely to take all Russian aluminium exports currently being exported to Western nations.

Figure 11.10: Primary aluminium and alumina prices



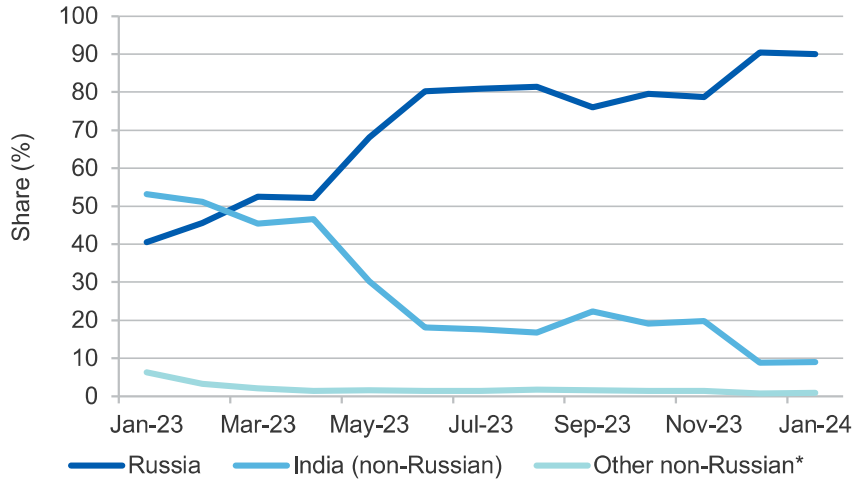
Source: LME (2024); Department of Industry, Science and Resources (2024)

Figure 11.11: Exchange aluminium stocks



Source: London Metal Exchange (2024); Bloomberg (2024)

Figure 11.12: LME on-warrant primary aluminium stocks



Notes: Non-Russian includes Australia, Bahrain, Canada, India, Indonesia, Iran, Malaysia, Oman, Saudi Arabia, South Africa, the UAE and the US.

Source: London Metal Exchange (2024)

Higher aluminium prices over the outlook period

After 2024, the LME aluminium price is projected to rise to average US$2,437 a tonne in real terms in 2029 (Figure 11.10). Growing demand for new, energy-efficient cars and technologies will boost aluminium usage. This is projected to see the FOB Australian alumina price average US$339 a tonne in real terms in 2029 (Figure 11.10).

11.6 Australia's exports and production

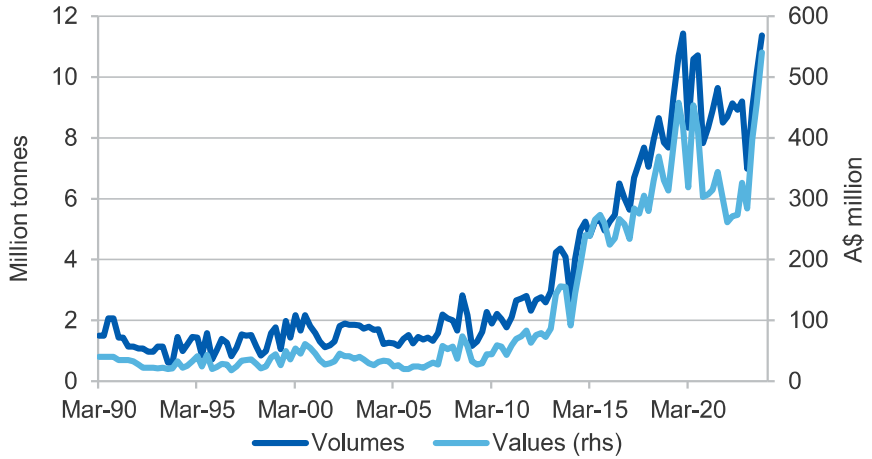
Record bauxite exports in the December quarter 2023

A 16% year-on-year fall in the LME aluminium price in 2023 and a 5.3% year-on-year fall in the Australian FOB alumina price in 2023 reduced Australian aluminium, alumina and bauxite export values by 8.4% year-on-year in 2023 to $16.6 billion in real terms.

Australian alumina export volumes fell by 5.7% year-on-year to 16 million tonnes in 2023. Australian alumina export values fell by 12% year-on-year over the same period to $8.5 billion in real terms.

The Indonesian ban on bauxite exports boosted Australian bauxite export volumes and values by 4.3% (to 37 Mt) and 48% (to nearly $1.7 billion) year-on-year in 2023, respectively. In the December quarter 2023, Australia had record export earnings — more than $0.5 billion (Figure 11.13) — of which 98% to China.

Figure 11.13: Australia's bauxite exports, quarterly



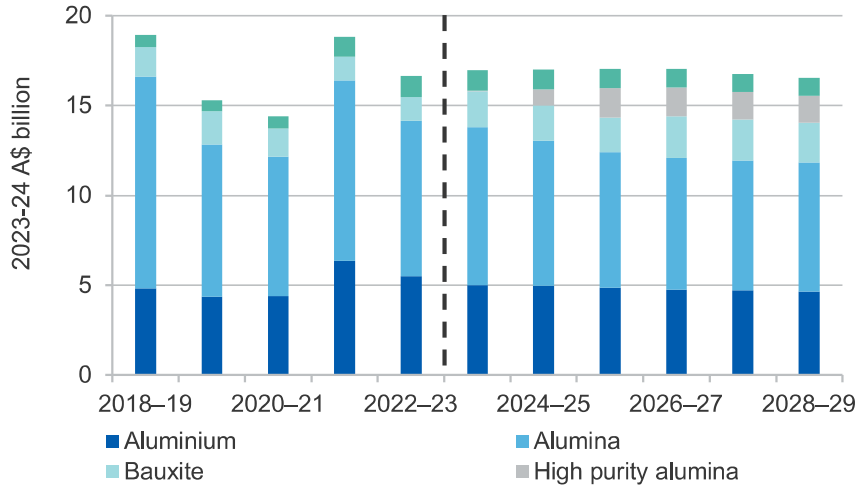
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024).

A strong earnings year for Australia's AAB exports in 2023–24

An expected rise in bauxite exports in 2024 is likely to boost Australia's aluminium, alumina and bauxite (AAB) export earnings to $17 billion in real terms in 2023–24 (Figure 11.14).

Disruptions to bauxite exports from Guinea are expected. In Guinea, bauxite mines are dependent upon diesel for their operations. Damage to a major oil depot in Guinea from an explosion in December 2023 is likely to take more than two years to repair. As the world's 2nd largest bauxite exporter, Australia is in the box seat to fill the loss of bauxite from Guinea. In China's Guangxi province, alumina refineries are encouraged to use imported bauxite with preferential support from the local government.

Figure 11.14: Australian aluminium/alumina/bauxite exports



Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

After 2023–24, Australia's AAB exports are projected to be about $17 billion a year in real terms over the outlook period (Figure 11.14). The Australian bauxite industry is expected to earn $2 billion in exports by 2026–27. It is estimated that high purity alumina (HPA) will add about $1.5 billion to Australia's AAB exports from 2025–26 and onwards.

Australia's primary aluminium and bauxite production rose in 2023

An improved operating performance from Rio Tinto's aluminium smelters led to a 3.0% year-on-year rise in Australian primary aluminium output in 2023 to 1.56 Mt. Over this period, production at Boyne Island aluminium smelter in Queensland rose by 10% year-on-year to 496,000 tonnes.

Planned maintenance at Worsley alumina refinery and approval delays at Alcoa's refineries in Western Australia reduced Australian alumina output by 3.9% year-on-year to 18.8 Mt in 2023.

A production ramp-up at Metro Mining's Bauxite Hill mine lifted Australian bauxite output, up by 3.3% year-on-year in 2023 to nearly 104 Mt.

Higher bauxite output over the outlook period

No expansions or major disruptions are expected at existing aluminium smelters in Australia over the outlook period. Australia's primary aluminium output is projected to be around 1.6 Mt a year.

In mid-December 2023, Alcoa received an approval from the Western Australia Government to continue mining bauxite in WA.

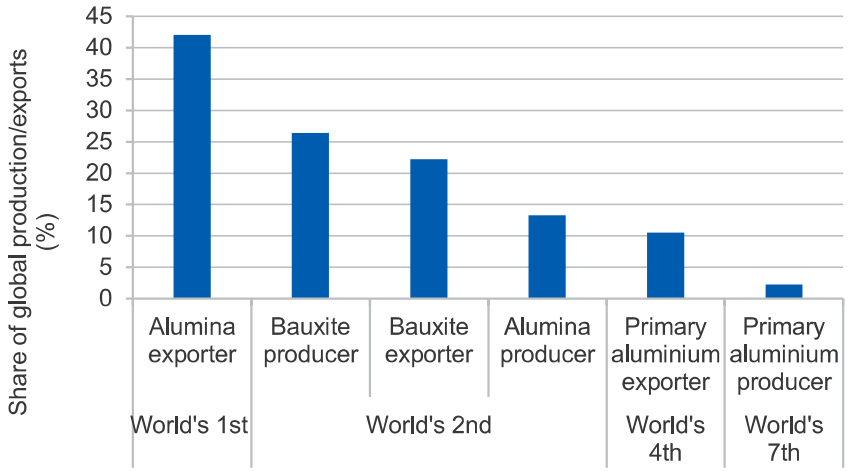
Rio Tinto's Gove bauxite mine in WA is expected to continue until 2030. Mine expansion and new mine are expected to boost Australian bauxite output to 122 Mt by 2029. These include the expansion of Metro Mining's Bauxite Hills mine in Queensland from 3.5 million tonnes a year to 7 million tonnes a year (expected to be commissioned in 2024) and the commissioning of Glencore Bauxite Resources' and Mitsubishi's 8.0 million tonnes a year Aurukun bauxite project in Queensland.

Alumina output to fall from 2024–25

In January 2024, Alcoa announced its decision to fully curtail its 2.2 Mt a year Kwinana alumina refinery in WA by the end of the June quarter of 2024 amid rising costs, ageing plant and grade challenges. This curtailment is likely to reduce Australian alumina output from 19.4 Mt in 2023–24 to 18.6 Mt a year from 2024–25 and beyond. Despite the production curtailment at Alcoa's Kwinana alumina refinery, Australia remains the world's second largest producer of alumina and the world's largest exporter of alumina.

In early January 2024, the Australian Government announced the inclusion of aluminium on the Strategic Materials List. The list contains minerals that are important to the global transition to net zero, for which Australia has potential for resources, and in demand. Australia is one of few countries in the world that has an integrated aluminium value chain - bauxite mining, alumina refining, aluminium smelting and downstream manufacturing. It is a key global producer and exporter of primary aluminium, alumina and bauxite (Figure 11.15).

Figure 11.15: Australian world ranking, 2023



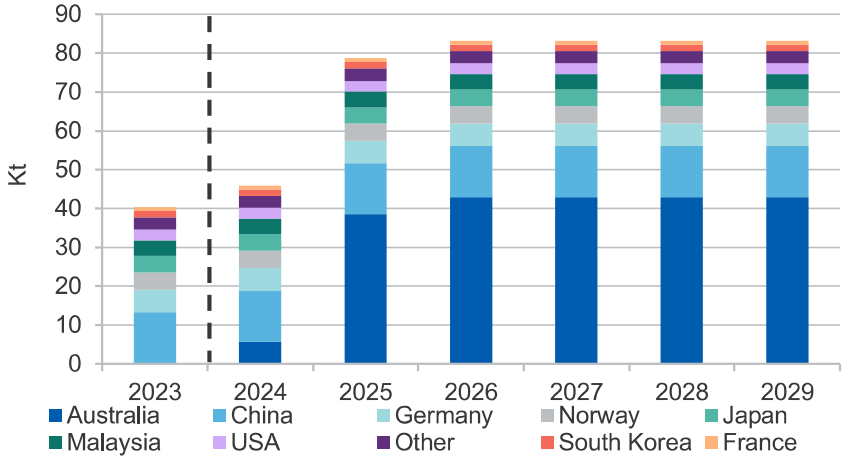
Source: World Bureau of Metal Statistics (2024); Department of Industry, Science and Resources (2024)

Australia: likely the world's largest high purity alumina producer in 2025

The addition of HPA to Australia's critical minerals list in 2022 reflects its growing economic and strategic importance. HPA is used in the aerospace and automotive sectors, and is an important component of high-performance electronics and optics. HPA is also a key input for ensuring the stability of lithium-ion batteries. As the world's second-largest producer and the world's largest exporter of smelting grade alumina, Australia is well placed to build capacity in HPA. Australia is expected to overtake China as the world's largest HPA producer by 2025, with 49% of world output (Figure 11.16).

Alpha HPA is expected to release a definitive feasibility study for its $300 million Stage 2 First Project in the March quarter 2024. This comes after Stage 1 of the project reached commercial production in late 2022. Queensland Pacific Metals' $82 million Lava Blue HPA Project is expected to start commercial production in 2025. The pre-feasibility study of Lake Hope's $65 million HPA Project in Western Australia is expected to be completed in late 2024.

Figure 11.16: World's high purity alumina production



Source: Altech Chemicals (2020), *White paper: The global high purity alumina market;* CRU (2020), *High purity aluminium: A steady developing industry promoted by high-tech*; Department of Industry, Science and Resources (2024)

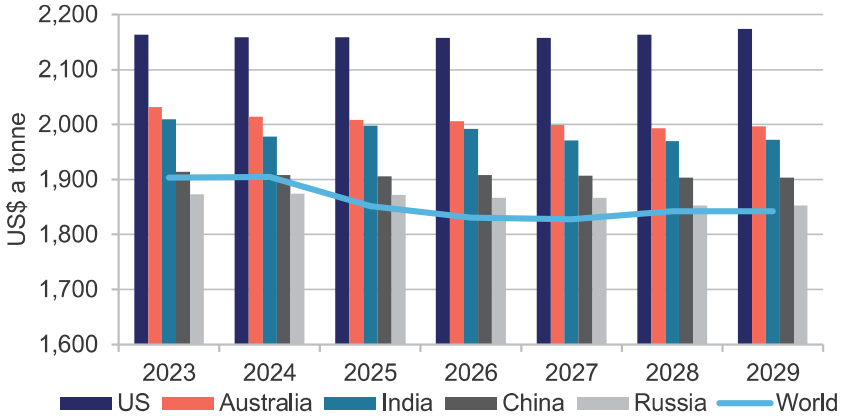
Australian alumina and bauxite producers have comparatively low costs

Figure 11.17 shows the operating cash costs of aluminium smelters in select major primary aluminium producing nations. Australian smelters' operating costs are above the world average of US$1,905 a tonne in 2024, and those in India, China and Russia.

Figure 11.18 shows the operating cash costs of alumina refineries in selected major alumina producing nations. Australian refiners' operating costs are below the world average of US$297 a tonne in 2024, and those in Russia, China and Brazil.

Figure 11.19 shows the operating cash costs of bauxite mines in selected major bauxite producing nations, Australia, Guinea, China, Indonesia and Brazil. Australian miners' operating costs are below the world average of US$20 a tonne in 2024, and those in China, Guinea, Brazil and Indonesia.

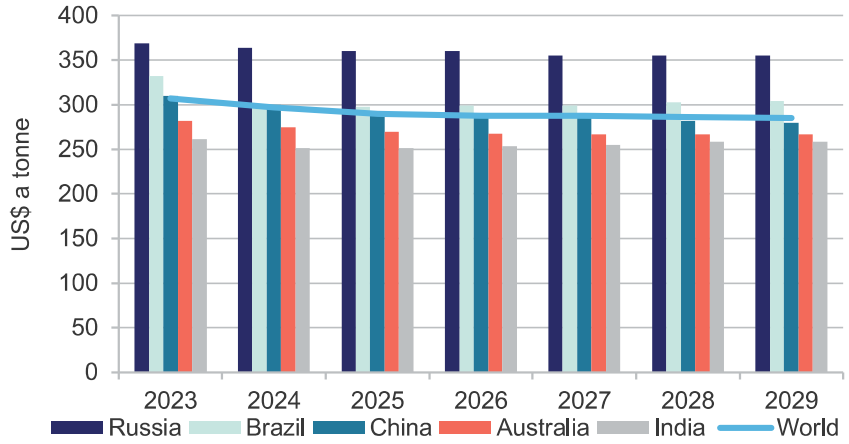
Figure 11.17: Aluminium smelter total operating cash costs



Notes: Total operating cash costs include average delivered alumina cost, carbon and other raw materials, consumables, labour, repair and maintenance materials, services and other cost, and total energy.

Source: Wood Mackenzie (2024)

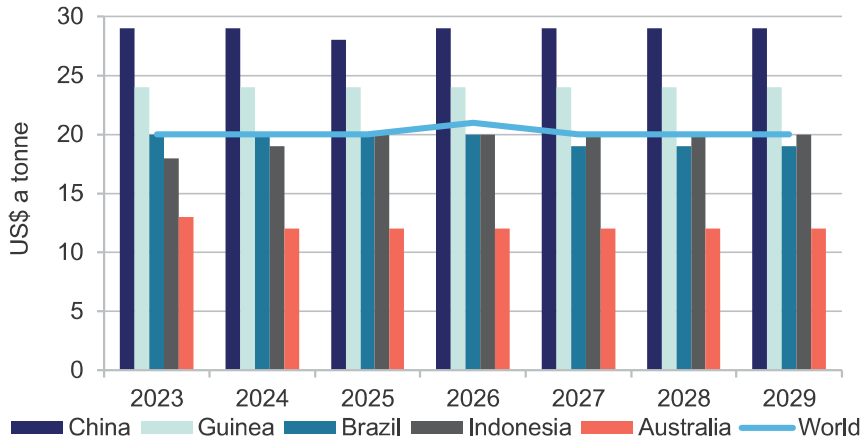
Figure 11.18: Alumina refinery total operating cash costs



Notes: Total operating cash costs include bauxite, freight, caustic/lime/limestone/ash, total energy, labour, and other costs.

Source: Wood Mackenzie (2024)

Figure 11.19: Bauxite mine total operating cash costs



Notes: Total operating cash costs include diesel, residual fuel, labour, consumables, other materials, services, bauxite levy, royalties and taxes.

Source: Wood Mackenzie (2024)

Revisions to the outlook

The forecast for Australia's AAB export earnings in 2023–24 has been revised up from the December 2023 *Resources and Energy Quarterly (REQ)* — by $478 million. The revision reflects a stronger than expected rise in bauxite exports in the December quarter 2023. Compared with the March 2022 REQ, forecast Australian earnings in 2027–28 (in nominal terms) has been revised down by 2.6% to $18.9 billion. This reflects the impacts of Kwinana's alumina production curtailment on alumina export volumes.

Table 11.1: Aluminium, alumina and bauxite outlook

World	Unit	2023	2024[f]	2025[f]	2026[z]	2027[z]	2028[z]	2029[z]	CAGR[r]
Primary aluminium									
Production	kt	69,759	70,963	72,409	73,521	74,705	75,060	75,487	1.3
Consumption	kt	69,184	72,326	75,156	77,738	80,272	83,355	86,526	3.8
Prices aluminium[c]									
- nominal	US$/t	2,249	2,299	2,470	2,580	2,644	2,663	2,700	3.1
- real[d]	US$/t	2,299	2,299	2,424	2,478	2,488	2,454	2,437	1.0
Prices alumina spot									
- nominal	US$/t	344	347	352	355	360	365	375	1.4
- real[d]	US$/t	352	347	345	341	339	336	339	-0.6
Australia	**Unit**	**2022–23**	**2023–24[f]**	**2024–25[f]**	**2025–26[z]**	**2026–27[z]**	**2027–28[z]**	**2028–29[z]**	**CAGR[r]**
Production									
Primary aluminium	kt	1,532	1,571	1,561	1,561	1,561	1,561	1,561	0.3
Alumina	kt	18,971	19,445	18,484	18,564	18,564	18,564	18,564	-0.4
Bauxite	Mt	98.5	107.8	106.4	106.4	122.4	122.4	122.4	3.7
Consumption									
Primary aluminium	kt	151	150	126	126	126	126	126	-3.0
Exports									
Primary aluminium	kt	1,440	1,462	1,483	1,483	1,483	1,483	1,483	0.5
- nominal value	A$m	5,281	4,985	5,108	5,129	5,168	5,248	5,309	0.1
- real value[e]	A$m	5,494	4,985	4,951	4,837	4,756	4,711	4,650	-2.7
Alumina	kt	16,566	17,165	16,636	16,708	16,708	16,708	16,708	0.1
- nominal value	A$m	8,308	8,826	8,370	8,023	7,977	8,064	8,215	-0.2
- real value[e]	A$m	8,642	8,826	8,112	7,567	7,340	7,239	7,195	-3.0
Bauxite	kt	34,113	43,237	43,492	43,492	50,212	50,212	50,212	6.7
- nominal value	A$m	1,284	1,987	1,987	2,023	2,517	2,517	2,517	11.9
- real value[e]	A$m	1,335	1,987	1,926	1,908	2,316	2,260	2,205	8.7
Total value									
- nominal value	A$m	16,005	16,967	17,535	18,061	18,511	18,678	18,890	2.8
- real value[e]	A$m	16,649	16,967	16,996	17,035	17,033	16,768	16,544	-0.1

Notes: Total nominal and real values of Australian exports include primary aluminium, aluminium waste and scrap, alumina, high purity alumina and bauxite. **c** LME cash prices for primary aluminium; **d** In 2024 calendar year US dollars; **e** In 2023–24 financial year Australian dollars; **f** Forecast; **r** Average annual growth between 2023 and 2029 or 2022–23 and 2028–29; **z** Projection; Source: ABS (2024) International Trade in Goods and Services, 5368.0; Bloomberg (2024); London Metal Exchange (2024); Department of Industry, Science and Resources (2024); World Bureau of Metal Statistics (2024)