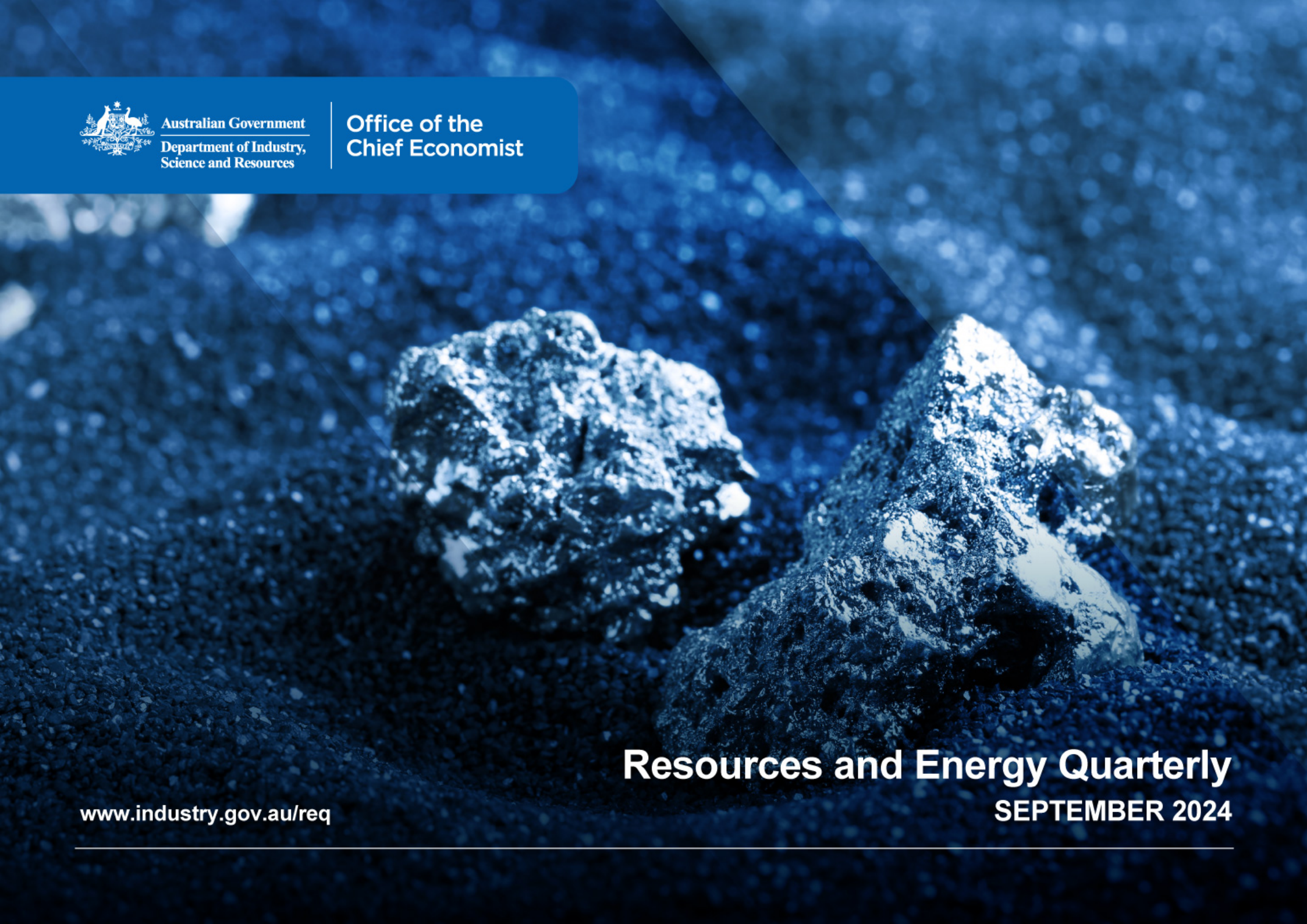

Australian Government
Department of Industry, Science and Resources

Office of the Chief Economist

Resources and Energy Quarterly

SEPTEMBER 2024

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Editor

David Thurtell

Chapter Authors

Resource and energy overview: David Thurtell

Macroeconomic overview: Colin Clark

Iron ore: Colin Clark

Metallurgical coal: Dan Dwyer

Thermal coal: Ranjini Palle

Gas: Mark Gibbons

Oil and uranium: Sufyan Saleem

Gold: Andy Lee

Aluminium, alumina and bauxite: Andy Lee

Copper: Eshaq Farahmand

Nickel: Steve Smith

Zinc: Hayden Jackson

Lithium: Justin Tang

Battery Energy Storage Systems (special topic): Bridget Leibold

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Executive Summary

Australian resource and energy export earnings are forecast to decline by around 10% in 2024–25, to $372 billion from $415 billion in 2023–24. This estimate is slightly weaker than the forecast in the June 2024 *Resources and Energy Quarterly* (REQ). The fall mainly reflects slightly larger forecast declines in bulk commodity prices. The earnings falls of the past 2 years will lessen in 2025–26 — with exports forecast at $354 billion.

World economic growth remains relatively soft, weighed down by relatively tight financial conditions. Key economic indicators suggest the modest growth so far in 2024 has been driven by increased activity in the services sector — and by easing monetary conditions in recent months. In the United States, growth remains positive, and inflation is declining. In China, ongoing weakness in the residential property sector is still heavily impacting consumer and business confidence.

The price moves have been typical for commodity markets, which are often more volatile than other financial markets — such as for currencies, interest rates, and equities.

The main changes seen since the June 2024 REQ include:

- The iron ore price recently fell below US$100 a tonne, on the back of weak Chinese demand.
- Weakness in metallurgical coal prices as weakness in the steel sector impacts on metallurgical coal demand.
- Base metals prices have generally declined, on the back of weakness in the Chinese property sector.
- The prices of lithium and nickel remain weak due to market surpluses continue to build inventories.
- The gold price has hit new record highs since the June 2024 REQ, driven by expectations of interest rate declines, the lower US dollar, central bank buying and Chinese household demand for alternative investments — amidst property and share market weakness.

Battery energy storage systems (BESS) are set to play a key role in decarbonised energy systems through the balancing of gaps in renewable-generated power. With large natural endowments of vanadium, Australia is well-placed to support growing BESS demand through the provision of raw materials and downstream manufacturing.

Lithium and nickel supply rose much faster than demand in 2023 and early 2024, pushing prices down. Partly due to the falling price of these vital electric vehicle (EV) battery inputs, the cost of EVs continues to fall relative to their internal combustion engine (ICE) counterparts. These falls are set to help the share of EVs in global passenger vehicle sales rise further, with positive implications for the demand for copper, lithium and aluminium. Battery developments continue to lift the driving range and lower charging times of EVs, also raising the attractiveness of EVs.

There are a number of risks to the forecasts of resource and energy exports from Australia. A broadening of conflict in the Middle East could disrupt oil and gas exports and raise prices. Higher-than-normal odds of a La Niña weather episode in 2024–25 raises the risk of wet weather and flooding that could impact both production at Australian mines and the transportation of mine products and supplies.

Overview

Australia's mining sector

Contributes to around **13.4% of GDP**

Makes up around **two-thirds** of Australia's total merchandise exports

Directly employs **around 300,000** people

Outlook

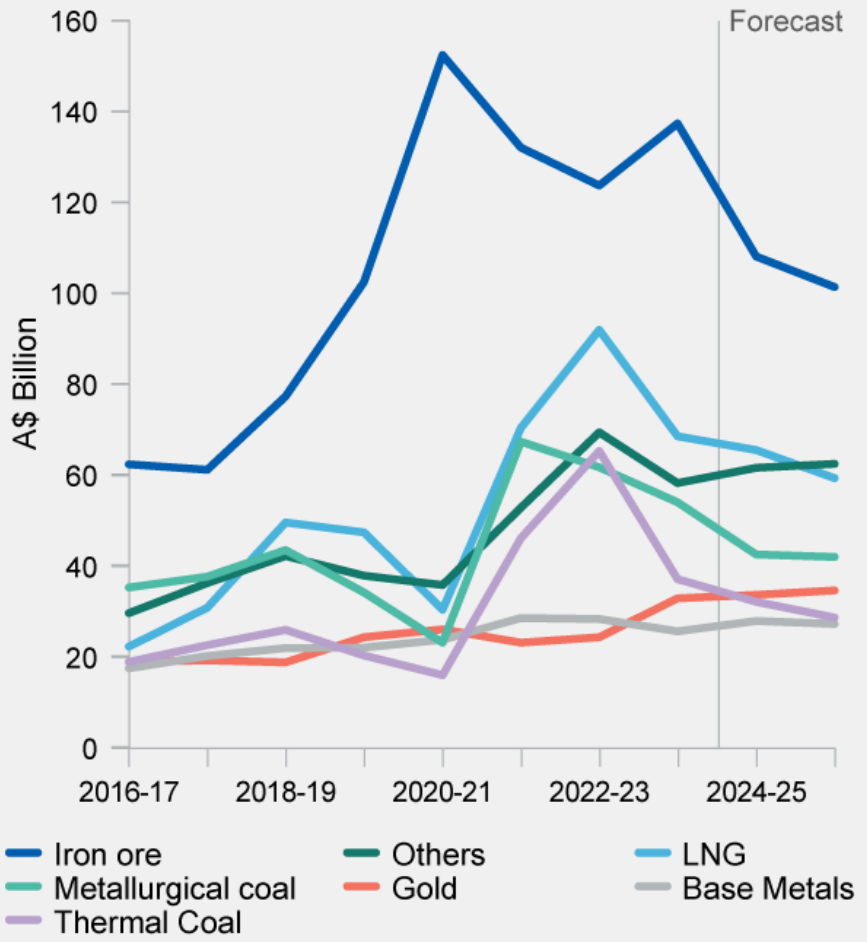
Near-term outlook for Australian resource and energy commodity exports has **deteriorated slightly**

World economic **growth remains moderate**, with some slight strenthening expected in 2025 and 2026

Gold price hitting **new highs**; lithium and nickel prices **remain weak** after falls in 2023, early 2024

Investment in new deposits and mines is on the rise, though with variation between commodities

Australia's resource and energy exports



SOURCE: ABS; DISR; OCE

1.1 Summary

- The near-term outlook for Australian resource and energy commodity exports has eased in net terms since the June 2024 REQ. But the outlook is for an improvement in world economic growth in 2025 and 2026, as monetary conditions ease in Advanced Economies and China's economy is expected to stabilize.
- Lower commodity prices should see Australia's resource and energy exports fall to $372 billion in 2024–25 from $415 billion in 2023–24. Exports are seen at $354 billion in 2025–26.
- Gold prices have hit a new record high, but iron ore prices have declined as weakness in the Chinese property sector continues. Nickel and lithium prices remain weak.

1.2 Macroeconomic, geopolitical and policy factors

Global growth steady despite weaker China growth

The International Monetary Fund's (IMF) July forecast for world economic growth in 2024 was unchanged from its April outlook at 3.2%. Growth in 2025 is forecast to pick up slightly to 3.3% — an upgrade of 0.1 percentage points from the prior forecast (Figure 2.1).

China's growth slowed in the June quarter, weighed down by ongoing weakness in the property sector. It is expected to moderate over the forecast period, due to structural and demographic factors. The IMF expects China's economy to grow by 5.0% in 2024 and 4.5% in 2025, easing to 3.8% by 2026 — in line with a long-term trend towards lower growth.

Easing inflation has seen a number of major central banks have started to lower official interest rates from cyclical highs. The Bank of Japan has been the notable exception, raising rates from zero as the Japanese economy records its fastest growth in decades. As inflation moderates further, moves to a more neutral monetary stance by the world's major central banks should lift global growth.

Government trade changes impacting resource commodities

Some countries have imposed tariff increases on Chinese EVs, potentially inhibiting Chinese EV production. In early August, the European Union said it plans to introduce an additional 9% tariff on Teslas imported from China, due to commence by November. In late August, Canada announced a 100% levy on Chinese EVs and a 25% levy on steel and aluminium imports from China. The Canadian government also launched a new 30-day consultation period on other sectors, including batteries and battery parts, semiconductors, solar products and critical minerals.

Geopolitical tensions and the weather pose risks to commodity markets

Geopolitical developments continue to pose risks to the outlook for commodity markets. An escalation of conflict in the Middle East could impact the global supply of oil/gas/LNG with many significant producers in the region. Iran accounts for 3-4% (~3.4mb/d in July 2024) of global oil demand, of which 25-50% is exported.

Some weather forecasters attach a much higher-than-normal chance of the start of a La Niña weather episode in the coming few months. Should a La Niña weather cycle emerge, Australian miners may experience a repeat of the wet weather and the associated flooding of mines, transport routes and ports that hampered output in the 2021-2023 period. Australian coal exports were heavily impacted in this period; as a supplier of 55% of the seaborne metallurgical coal tonnages, global metallurgical coal prices are vulnerable to a significant disruption to Australian exports.

AUD rising against the USD

The AUD/USD has risen in recent months. Australian-US interest rate differentials favour AUD fixed interest assets as the market views US official interest rate cuts as likely to be sooner and deeper than Australian cuts.

The consensus forecast adopted is for the AUD/USD to lift in the outlook period, from about 67 US cents in 2024 to 71 cents in 2026.

1.3 Export values

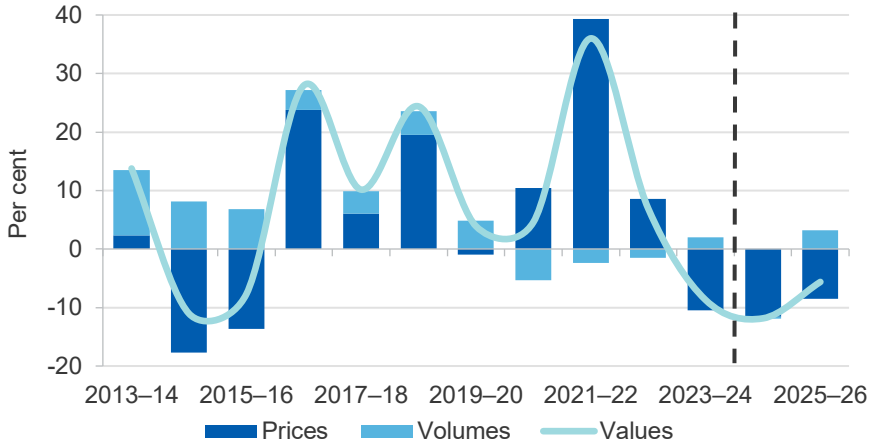
Australia's export values are forecast at $372 billion in 2024–25

Relatively slow world economic growth and fewer supply disruptions generally reduced commodity prices over the September quarter. The Resources and Energy Export Values Index fell 5% from the June quarter 2024: a fall in volumes added to the impact of a fall in prices (Figure 1.1).

There has been a modest revision to the aggregate forecasts since June. Resource and energy exports are forecast to be $372 billion in 2024–25 and $354 billion in 2025–26 (Figure 1.2). Within the totals, energy export earnings are set to show double digit falls:

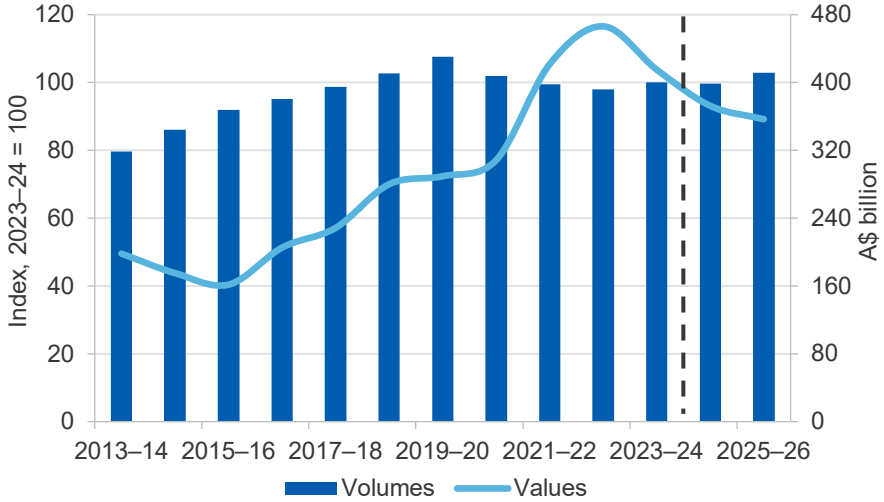
- Lower **LNG** prices will see LNG earnings fall by $3 billion to $66 billion in 2024–25, and then fall to $60 billion in 2025–26.
- **Thermal coal** exports are forecast to fall from $37 billion in 2023–24 to $32 billion in 2024–25 and $29 billion in 2025–26.
- **Metallurgical coal** exports should fall to $43 billion in 2024–25 from $54 billion in 2023–24.

Figure 1.1: Annual growth in Australia's resources and energy export values, contributions from prices and volumes



Source: ABS (2023) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Figure 1.2: Australia's resource and energy export values/volumes



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

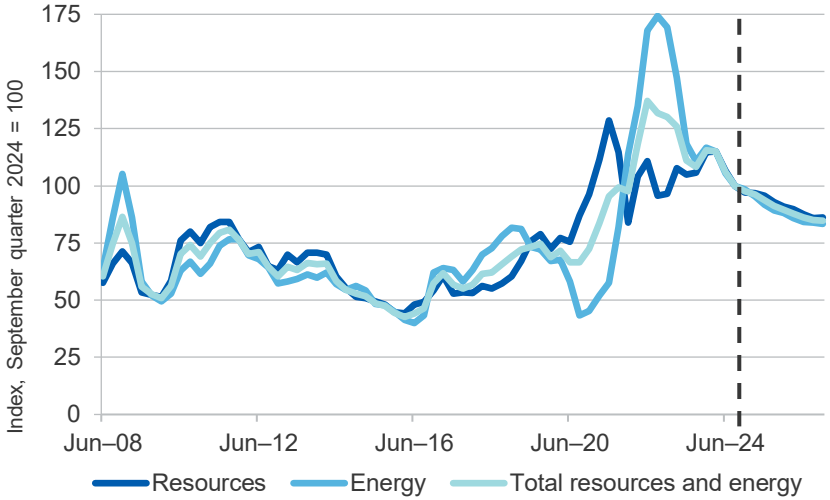
Among resource commodities:

- **iron ore** remains the largest earner, though lower prices will see export earnings fall by an estimated $31 billion to $107 billion in 2024–25 and with a further decline to $99 billion in 2025–26.
- Low **lithium** prices are forecast to see lithium exports fall to $6 billion in 2024–25, down from $10 billion in 2023–24 and $20 billion in 2022–23. Export values should then rebound to be more than $8 billion in 2025–26.

1.4 Prices

Since the June 2024 *Resources and Energy Quarterly*, resource and energy commodity prices have fallen in US$ terms (Figure 1.3): driven by a sharp fall in the metallurgical coal price and bouts of weakness in the iron ore price. Ongoing weakness in the Chinese property sector and sluggish world economic growth also had an impact.

Figure 1.1: Resource and energy export prices, A$ terms



Notes: The export price index is based on Australian dollar export unit values (EUVs, export values divided by volumes); the export price index is a Fisher price Index, which weights each commodity's EUV by its share of total export values.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

In Australian dollar terms, the Resources and Energy Commodity Price Index fell by 9% in the September quarter 2024 to be down 6% year-on-year. In US dollar terms, the index fell by 9% in the quarter to be down 8% year-on-year. Resource export prices (in A$ terms) were flat year-on-year, while energy prices fell by 14%.

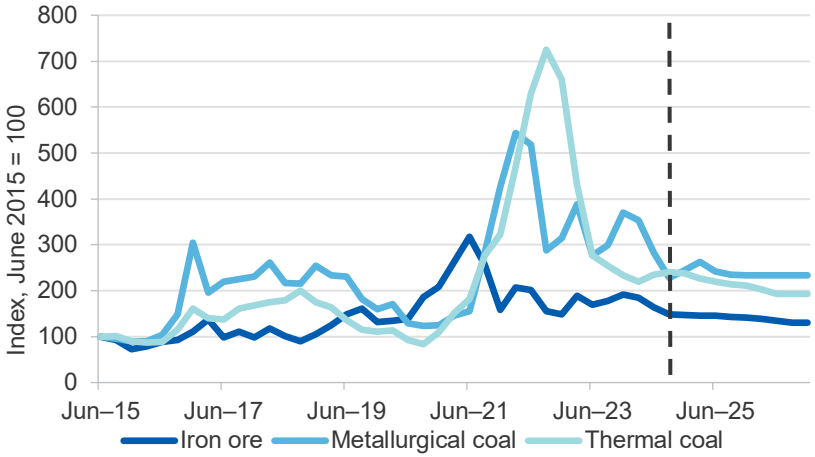
Iron ore price volatility continued in the September quarter — with the price falling to two-year lows in August before regaining some ground — leaving prices down by around a third since the start of 2024. The falls reflect weakening steel demand in China, strong growth in iron ore supply and high stockpiles (Figure 1.4). The price of **metallurgical coal** followed a similar trajectory, with prices falling below US$200 a tonne towards the end of the September quarter. Whilst supply has been relatively constrained, global demand is expected to remain at similar levels through to 2026 and prices should remain near US$200 a tonne.

Energy prices have declined recently from the highs seen in 2022 and 2023 as supply chains have adjusted to the significant supply chain disruptions that resulted following the Russian invasion of Ukraine. Slow world economic growth has constrained energy usage. **Oil** prices have fallen noticeably since the last REQ, with rising non-OPEC supply and some easing in concerns over tensions in the Middle East.

Thermal coal prices are still above pre-pandemic levels, with some Russian production further isolated from major markets because of trade measures. **LNG** prices have held up, with supply disruptions offsetting a slowdown in in growth since the March quarter. Prices should come under downward pressure from rising US and Qatari supply in 2025. Gas/LNG markets remain highly vulnerable to supply shocks following the stranding of some Russian supply.

The **gold** price has hit a record above US$2,500 an ounce since the last REQ, on the back of a number of factors: an expected easing in global monetary conditions, Chinese household concerns over the Chinese property and equity markets, and geopolitical tensions.

Figure 1.4: Bulk commodity prices

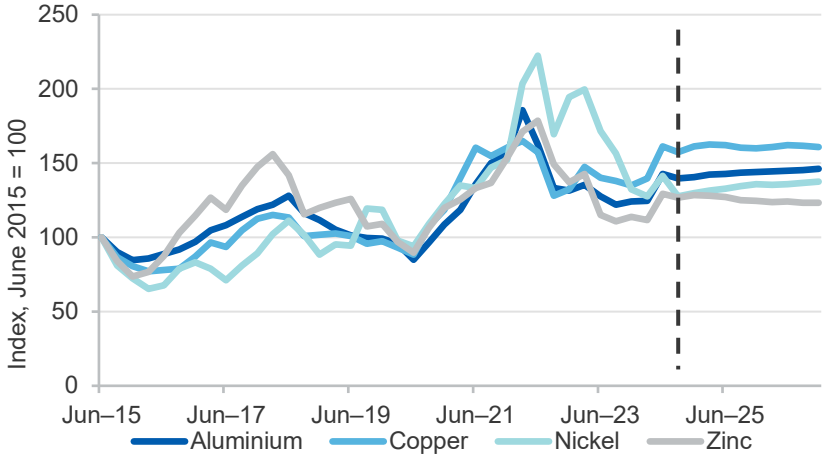


Notes: Prices are in US dollars, and are the international benchmark prices
Source: Bloomberg (2024); Department of Industry, Science and Resources (2024)

Base metal prices have varied since the last REQ (Figure 1.5). The price of **nickel** fell through June and July, as supply growth in Indonesia more than accounted for production cuts in other nations. **Copper** prices have fallen in recent months due to rising supply and low demand from China and the US. However, **aluminium** prices have gained over the quarter because of stronger Chinese demand.

Base metal prices are expected to rise over the outlook period on growing demand for clean-energy technologies. Nickel prices should respond to ongoing production cuts, while copper demand should benefit from growth in renewable energy infrastructure and a rebound in building activity. Base metal inventories on metal exchanges are low by historical standards, which skews price risks for most metals to the upside. An expected easing of global monetary conditions will be positive for demand and thus prices.

Figure 1.5: Base metal prices



Notes: Prices are in US dollars, and are the international benchmark prices
Source: Bloomberg (2024); Department of Industry, Science and Resources (2024)

Since the last REQ, **lithium** prices (spodumene and lithium hydroxide) have declined. Inventories have risen and low prices are driving producers in a number of nations (including Australia) to announce cuts/closures. However, Australian lithium exports will continue to contribute substantially to resource and energy export earnings.

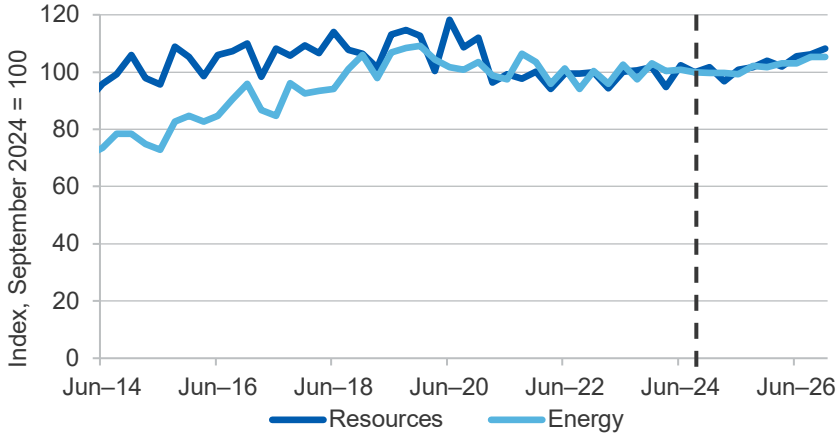
1.5 Export volumes

Export volumes are estimated to have fallen in the September quarter

The Resources and Energy Export Volumes Index (preliminary estimate) fell 1.7% in the September quarter 2024 from the June quarter 2024 but was up 0.9% on the September quarter 2023. Resource commodity export volumes fell by 0.6% in the year to the September quarter 2024 but energy export volumes rose 2.5% (Figure 1.6). Still relatively high prices, better weather conditions and easing workforce problems drove the gains. In volume terms, most resource exports are likely to show only modest growth in 2024 but pick up with improved world economic growth in 2025 and 2026. The global energy transition will support resource export volumes over the outlook period.

Energy exports will level out in 2024–25, as the sharp price falls of the past year temper production and encourage delayed maintenance to occur. The Bureau of Meteorology attaches a higher-than-normal chance of a La Niña episode emerging in 2024–25, raising the odds of the type of wet weather disruptions that hampered mine production and transportation of mine output in the 2021 to 2023 period. Energy production and exports are likely to grow modestly in 2025– 2026, as world growth picks up.

Figure 1.6: Resource and energy export volumes



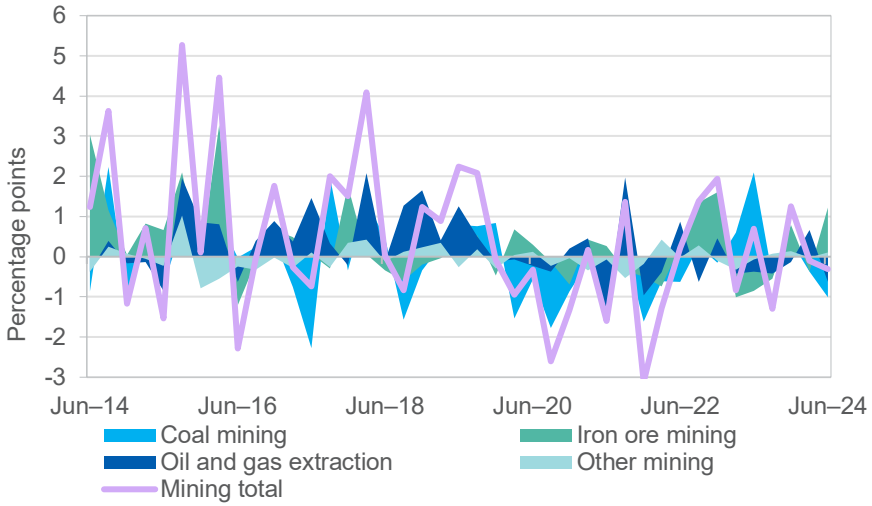
Source: Department of Industry, Science and Resources (2024)

1.6 Contribution to growth and investment

Mining output rose marginally in line with the overall economy

Australia's real GDP rose by 0.1% in the June quarter 2024, to be up 1.0% from a year before. Mining value-added fell by 0.3% in the June quarter and was 0.5% lower than in June 2023 (Figure 1.7). A decline in coal production (down 3.4%) and lower oil and gas output (down by 2.5%) was almost offset by a sharp rise in iron ore and 'other' mining.

Figure 1.7: Contribution to quarterly growth, by sector



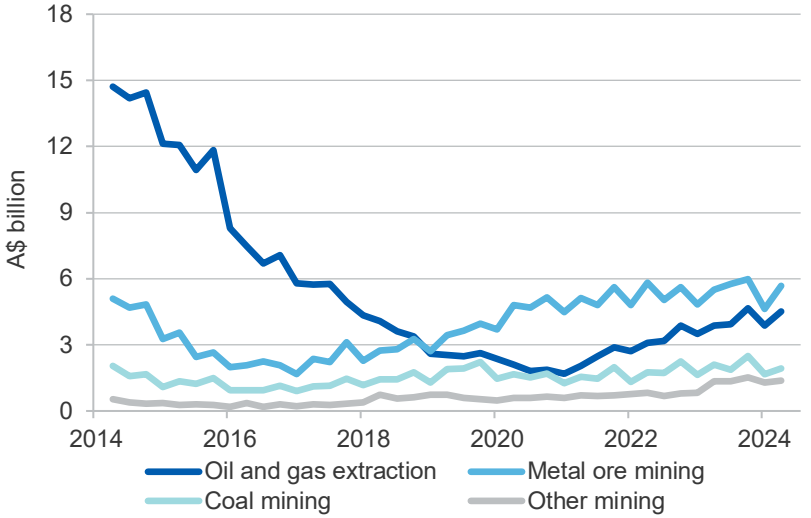
Source: ABS (2023) Australian National Accounts, 5206.0

Mining investment is growing

The latest ABS Private New Capital Expenditure and Expected Expenditure survey shows that Australia's resources industry invested $13.5 billion in the June quarter 2024, up 5% from the June quarter 2023. Total capital spending rose strongly in quarterly terms, with growth across all categories (Figure 1.8).

Expenditure for buildings and structures rose by 3.6% in the June quarter, while investment in equipment, plant and machinery fell by 2.1% (Figure 1.9). Both categories have recovered significantly from the lows of 2021.

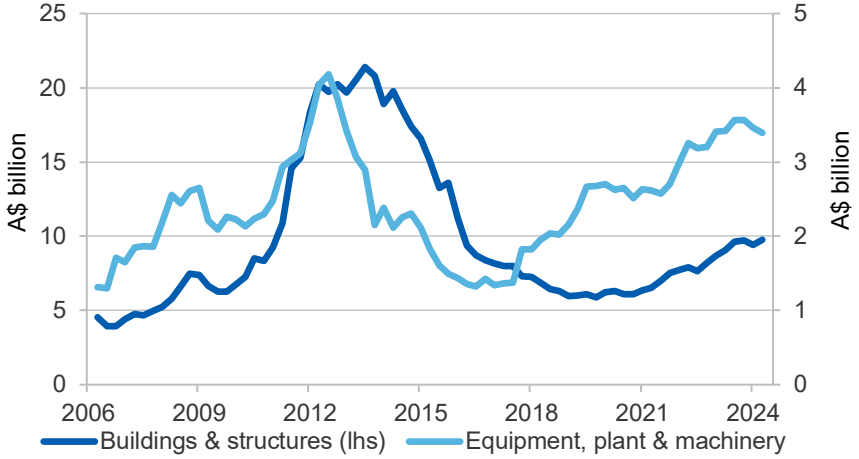
Figure 1.8: Mining capex by commodity, not seasonally adjusted



Notes: Other mining includes non-metallic mineral mining and quarrying and exploration and other mining support services; chart data is in nominal, original terms

Source: ABS (2024) Private New Capital Expenditure and Expected Expenditure, 5625.0

Figure 1.9: Mining industry capital expenditure by type, quarterly



Notes: Chart data is in nominal terms, seasonally adjusted.

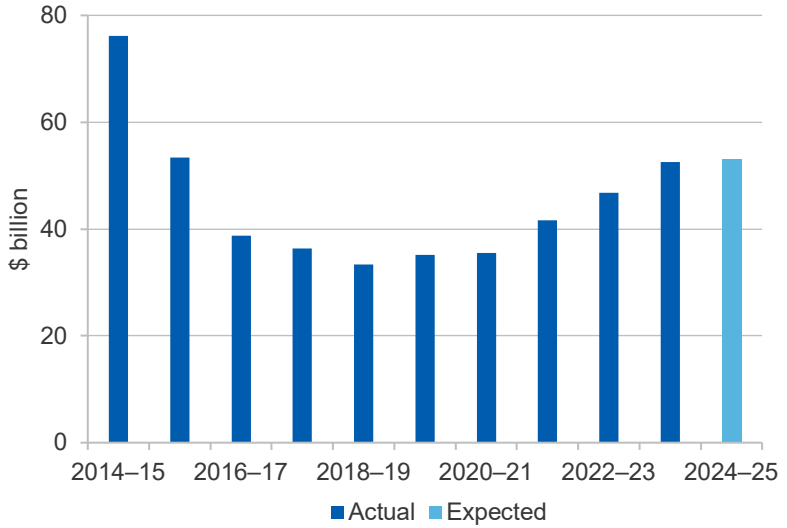
Source: ABS (2024) Private New Capital Expenditure and Expected Expenditure, 5625.0

Spending on plant and machinery has accounted for a steadily rising share of total investment spending since 2017. However, in recent years, spending on buildings and structures has started to move closer in lockstep with spending on plant and equipment.

Total mining industry investment rose by 12% in 2023–24 (Figure 1.10). The fifth estimate for 2024–25 ($53 billion) is around 15% higher than the first estimate.

In the outlook period, capital expenditure in the lithium and nickel sector are expected to be weak as miners react to ongoing price weakness.

Figure 1.10: Mining industry capital expenditure, fiscal year



Notes: Chart data is in nominal terms

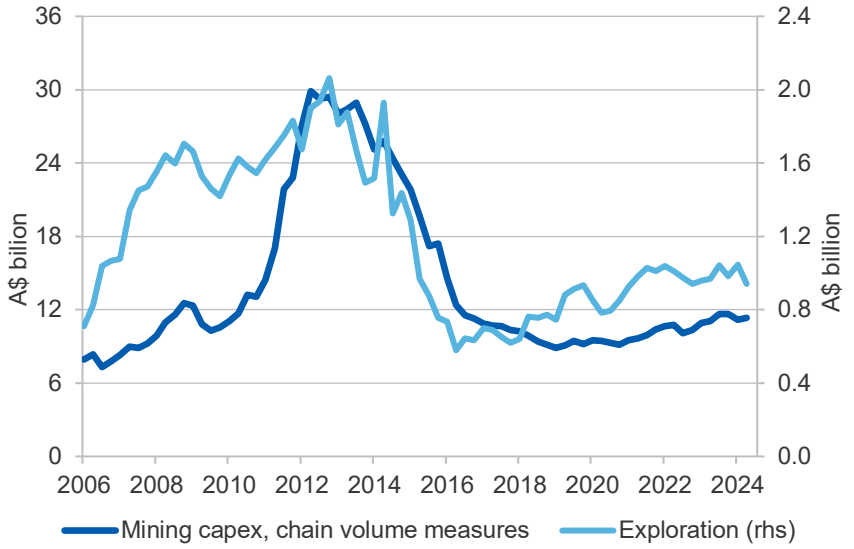
Source: ABS (2024) Private New Capital Expenditure and Expected Expenditure, 5625.0

Mining exploration eased following strong March quarter growth

Exploration expenditure (adjusted for inflation) fell by 10% to $0.94 billion in the June quarter 2024 (Figure 1.12). This is 3% below the level of a year ago and suggests that recent strong growth (triggered by high commodity prices for traditional energy commodities) has plateaued. In recent years, exploration has been drawn to minerals needed for the global energy transition, and growth has persisted among these commodities.

Exploration spending fell for petroleum (by 12% in the June quarter) following strong growth in March. However, other industries recorded rising quarterly spending, including iron ore (by 30%); base and other metals (by 19%); gold (by 5%) and coal (by 1%).

Figure 1.11: Mining capital expenditure vs exploration (real, quarterly)



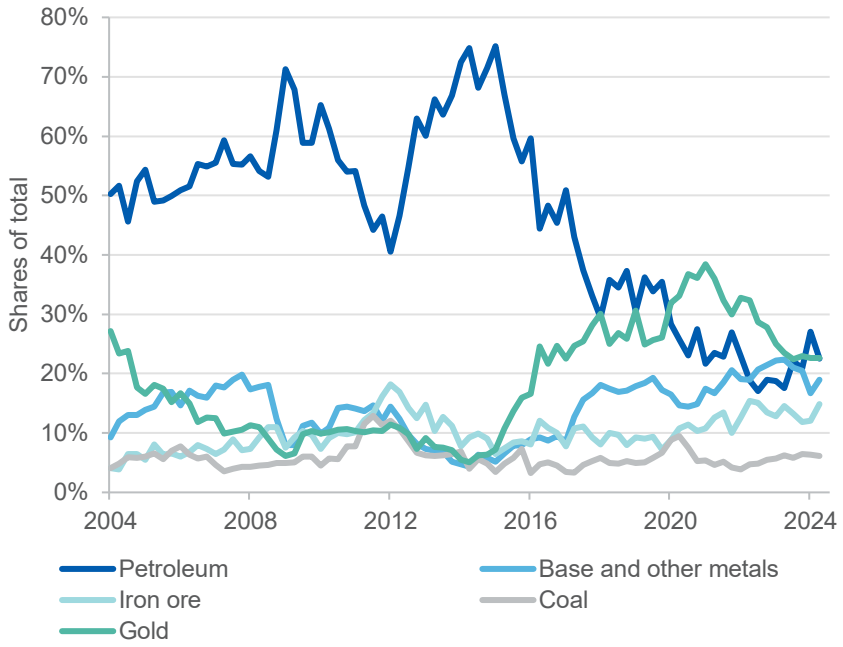
Source: ABS (2024) Private Capital Expenditure Survey, Chain Volume measure, 5625.0

Most industries have recorded steady growth in exploration since 2020, and exploration for most industries remains above the recent average.

Exploration spending is a leading indicator of broader capital investment in the sector. Growth since 2020 suggests interest is rising in precious and industrial metals (such as copper and iron ore), and critical minerals. However, coal exploration remains weak, reflecting the long term decline in coal demand as efforts to reach net zero expand. Petroleum exploration is declining, reflecting a softening price outlook for oil and LNG over the next two years.

Given the typical lags involved, capital spending by resource and energy companies is expected to continue to lift over the next few years.

Figure 1.12: Shares of exploration expenditure by commodity type



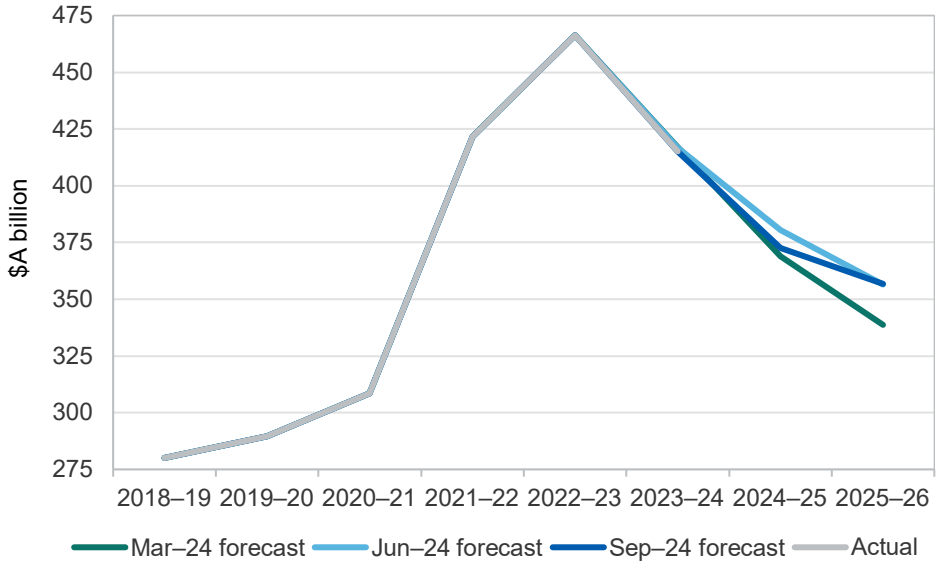
Source: ABS (2024) Private Mineral and Petroleum Exploration, 8412.0

1.7 Revisions to the outlook

The forecast for 2024–25 is $8 billion lower and the 2025–26 forecast is $2 billion lower than the forecasts contained in the June 2024 *Resources and Energy Quarterly* (Figure 1.13).

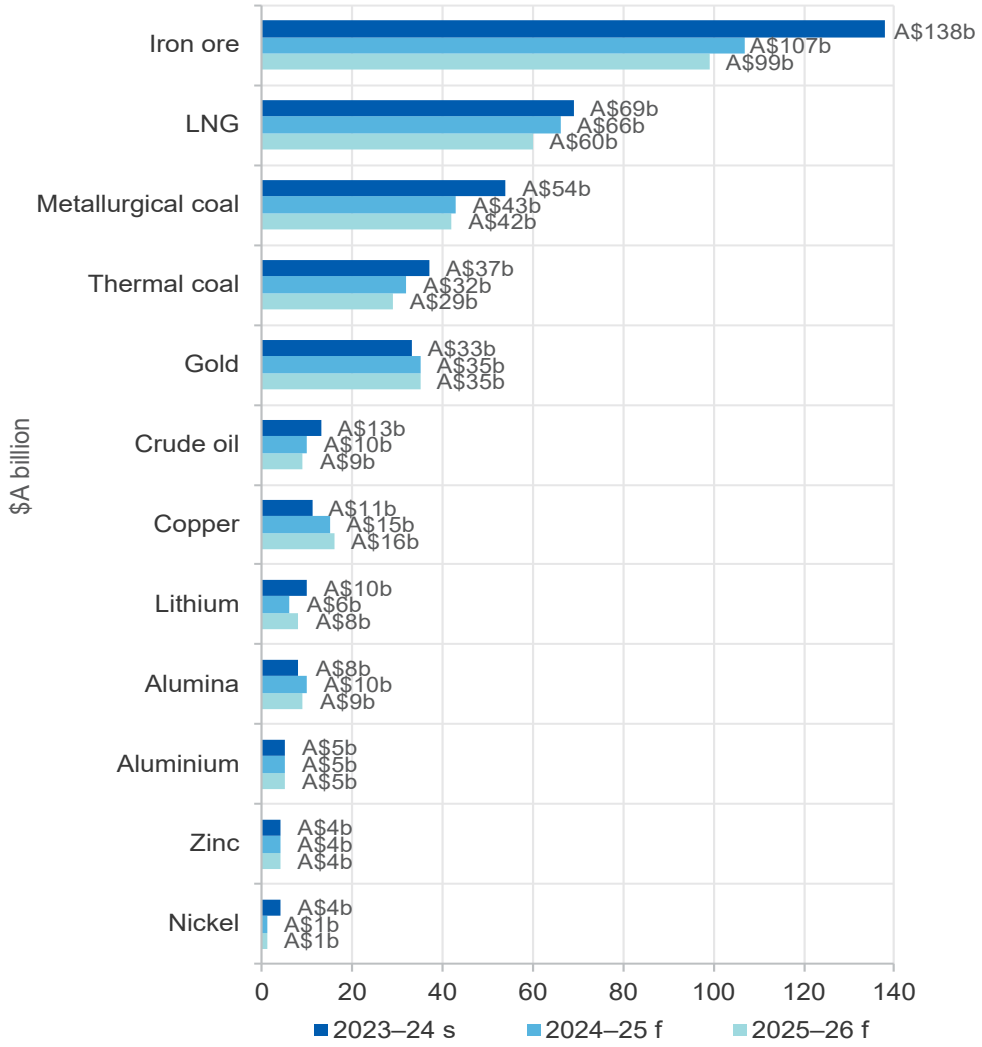
The 2024–25 and 2025–26 forecast revisions have been largely driven by downward revisions to bulk commodity prices and by the impact of a slightly stronger than expected exchange rate against the US dollar (AUD/USD). These downward revisions have more than offset the impact of an upward revision in gold exports.

Figure 1.13: Resource and energy exports, by forecast publication



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

Figure 1.14: Australia's major resources and energy commodity exports, nominal



Annual per cent change

	2024–25 f			2025–26 f		
	volume	EUV	value	volume	EUV	value
Iron ore	2	-24	-22	2	-9	-8
LNG	-4	0	-4	0	-9	-9
Metallurgical coal	7	-26	-21	9	-9	-1
Thermal coal	-3	-11	-14	4	-14	-11
Gold	-6	12	6	8	-7	1
Crude oil	-7	-11	-17	-5	-12	-16
Copper	18	16	37	4	-3	1
Lithium	27	-50	-36	17	10	29
Alumina	4	17	21	1	-18	-17
Aluminium	4	2	6	0	-1	-1
Zinc	-6	12	5	-2	-5	-7
Nickel	-63	6	-61	-26	2	-25

Notes: s estimate; f forecast. EUV is export unit value.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Table 1.1: Outlook for Australia's resources and energy exports in nominal and real terms

					Percentage change			
Exports (A$m)	2022–23	2023–24	2024–25 [f]	2025–26 [f]	2022–23	2023–24	2024–25 [f]	2025–26 [f]
Resources and energy	466,293	415,158	372,377	354,103	10.6	–11.0	–10.3	–4.9
– real[b]	500,239	427,407	372,377	342,461	3.3	–14.6	–12.9	–8.0
Energy	238,711	180,520	158,001	146,178	17.0	–24.4	–12.5	–7.5
– real[b]	256,089	185,846	158,001	141,372	9.3	–27.4	–15.0	–10.5
Resources	227,582	234,638	214,376	207,925	4.6	3.1	–8.6	–3.0
– real[b]	244,150	241,561	214,376	201,089	–2.3	–1.1	–11.3	–6.2

Notes: **b** In 2023–24 Australian dollars; **f** forecast.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Table 1.2: Australia's resource and energy exports, selected commodities

		Prices				Export volumes			Export values, A$b		
	Unit	2023–24	2024–25 [f]	2025–26 [f]	Unit	2023–24	2024–25 [f]	2025–26 [f]	2023–24	2024–25 [f]	2025–26 [f]
Iron ore	US$/t	103	82	78	Mt	900	915	931	138	107	99
LNG	A$/GJ	16.1	16.0	14.5	Mt	81	78	78	69	66	60
Metallurgical coal	US$/t	285	214	205	Mt	151	161	175	54	43	42
Thermal Coal	US$/t	136	134	119	Mt	205	198	205	37	32	29
Gold	US$/oz	2,079	2,458	2,393	t	258	243	263	33	35	35
Crude oil	US$/bbl	85	76	70	Kb/d	261	243	231	13	10	9
Copper	US$/t	8,680	9,732	9,731	Kt	756	893	926	11	15	16
Lithium	US$/t	1,833	1,054	1,156	Kt	433	551	646	10	6	8
Alumina	US$/t	363	424	365	Kt	15,877	16,473	16,655	8.5	10.3	8.6
Aluminium	US$/t	2,266	2,464	2,549	Kt	1,437	1,495	1,495	5.1	5.4	5.4
Zinc	US$/t	2,552	2,795	2,726	Kt	1,322	1,237	1,209	3.8	3.9	3.7
Nickel	US$/t	18,149	16,900	17,625	Kt	158	59	43	3.5	1.4	1.0
Uranium	US$/lb	82	80	87	t	5,883	6,199	6,933	1.2	1.3	1.5

Notes: **a** Export data covers both crude oil and condensate; **b** Lithium carbonate equivalent; **s** estimate. **f** forecast. **Price information:** Iron ore fob (free-on-board) at 62 per cent iron content estimated netback from Western Australia to Qingdao China; Metallurgical coal premium hard coking coal fob East Coast Australia; Thermal coal fob Newcastle 6000 kc (calorific content); LNG fob Australia's export unit values; Gold LBMA PM; Alumina fob Australia; Copper LME cash; Crude oil Brent; Aluminum LME cash; Zinc LME cash; Nickel LME cash; Lithium spodumene ore.
Source: ABS (2023) International Trade in Goods and Services, Australia, Cat. No. 5368.0; LME; London Bullion Market Association; The Ux Consulting Company; US Department of Energy; Metal Bulletin; Japan Ministry of Economy, Trade and Industry; Department of Industry, Science and Resources (2024)

Macroeconomic Outlook

Global GDP and economic change in 2023

Country	China	US	EU	India	ASEAN	Japan	S Korea	Taiwan	**Australia**
Per cent share of global GDP (PPP)	**19**	**15**	**15**	**8**	**5**	**4**	**2**	**1**	**1**
Yearly change	▲ 5.2%	▲ 2.5%	▲ 0.6%	▲ 8.2%	▲ 4.1%	▲ 1.9%	▲ 1.4%	▲ 1.4%	▲ **2.0%**
Share of Australia's two-way trade	30%	6%	9%	4%	10%	12%	7%	4%	–

Global overview

- The global economic and industrial outlook is **stable** and the overall risk profile remains **evenly balanced.**
- **Steady** disinflation and **easing** monetary conditions in major economies is expected to **support growth** in late 2024 and 2025.
- **China's economic growth** is projected to slow from **5.0%** in 2024 to **4.5%** in 2026.

Global risks

- **Tight monetary policy for longer** if inflation pressures, particularly in services, persist or rebound.
- Continuation of **China's property sector downturn** could further weigh on the Chinese economy
- **Increasing risks** to global trade and geoeconomic **fragmentation**

SOURCE: IMF; ABS; OCE

2.1 Summary

- The outlook for the global economy in 2024 and 2025 is stable. Services inflation is causing near-term risks in some economies.
- Global industrial production continued to recover in the June quarter 2024, but forward indicators of global manufacturing point to a moderation in industrial activity over the second half of the year.
- China recorded weak June quarter GDP growth, as ongoing property sector weakness continues to weigh on activity and investment.

2.2 World economic outlook

Global growth steady despite weaker China growth

The International Monetary Fund's (IMF) July forecast for world economic growth in 2024 was unchanged from its April outlook at 3.2%. Growth in 2025 is forecast to pick up slightly to 3.3% — an upgrade of 0.1 percentage points from the prior forecast (Figure 2.1).

Global activity and world trade have firmed, spurred by strong Asian exports, particularly in the technology sector. The overall risk profile to the global economy remains relatively balanced. The IMF expects world trade to grow by 3.1% in 2024 and 3.4% in 2025, reflecting modest (0.1%) upward revisions for both years compared to the April 2024 World Economic Outlook. IMF analysis indicates the increase in cross-border trade restrictions is impacting trade between geopolitically distant blocs rather than trade within blocs. As a result, the overall global trade-to-GDP ratio is expected to remain stable over the outlook period to 2026.

Growth among advanced economies is expected to converge over the coming quarters. United States' growth exceeded expectations in the June quarter, but with signs of slowing momentum. Consumer spending has begun to moderate and recent large revisions to jobs data indicate the US labour market is cooling faster than expected. In the Eurozone, improved services activity and higher-than-expected net exports in H1 2024 point (provisionally) to economic recovery. High wages growth, in part reflecting catchup from previous high inflation, has softened the effects of tightened monetary policy on consumption growth.

China's growth slowed in the June quarter, leading to weakening sentiment in commodity markets. Strong external demand and manufacturing investment was partly offset by weak consumer confidence. China's growth is expected to moderate out to 2026 due to structural and demographic factors, including population falls and slowing urbanisation.

India continues to grow strongly despite global uncertainties. High domestic demand and continued growth in manufacturing has allowed India to outperform market expectations for the past three years.

In Japan, supply disruptions and weak private investment at the start of the year are expected to reduce growth in 2024. However, strong wage growth is expected to bolster private consumption in H2 2024.

Global industrial production picks up, but economic headwinds remain

Global goods demand continues to improve. Global industrial production increased by 1.8% year-on-year in the June quarter 2024. Positive annual global industrial production growth largely reflects stronger industrial activity in China (relative to 2023) and emerging Asian economies, particularly India. Industrial production growth has been weak in advanced economies due to relatively tight monetary policy and rising input costs.

Forward indicators of manufacturing activity have weakened in recent months. Weak output growth and falling new orders saw the JP Morgan Global Manufacturing Purchasing Managers Index (PMI) contract in July 2024 and remain negative in August 2024. The result is a setback to the recovery in global manufacturing that occurred in H1 2024 and points to a weaker H2 2024.

China's industrial production and fixed asset investment slowed in July 2024, while its infrastructure investment contracted in month-on-month terms. Ongoing weaknesses in Europe's manufacturing sector points to a slower recovery among its major industrial producers, though the worst of the sector's downturn is most likely over. India's manufacturing PMI fell

slightly but remained expansionary in August 2024. South Korea's industrial production growth has moderated in recent months but remains healthy — up 3.8% year-on-year in July 2024, driven by strong manufacturing output. US industrial production weakened slightly in July 2024 due to weaker mining and utilities output, partly offset by higher manufacturing output.

Service prices may slow efforts to lower inflation

Central banks in a number of advanced economies have already began cutting interest rates. However, uncertainty around the inflation outlook could slow the pace of further rate cuts. Persistent services inflation is driving uncertainty and offsetting goods disinflation.

Headline inflation continues to ease in most economies, falling faster than expected in the US. However, progress in reducing core inflation (which excludes volatile goods such as food and energy) has stalled in Europe and the UK. Sharp rises in global shipping costs over recent months could also slow global progress on lowering inflation.

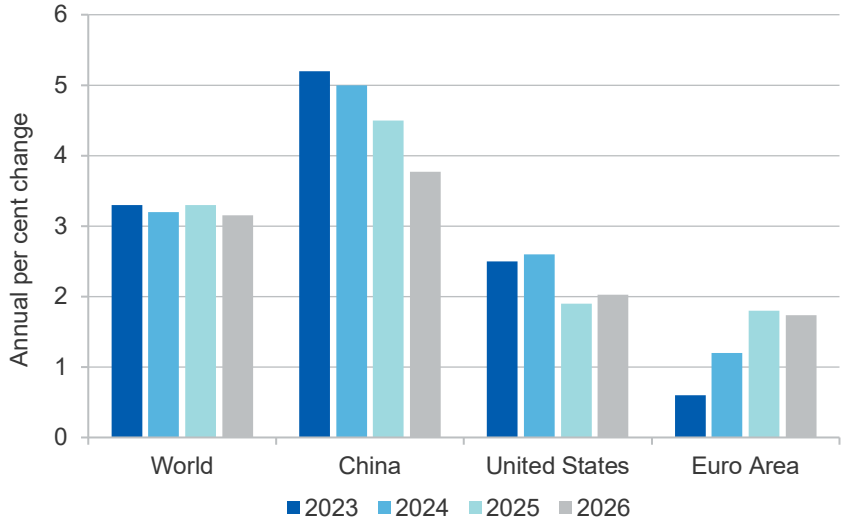
Market expectations for monetary easing by the end of 2024 have softened modestly since the June 2024 *Resources and Energy Quarterly* (REQ). However, most advanced economy central banks still expect headline inflation to be close to target by the end of 2025 as labour markets cool and energy prices continue to decline.

Exchange rate assumptions have been revised up slightly for 2024

Since the start of 2024, the Australian dollar has largely remained flat relative to the US dollar (Figure 2.2). Australian export value forecasts in this REQ adopt the market consensus on the outlook for the AUD/USD. This suggests the AUD/USD will appreciate over the outlook period as interest rates decline faster in the US than in Australia.

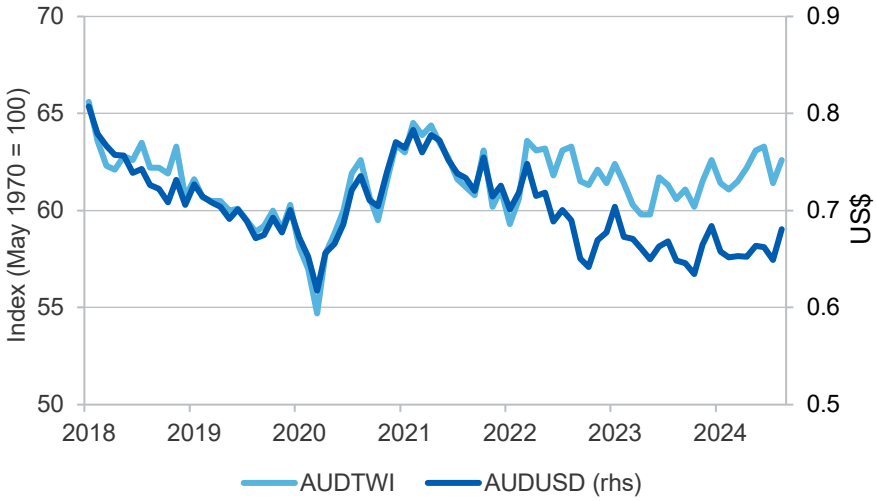
In mid-August 2024, the median consensus for the AUD/USD exchange rate was an average of US$0.67 in 2024, US$0.70 in 2025 and US$0.71 in 2026. Adopting these consensus expectations has led to an upgrade of about US$0.01 in 2024, with no change in 2025 and 2026 compared with the June 2024 REQ.

Figure 2.1: GDP growth forecasts



Source: IMF (July 2024)

Figure 2.2: Australian trade-weighted index and AUD/USD



Source: RBA (2024)

Table 2.1: IMF annual GDP growth projections for major trading partners

	2023	2024[a]	2025[a]	2026[a]
World [b]	**3.3**	**3.2**	**3.3**	**3.2**
China [c]	5.2	5.0	4.5	3.8
Japan	1.9	0.7	1.0	0.8
South Korea	1.4	2.5	2.2	2.2
India [d]	8.2	7.0	6.5	6.5
ASEAN-5 [e]	4.1	4.5	4.6	5.1
Eurozone	0.6	1.2	1.8	1.7
United States	2.5	2.6	1.9	2.0

Notes: **a** Assumption. **b** Calculated by the IMF using purchasing power parity (PPP) weights for nominal country gross domestic product. **c** Excludes Hong Kong. **d** Based on fiscal years, starting in April; **e** Indonesia, Malaysia, Philippines, Thailand and Vietnam.
Sources: IMF (2024); Bloomberg (2024)

Table 2.2: Exchange rate and inflation assumptions

	2023	2024[a]	2025[a]	2026[a]
AUD/USD exchange rate	0.66	0.67	0.70	0.71
Inflation rate [b]				
United States	4.1	3.1	2.0	2.1
	2022–23	**2023–24 [a]**	**2024–25 [a]**	**2025–26 [a]**
Australia	7.0	4.2	3.0	3.4

Notes: **a** Assumption; **b** Average CPI growth over the specified year (fiscal or calendar).
Sources: ABS (2024) Consumer Price Index, 6401.0; Bloomberg (2024); DISR (2024); RBA (2024); IMF (2024)

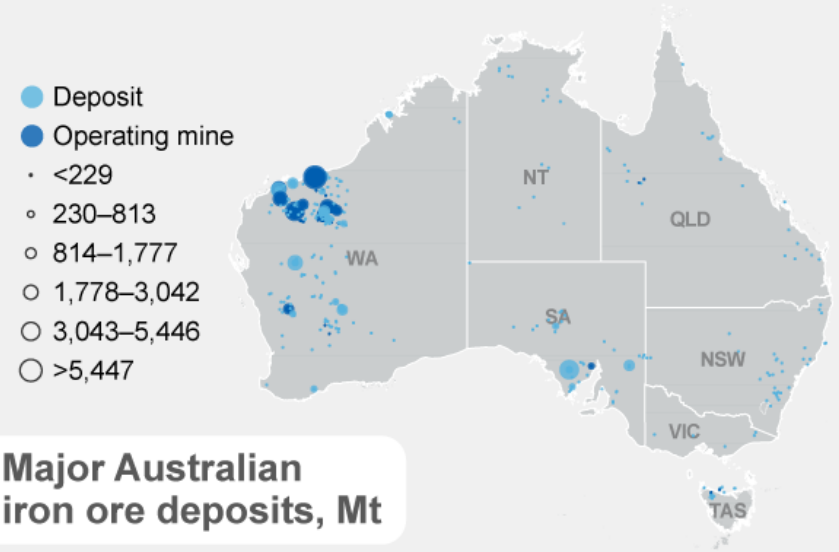
Iron Ore

Australia's iron ore sector

World's no.1
for iron ore **resources**

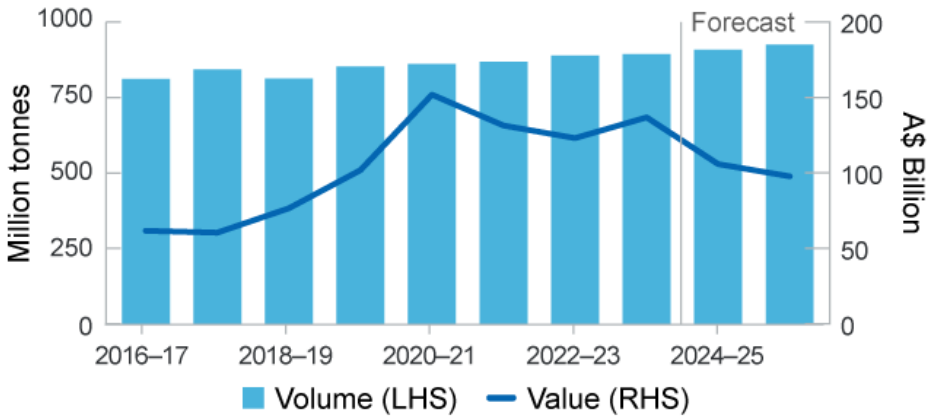
Largest
iron ore producer in the world

892m tonnes
of iron ore **exported** in 2023



Major Australian iron ore deposits, Mt

Australian iron ore exports



Outlook

Iron ore prices fell to **2-year lows** in the September quarter 2024

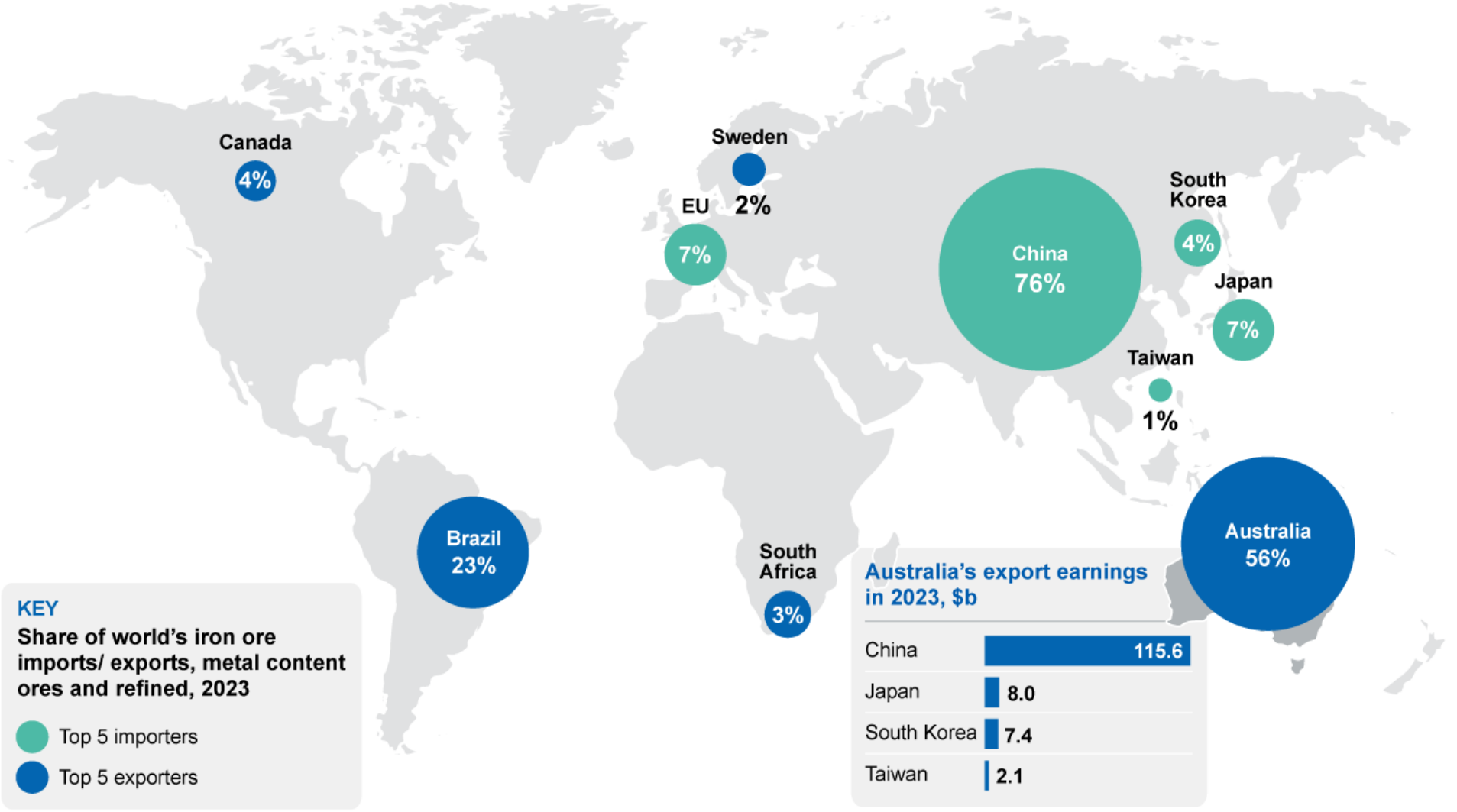
Future export earnings to **fall** as **prices decline**

Australian **export volumes rising**, with further greenfield supply expected

Exploration expenditure **remains strong**

SOURCE: GA; ABS; DISR; OCE

Iron Ore TRADE MAP



SOURCE: ITC Comtrade; ABS

3.1 Summary

- In the September 2024 quarter spot iron ore prices fell to 2-year lows due to weakness in global steel demand and falling steel production in China.
- Australian iron ore export volumes picked up in the June 2024 quarter due to improved productivity and ramp-ups in newer mines. Export volumes are forecast to increase by 1.7% annually over the next two years to reach around 930 million tonnes in 2025-26.
- Lower prices projected over the outlook period will reduce Australia's iron ore export earnings by more than $30 billion this year, from $138 billion in 2023–24 to $107 billion in 2024–25, easing to $99 billion in 2025–26.

3.2 World steel production and consumption

Global steel production has been weak so far in 2024

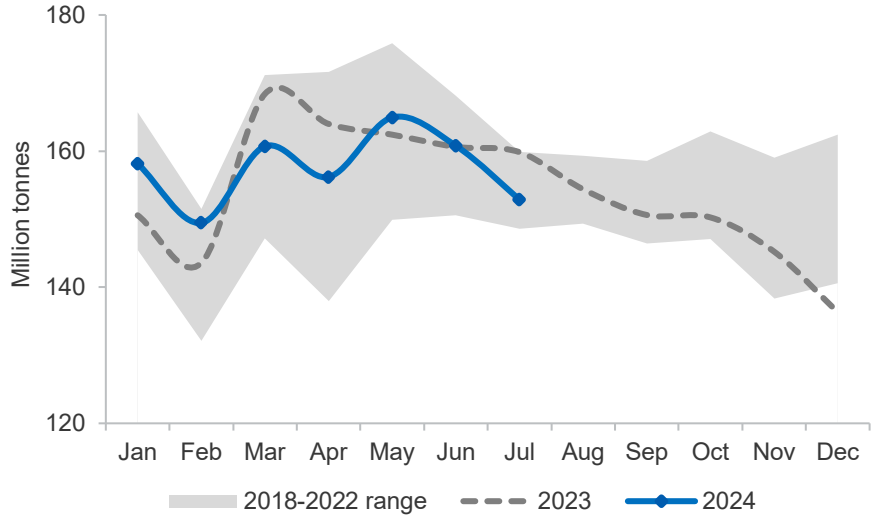
World steel production has fallen in 2024. Production in the seven months to July 2024 was 1,103 Mt (million tonnes), 0.6% below the corresponding period in 2023, but slightly above the average of the global range from 2018 to 2022 (Figure 3.1).

The weakness in global steel production has been largely driven by China. While China's residential property sector weakness has yet to show any sign of recovery, less restrictive monetary policies in advanced economies should see Western steel demand recover somewhat in H2 2024 and next year. However, increasing trade sanctions resulting from the large volumes of cheap steel entering world markets from China could further disrupt global steel markets.

World steel production is expected to record weak year-on-year growth in 2024. The increase follows weakness in global steel production over the past two years. Global steel output was flat last year after falling 3.7% in 2022, leaving it well below the peak in global steel production in 2021.

World steel demand continues to be affected by the elevated interest rate environment in most advanced economies which has contributed to weaker industrial output since early last year (Figure 3.2).

Figure 3.1: Global monthly steel production



Source: World Steel Association (2024); DISR (2024)

Gradual growth in ex-China manufacturing and further stimulus-related infrastructure projects are expected to provide some support to steel demand in the December quarter of 2024.

Over the rest of the outlook period to 2026, global steel production will be supported by new capacity — either under construction or planned — with large-scale projects slated for Asia, North America, Europe and the Middle East. By process, blast furnace-basic oxygen furnace steelmaking (favouring iron ore and metallurgical coal as inputs) is expected to make up just under half of new global supply, and more than 75% of new capacity in Asia. Asia is the dominant market for Australia's iron ore, accounting for over 99% of Australia's iron ore exports in 2023.

Strong growth in global steel capacity combined with sluggish steel demand has meant that excess capacity is a growing problem. OECD estimates indicate global crude steelmaking capacity exceeded global steel production by 543 million tonnes in 2023, with the OECD warning excess steel capacity will become increasing problematic in coming years.

World steel production is projected to grow by 1.7% in 2025 and by 1.5% to just under 2 billion tonnes in 2026. Global steel consumption is projected to grow by 1.1% a year over the outlook period to 2026. Growth is expected to be highest in South and South-East Asia (particularly India), the Middle East, and North America (particularly the US and Mexico).

China freezes approvals for new steel plants as mill losses build

The challenging conditions faced by Chinese steel mills over the past two years deteriorated further in H2 2024 as steel prices in China approached five year lows in August (Figure 3.3). In August 2024, China's monthly steel output fell 10% year-on-year to leave production for the first eight months of 2024 3.3% below the same period in 2023.

While many Chinese steel mills have been operating with slim or negative margins for some time, Mysteel data indicate the situation worsened in August, with only 1% of China's steel mills estimated to be operating at a profit. China Baowu Group, the world's largest steelmaker, stated that in the second half of the year, the steel industry will maintain a situation of oversupply, and steel companies will continue to face pressure.

In response to growing steel mill losses and mounting debts, China's Ministry of Industry and Information Technology announced in August 2024 the suspension of the system of approving new steel capacity in China. According to market sources the reported aim of the change is to assist the industry in reducing overall pig iron and crude steel capacity and increase the share of electric arc furnace steel capacity.

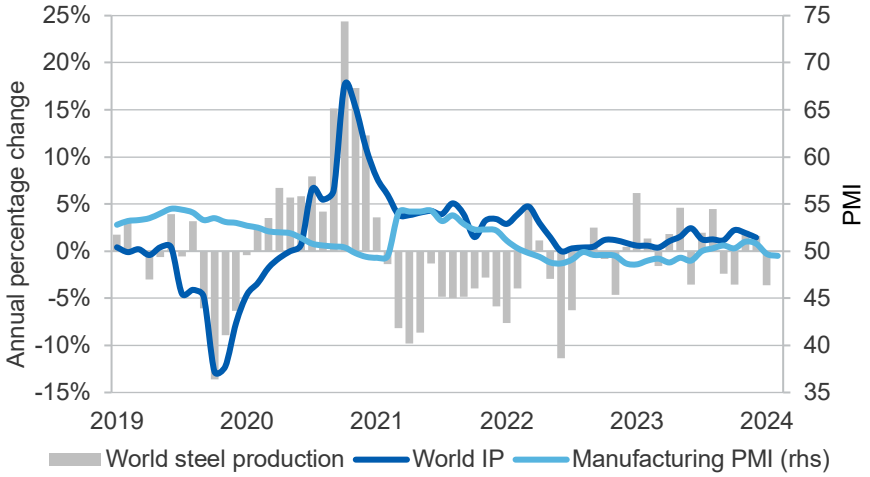
China's property sector remains the key driver of China's weak steel demand. The property sector shows little indication of stabilising in the second half of 2024. Newly constructed floor space continues to fall, down 23% year-on-year in the first seven months of 2024. Fixed asset investment in real estate was also down, falling by 11% year-on-year in the 3 months to July 2024.

The Chinese Governments RMB 500bn package announced in May 2024 was designed to stabilise the property sector by funding local governments and state-owned enterprises to acquire unsold properties and convert them into affordable public housing. However, roll out of the program has been slow to date and market estimates indicate that substantial additional funding will be required to absorb the excess housing inventory, with estimates ranging from RMB 2.7–7 trillion.

Partly offsetting the property sector weakness is the compositional shift in investment from property to advanced manufacturing — particularly electric vehicles, new energy components and infrastructure including solar, wind and batteries, and shipbuilding — already being observed in the Chinese economy. New infrastructure investment in China, as well as new measures by the Chinese government to alleviate weakness in the domestic property sector, should also provide support for construction activity — and hence steel and iron ore prices — over the next few years.

Exports have been increasingly important in supporting China's steel sector through the protracted domestic property downturn. China's steel exports are currently at near decade highs, with the 20% year-on-year increase in China's steel product exports in H1 2024 building on last year's 35% year-on-year growth in steel exports.

Figure 3.2: World manufacturing PMI and industrial output



Notes: JPMorgan Global Manufacturing Index; a reading above 50 indicating an overall increase compared to the previous month, and below 50 an overall decrease
Source: World Steel Association (2024); S&P Global (2024); Bloomberg (2024)

The impact of additional Chinese steel exports on global steel producers already struggling with low steel prices is increasing trade tensions around the world. Many countries are raising tariffs or launching trade remedy investigations against Chinese steel products. In recent months several countries, including the US and Canada, have announced new tariffs on Chinese steel exports.

Overall, China's steel production is expected to fall by 1.2% in 2024, a downgrade from the more modest fall of 0.4% projected in the June *Resources and Energy Quarterly* (REQ). The downward revision reflects the sharp falls in Chinese steel output in recent months and weakening outlook for steel demand. This downward trend is expected to continue over the rest of the outlook period, albeit at a more moderate pace (Table 3.1). China's steel consumption, which peaked in 2020, is forecast to continue to fall by 0.8% a year over the outlook period to 2026.

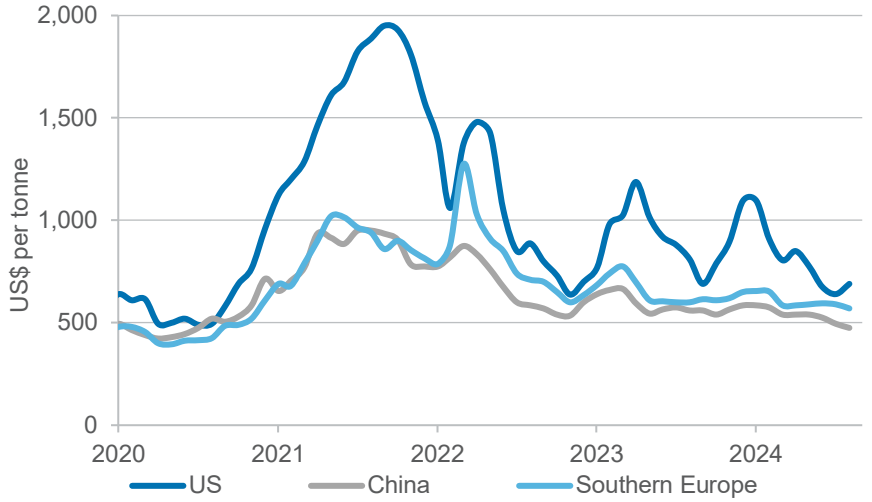
Infrastructure continues to drive global construction

Global construction — representing about 50% of world steel demand — is expected to see steady growth over the outlook period. This will be spurred by substantial levels of infrastructure investment pledged across many large economies in recent years. This includes the US$1.2 trillion Bipartisan Infrastructure Framework in the US, as well as India's US$1.3 trillion National Infrastructure Pipeline.

With private sector residential and commercial activity dampened by tighter credit conditions, infrastructure remains the key driver of global construction. Recent forward indicators of construction activity indicate global construction continues to rise modestly, with a slight improvement in activity in the June quarter 2024 in Europe and continuing steady growth in other major markets including the US and India.

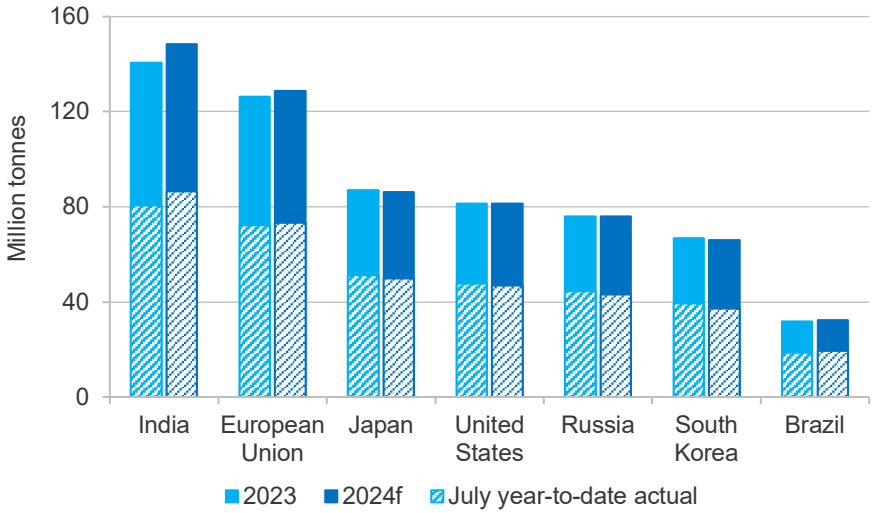
Ongoing disinflation in major economies is expected to result in monetary policy normalisation over the next two years, which should support a more broad-based recovery in global construction and hence steel demand.

Figure 3.3: Hot rolled coil steel prices



Source: Bloomberg (2024)

Figure 3.4: Steel production — other major producers



Source: World Steel Association (2024); DISR (2024)

Ex-China steelmaking has been resilient, led by India

Ex-China global steel production increased 1.2% in the year to July 2024. After taking over from the EU last year as the second largest steel producer after China, India has maintained its growth momentum this year — achieving year-on-year growth of 7.2% in the year to July 2024 (Figure 3.4). Over the outlook period to 2026, India is projected to record some of the strongest growth in steel output globally. Substantial production capacity is expected to be added through to the end of the decade, with the Government aiming to increase steel capacity from around 150 Mt in 2022 to 300 Mt by 2030.

The European steel outlook continues to be weighed down by weakness in construction and manufacturing, with the partial exception of automotive production. Nevertheless, European steel production is expected to regain some of the ground it lost over the past two years as wider economic activity picks up over the next two years. Downside risks remain due to high interest rates, above-target inflation and still high energy prices.

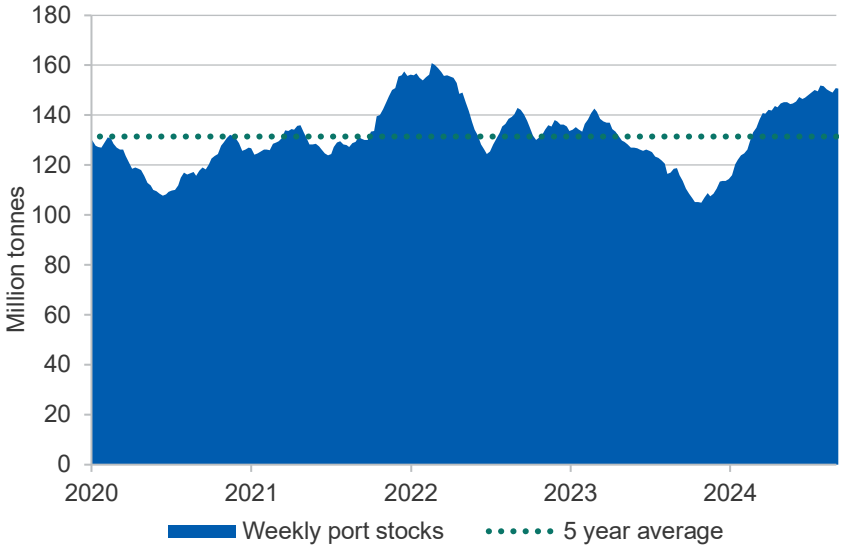
Rising steel demand and production capacity in regions such as emerging Asia and the Middle East will see ex-China iron ore demand increase over the outlook period. The increase in demand includes over 100 Mt of integrated (Blast Furnace-Basic Oxygen Furnace) steelmaking capacity expected to come online in the next few years in Asia. Over the next two years, iron ore demand is expected to receive support from a modest rise in iron ore demand in Europe and North America as interest rates fall.

Japanese steel production fell by 2.8% year-on-year in the first seven months of 2024. However, domestic steel demand picked up in the first half of the year, driven by rising building construction orders. South Korean crude steel production has also fallen so far this year, with high interest rates, rising prices, and strikes at Hyundai, Kia, and GM Korea all leading to reduced domestic automobile production and exports. Both Japanese and South Korean steel production is expected to remain relatively flat over the outlook to 2026 (Table 3.1).

Figure 3.5: Iron ore price and China steel production, monthly

Notes: China import Iron ore fines 62% Fe spot (CFR Tianjin port)
Source: Bloomberg (2024) China import prices; World Steel Association (2024)

Figure 3.6: China's weekly iron ore port stocks



Source: Bloomberg (2024)

US steel production is expected to remain flat in 2024, after weak growth last year as tight monetary conditions weighed down the residential property sector. The Inflation Reduction Act and Infrastructure Investment and Jobs Act are expected to further boost steel demand and infrastructure growth over coming years. Overall, US steel production is projected to grow by a relatively healthy 2.9% in 2025, before moderating in 2026 (Table 3.1).

3.3 Iron ore prices

Iron ore prices fall to 2-year lows as global supply outpaces demand

Iron ore price volatility continued in the September 2024 quarter as the benchmark iron ore spot price (basis 62% Fe fines CFR Qingdao) plunged more than 10% in mid-August to under US$90 a tonne. Prices consolidated and regained some ground in late August to bring the average to around US$95 a tonne for the quarter. Overall, iron ore prices have declined by more than a third since the start of 2024 (Figure 3.5).

These falls reflect weakening steel demand in China in the context of strong growth in iron ore supply. As noted above, weak steel prices pushed steel mill margins negative in almost all of China's steel mills in August. As a result, price premiums for high-grade iron ore products remained weak as Chinese mills sought to reduce operating losses by reducing input costs with lower grade feedstock.

High and rising iron ore stockpiles also put downward pressure on prices. China's portside stocks rose to more than 150 Mt in August, close to 5-year highs immediately before the rapid price falls (Figure 3.6).

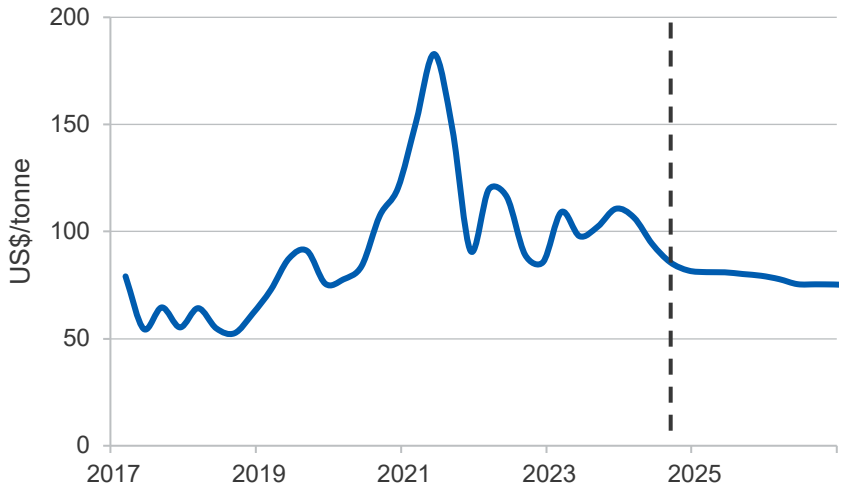
Lower Chinese demand for steel is expected to soften the rate of growth in global iron ore demand in the coming years, putting downward pressure on prices.

Rising global supply to push prices lower over the outlook

Strong iron ore supply outlook in the context of weaker than expected steel demand has seen the outlook for iron ore prices soften in recent months. The world's two largest producers — Australia and Brazil — are expected to continue to collectively grow export volumes by 3.1% annually over the outlook period to 2026. This follows a ramp up of greenfield projects for major Australian miners, and major expansions planned by Brazilian producers including Vale and CSN. New supply from emerging producers in Africa will also contribute to the growth in global trade of iron ore.

As a result, the expected declines in iron ore prices forecast in the June 2024 REQ have been brought forward. Forecast iron ore prices have been revised down by around US$4 a tonne (FOB) in 2024 and 2025 compared with the June REQ forecasts, while the 2026 price has been revised down by US$1 a tonne. From an estimated average price of around US$92 a tonne (FOB) in 2024, the benchmark iron ore price is now projected to fall to an average of US$80 a tonne in 2025, then decline further to around US$76 a tonne in 2026 (Figure 3.7). These declines are not expected to result in significant changes in Australian export volumes or exits from the market.

Figure 3.7: Iron ore price outlook, quarterly



Notes: China import iron ore fines 62% Fe spot (FOB)
Source: Bloomberg (2024); Department of Industry, Science and Resources (2024)

3.4 World iron ore trade

China's iron ore imports continue to rise despite steel sector woes

China's imports of iron ore have continued to grow despite the weak steel demand discussed above, rising 6.8% in the year to July 2024 to 714 Mt, an increase of 46 Mt on the same period in 2023. Iron ore imports from Australia increased by 6.6% year-on-year in the June quarter 2024, a turnaround from the 3.5% year-on-year fall in the March quarter. Combined shipments to China from Australia, Brazil and South Africa — representing around 80% of global seaborne supply — were estimated at around 600 Mt for the 7 months to July 2024, a rise of 3.5% from the same period in 2023.

Over the outlook period to 2026, global supply is expected to grow by 1.2% annually, with new supply coming online in Australia, Brazil and potentially Africa.

Total iron ore shipments from Brazil increased by 1.6% year-on-year in the June quarter 2024. Vale, which accounts for over 80% of Brazil's iron ore output, recorded an increase of 7.3% in output to produce 80.6 Mt of ore in the June quarter 2024. Vale increased its production guidance for 2024 in September to 323-330 Mt, up from 310-320 Mt.

Brazil is expected to grow iron ore exports by around 6% annually over the outlook period. This will include Vale's S11D expansion, as well as new and expanded output by a number of other producers, such as CSN's Casa de Pedra mine, and IndoSino's Amapa high grade concentrate.

Outside of Australia and Brazil, iron ore exports are projected to be bolstered by additional supply from Canada and India and new projects coming out of Africa, including the Simandou mine in Guinea which is targeting first production next year.

Guinea's Simandou mine receives final approval; first output due in 2025

Progress on Guinea's Simandou 150–200 Mt mine continued in the September quarter 2024. In July, Rio Tinto reported that it had received final approval from the Guinean and Chinese governments. Rio Tinto plans to invest US$6.2 billion in the mine, rail and port projects, in collaboration with a number of other companies. First production from the Simfer mine — of which Rio Tinto holds a 53% share — is expected in 2025, ramping up over 30 months. The mine has a targeted capacity of 60 Mt per year.

India's iron ore exports slowing after strong start to the year

India's iron ore exports weakened in the June quarter, down 3.1% year-on-year. However, due to strong growth in the March quarter total exports for H1 2024 were 10% higher compared with the same period last year. Despite heavy rains, Indian production was up 15% year-on-year in July, with most of this output used domestically. The slowing in Indian iron ore exports in recent months reflects weaker global demand and challenging market conditions due to softer prices and high Chinese inventories.

Domestic iron ore production is expected to increase in H2 2024 as monsoon rains subside and additional capacity is added due to restarts and expansions to mines in some regions, including Goa and Odisha.

India has historically been a price-sensitive iron ore exporter, with domestic miners exporting in times of high seaborne prices. The forecast easing in prices suggests India's iron ore exports are likely to grow relatively slowly over the outlook to 2026. As India's steelmaking capacity continues to grow — in order to meet the rising demand from manufacturing, infrastructure and residential and commercial construction — the quantity of iron ore available for export will decline.

India's imports are forecast to continue to rise over the outlook to 2026, albeit from a low base. The rate of increase is highly uncertain. Much will depend on how fast iron ore production capacity and associated infrastructure can be brought online.

The recent Indian Supreme Court ruling to allow State governments to tax iron ore miners could affect Indian iron ore production over the outlook. The tax will be levied on future sales and, crucially, retrospective sales since 2005. Market estimates indicate the tax could push up production costs per tonne of output by 5-20% depending on the final tax rates. Any resulting costs would likely be passed on to steelmakers. However, low global steel prices and cheap imports will make it difficult for steelmakers

to pass these on to end users. Steelmakers like Tata and NMDC face large potential tax bills — a bill for US$2 billion has already been raised against Tata Steel — which could see Indian miners and steelmakers defer expansion plans.

3.5 Australia

Australian iron ore shipments surge in June quarter

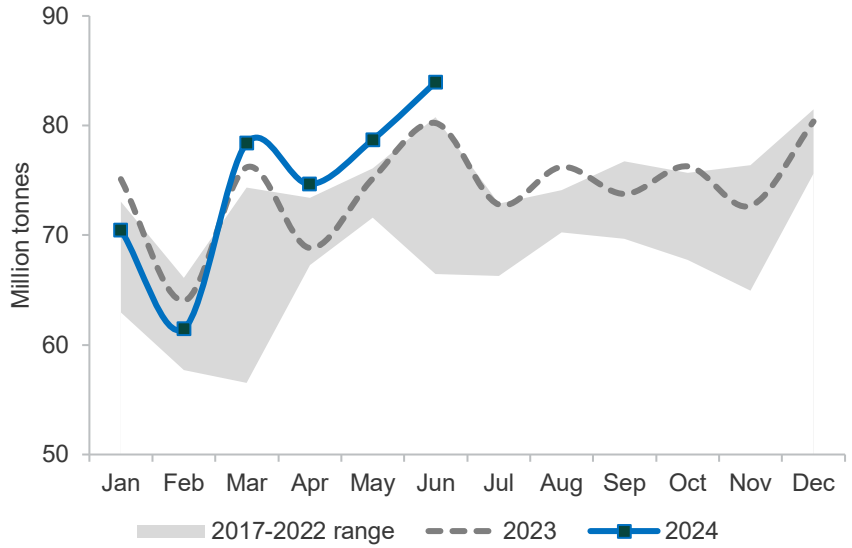
Australia's iron ore export earnings were $32.9 billion in the June quarter 2024, a 1.1% (or $0.4 billion) increase year-on-year. The increase reflected higher export volumes, which were partially offset by weaker iron ore prices over the period (Figure 3.8). The unit export price in the June quarter 2024 was 4.7% lower compared with the previous year.

In volume terms, Australia exported 237 Mt of iron ore in the June quarter 2024, up 13 Mt year-on-year. The strong June quarter result reflects higher productivity in existing mines and ongoing ramp up of newer operations. As the world's largest exporter of key commodities required for steel production, Australia is well placed to benefit from the demand growth projected in global markets in 2025 and 2026. Australia's production volumes are forecast to increase by 2.8% a year over the next two years, to an estimated 1,012 Mt by 2025-26 (Table 3.1).

Rio Tinto produced 79.5 Mt of iron ore in the June quarter 2024, down 2% year-on-year. Productivity gains offset lower ore yields. However, a train collision in mid-May — which resulted in around six days of lost rail capacity and full stockpiles at some mines — affected production and shipping in the quarter. Construction of the company's $3 billion Western Range joint venture with Baowu Steel Group is now 70% complete. Bulk earthworks and initial mining area development were completed during the June quarter. This project is expected to produce 25 Mt a year, with first ore scheduled for 2025.

BHP's iron ore output was 68.2 Mt in the June quarter 2024, up 6.4% on the June quarter 2023. Production was higher due to increased capacity unlocked by the Port Debottlenecking Project and record production at South Flank. These more than offset the impacts of the continued tie-in activity for the Rail Technology Programme.

Figure 3.8: Australian monthly iron ore export volumes



Source: ABS (2024) International Trade, Australia, 5368.0; Department of Industry, Science and Resources (2023)

Fortescue's total iron ore shipments were 53.7 Mt in the June quarter 2024, 10% higher year-on-year. The strong result reflected improved efficiencies following an ore car derailment in December 2023. The Iron Bridge magnetite mine continued to ramp up production, with 1.3 Mt of concentrate produced in the June quarter 2024. Fortescue's production guidance for the 2024–25 financial year is 190–200 Mt, including 5–9 Mt from Iron Bridge.

Mineral Resources' Onslow Iron project continues to ramp up, with 0.4 Mt of iron ore produced in the June quarter and the first capsize shipment loaded in July. The project is expected to achieve production of around 35 Mt per year when fully operational.

Australia's iron ore exports are projected to reach 937 Mt by 2026. The additional tonnes reflect the ramp-up of Mineral Resources' Onslow Iron and FMG's Iron Bridge projects plus incremental tonnes from the replacement projects of major producers.

Australian export earnings projected to fall around $30 billion this year

Australia's iron ore export earnings reached $138 billion in 2023–24, reflecting higher production volumes and stronger prices. Moderating prices and a slightly higher AUD/USD exchange rate are forecast to lead to lower iron ore earnings over the outlook period. Total export earnings are forecast to decline to $107 billion in 2024–25, and then fall to around $99 billion in 2025–26 (Figure 3.9).

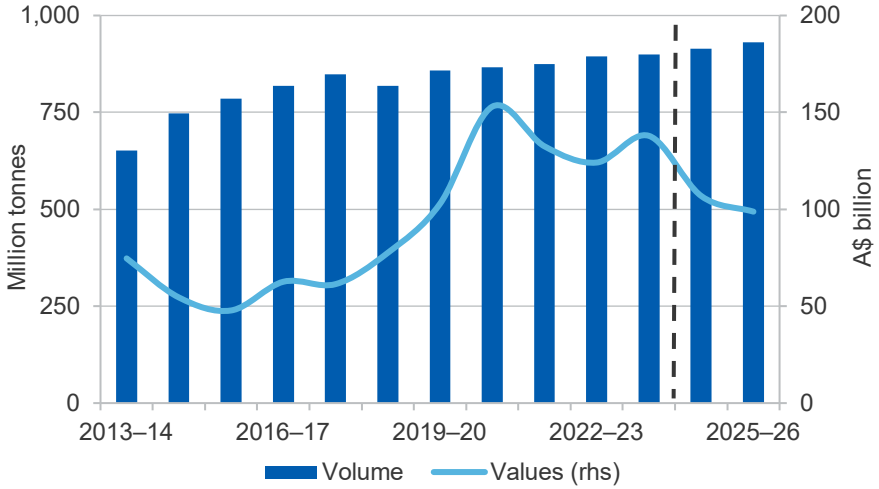
Iron ore exploration surge leveling out

A total of $195 million was spent on iron ore exploration in the June quarter 2024 (Figure 3.10). This was 30% higher compared to the previous quarter, but around the same level as the September quarter 2023. Exploration has eased marginally from near decade highs in 2022. The latest results continue the robust levels of iron ore exploration triggered by the historical high iron ore prices (of above US$200 a tonne) in early 2021.

Revisions to the outlook

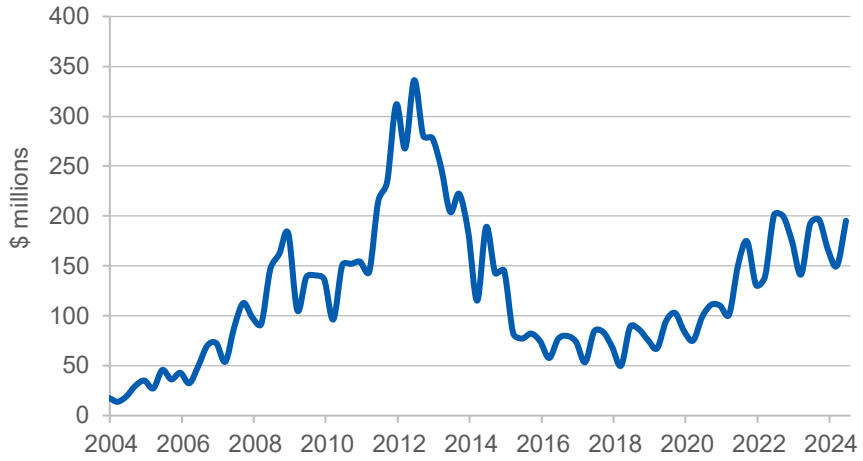
Export earnings in 2024–25 have been revised down from the June 2024 *Resources and Energy Quarterly* reflecting a slightly higher exchange rate and lower prices offsetting an upward revision in export volumes. Earnings of $107 billion rather than $114 billion are now forecast for 2024–25. Export earnings for 2025–26 have been revised down by $3.5 billion due to lower prices.

Figure 3.9: Australia's iron ore export volumes and values



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

Figure 3.10: Australian iron ore exploration expenditure



Source: ABS (2024) Catalogue 8412.0

Table 3.1: World steel consumption and production

	Million tonnes				Annual percentage change		
Crude steel consumption	**2023**	**2024[f]**	**2025[f]**	**2026[f]**	**2024[f]**	**2025[f]**	**2026[f]**
China	932	920	911	906	-1.3	-1.0	-0.5
European Union	140	144	147	149	3.0	1.8	1.5
India	142	151	161	171	6.5	6.4	6.4
United States	101	101	104	108	0.8	3.1	3.4
Other Asia[a]	110	115	117	120	4.5	2.0	2.3
Japan	59	59	59	60	-0.6	1.1	1.5
Middle East	58	59	61	63	1.8	2.8	3.1
South Korea	57	56	56	57	-1.2	0.4	1.5
Russia	47	47	47	48	-1.0	0.7	2.5
World steel consumption	1,880	1,897	1,918	1,946	0.9	1.1	1.5
Crude steel production	**2023**	**2024[f]**	**2025[f]**	**2026[f]**	**2024[f]**	**2025[f]**	**2026[f]**
China	1,019	1,007	1,002	999	-1.2	-0.4	-0.3
European Union	126	129	131	131	2.4	0.9	0.7
India	141	149	157	166	5.8	5.7	5.3
Japan	87	86	85	85	-1.5	-0.7	0.3
United States	81	81	83	84	-0.4	2.9	0.3
Russia	76	76	76	76	-0.5	0.4	0.2
South Korea	67	66	67	67	-1.4	1.7	0.0
Other Asia[a]	63	73	83	86	16.7	12.6	3.9
World steel production	1,892	1,907	1,939	1,968	0.8	1.7	1.5

Notes: **a** Asia ex. China, India, Japan, South Korea and Taiwan; **f** Forecast; r Annual percentage change

Source: World Steel Association (2024); Department of Industry, Science and Resources (2024)

Table 3.2: World trade in iron ore

	Million tonnes				Annual percentage change		
	2023	2024[f]	2025[f]	2026[f]	2024[f]	2025[f]	2026[f]
World trade	1,621	1,619	1,650	1,678	-0.1	1.9	1.7
Iron ore imports							
China	1,180	1,094	1,069	1,050	-7.3	-2.3	-1.8
Japan	101	102	101	101	0.2	-0.7	0.3
European Union	108	109	111	112	1.2	1.6	0.6
South Korea	74	71	72	72	-4.4	1.6	0.0
India	6	25	38	52	316.2	50.1	36.2
Iron ore exports							
Australia	892	908	926	937	1.9	1.9	1.3
Brazil	367	390	413	440	6.3	5.9	6.5
South Africa	59	60	61	62	1.7	1.7	1.6
Canada	56	58	60	62	3.6	3.5	3.3
India	37	38	39	40	2.7	2.6	2.6

Notes: **s** Estimate; **f** Forecast; **r** Annual percentage change

Source: World Steel Association (2024); International Trade Centre (2024); Department of Industry, Science and Resources (2024)

Table 3.3: Iron ore outlook

				Million tonnes			Annual percentage change	
World	**Unit**	**2023**	**2024[f]**	**2025[f]**	**2026[f]**	**2024[f]**	**2025[f]**	**2026[f]**
Prices [a]								
– nominal	US$/t	105	92	80	76	-12.3	-12.7	-5.5
– real [b]	US$/t	108	92	79	73	-14.9	-14.4	-7.4
Australia	**Unit**	**2022–23**	**2023–24[s]**	**2024–25[f]**	**2025–26[f]**	**2023–24[s]**	**2024–25[f]**	**2025–26[f]**
Production								
– Steel [c]	Mt	5.6	5.0	5.4	5.5	-10.3	7.8	0.3
– Iron ore [g]	Mt	957	958	982	1,012	0.2	2.5	3.0
Exports								
Steel [c]	Mt	1.21	1.07	1.02	1.10	-11.9	-4.4	7.8
– nominal value	A$m	1,356	1,371	1,259	1,345	1.1	-8.1	6.8
– real value [i]	A$m	1,455	1,411	1,259	1,301	-3.0	-10.8	3.3
Iron ore [h]	Mt	895	900	915	931	0.6	1.6	1.8
– nominal value	A$m	124,131	137,897	106,884	98,786	11.1	-22.5	-7.6
– real value [i]	A$m	133,168	141,965	106,884	95,538	6.6	-24.7	-10.6

Notes: a Spot price, 62% iron content, fob Australian basis; b In 2024 US dollars; c Crude steel equivalent; Crude steel is defined as the first solid state of production after melting. In ABS Australian Harmonized Export Commodity Classification, crude steel equivalent includes most items from 7206 to 7307, excluding ferrous waste and scrap and ferroalloys; f forecast; g In wet metric tonnes; h In dry metric tonnes; i In 2024–25 Australian dollars; r Annual percentage change
Source: ABS (2024) International Trade in Goods and Services, Australia, 5368.0; Bloomberg (2024); World Steel Association (2024); company reports; Department of Industry, Science and Resources (2024)

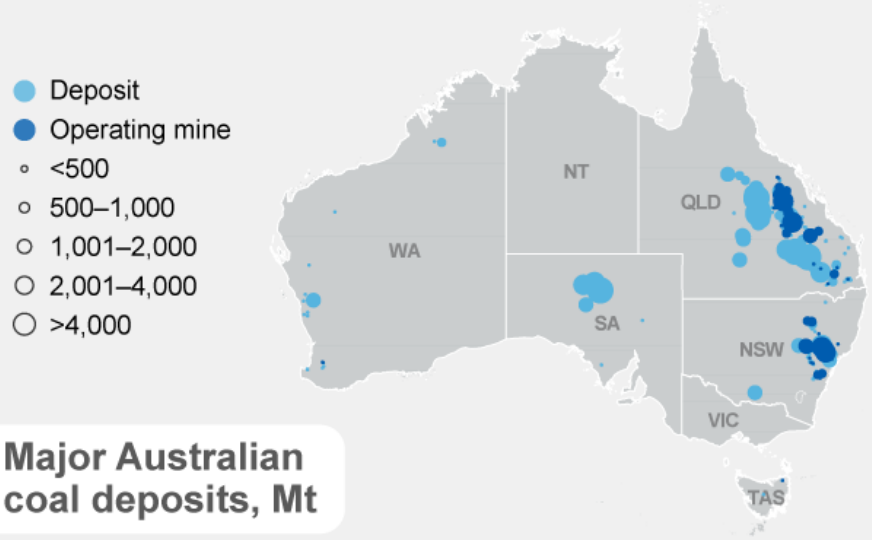
Metallurgical Coal

Australia's metallurgical coal sector

160Mt
exported annually, making Australia the world's largest exporter

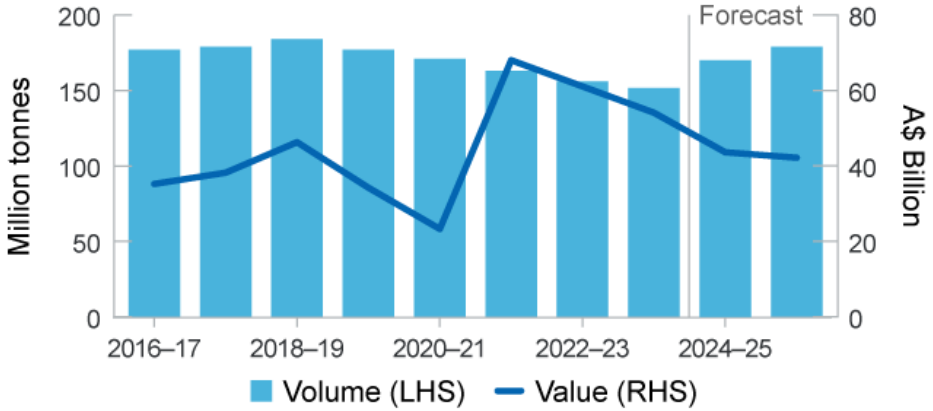
Growth
over time in exports to India

Almost all
of Australia's **production** is exported



Major Australian coal deposits, Mt

Australian metallurgical coal exports



Outlook

Metallurgical coal **prices are falling** as demand from China wanes

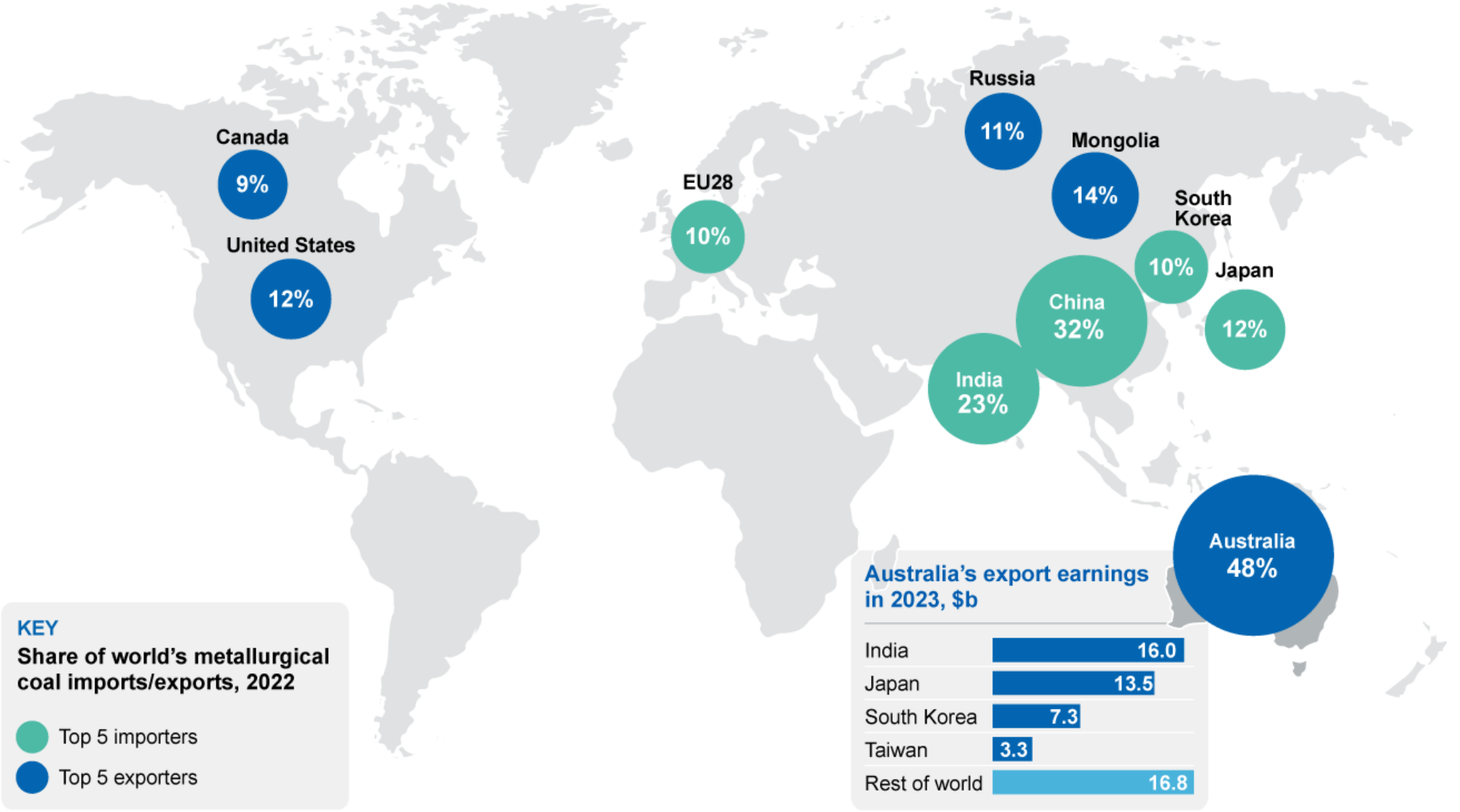
Earnings are **expected to decline** over time as prices ease

Volumes are expected to grow over the next five years as **new mines** ramp up

Exploration spending **remains high**

SOURCE: World Steel; GA; DISR; OCE

Metallurgical Coal TRADE MAP



SOURCE: WSA; ABS

4.1 Summary

- Metallurgical coal prices fell sharply in the September quarter as falling Chinese steel prices squeezed input costs. The benchmark price is expected to fall from US$253 a tonne in 2024 to US$205 a tonne by 2026.
- Falling prices are forecast to reduce export earnings from $54 billion in 2023–24 to $42 billion in 2025–26.
- Export volumes are expected to rise from 151 Mt in 2023–24 to 175 Mt by 2025–26 (see *Australia* section). A potential recurrence of the La Niña cycle has been factored into volumes in 2024–25.

4.2 World trade

Global metallurgical coal imports rose 6% in the June quarter, driven by strong demand in China and India and attractive pricing. Metallurgical coal prices subsequently fell during the September quarter as a compression of steel making margins induced lower metallurgical coal demand. Prices are expected to remain around current levels through the forecast period, although short-term volatility is expected to remain.

Supply side risks include potential weather disruptions (especially on Australia's east coast) and the potential for reduced supply from Russia. Meteorological bodies forecast the likelihood of La Niña conditions emerging in late 2024 through to early next year at between 50%-70%. Australia experienced significant supply disruptions during the previous La Niña cycle, with waterlogged mines and reduced port and rail capacity.

Supply shocks are unlikely to result in shortages due to current high inventories held by steel makers. Margins at many Chinese steel mills are negative, putting downwards pressure on the demand for metallurgical coal. China's global dominance in steel production means excess finished steel and low prices in China have a material negative effect on steel producers in ex-China Asia. Accordingly, world steel production growth has been revised down to between 1.0–1.7% over the forecast period.

Although prices are expected to remain soft in the short-term, long-term demand for metallurgical coal will be underpinned by continued blast furnace capacity expansion in India and China. In the short term, reduced production volumes are possible if prices remain at September 2024 levels for a sustained period. Negative profits may provide a price floor for metallurgical coal, as high-cost producers lower capacity utilisation.

4.3 World imports

Chinese imports rose again but imports have likely peaked

Chinese metallurgical coal imports rose 33% year-on-year in the June quarter, continuing the strong momentum from the March quarter. Most additional supply was from Mongolia and Russia. Chinese domestic metallurgical coal mine supply fell in H1 2024. This was offset by strong imports as speculation that steel production limits would be introduced in Q3 2024 caused a short-run steel production spike flowing through to increased Chinese metallurgical coal production.

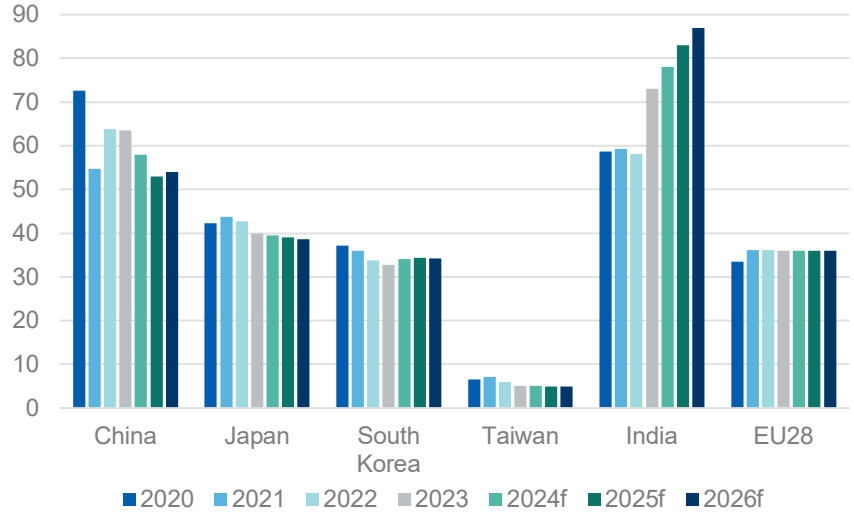
China's demand for metallurgic coal is expected to lower in coming months due to falling steel prices and negative margins at steel mills from oversupply. See *Iron Ore Chapter* for more information.

India's demand outlook remains strong with growing blast furnace capacity

India continues to drive international demand for metallurgical coal, with quarter-on-quarter import growth of 7% and year-on-year quarterly growth of 1%. India has a diverse supply base including key suppliers Australia (contributing around 40% of total imports), Russia and the US.

India's imports of metallurgical coal are expected to steadily grow over the outlook period as the nation continues to expand its blast furnace capacity in line with its 2030 production capacity target of 300 Mt. Although domestic metallurgical coal production is expected to increase, blast furnace expansion is expected to outstrip the ability of local supply to keep pace. India also announced plans to construct 30 million additional houses through the allocation of Rs 2.2 trillion (US$26.3 billion) over the next 5 years under the Housing for All scheme. The scheme is expected to increase steel demand from the December 2024 quarter.

Figure 4.1: Metallurgical coal imports



Notes: **f** Forecast
Source: McCloskey (2024); Department of Industry, Science and Resources (2024)

4.4 World exports

World exports are expected lift from 2023 levels of 348Mt to 369Mt in 2026 (Figure 5.2). The increase mainly reflects an increase in Australian supply. Mongolian and Russian exports are expected to be stable over the period. Russia is expected to maintain volumes through continued export to India, with the effect of more severe trade measures presenting a downside risk to Russian exports.

Mongolia is likely at peak exports because of falling Chinese demand

Mongolian exports saw very strong growth over the June 2024 quarter, reporting 44% year-on-year growth. The increase was driven by sales to its sole export partner, China. However, Chinese demand is expected to drop due to weak steel market conditions through the rest of this year. Mongolia has the advantage of low freight costs but also has reduced market pricing power and faces a 3% Chinese tariff on its metallurgical coal as it lacks a Free Trade Agreement.

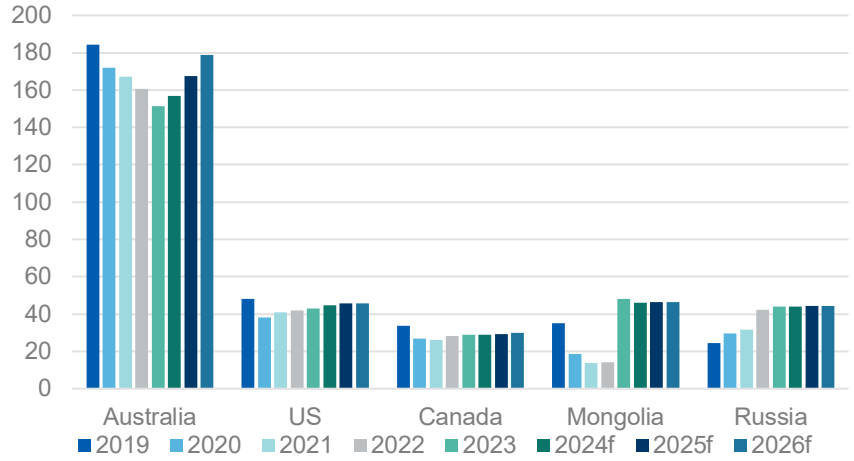
Monthly Mongolian exports were lower in July reflecting a 5-day holiday shutdown. China has displayed a clear preference for cheaper Russian and Mongolian metallurgical coal over Australian in recent years despite the lower quality. Mongolia also has a significant freight cost advantage over Australia, Canada and the US.

Russian exports are strong but still face secondary sanctions risks

Russian exports increased 18% year-on-year over the June 2024 quarter and a 31% quarter-on-quarter increase, driven by particularly strong export volumes in April 2024. Russian metallurgical coal sells at a discount to similar grades from other countries.

Russia is heavily reliant on China and India; together, they make up around 95% of Russia's export market. Russia has continued to service India via sea, with the majority of exports shipped from western Russian ports. Additional US sanctions against Russian coal producers and transporters still present a downside risk to Russian exports. For example, the US' sanctions of the Moscow Exchange on 12 June 2024 will make currency transactions more difficult, thus making exporting more difficult.

Figure 4.2: Metallurgical coal exports



Notes: f Forecast
Source: McCloskey (2024); Department of Industry, Science and Resources (2024)

4.5 Prices

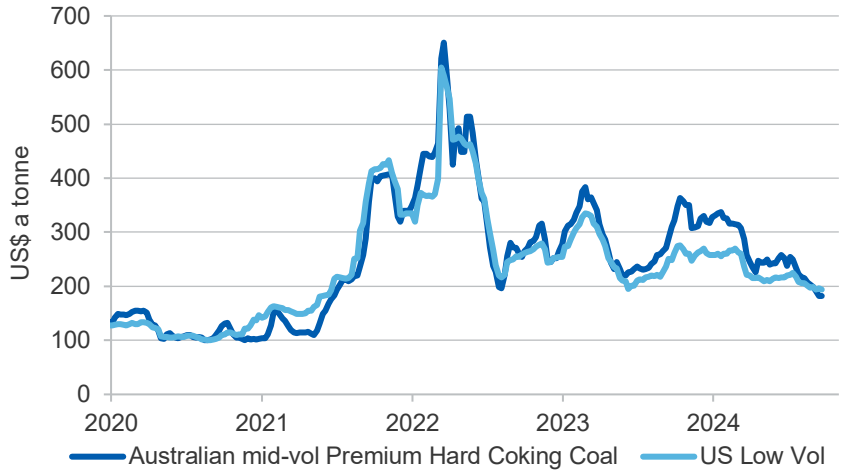
Metallurgical coal prices have declined but are expected to stabilise

Prices declined from US$233 a tonne at the start of July to US$195 a tonne by the end of August 2024. Prices are expected to average around the US$200 a tonne mark through to 2026.

Significant price volatility is to be expected throughout the forecast period. On the supply side, volatility is expected given illiquidity and supply concentration in the Australian spot market. La Niña weather conditions in Queensland and New South Wales could also disrupt mine operations. On the demand side, opportunistic Chinese and Indian demand in the spot market is expected to continue, as buyers look to maximise profits by buying Australian coal when prices plus freight are below domestic prices.

Chinese domestic metallurgical coal production and consumption is expected to remain volatile. Additional consumption may be stoked by government demand stimulus in order to meet economic growth targets. Indian demand for prime hard coking coal is expected to remain strong due to strong steel blast furnace activity and the new facility pipeline.

Figure 4.3: Metallurgical coal price fluctuations, 2020 - 2024



Source: McCloskey (2024)

4.6 Australia

New metallurgical coal supply will likely outpace closures through to 2026

Australia metallurgical coal exports increased by 9% quarter-on-quarter in the June 2024 quarter. Year-on-year exports were down 4%, which was a cyclically high level of export volumes. June quarter exports to China increased 150% from the March quarter, but volumes are still well down on historical export volumes. India remains the key export destination for Australian metallurgical coal along with Japan, with volumes remaining relatively stable for both. Australia maintains a diverse customer base for metallurgical coal, with Germany, Vietnam, the Netherlands and Turkey importing material volumes over the June 2024 quarter.

Australian output has been adversely affected by a number of developments. Production was paused at Bowen Coking Coal's Broadmeadow East mine due to power problems. After a second fatal accident within three weeks, QCoal suspended operations at its Byerwen mine in August to investigate the incident. Production at Anglo American's Bowen Basin Grosvenor mine was halted in June 2024 after an underground fire. Anglo American subsequently lowered H2 2024 metallurgical division production guidance by 1-1.5 Mt. The loss of the mine's supply initially raised Australian prime hard coking coal prices. Prices increased from $US234 a tonne on 28 June 2024 to a high of US$260 a tonne on 2 July 2024. However, falling global demand subsequently outweighed the reduction in supply, as prices fell to US$213 by the end of July 2024.

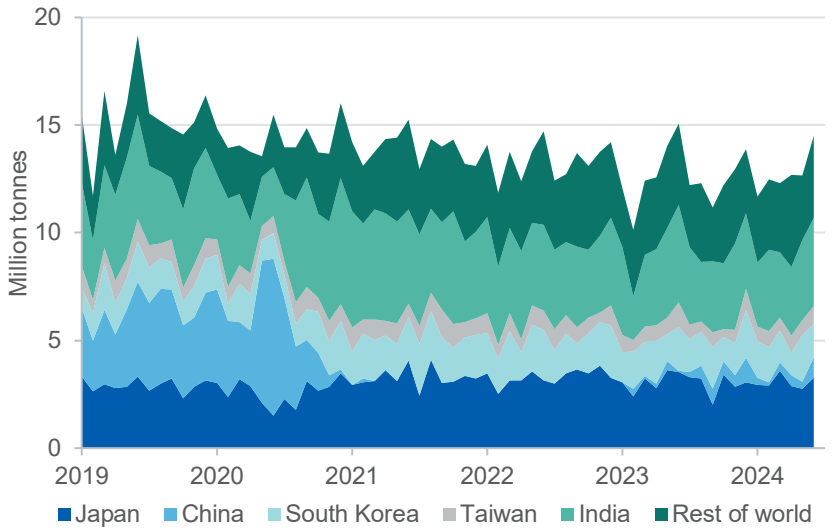
Peabody Energy resumed production at its Centurion mine (previously North Goonyella), expecting to approach full capacity of 4.7 Mtpa in H1 2026 as it commences longwall production. Peabody is also ramping up production at Burton, expecting to hit 4.4Mtpa by 2026. Pembroke Resources' Olive Downs mine officially opened in April 2024. Production volumes for 2024-25 for BHP, Anglo American and Glencore have been revised down slightly, in line with company forward guidance.

The potential for La Niña conditions in Australia offsets production from new mines to result in a stable supply outlook. The last La Niña (in 2022) resulted in material Australian supply reductions.

Exports are expected to rise from 151 Mt in 2023–24 to 175 Mt by 2025-26. Existing mines are expected to operate at maximum available capacity given prices are expected to average slightly above US$200 a tonne. Demand for Australian metallurgical coal is expected to remain relatively strong through the forecast period due to its diverse customer base and premium product offering.

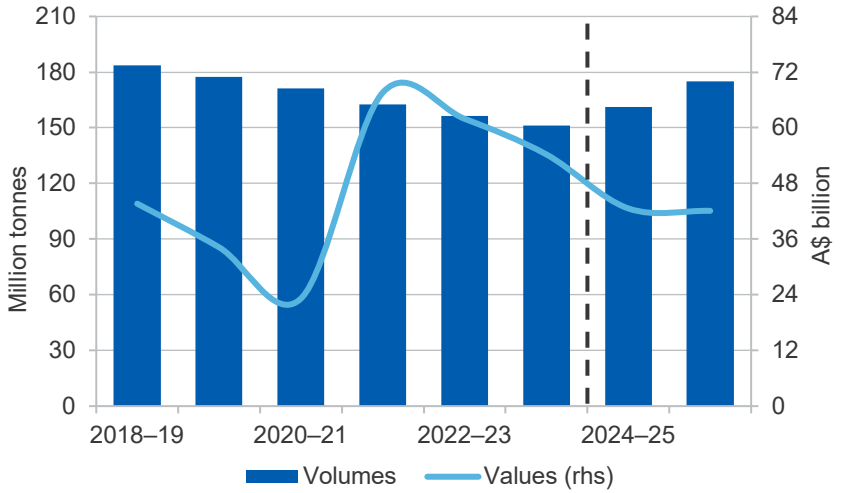
Export earnings are expected to fall from $54 billion in 2023–24 to $42 billion by 2025–26. Upside risk factors include reductions in Russian exports linked to sanctions, and supply-side shocks due to weather events, particularly in Australia. Downside risk factors include a Chinese-led global steel manufacturing slowdown, and a shift towards new low emission steel production facilities, which do not use metallurgical coal as an input.

Figure 4.4: Australia's metallurgical coal export volumes, monthly



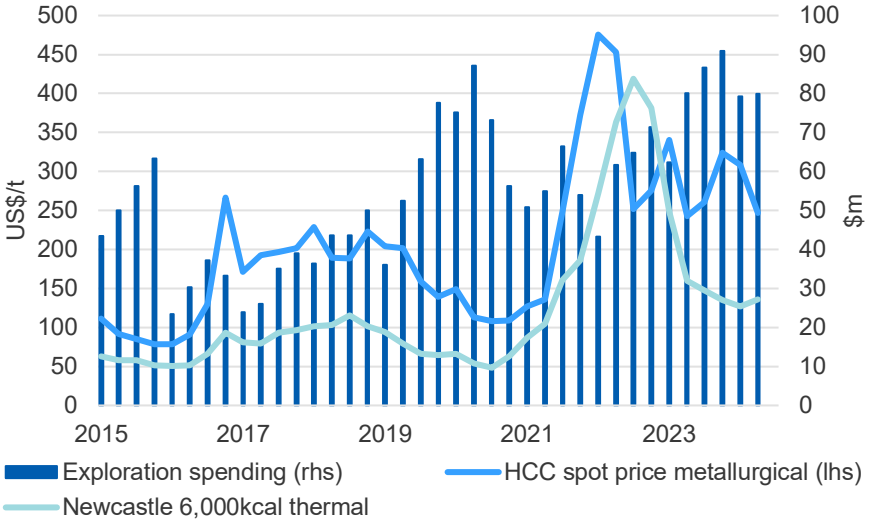
Source: ABS (2024) International Trade, Australia (trade tables subscription)

Figure 4.5: Australia's metallurgical coal exports



Source: ABS (2024) International Trade, Australia 5454.0; Department of Industry, Science and Resources (2024)

Figure 4.6: Australian coal exploration expenditure and prices



Notes: exploration for all coal types
Source: ABS (2024); McCloskey (2024)

Coal exploration expenditure increased in the June quarter

Australian exploration expenditure for thermal and metallurgical coal (Figure 4.6) increased 1% in the June 2024 quarter. Growth came from Queensland. While exploration expenditure has fallen compared to 2023, it remains much higher than the historical average. Metallurgical coal likely accounts for the majority of this spend.

Revisions to the outlook for Australian metallurgical coal exports

The export earnings forecast for 2024–25 have been revised down $5 billion from the June 2024 *Resources and Energy Quarterly* due to a downward revision in export volumes and a downward revision to forecast prices. The 2025–26 forecast is little changed.

Table 4.1: World trade in metallurgical coal

Metallurgical coal						Annual percentage change		
	Unit	2023	2024	2025	2026	2024	2025	2026
World trade	Mt	348	341	356	369	-2.0	4.4	3.5
Metallurgical coal imports		**2023**	**2024**	**2025**	**2026**	**2024**	**2025**	**2026**
China	Mt	64	58	53	54	-8.7	-8.6	1.9
India	Mt	73	78	83	87	6.8	6.4	4.8
Japan	Mt	40	40	39	39	-1.1	-1.2	-1.1
European Union 28	Mt	36	36	36	36	0.0	0.0	0.0
South Korea	Mt	33	34	34	34	4.1	0.9	-0.4
Metallurgical coal exports		**2023**	**2024**	**2025**	**2026**	**2024**	**2025**	**2026**
Australia	Mt	151	157	167	179	3.6	6.8	6.8
United States	Mt	43	45	46	46	4.0	2.1	0.4
Canada	Mt	29	29	29	30	-0.6	1.6	1.7
Russia	Mt	44	44	44	44	-0.2	0.7	0.0
Mongolia	Mt	48	46	46	46	-4.1	1.0	0.0
Mozambique	Mt	4	4	4	4	0.0	0.0	0.0

Notes: **f** Forecast;

Source: IEA (2024) Coal Information; IHS (2024); Department of Industry, Science and Resources (2024)

Table 4.2: Metallurgical coal outlook

World	Unit	2023	2024	2025	2026	2024[s]	2025[f]	2026[f]
Contract prices[e]								
– nominal	US$/t	289	251	214	205	-13.0	-15.0	-4.1
– real[d]	US$/t	295	252	209	197	-14.7	-16.8	-6.0
Spot prices[g]								
– nominal	US$/t	292	242	213	205	-17.0	-12.1	-3.7
– real[d]	US$/t	298	243	209	197	-18.6	-13.9	-5.7
Australia	**Unit**	**2022–23**	**2023–24**	**2024–25**	**2025–26**	**2023–24**	**2024–25**	**2025–26**
Production	Mt	162	161	165	179	-0.9	2.8	8.4
Export volume	Mt	156	151	161	175	-3.2	6.5	8.6
– nominal value	A$m	61,922	54,237	42,612	42,092	-12.4	-21.4	-1.2
– real value[i]	A$m	66,430	55,837	42,612	40,708	-15.9	-23.7	-4.5

Notes: **d** In 2024 US dollars. **e** Contract price assessment for high-quality hard coking coal. **i** In 2023–24 Australian dollars. **f** Forecast. **g** Hard coking coal fob Australia East Coast ports. **s** Estimate.

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

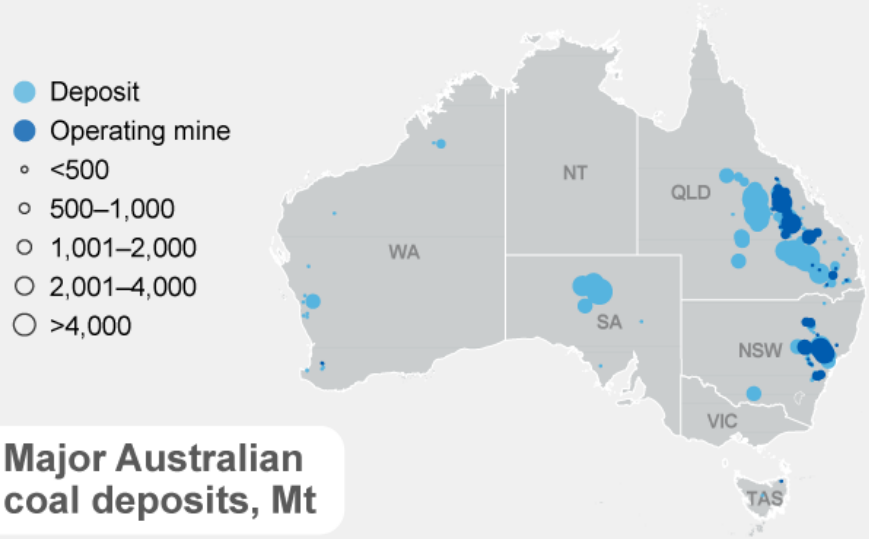
Thermal Coal

Australia's thermal coal sector

World's 2nd
largest thermal coal **exporter** & **3rd largest** black coal resource

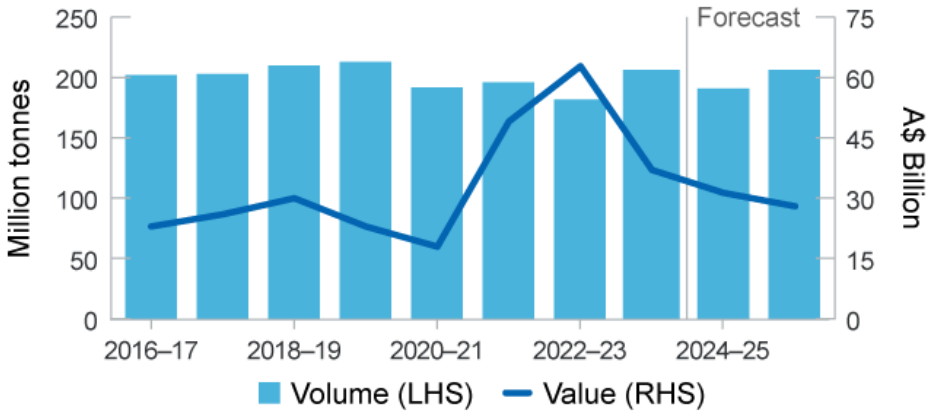
Strong growth
in exports to **Vietnam** in recent years

75-85%
of Australia's thermal coal is **exported**



Major Australian coal deposits, Mt

Australian thermal coal exports



Outlook

Prices **well below** 2022 peaks as **supply conditions improve**

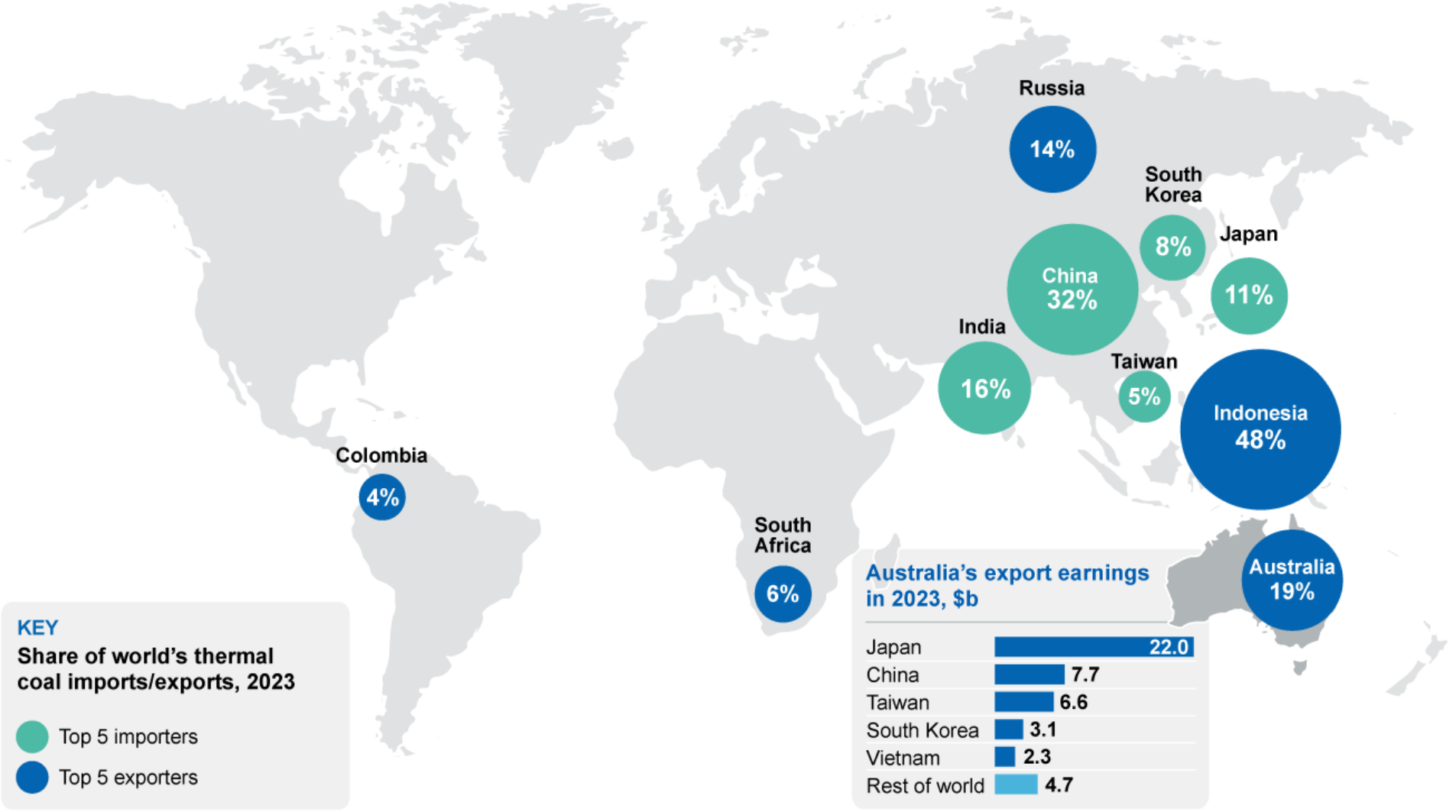
Earnings remain on a **downward trajectory**, as prices **continue to ease**

Volumes remain **vulnerable to wet weather and disruptions**

The global energy transition is expected to **reduce demand**

SOURCE: GA; DISR; OCE

Thermal Coal TRADE MAP



SOURCE: IEA; ABS

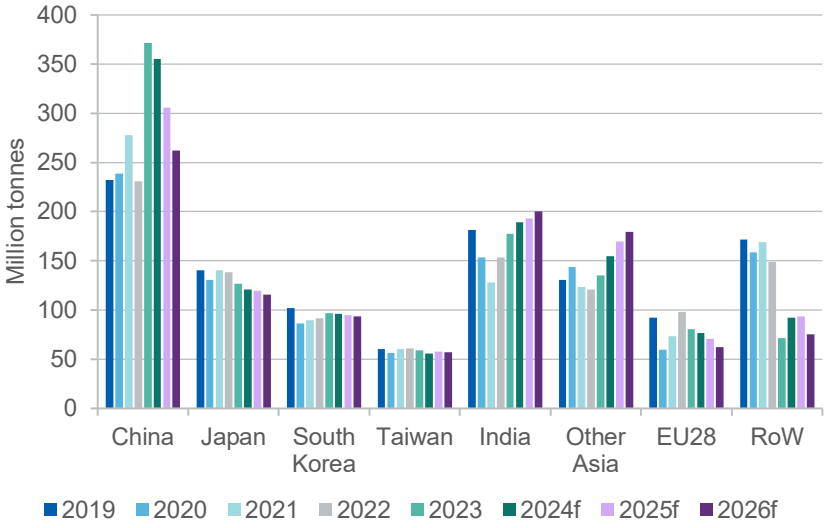
5.1 Summary

- As global seaborne demand falls and supply remains relatively constant, thermal coal spot prices are expected to decline. Prices are expected to fall from US$135 a tonne in 2024 to US$113 a tonne by 2026.
- Australia's thermal coal export earnings are expected to ease from $36 billion in 2023–24 to $27 billion by 2025–26 due to price falls.
- Australian export volumes are expected to be stable at around 200 Mt over the outlook period.

5.2 World imports

Global imports are expected to fall over the outlook from 1,120 million tonnes (Mt) in 2023 to 1,045 Mt by 2026. China and Europe will likely be the largest contributors to the decline in global imports as they continue to decarbonise. India and Other Asia will drive demand growth (Figure 5.1). Weather events will be a major driver of market volatility.

Figure 5.1: Thermal coal imports



Note: **f** Forecast; **RoW** Rest of World.

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

Hot weather, low domestic output and stockpiling lifted Chinese imports

China's seaborne imports of thermal coal were strong in H1 2024, increasing by 9% compared with H1 2023, which was already a record-breaking year. China's thermal coal imports were expected to peak in 2023 on the back of a significant roll out of renewable generation capacity and increased output from hydroelectric generation.

While electricity generation from hydro, wind and solar lifted in 2024, several other factors have supported higher than expected thermal coal demand. For example, China's domestic output fell in H1 2024 as mines implemented tightened safety regulations. Chinese coal inventories rose by 86 Mt, or 15% in H1 2024 (Figure 5.2). While domestic production has since recovered, relatively high domestic prices and increased demand due to hot weather over summer have increased imports.

Figure 5.2: China Coal Inventory (thermal and metallurgical)

Source: Bloomberg (2024)

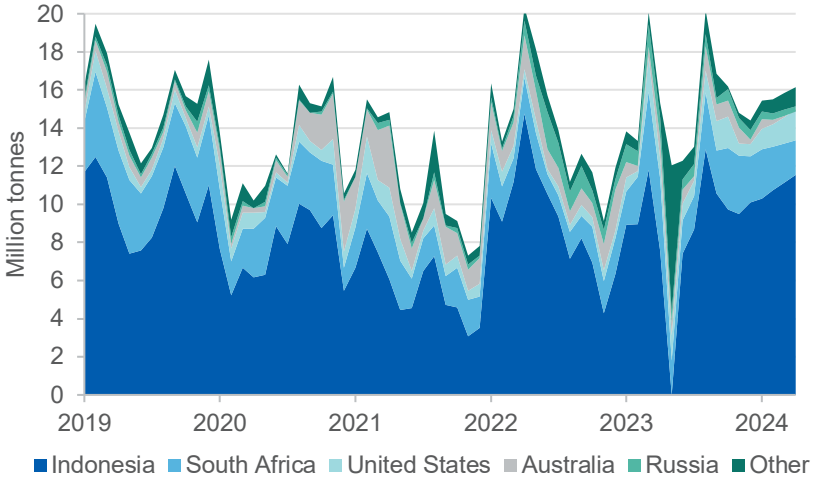
Although the outlook for China's imports is higher than previously forecast, imports are still not expected to exceed 2023. While upside risk remains, China's thermal coal imports are expected to decline as the rollout of renewables progresses. In 2020, China set a target to install 1,200GW of wind and solar capacity by 2030. This target was achieved in July 2024, six years ahead of schedule.

India's imports will rise in line with economic growth

Demand from India has also remained strong in H1 2024, increasing by 13% year-on-year (Figure 5.3). An intense heat wave from March 2024 through to May 2024 (temperatures reached 50 degrees Celsius) placed intense pressure on India's power grid. India continued to experience intense heat through the summer months, with the number of heatwave days recorded over north-western and eastern parts of the country being double normal levels.

Increased urbanisation and industrial activity in line with economic growth have consistently increased India's demand for thermal coal. While India has increased domestic production, demand growth is expected to outpace domestic production growth over the outlook period.

Figure 5.3: India's thermal coal imports, monthly



Source: McCloskey (2024)

As in China, India's hydroelectric generation had been lagging under El Niño conditions. In June 2024, hydroelectricity's share of power generation rose to 8.7%, the highest level since September 2023 as rains from India's monsoon season filled reservoirs. India remains one of the few markets that is expanding coal generation capacity and will meet this increased demand with imports. Indian thermal coal imports are expected to increase by 12% between 2026 and 2024.

Japan, South Korea, and Taiwan expected to maintain demand

Imports from Japan, South Korea and Taiwan have all had a minor fall in thermal coal imports across the first half of 2024. Renewables and nuclear displaced some thermal coal demand, although hot weather during the North Asian summer months supported a short-term boost in coal use.

Japan, South Korea and Taiwan have limited domestic thermal coal production, prefer higher grades of coal and import most of their demand for power generation. These economies are expected to maintain stable imports across the outlook.

5.3 World exports

Seaborne thermal coal exports are expected to fall over the outlook period, driven by reduced supply from Russia and falling global demand (Figure 5.4). Weather disruptions will likely affect the stability of thermal coal supply in the outlook period, with mines remaining vulnerable to heavy rains and ports vulnerable to cyclones and typhoons.

Russian coal exports have fallen due to global sanctions

Russian exports are facing challenges with falling demand, logistical issues, and expanding sanctions all weighing on exports. Russian thermal coal exports are down 24% in H1 2024 year-on-year, and raw thermal coal production is down 10%. Most of this decrease comes from falls in exports to South Korea, China, and India. Exports to South Korea experienced the largest decline, falling by 44% as the South Korean government encouraged buyers to divert away from Russian cargoes.

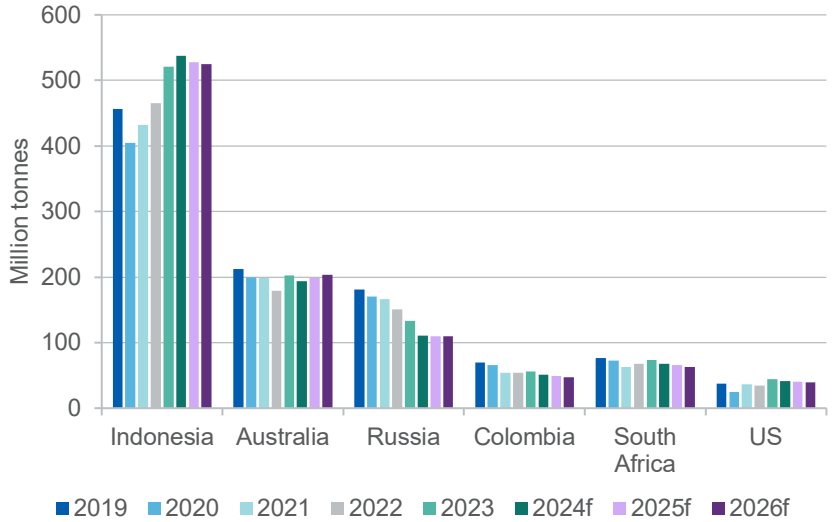
The US included additional Russian steel and coal companies in a new round of sanctions announced in August 2024. New sanctions cover Mechel Mining, SDS-Ugol and Stroyservice — companies that are involved in coal mining, transport, and operations.

Sanctions are leading Russian suppliers to divert supply to the domestic market, with the impact of this diversion most acutely felt by exporters in

Kazakhstan. In 2021, Kazakhstan exported 25 Mt of thermal coal, with three quarters going to Russia. In 2022, exports to Russia fell to zero.

Thermal coal exports from Russia are expected to fall by 17% in 2024 to 110 Mt and then hold steady for the remainer of the outlook.

Figure 5.4: Thermal coal exports



Notes: **f** Forecast.
Source: McCloskey (2024); Department of Industry, Science and Resources (2024)

Increasing Indonesian domestic demand is expected to limit export growth

Indonesian exports have recorded a modest 3% growth year-on-year in H1 2024. Indonesia has experienced supply disruptions from heavy rain in parts of the country and dry weather in other parts leading to shallow barging conditions. Over the outlook, Indonesian domestic consumption is expected to outpace production growth — in part due to Indonesia's increase in nickel production, which requires additional energy.

Indonesia has plans to further expand its domestic metals processing industry over the next five years. Some of these refining processes will have significant energy or electricity requirements, placing further downward pressure on Indonesia's thermal coal exports.

Exports from the US, Colombia and South Africa are expected to decline

Exports from other major producers have mostly declined over the first five months of 2024. The Baltimore bridge collapse in March led to a temporary decline in exports from the US, although volumes have since recovered to normal levels for the season. Exports from South Africa continued to face logistical issues due to vandalism and theft at the Richards Bay Coal Terminal, and ongoing delays due to rail maintenance. Colombian exports lifted modestly, but supply continues to be affected by blockades and protests which have hampered delivery of output to ports.

These exporters are expected to reduce supply over the outlook due to falling global demand and declining investment, with combined exports falling from 161 Mt in 2024 to 149 Mt in 2026.

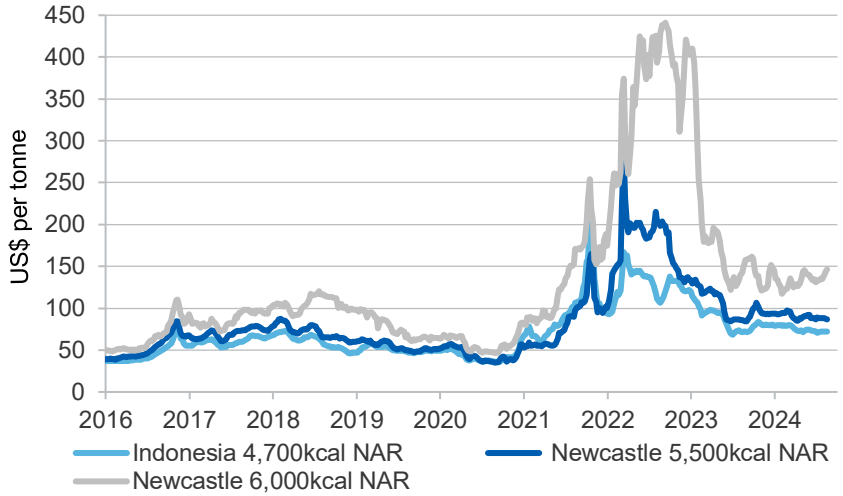
5.4 Prices

Prices are increased from high cooling demand in Asia

The price of Newcastle 6,000 kcal/kg mostly remained within a range of US$120 to US$130 a tonne in the March quarter 2024. Prices have since risen and remain elevated across the June and September quarters, ranging from US$130 to US$150 a tonne in July and August (Figure 5.5).

Key factors placing upward pressure on prices include the exclusion of Russian coal from some markets, record summer heat across Asia, and logistical issues hampering supply in South Africa and Colombia. Factors easing pricing pressures include improved performance of hydroelectric power in China and India as the rainy season refilled reservoirs. Increasing output from renewables and nuclear power is also lowering the demand for coal fired electricity generation. Inventory levels in China are at the highest levels on record, providing a buffer against further price increases.

Figure 5.5: Thermal coal prices — Australian vs Indonesian



Source: McCloskey (2024). NAR = Net as received. Kcal = Kilocalories per kilogram

5.5 Australia

Australian exports remain vulnerable to weather disruptions

Australian exports increased by 3% year-on-year in H1 2024. Exports to almost all major trading partners fell, but exports to China increased by 65% year-on-year following the end of China's informal import restrictions.

Newcastle's coal terminal experienced disruptions in late June and early July 2024 due to protests, which led to suspended rail operations. Australian Rail Track Corporation stated more than 500 passenger trains and 220 freight trains had been affected.

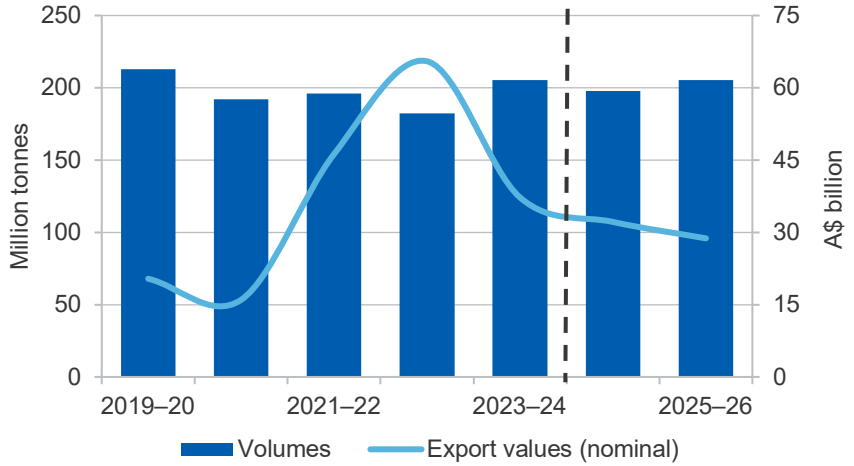
Extended shipping queues resulting from cyclones Jasper and Kirrily in Queensland have eased, though wet weather continues to impact mining operations, causing delays. Yancoal's June quarter report showed a slight decline in saleable volumes, but output still grew by 18% compared to La Niña-affected H1 2023. Whitehaven coal reported 4.3 Mt of saleable coal production in the June 2024 quarter, 11% higher than the previous quarter, underpinned by improved performance at Narrabri. Whitehaven also reported first production at Vickery and Werris Creek reaching end of life.

Asian demand is expected to remain stable through to the end of 2024, with expectations of a cold northern hemisphere winter and stockpiling ahead of winter supporting demand for Australian thermal coal. Over the outlook, Australian supply will likely be affected by the scale and speed of the next La Niña cycle. Exports from Australia have been downgraded since the last REQ in 2024-25 and 2025-26 based on updated company guidance and a revision to incorporate the effects of a possible La Niña.

Revisions to the outlook for Australian thermal coal exports

On balance, export earnings are similar to the 2024 June REQ. This reflects a revision to export volumes and potential supply disruptions due to a likely La Niña weather episode.

Figure 5.6: Australia's thermal coal exports



Source: ABS (2024) International Trade, Australia 5454.0; Department of Industry, Science and Resources (2024)

Table 5.1: World trade in thermal coal

	Unit	2023	2024 [f]	2025[f]	2026[f]	Annual percentage change 2024[s]	2025[f]	2026[f]
World trade	Mt	1,114	1,108	1,092	1,045	-0.5	-1.5	-4.3
Thermal coal imports								
Asia	Mt	962	962	938	908	0.0	-2.5	-3.1
China	Mt	372	355	306	262	-4.4	-13.8	-14.4
India	Mt	182	189	193	200	3.9	2.1	3.6
Japan	Mt	124	118	116	116	-4.8	-1.5	-0.3
South Korea	Mt	97	96	95	94	-1.0	-1.4	-1.1
Taiwan	Mt	59	58	58	57	-2.2	0.5	-2.0
Thermal coal exports								
Indonesia	Mt	521	538	528	525	3.2	-1.8	-0.5
Australia	Mt	202	195	202	206	-3.4	3.5	2.0
Russia	Mt	133	110	109	110	-16.9	-1.0	0.7
Colombia	Mt	56	52	50	47	-8.0	-3.7	-5.8
South Africa	Mt	74	68	66	63	-8.1	-2.9	-4.5
United States	Mt	44	41	40	39	-6.8	-1.3	-3.6

Notes: **f** Forecast

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

Table 5.2: Thermal coal outlook

World	Unit	2023	2024[f]	2025[f]	2026[f]	Annual percentage change 2024[f]	2025[f]	2026[f]
Contract prices[b]								
– nominal	US$/t	200	147	137	123	-26.6	-6.5	-10.6
– real[c]	US$/t	195	147	128	112	-24.5	-12.7	-12.4
Spot prices[d]								
– nominal	US$/t	173	135	126	113	-22.0	-6.4	-10.5
– real[e]	US$/t	178	135	124	108	-24.3	-8.3	-12.3
Australia	**Unit**	**2022–23**	**2023–24[s]**	**2024–25[f]**	**2025–26[f]**	**2023–24[s]**	**2024–25[f]**	**2025–26[f]**
Production	Mt	210	244	242	245	16.0	-0.9	1.4
Export volume	Mt	182	205	198	205	12.6	-3.5	3.7
– nominal value	A$m	65,500	37,240	32,165	28,757	-43.1	-13.6	-10.6
– real value[h]	A$m	70,268	38,339	32,165	27,811	-45.4	-16.1	-13.5

Notes: **b** refers to benchmark Japanese Fiscal Year 6322kcal GAR thermal coal contract reference price; **c** In current JFY US dollars; **d** fob Newcastle 6000 kcal net as received; **e** In 2024 US dollars; **f** Forecast; **h** In 2023–24 Australian dollars; **s** Estimate

Source: ABS (2024) International Trade in Goods and Services, Australia, Cat. No. 5368.0; IHS (2024); NSW Coal Services (2024); Queensland Department of Natural Resources and Mines (2024); Company Reports; Department of Industry, Science and Resources (2024)

Gas

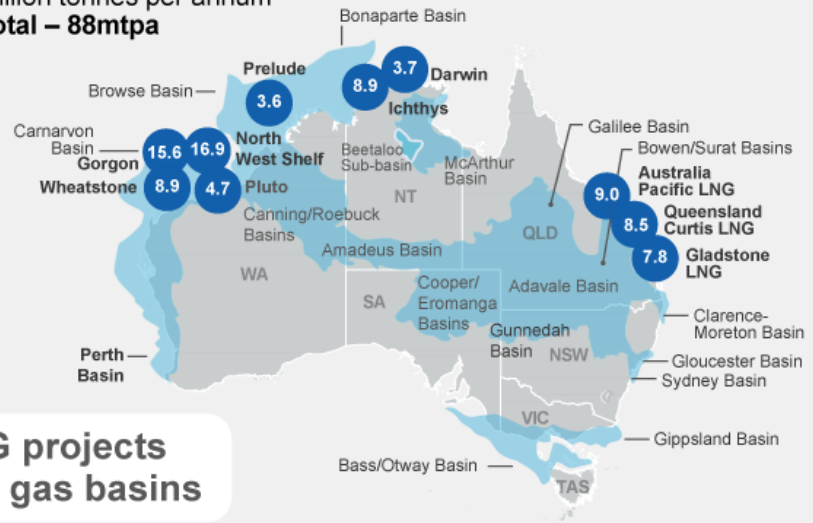
Australia's LNG sector

81m tonnes
exported in 2023

80%
of Australian LNG exports sold to **Japan, China and Korea**

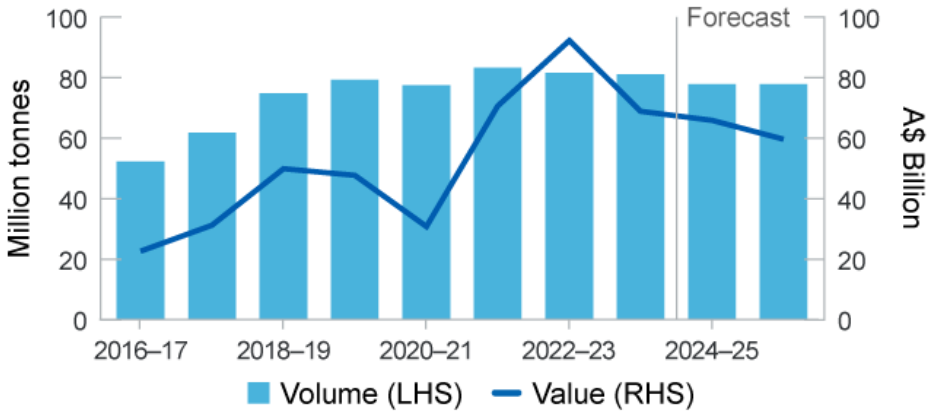
Around 3/4
sold on **long-term contracts**

- Gas basin
- Nameplate capacity, million tonnes per annum
  Total – 88mtpa



LNG projects and gas basins

Australian LNG exports



Outlook

Earnings set to ease over the outlook period as prices drop

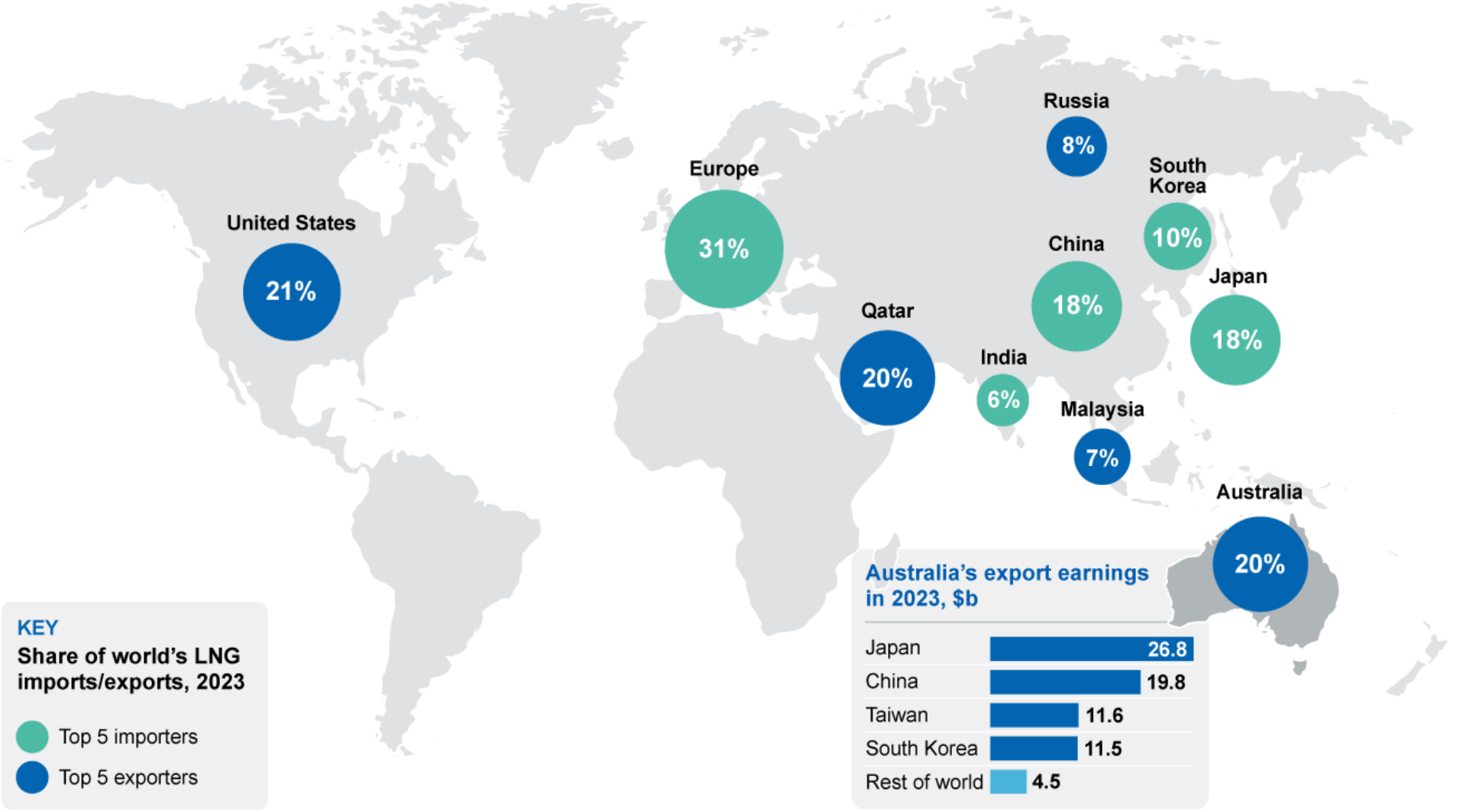
Steady Australian output expected, with **small declines** as projects deplete

Global conflicts **present risks** to LNG production in Russia and the Middle East

Expenditure on exploration **remains relatively modest**

SOURCE: ABS; DISR; OCE

LNG TRADE MAP



SOURCE: World Gas Model; DISR; ABS International Trade

6.1 Summary

- Australia's LNG export revenues are forecast to decline from $69 billion in 2023–24 to $60 billion by 2025–26. This outlook is largely unchanged from the June quarter *Resources and Energy Quarterly*.
- The fall in export earnings is expected to be largely driven by lower LNG prices, which have eased from the record levels of 2022. Depletion of some gas reserves could marginally affect export volumes.
- New supply from the US and Qatar should help to bring LNG prices down further towards the end of the outlook period. Prices are expected to remain below US$12/MMBtu over the next two years.

6.2 World trade

Gas markets remain tight as a result of ongoing heatwaves

Growth in global gas consumption slowed between the March and June 2024 quarters. This was despite July 2024 being the 14th consecutive month of record global average temperatures (as measured by the US National Oceanic and Atmospheric Administration). This record heatwave drove strong demand for cooling across Asia, but some of this demand has eased off with the passing of the northern summer. Minor disruptions to supply have held LNG prices up despite the slight softening in demand growth. Warm weather in Europe has also suppressed European demand and partially offset high demand in Asia. Lower seasonal demand (in conjunction with stronger energy efficiency policies) has enabled European gas storage to build more rapidly than usual.

Growth in global gas demand is expected to hold near the softer June quarter level over the rest of 2024. Asian demand accounted for about 60% of global growth in LNG use over H1 2024 and is expected to account for a similar share over the full year. As demand for cooling in Asia edges back, industrial demand is expected to play a bigger role. Asia continues to expand its gas import infrastructure, becoming increasingly important as a gas importing and price setting region.

Beyond 2024, gas markets are expected to become more stable as new supply enters global markets. A massive wave of investment in gas projects is progressing in the US and Qatar, and output from new projects in the two nations should begin to outpace demand growth from late 2025.

LNG demand is expected to grow at a moderate pace in 2025 and 2026, supported by ongoing widespread transition away from coal and a steady expansion in Asian LNG infrastructure. As the record global temperatures of the last year ease, gas consumption is likely to edge back in Asia, but expand in Europe, where the cooling conditions will likely drive greater use of heating. Policies aimed at decarbonisation will likely work the opposite way, reducing gas consumption in Europe (where renewables are displacing LNG) but adding to gas consumption in Asia (where LNG is replacing coal). Gas demand may be suppressed at the margins by sanctions against Russia, which have stranded some Russian output and likely added slightly to gas prices in surrounding regions.

LNG markets remain somewhat fragile with ongoing geopolitical conflicts. Ukraine's recent incursion into Russia's Kursk oblast has brought a primary gas pipeline from Russia to Europe into the conflict zone, adding to the risk of accidental disruption. Meanwhile, Russia's strikes on Ukrainian energy infrastructure have forced Ukraine to increase energy imports and placed several underground gas storage facilities at risk, adding to concerns over security of supply. Events in the Middle East continue to pose a risk for LNG markets, with any disruption or closure of the Persian Gulf likely to hamper exports from Qatar.

On balance, global LNG demand is expected to increase by just under 2.5% in 2024 (from 2023), largely driven by Asian demand. Supply and demand are generally expected to remain in balance in 2024 and 2025 (Figures 7.1 and 7.2). Supply is forecast to outgrow demand from 2026 as capacity in the US and Qatar expands, which should see reduced market volatility and lower LNG prices from late in the outlook period.

6.3 World imports

European imports have softened amidst record global temperatures

European gas imports trended down so far in 2024 (Figure 7.3), as household demand softened through months of warm weather. Industrial demand also slowed as PPI surveys indicate weaker industrial activity. Industrial growth is showing signs of picking up, led by the Netherlands, Belgium, and Spain. However, household demand remains flat, and inventories have firmed up well in advance of the next winter season.

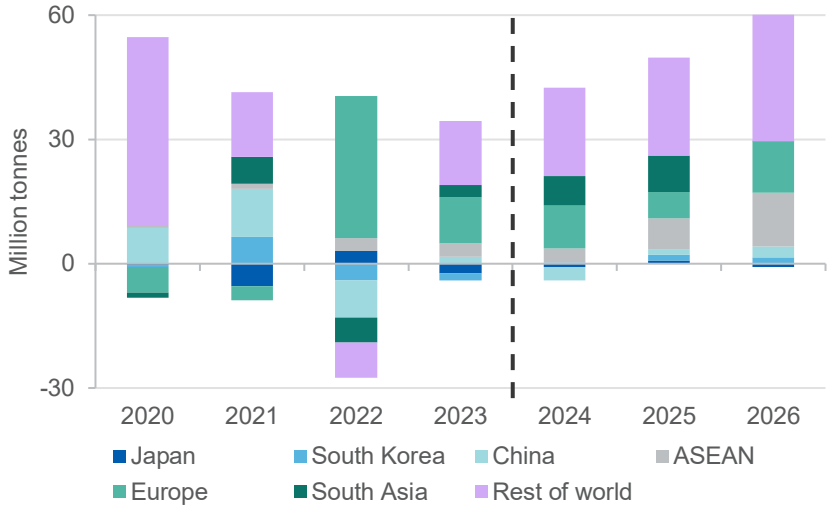
European countries have intensified their push towards renewable energy. This pivot could provide a short-term upside to European LNG use, since LNG is often used to balance and firm renewable power generation.

However, the scale of renewables under development is expected to reduce the need for gas over time, even in a load-balancing capacity. European governments are seeking ways to use different forms of renewable energy to balance each other, and higher renewable generation contributed to a fall in the share of power generation attributed to natural gas (to 12%) in the first half 2024. If this result were sustained through the full year, 2024 would see the lowest share of generation from natural gas since 2016.

There are also signs that the record global heatwave of the last year is easing. If temperatures cool markedly, heating demand in the upcoming winter season will likely exceed that of the last winter season, placing increased pressure on European inventories.

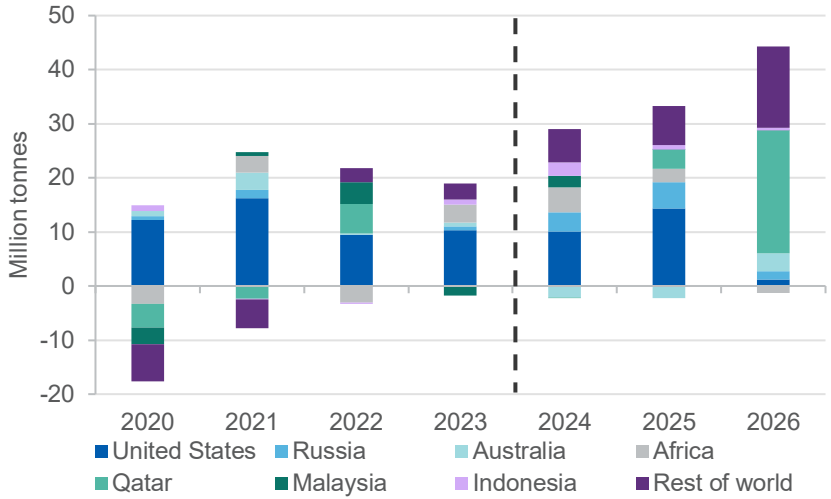
Falling domestic gas production could add to LNG imports. Europe's share of imported gas rose from 40% of total consumption in 1992 to 80% in 2022. The decline of gas fields in the Netherlands and elsewhere could increase this dependency further. However, rising seaborne output from the US and additional pipeline output from Eastern European suppliers (notably Azerbaijan) could help to fill the gap.

Figure 7.1: Global LNG demand growth forecasts to 2026



Notes: 2020, 2021, 2022 and 2023 figures based on historical data.
Source: Department of Industry, Science and Resources (2024), Nexant ECA (2024)

Figure 7.2: Global LNG supply growth forecasts to 2026



Notes: 2020, 2021, 2022 and 2023 figures based on historical data.
Source: Department of Industry, Science and Resources (2024); Nexant ECA (2024)

China's LNG imports are being boosted as LNG replaces other fuels

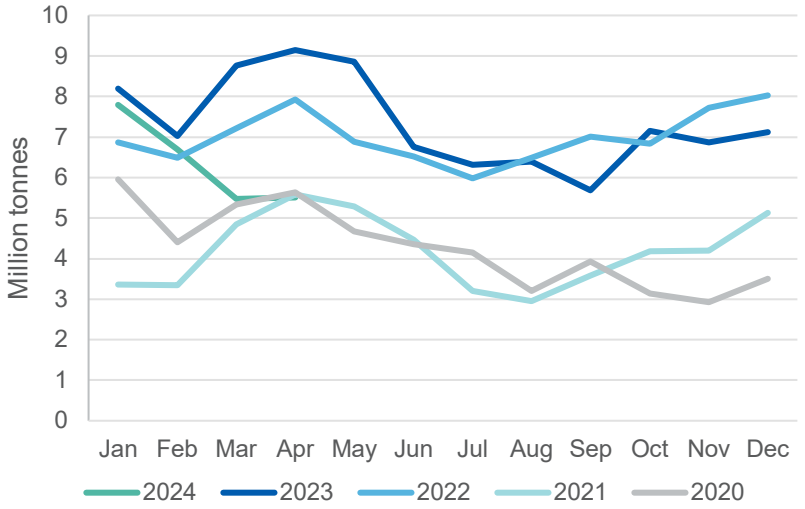
China's LNG use has remained relatively strong in recent months (Figure 7.4) despite some broader softness in the Chinese economy. The global heatwaves of 2023–24 resulted in higher residential demand for cooling, helping to push China's LNG imports up by 7% over the year to the June quarter 2024. (This is still well below the 16% annual growth recorded over the year to the June quarter 2023, when imports were rebounding following the normalisation of LNG prices).

Summer rains and typhoon incidents have intensified in China over the last few months, resulting in floods across China's expansive river systems. High rainfall is expected to persist through the September quarter, potentially disrupting production of some commodities, but adding significantly to hydropower reservoirs. Increased access to hydropower will primarily affect thermal coal consumption but will also provide a flexible substitute for LNG. High hydropower reservoirs (in conjunction with China's recent buildup of LNG inventories) should put downside pressure on Chinese LNG imports through the rest of 2024.

A new source of LNG demand is emerging in China: the nation's huge fleet of heavy-duty trucks (estimated at almost 9 million vehicles) is changing as LNG-fuelled trucks displace diesel trucks. LNG-powered trucks now account for one-third of heavy truck sales and make up 10% of heavy-duty trucks on the road in China. This has reduced diesel consumption by around 200,000 barrels of per day, reducing pollution and fuel costs but adding to long-term LNG demand.

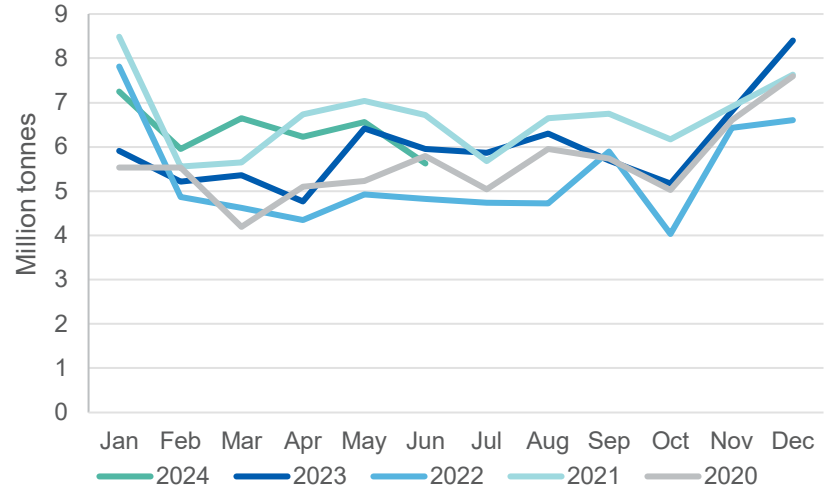
On the supply side, the China National Offshore Oil Corporation recently announced the discovery of a new gas deposit in the South China Sea. The discovery includes geological reserves of over 100 billion cubic meters of natural gas, though the depth of the gas field (around 1500 metres) may add to the complexity of extracting it. Successful extraction will reduce Chinese LNG imports over the longer term, but this discovery is not expected to have a material impact within the outlook period.

Figure 7.3: Europe's monthly LNG imports, 2020–2024



Source: McCloskey (2024)

Figure 7.4: China's monthly LNG imports, 2020–2024



Source: McCloskey (2024)

Long-term structural factors such as urbanisation and industrialisation will continue to support Chinese LNG imports, with policy measures having a more mixed effect. The use of gas in the industrial sector has long been encouraged by the Chinese Government, though progress on this front was stalled by the gas price surges of 2022. Under the recently announced 'carbon peaking and neutrality' strategy, China plans to construct six gas storage centres with a combined capacity exceeding 100 billion cubic metres. The Chinese Government is also encouraging additional investment in gas production under its '60:40' policy, which includes a target to meet 60% of gas needs from domestic sources.

Japan's LNG imports face rising competition from other energy sources

Japanese LNG imports remained relatively contained in the first half of 2024 (Figure 7.5) as mild weather reduced household energy demand. The steady reconnection of nuclear reactors in recent years has also helped to reduce Japan's dependency on LNG imports. The connection of further nuclear plants (including Onawaga 2 in 2024) will solidify this trend.

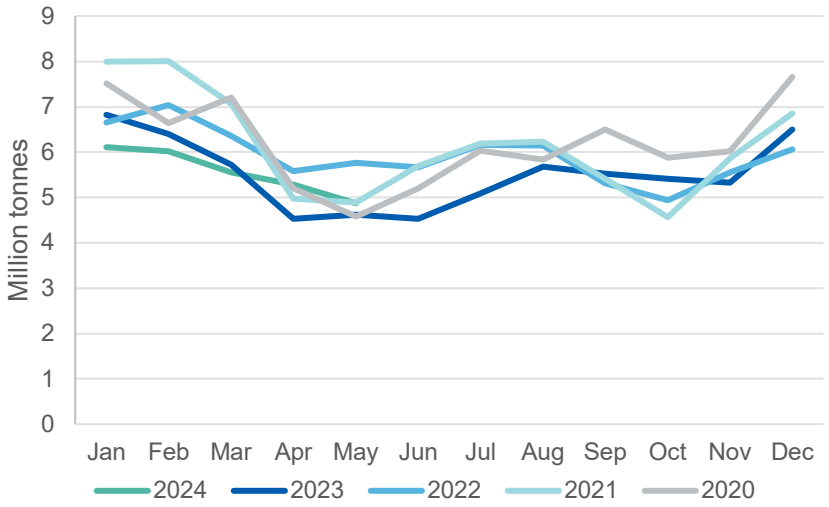
Japan's 6th Strategic Energy Plan includes a proposal to lift the renewable share of power generation from 18% (in 2021) to 22-24% by 2030. The share of nuclear power is forecast to grow from 6% to 22% over the same period, while the share of gas is intended to fall from 37% to 27%. LNG imports are likely to be constrained and mostly stable through the outlook period, with slightly higher residential energy use matched by greater nuclear output. LNG imports to Japan are expected to fall over the longer term as government energy policy measures and targets come into effect.

South Korean LNG imports should grow slightly as industrial use rises

A brief cold stretch boosted South Korea's LNG imports during parts of the March quarter, but demand has trended off in more recent months as temperatures warmed (Figure 7.6).

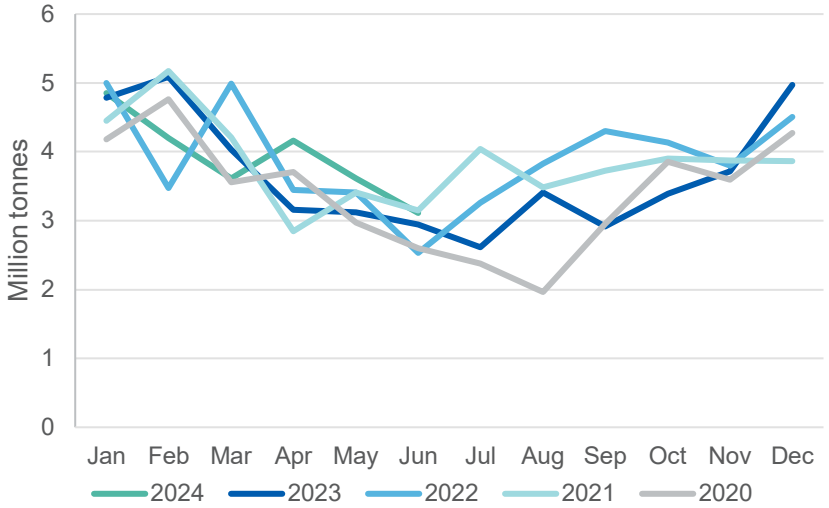
South Korea's newest nuclear plant — Shin Hanul 2 — started commercial generation in April 2024, reducing South Korea's LNG requirements from the June quarter. Total gas demand is expected to edge up by around 2%

Figure 7.5: Japan's monthly LNG imports, 2020–24



Source: McCloskey (2024)

Figure 7.6: South Korea's monthly LNG imports, 2020–24



Source: McCloskey (2024)

across 2024 as a whole, with most of this growth occurring in the March quarter. Industrial demand is likely to remain strong, providing a potential upside to LNG use in South Korea over the next two years.

Taiwan's LNG imports are growing as LNG replaces other energy sources

Taiwan's LNG imports grew by almost a third over the four years to 2023 as gas and renewables were prioritised relative to other energy sources. LNG imports are expected to grow further over coming years as Taiwan's remaining nuclear power plants undergo long-planned decommissioning.

LNG imports are rising in India as hot weather pushes up urban demand

Indian LNG use grew by around 11% over the first five months of 2024, from the equivalent period in 2023 (Figure 7.7). Indian LNG importers are price-sensitive and previously curbed imports sharply following the price surges of 2022. Higher domestic production has accounted for part of India's growing LNG requirements. However, recent strong growth in gas-fired electricity generation in cities (reflecting unseasonal hot weather as well as higher use in industry and refining) has pushed up LNG imports.

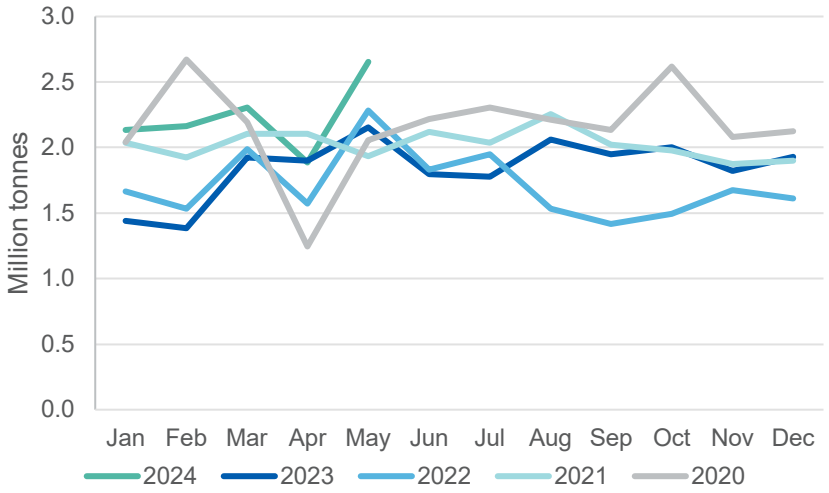
Although LNG makes up a relatively small share of total electricity generation in India, its use as backup and flexible fuel has meant that it absorbs a larger share when power needs increase unexpectedly. Persistent hot weather saw the household sector more than double its use of LNG (linked to electricity generation) in the first half of 2024, from the equivalent period in 2023.

LNG imports are rising elsewhere in Asia, though at widely different rates

Gas use across the rest of Asia rose by around 5% over the first four months of 2024 compared to the same part of 2023 (Figure 7.8). The region is generally price sensitive and has steadily switched back to gas since prices corrected from the surges of 2022.

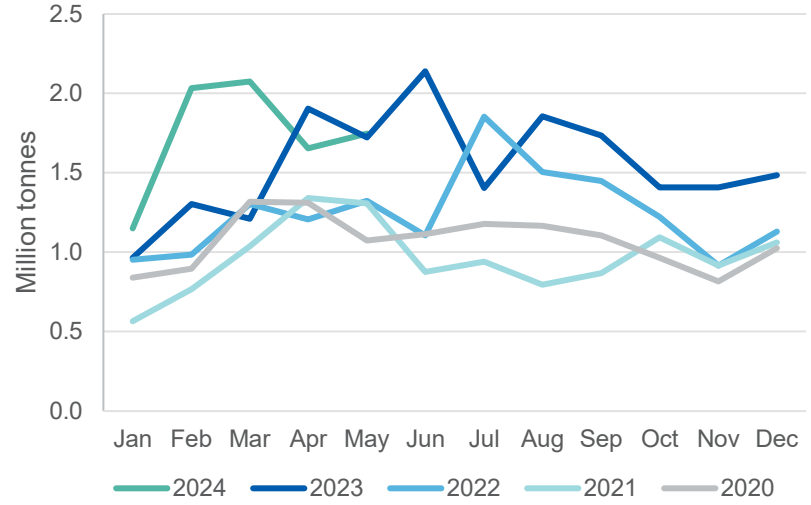
Growth in the region has been led by Thailand, where gas consumption rose by 9% in the first four months of 2024, from the same period in 2023. Growth was largely driven by households, with heatwaves fuelling electricity demand for cooling.

Figure 7.7: India's monthly LNG imports, 2020–24



Source: McCloskey (2024)

Figure 7.8: Total monthly ASEAN LNG imports, 2020–24



Source: McCloskey (2024)

Gas accounts for around two-thirds of total electricity generation in Thailand. Thailand's Government has announced plans to shift more rapidly towards renewables in the 2030s, but further growth in LNG demand is likely in the interim. Thailand has long imported gas by pipeline from Myanmar, but recent falls in availability of Myanmar supply may push the country towards seaborne LNG as a substitute.

Gas demand has grown strongly in Malaysia – by 14% over the first four months of 2024 compared with the equivalent period in 2023. Gas has become increasingly important to baseload power in Malaysia, with renewable generation yet to ramp up significantly. Decarbonisation targets are expected to spur stronger LNG imports to Malaysia through the rest of outlook period.

Indonesian gas demand grew by around 5% over the first four months of 2024, though gas remains small as a share of overall electricity demand. Indonesia remains committed to ramping up coal power, with its relatively modest LNG needs expected to be met largely from domestic sources over the outlook period.

LNG demand is expected to grow in Vietnam, though the pace of growth remains uncertain. High spot prices over recent years have deterred some importers, and the Nhon Trach 3&4 project — the country's first LNG-power integrated project — has faced delays. Industrial growth remains the strongest prospect for LNG in Vietnam over coming years. Emissions policies in Vietnam will likely drive LNG take-up as a substitute for coal.

LNG imports to Singapore are expected to hold steady over the outlook period, though with a shift away from Malaysian pipeline gas imports and towards seaborne LNG as Singapore diversifies its supply sources. Long-term gas uptake is likely to be curbed by Singapore's carbon tax, which is set to reach 45 Singaporean dollars a tonne by 2026.

The Philippines is expected to slightly ramp up in its LNG imports over the outlook period. The Malampaya Field — the largest source of domestic gas generation — is aging and likely to be gradually replaced with imports over the coming years.

6.4 World exports

Global LNG exports have lost some momentum

Global LNG output declined slightly in the June 2024 quarter, affected by outages at transport infrastructure and shortages of feed gas in some areas. The decline in overall output over the June quarter was the first quarterly decline since the lockdowns of 2020. Exports from the US, Qatar and Egypt edged down in the June 2024 quarter, and were only partly offset by higher output from Mozambique, Norway and Indonesia.

Global LNG supply is expected to remain constrained through the rest of 2024. Falls in output (due to ageing supply sources) are expected to match or exceed new supply sources, with only two small floating facilities in Senegal and Mexico expected to come online.

The US faces short-term issues, but is set to strongly expand from 2025

The US became the world's largest LNG exporter in 2023. However, US output has been temporarily constrained in 2024 due to issues at the Freeport facility — where a train was taken offline through most of the March and June quarters. This continues a string of disruptions at the facility, which also faced outages in 2022 and 2023.

Growth in US output should resume from 2025 as a wave of projects achieve or approach completion. These include the Corpus Christi Stage 3 expansion (with annual capacity of 10 Mtpa), which is expected to commence by the start of 2025. Plaquemines LNG Phase 1 (with capacity of 10 Mtpa) is expected to begin supplying long-term contracts by 2026. The LNG Canada (7 Mtpa) and Golden Pass (18 Mtpa) projects are expected to ship their first cargoes in 2025. The US is expected to account for almost half of global growth in LNG exports over the next five years, with its exports reaching 150 Mtpa from 2030.

Qatar is set to bring new capacity online during the outlook period

Qatar has a range of projects under development, with its output expected to almost double — from around 77 Mtpa in 2023 to 142 Mtpa by 2030.

Qatar is expanding its fleet of LNG vessels to support this expected output growth. In March, agreements were signed to support construction of 19 new vessels in South Korean shipyards, with each expected to have a capacity of 174,000 cubic metres. A total of 104 vessels are now planned for construction to service the new LNG export capacity coming online in Qatar.

Geopolitical conflict has escalated in the Middle East over recent quarters, with potential disruptions in the Persian Gulf posing the largest risk to Qatar's short-term output.

Russian gas exports continue to decline

Russian LNG output — already constrained by sanctions following the invasion of Ukraine — has faced further issues in recent months. Liquefaction at Russia's Arctic 2 project begun in December 2023 but stopped in early 2024 and is not expected to recommence soon. Icebreaking vessels are required to ship from the site, and the owners currently have only five partly built vessels, of 21 initially planned. Trade restrictions are blocking further acquisitions.

In June 2024, the EU passed a 14th package of sanctions against Russia, which included a ban on the use of EU ports for the transit of Russian LNG to non-EU countries. This could significantly affect LNG shipments from Yamal LNG, which currently ship from Sabetta (on Russia's northern coast) to Asia via the North Sea.

The Ukrainian capture of Sudzha in the Kursk oblast could also affect Russian output. A Russian LNG pipeline runs through Sudzha before passing through Ukraine. To date, Ukraine has not shut down the pipeline, but gas flows are likely to cease when contracts with Russian exporters expire in December 2024. The expansion of the conflict zone to areas around Sudzha adds to the risk that pipeline flows could be disrupted earlier.

Two substantial pipelines proposed between Russia and China have recently fallen into doubt. The Far East pipeline (due for completion in 2028) and Power of Siberia 2 (due for completion by 2033) have been delayed by sanctions and the loss of access to funds and equipment. Progress on the Power of Siberia 2 pipeline (intended to transport 50 billion cubic metres of natural gas annually) stalled in June 2024 as price negotiations broke down between Russian and Chinese officials.

No other LNG-related constructions are expected to commence in Russia in the foreseeable future, and with existing pipeline infrastructure operating near capacity there is little prospect of any significant growth in Russian LNG exports.

Modest growth is expected from other LNG exporters

Smaller gas suppliers have benefitted from improving demand conditions in 2024. Indonesian supply has grown as output ramped up at Tangguh LNG's new Train 3. Norway also saw its exports grow after a fire at its Hammerfest LNG facility disrupted output for an extended period.

In Oman, the government has announced that it will seek to develop a fourth LNG train, which would boost LNG exports to around 15 Mtpa by 2029. First output is also expected soon from the Congo FLNG and Mexico's Altamira Fast LNG projects.

6.5 Prices

Prices are expected to hold under US$12/MMBtu for the next two years

LNG markets have faced tight conditions in recent months (Figure 7.9), with record global temperatures driving up demand in Asia as events in Russia and the Middle East add to supply risks.

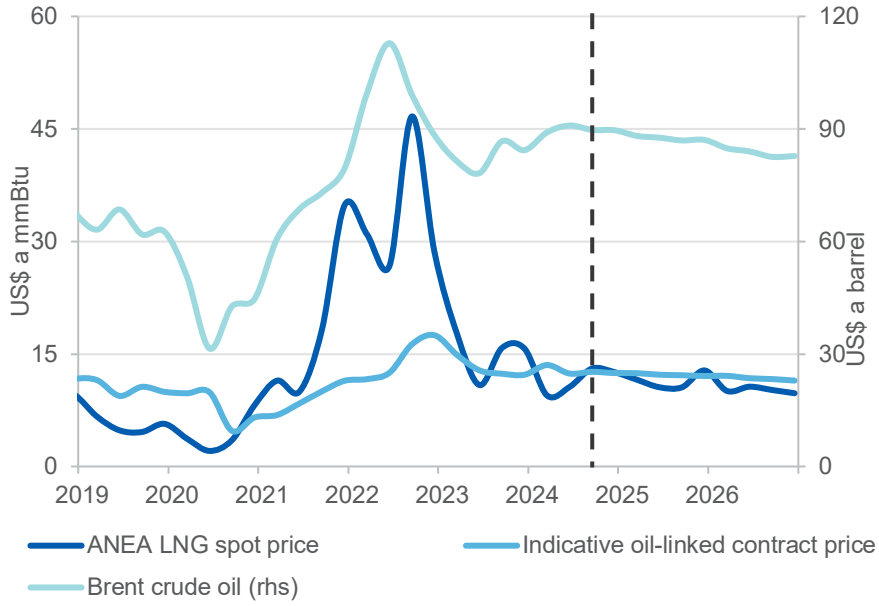
European imports will face some additional upward pressure from 2025 as residual contracts with Russian suppliers conclude. Growing industrial use in Asia should continue to support LNG prices in Q4 2024, though high inventories in Europe will provide a buffer against any rapid rise in prices.

Emerging US output is likely to be highly commercially flexible, with producers leaning into new trading mechanisms including alternative JKM derivatives, spot tendering, trading house activity, and 'destination free' contracts which enable LNG buyers and traders to move cargoes to bidders anywhere in the world. These flexible supply practices will allow

gas producers to shift production beyond destination-specific contracts more rapidly when conditions require it. The scale and flexibility of this supply should reduce the vulnerability of LNG markets to geopolitical events such as those which caused the price surges of 2022. LNG prices expected to stabilise in 2025 and decline from 2026.

Price risks are starting to shift from geopolitics and towards potential delays and issues in the project pipeline. The fall in LNG prices anticipated over the outlook period will depend to some degree on projects currently under construction concluding on time and without significant disruptions or cost blowouts.

Figure 7.9: LNG spot and contract prices, 2019–26



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

6.6 Australia

Australia's LNG export volumes beginning to decline

Australian gas exports are expected to hold largely steady over the next two years, with new supply from Woodside's Pluto expansion and Santos' Barossa project offsetting gradual declines from Woodside's North West Shelf. Slow declines in output and exports are expected after 2026 if new supply fails to emerge.

Among individual facilities, Ichthys LNG's export plant is likely to see its output curbed in 2024 following some disruption to its trains. Train 2, which has a capacity of around 4.5 Mtpa, went offline in August and will likely remain inoperable until the end of September. This follows a previous disruption which required repairs in July.

Woodside has announced that the first train closure at its North West Shelf facility could occur as soon as late 2024. The company noted in a public statement that '… the project is entering a period of production decline. The Karratha Gas Plant (KGP) currently has processing ullage due to natural field decline and the current level of third-party gas processing demand. To manage both operating costs and emissions, North West Shelf is preparing to take one LNG train offline between late 2024 and mid-2025'.

Shell and PetroChina — who jointly own the Surat coal seam gas project — have announced plans to develop Phase 2 of the project. The second phase of the project is expected to contribute around 130 million cubic feet of gas per day, and will be divided between domestic use and exports, the latter of which will ship from Curtis Island.

Santos has announced that its large Barossa Gas Project has passed 77% completion. The gas export pipelay is now in place, and three of six wells have been spudded.

In December 2023, the Queensland government announced that gas and oil developments would be banned in Queensland's Channel Country, located in the south-west of the State. The area to be protected includes the wetlands and rivers of the Kati Thanda-Lake Eyre Basin. The ban took

full effect in August 2024, but applies only to new exploration. Developments previously approved will proceed.

On balance, Australian LNG export volumes are expected to decline slightly over the outlook period, edging back to just under 80 Mt annually after 2023–24 (Figure 7.10). Beyond the outlook period, output levels could tighten further due to the gradual depletion of the North-West Shelf and delays in bringing new gas reserves online. Exploration remains modest overall (Figure 7.11), but slight growth was recorded in onshore exploration (from $195 million to $203 million) in the June quarter 2024. Offshore drilling fell back in the June quarter (from $142 million to $92 million) after strong growth in the March quarter.

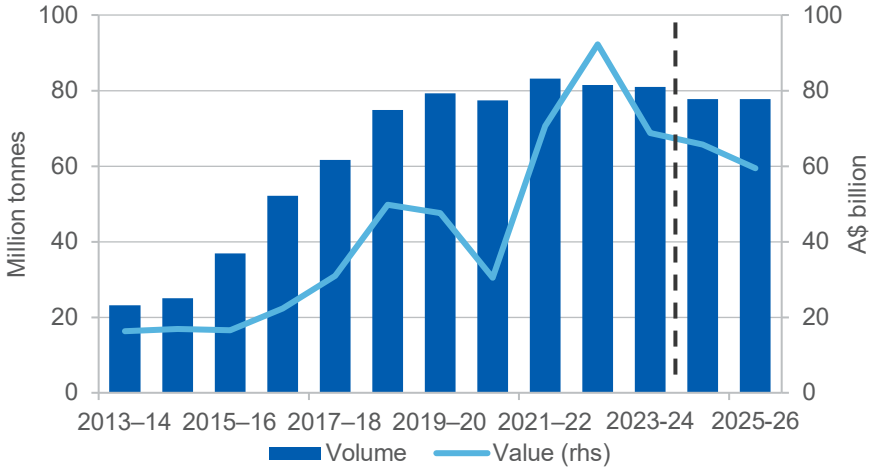
Australia LNG earnings are expected to ease further as prices drop

Australian LNG export earnings are expected to fall to A$66 billion in 2024–25, with a further easing to A$60 billion by 2025–26. This decline is largely a result of falling prices, with export volumes easing only marginally. Oil price moves will remain the major influence on Australia's LNG earnings. Around 80% of Australian LNG exports are sold under long-term contracts that link the price of LNG to the Japanese Customs-Cleared Crude (JCCC) oil price (with a 3-6 month lag, depending on contractual arrangements). Oil-linked LNG contract prices are forecast to average US$13/MMBtu in the 2023 to 2025 period, based on an oil price of US$83 per barrel (Figure 7.10). These prices are expected to ease slightly during the rest of the outlook period.

Revisions to the outlook

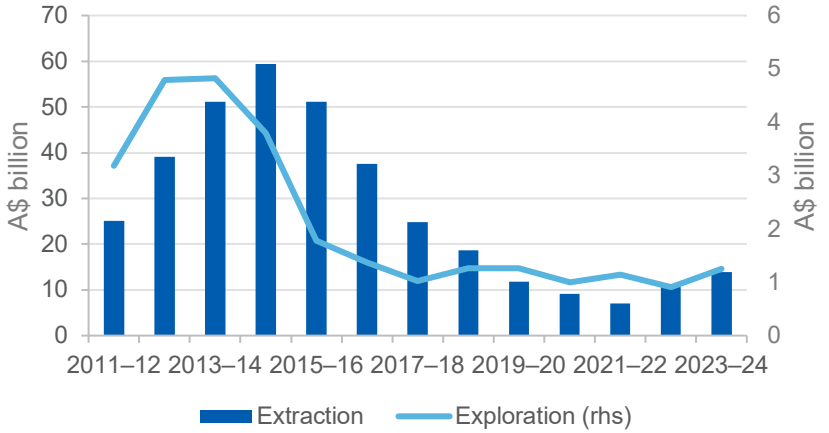
Australian LNG export earnings forecasts for 2024–25 and 2025–26 are largely unchanged from those published in the June 2024 *Resources and Energy Quarterly*.

Figure 7.10: Australia's LNG exports by value and volume



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

Figure 7.11: Petroleum expenditure, extraction and exploration



Notes: Extraction expenditure consists of all expenditure on buildings and structures, plant and machinery equipment associated with Oil and Gas extraction.
Source: Australian Bureau of Statistics (2024) Private New Capital Expenditure and Expected Expenditure, 5625.0; and Mineral and Petroleum Exploration, 8412.0

Table 7.1: Gas outlook

World	Unit	2023	2024[g]	2025[g]	2026[g]	Annual Percentage Change 2024[g]	2025[g]	2026[g]
JCCC oil price[a]								
– nominal	US$/bbl	86.7	83.0	75.2	72.0	-4.2	-9.5	-4.2
– real[i]	US$/bbl	89.4	83.0	73.7	69.2	-7.1	-11.2	-6.1
Asian LNG spot price								
– nominal	US$/MMBtu	14.8	11.7	11.8	10.6	-21.3	0.6	-9.5
– real[h,i]	US$/MMBtu	15.3	11.7	11.5	10.2	-23.7	-1.3	-11.3
LNG trade	Mt[e]	403.2	425.5	455.6	498.0	5.5	7.1	9.3
Gas production	Bcm	4,038	4,132	4,214	4,327	2.3	2.0	2.7
Gas consumption	Bcm	4,036	4,132	4,223	4,301	2.4	2.2	1.9
Australia	**Unit**	**2022–23**	**2023–24**	**2024–25[g]**	**2025–26[g]**	**2023–24[g]**	**2024–25[g]**	**2025–26[g]**
Production[b]	Bcm	164.0	163.8	157.3	156.8	– 0.1	– 4.0	– 0.3
– Eastern market	Bcm	57.8	57.7	53.3	51.7	– 0.1	– 7.7	– 3.0
– Western market	Bcm	91.0	85.3	84.6	83.9	– 6.3	– 0.9	– 0.8
– Northern market[d]	Bcm	15.1	17.2	16.7	17.4	14.1	– 3.1	4.0
LNG export volume	Mt[e]	81.5	81.0	77.8	77.8	– 0.6	– 4.0	0.0
– nominal value	A$m	92,237	68,778	65,730	59,507	-25.4	-4.4	-9.5
– real value[f]	A$m	98,952	70,807	65,730	57,551	-28.4	-7.2	-12.4
LNG export unit value[h]								
– nominal value	A$/GJ	21.4	16.1	16.0	14.5	– 25.0	– 0.4	– 9.5
– real value[f]	A$/GJ	23.0	16.5	16.0	14.0	– 28.0	– 3.3	– 12.5
– nominal value	US$/MMBtu	15.2	11.1	11.5	10.8	– 26.9	3.1	– 5.7
– real value[i]	US$/MMBtu	16.3	11.5	11.5	10.5	– 29.9	0.1	– 8.8

Notes: **a** JCCC stands for Japan Customs-Cleared Crude; **b** Production includes both sales gas and gas used in the production process (i.e., plant use) and ethane; **c** Gas production from Bayu-Undan Joint Production Development Area is not included in Australian production; **d** Browse basin production associated with the Ichthys project is classified as Northern market; **e** 1 Mt of LNG is equivalent to approximately 1.36 bcm of gas; **f** In 2023–24 Australian dollars; **g** Forecast; **h** 1 MMBtu is equivalent to 1.055 GJ; **i** In 2023 US dollars.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024); Company reports; Nexant (2024) World Gas Model.

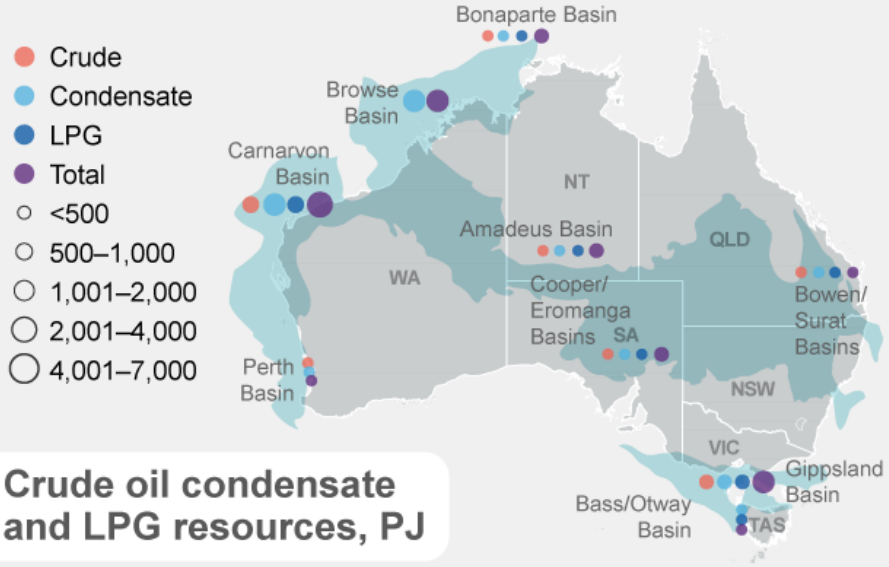
Oil

Australia's oil sector

0.3%
of the world's oil **reserves** and **0.5%** of production

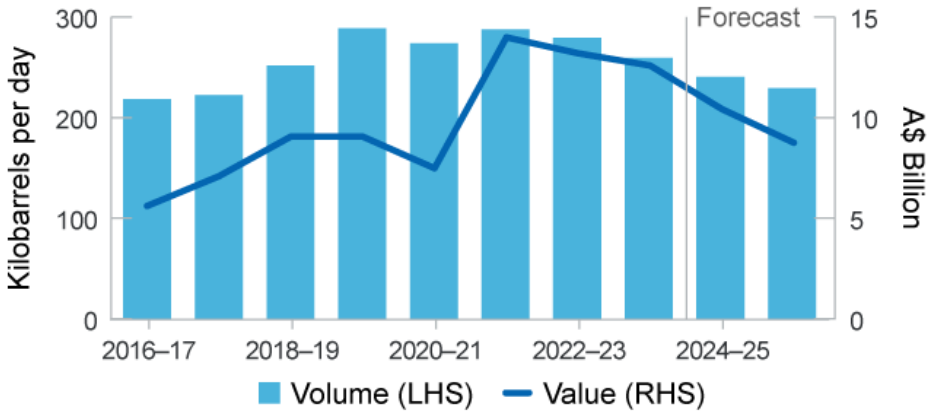
41% by value
of crude & condensate **exported** to Singapore and South Korea

Around 2/3
crude & condensate produced at **Carnavon basin,** offshore WA



Crude oil condensate and LPG resources, PJ

Australian oil exports



Outlook

Oil **prices will begin to weaken** from high North and Latin American supply

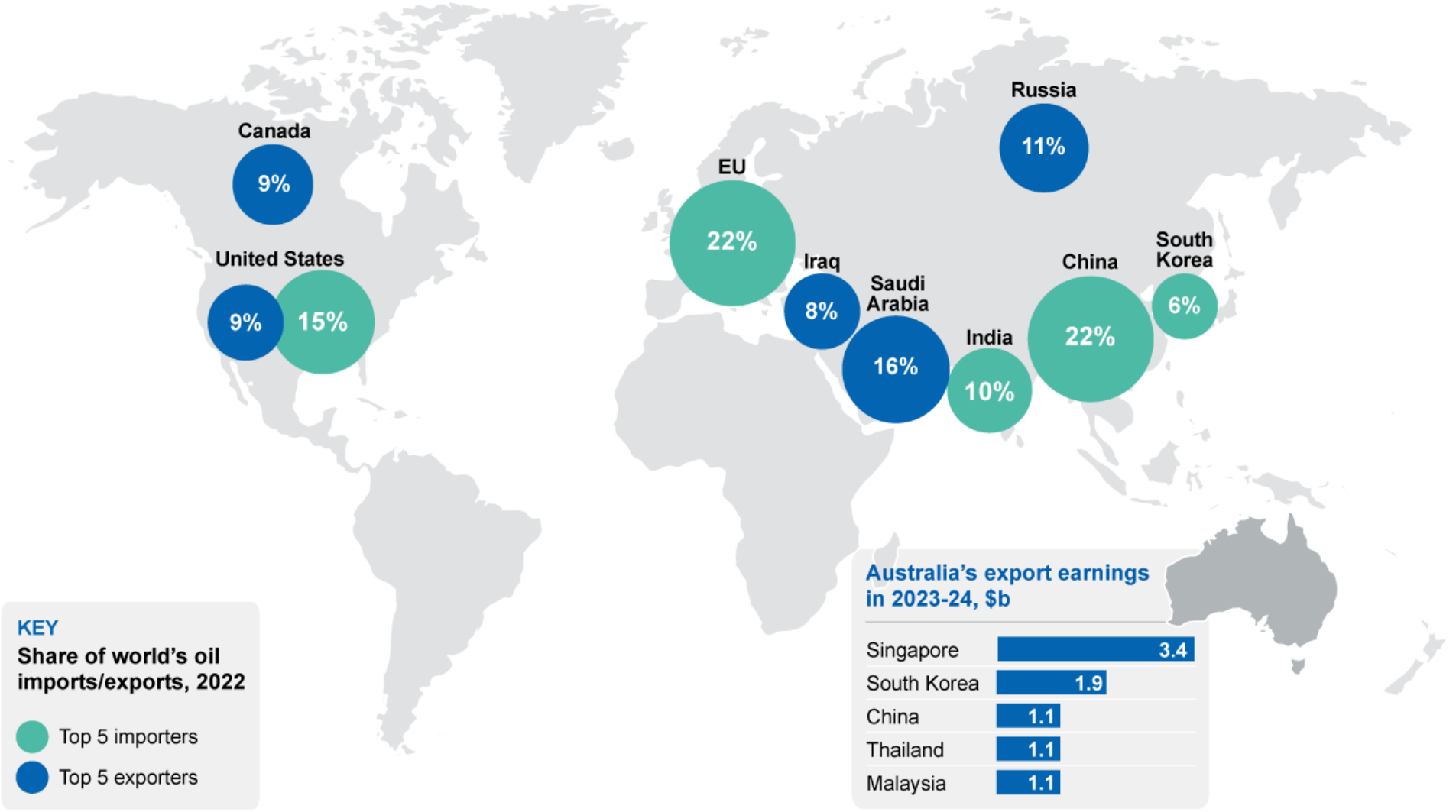
Earnings to **fall from 2024-25** as prices fall and basins deplete

Australian production **volumes ease** as offshore fields depletes

Petroleum exploration expenditure in the June quarter was **above the 2023 average**

SOURCE: GA; DISR; OCE

Oil TRADE MAP



SOURCE: International Energy Agency, World Oil Statistics

Note: Trade data includes crude oil, natural gas liquids, refinery feedstocks, addititves and other hydrocarbons for 2021

7.1 Summary

- The Brent crude oil price is forecast to fall from an average US$83 a barrel in 2023 to US$69 a barrel in 2026. The fall is expected to be driven by weak demand and gains in ex-OPEC production.
- Australia's crude and condensate output is forecast to fall steadily over the outlook period, from 253,000 barrels a day in 2024–25 to about 231,000 barrels per day by 2025-26 as mature fields see diminishing output.
- Australia's crude and condensate export earnings are forecast to fall from A$12.6 billion in 2023–24 to A$8.7 billion by 2025–26, as prices fall and output declines.

7.2 World consumption

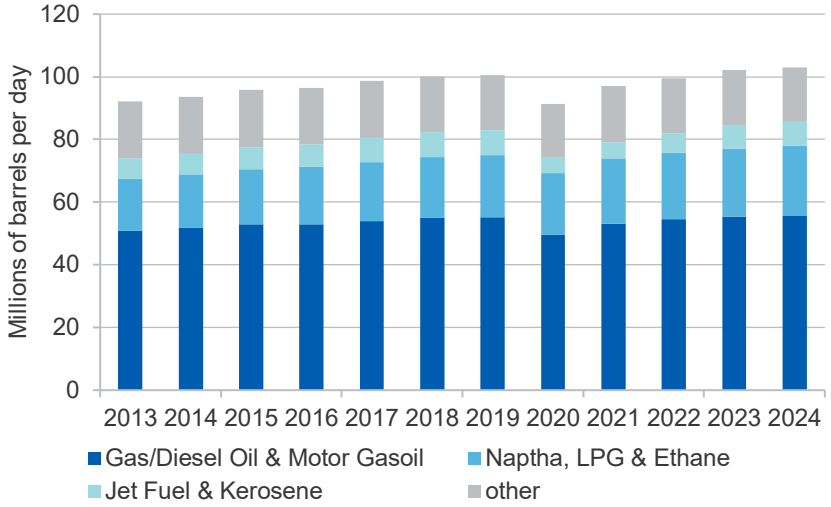
Growth in global oil demand led by petrochemical demand

The International Energy Agency (IEA) estimates that annualized global oil demand increased by 870 thousand barrels per day (kb/d) in the June quarter 2024 (see Figure 7.1). Demand is expected to increase by around 900 kb/d in 2024 and 2025 led by ex-OECD countries, with OECD demand declining slightly. Global oil demand is forecast to reach 105.5 mb/d by in 2026.

Throughout the outlook period, growth in oil consumption is forecast to be driven by a rise in petrochemical feedstock demand (LPG, ethane and naphtha) — as the demand for plastics and petrochemicals rises. The rise in plastics and petrochemical demand reflects increasing industrial production and demand for lightweight materials. Moderate gains in aviation fuel demand are expected. Motor gasoline and diesel oil demand is expected to plateau as electric vehicles (EV) usage rises, and petrol/diesel engines become more efficient.

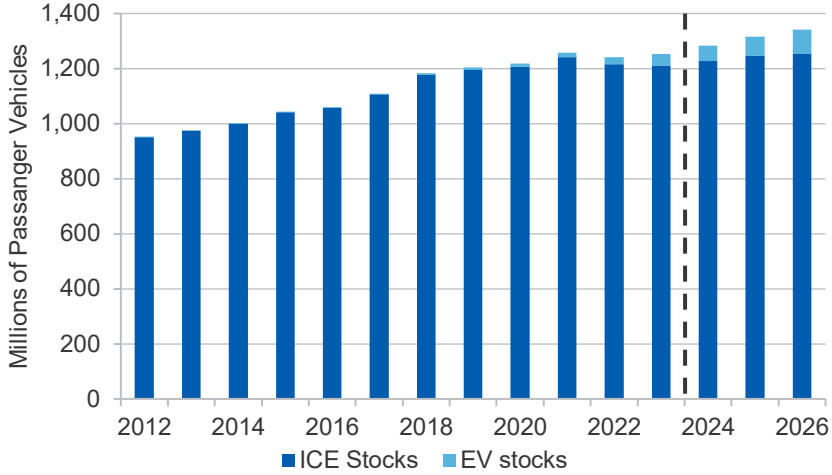
The share of electric vehicles (EVs) in the global passenger vehicle market is forecast to exceed 6% by 2026, with strong adoption expected in China and Europe (see Figure 7.2). The proportion of EVs in China's passenger vehicle fleet is expected to double from 7.6% in 2023 to 15% by 2026.

Figure 7.1: Global oil consumption by refined petroleum product



Source: International Energy Agency (2024)

Figure 7.2: Global passenger vehicle stocks



Notes: EV stocks include battery electric vehicles (BEVs) and plug in hybrid electric vehicles (PHEVs).

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

OECD demand falls as countries adopt EVs and embrace efficiency gains

OECD demand is set to plateau or fall slightly in 2024 with further declines expected in 2025 and 2026. The fall in demand is likely to be driven by increased efficiency gains and the displacement of fuel demand by EVs. Only demand for the petrochemical feedstock naphtha demand is expected to rise, with demand for all other refined petroleum products declining.

US transport fuel demand has been strong, offsetting falls in demand from the rest of the OECD. The summer driving season has been the strongest since 2019 and has supported transport fuel demand. Demand for LPG and ethane — major feedstocks for petrochemical production — has also grown. However, modest US GDP growth is expected to mute US oil demand growth in the medium-term.

Ex-OECD demand growth to slow on weak Chinese growth

Approximately half of ex-OECD oil demand growth is expected to come from China and India, with China taking the slightly larger share. China is also the world's largest consumer of oil, with consumption of 16.5 mb/d in 2023. Following the easing of pandemic restrictions, Chinese demand for oil has grown rapidly — increasing from the pre-pandemic baseline of 14.1 mb/d in 2019. However, the IEA forecasts the rate of growth in Chinese oil demand to slow to roughly 179 kb/d in 2024 and 262 kb/d 2025. The reduction in demand growth will be driven by several factors — primarily sluggish economic growth.

China is displacing demand for road transportation fuels by rapidly adopting natural gas powered heavy commercial vehicles (HCVs) and battery electric vehicles. The move to gas to power HCVs has been rapid, with up to 30% of new HCVs being powered by gas rather than diesel in H2 2023. PetroChina has forecast that displacement of oil by natural gas-powered trucks will reach 600 kb/d in 2024.

India's demand is expected to rise across most oil products over the outlook period. This should largely be driven by India's GDP growth, which the IMF forecasts to be about 7% in 2024 and 6.5% in 2025. India's oil demand has been further bolstered by its imports of Russian oil at a substantial discount. India imported over 1.5 mb/d of seaborne Russian crude according to S&P Global Commodity Insights in 2023. This may be subject to change as the discount on Russian oil has narrowed recently according to the IEA: the discount between Urals and Dubai M1 fell to US$0.69 per barrel in August 2024 from US$5.83 in May 2024. Indian demand for aviation fuel will likely be an exception to increased oil demand: domestic air travel in India remains relatively subdued.

7.3 World production

World supply continues to rise, driven by production in the Americas

Led by strong production from ex-OPEC nations (the Organisation of Petroleum Exporting Countries) — especially in the Americas — world oil supply is forecast to reach 105.9 mb/d by 2026. According to the IEA, increased supply from the Americas is forecast to lift global supply by 1.1 mb/d in 2024 and again in 2025. This increase is expected to be driven primarily by the US, Guyana, Canada, and Brazil.

Ex-OPEC Africa is beginning to see new discoveries and extraction, including four new fields in Angola, which recently left OPEC. The total increase in production when all four fields are operational will be 270kb/d.

Slight losses in OPEC+ supply as unrest in Libya offset elsewhere

Overall there are currently 5.9 mb/d of cuts by OPEC+, these are split into two sets of cuts. The first set amounted to 3.7 mb/d of cuts and were initially due to expire at the end of 2024 in the June 2024 OPEC+ meeting, the cuts have been extended until the end of 2025. The second set of cuts were voluntary and amounted to 2.2 mb/d, the cuts were scheduled to expire in October 2024. However, following a meeting on 5 September OPEC+ have delayed the phasing out of the 2.2 mb/d, at time of writing, scheduled to begin unwinding in December 2024. The group has also signalled that any unwinding of cuts is subject to market conditions and could be delayed further.

The Sahara oil field in Libya — the African country with the largest oil reserves — was shut down by protests in August 2024. The field produces approximately 300kb/d of oil. Political tensions then escalated, resulting in close to 700 kb/d of Libya's 1.3 mb/d crude supply being taken offline. Further political disruptions could see the reduction in supply continue or worsen.

According to the IEA reductions in Libya's crude oil output was partly offset by increased flows of crude oil from the rest of the group, resulting in an estimated net decrease in OPEC supply of around 270 kb/d in August. In the June quarter 2024, OPEC crude oil spare capacity was estimated at 18% (Figure 7.3). Spare capacity could fall in the December quarter if voluntary cuts start to be reversed.

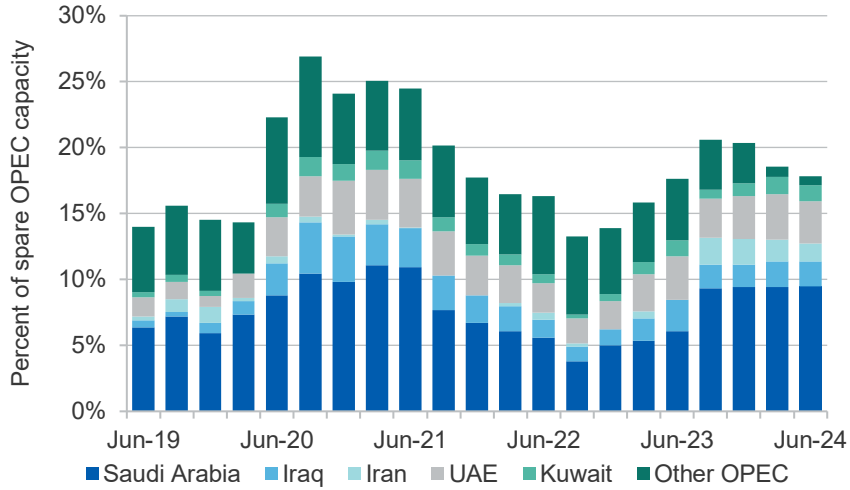
Damage to Russian refineries may cause short term supply reductions

Russian crude oil supply has remained flat in 2024, at around 9.2 mb/d. However, in August 2024 two Russian oil facilities in the Rostov Oblast region were struck by Ukrainian drones. Additionally, an explosion at the Omsk refinery — Russia's largest refinery — has taken out half of the refinery's capacity. The damage to these facilities will reduce Russian refined products supply in the short-term, resulting in pressure on the global crude market as refineries in other economies seek to increase output.

Following the Russian invasion of Ukraine, Russian oil exports have diverted away from OECD countries, with India becoming the largest consumer of Russian seaborne crude oil exports (Figure 7.4).

The G7, EU and Australia all imposed price caps on seaborne exports of Russian crude oil and refined petroleum products from 4 December 2022. Price caps imposed on Russian oil have required new and complex monitoring and enforcement measures. Russian oil exporters seek to avoid these by using older tankers operating outside of the Western shipping system, to circumvent the insurance bans and price caps. Whilst Russian oil has been traded above price caps, it remains at a discount compared to the rest of the market.

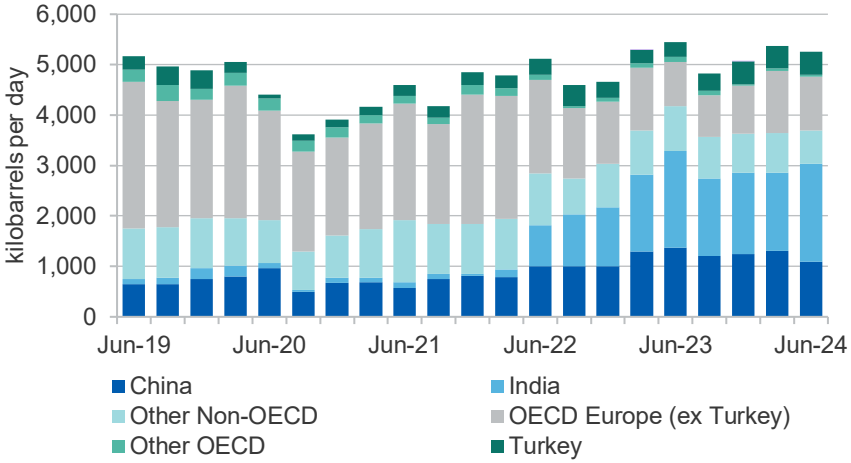
Figure 7.3: OPEC spare crude oil capacity, as a percentage of total



Notes: Spare capacity is the estimated capacity which can be produced within 90 days. Condensate excluded.

Source: Wood Mackenzie (2024), International Energy Agency (2024), Department of Industry, Science and Resources (2024)

Figure 7.4: Russian seaborne crude oil and condensate exports



Notes: Export volumes are estimated using vessel tracking data and may deviate from customs data.

Source: S & P Global Commodity Insights (2024)

7.4 Prices

High supply and soft demand is expected to bring prices down

Oil prices were volatile through the June and September quarters, rising and falling with perceived geopolitical risks. The Brent price has been between US$78 and US$90 per barrel, with WTI between US$72 and US$86 per barrel. From 3 September, following concerns over Chinese demand, Brent fell to US$72 a barrel and WTI fell to US$68 a barrel.

Demand for transport fuels is expected to plateau over the outlook period. Most growth in oil demand is expected to come from petrochemicals and aviation fuels (see World Consumption section). Non-OPEC supply gains are forecast to continue to put downward pressure on prices. WTI and Brent prices are forecast to fall steadily during the outlook period absent major supply disruptions. In 2026, Brent is forecast to fall to US$69 per barrel and WTI is forecast to fall to US$67 per barrel (see Figure 7.5).

Tensions in the Middle East are adding to risk premiums and volatility

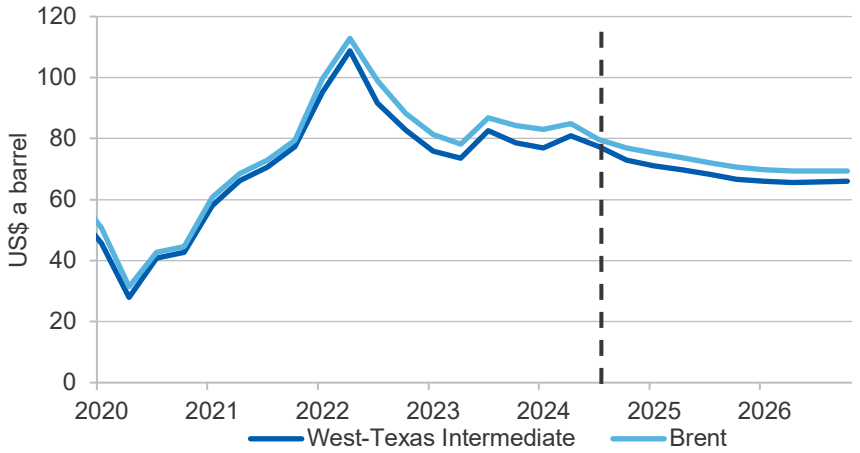
The Persian Gulf hosts ports where some of the largest oil exporters transit their oil supply. In 2023, 16 mb/d of seaborne crude supply transited via the Persian Gulf and out of the Gulf of Oman into the Red Sea. Disruptions in the region thus present risks to a big proportion of global oil supply. Iran borders the Persian Gulf and holds one side of the Strait of Hormuz through which Persian Gulf oil exits to the Indian Ocean. As perceived tensions have flared, prices have moved in tandem as the market has priced in a risk premium on potential disruptions to oil flows.

7.5 Australia

Export values to fall as volumes and prices fall

Australian crude oil and condensate export earnings fell by 3% year-on-year to reach $3 billion in the June quarter 2024. The fall reflects lower volumes of crude and condensate production, notably from the Carnarvon Basin which is approaching end of life. The Carnarvon Basin includes substantial fields such as those associated with the Northwest Shelf and Greater Enfield projects.

Figure 7.4: Price outlook



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

Output is forecast to fall further over the outlook period — to 253 kb/d in 2025–26 — as the Carnarvon Basin fields deplete further. Export values are forecast to fall to $8.7 billion by 2025-26, as production and prices both fall through the outlook period (Figure 7.6).

Moderate increases in refined production consumption led by aviation fuel

Australia's consumption of refined oil products rose by 2% year-on-year in the June quarter 2024.The increase was driven by a 9% year-on-year rise in aviation fuel consumption and a 2% rise in diesel consumption.

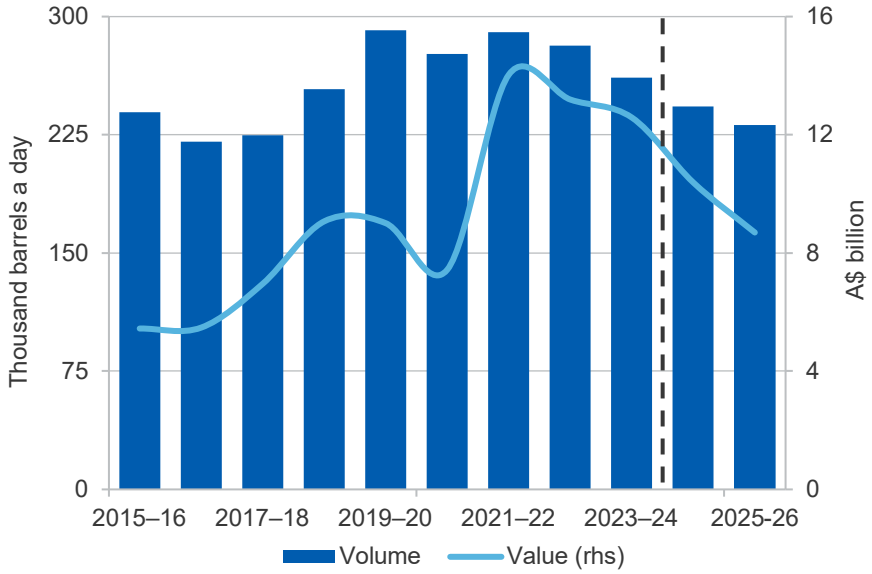
Exploration

Australia's petroleum exploration expenditure in the June quarter 2024 was $294 million, up on the $254 million 2023 average but still below the highs of 2010-2020.

Revisions to forecasts

Since the June 2024 *Resources and Energy Quarterly*, the forecasts for Australia's crude and condensate export earnings have been revised up by $0.8bn (to $11.4 billion) in 2024–25 and $0.8 bn (to $8.7 billion) in 2025–26.

Figure 7.6: Australian crude oil and condensate exports



Source: Australian Bureau of Statistics (2024); Department of Climate Change, Energy and Water; Department of Industry, Science and Resources (2024).

Table 7.1: Oil Outlook

World	Unit	2023	2024 [s]	2025 [f]	2026 [f]	Percentage changes 2024 [f]	2025 [f]	2026 [f]
Production[a]	mb/d	102	103	105	106	0.3	2.1	1.1
Consumption[a]	mb/d	102	103	104	106	1.2	1.2	1.0
WTI crude oil price								
– nominal	US$/bbl	78	77	69	66	-0.8	-10.5	-4.5
– real[b]	US$/bbl	80	77	68	63	-3.8	-12.2	-6.4
Brent crude oil price								
– nominal	US$/bbl	83	81	73	69	-1.8	-10.2	-4.7
– real[b]	US$/bbl	85	81	71	67	-4.8	-11.9	-6.6
Australia	**Unit**	**2022–23**	**2023–24 [s]**	**2024–25 [f]**	**2025–26 [f]**	**2023–24 [s]**	**2024–25 [f]**	**2025–26 [f]**
Crude and condensate								
Production[ac]	kb/d	298	275	261	253	-7.6	-5.0	-3.3
Export volume[a]	kb/d	282	261	243	231	-7.1	-7.1	-4.7
– Nominal value	A$m	13,193	12,585	10,385	8,693	-4.6	-17.5	-16.3
– Real value[h]	A$m	14,153	12,956	10,385	8,407	-8.5	-19.8	-19.0
Imports[a]	kb/d	169	169	200	198	-0.2	18.2	-0.8
LPG production[acd]	kb/d	93	95	93	92	1.9	-1.6	-1.4
Refined products								
– Refinery production[a]	kb/d	252	256	255	253	1.3	-0.4	-0.8
– Export volume[ae]	kb/d	6	7	7	7	21.5	6.6	-7.5
– Import volume[a]	kb/d	856	896	913	919	4.7	1.8	0.8
– Consumption[ag]	kb/d	1,022	1,061	1,069	1,074	3.8	0.8	0.5

Notes: **a** data was revised in the December quarter 2021 to align with the Australian Petroleum Statistics; **d** Primary products sold as LPG; **e** Excludes LPG; **f** Forecast; **g** Domestic sales of marketable products, including imports; **h** In 2024-25 financial year Australian dollars; **r** Compound annual growth rate (per cent), for the period from 2023 to 2029 or for the equivalent financial years; **s** Estimate.

Source: ABS (2024) International Trade in Goods and Services, Australia, Cat. No. 5368.0; International Energy Agency (2024); US Energy Information Administration (2024); Department of Industry, Science and Resources (2024); Department of Climate Change, Energy and Environment (2024).

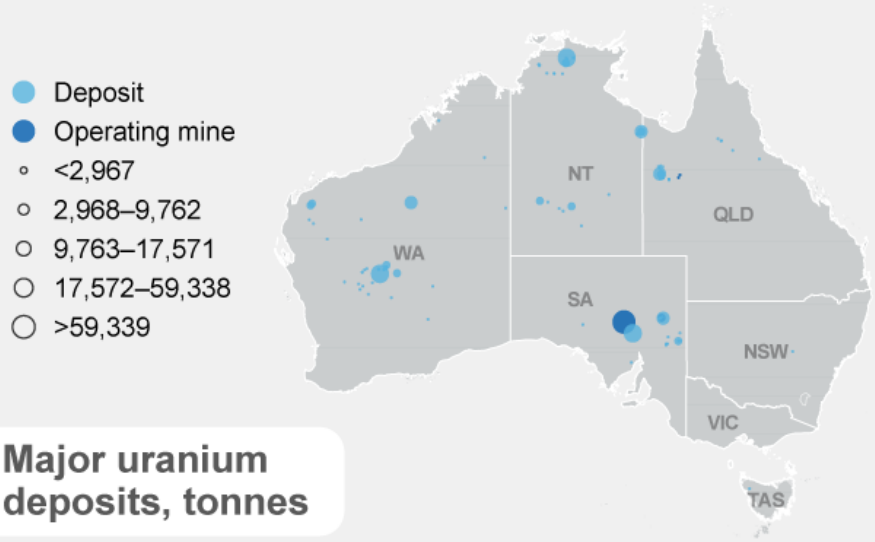
Uranium

Australia's uranium sector

Ranked 1st
for uranium
resources

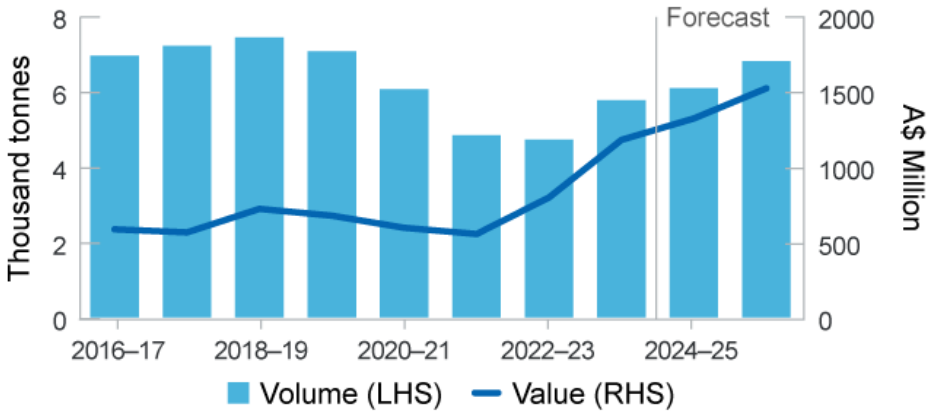
Ranked 4th
largest producer
globally

$1,200 million
value of exports
2023–2024



Major uranium deposits, tonnes

Australian uranium exports



Outlook

Prices have been **rising**, with **further growth** expected through the outlook

Earnings **have passed a low point**, with higher prices and volumes in prospect

The opening of the Honeymoon mine in South Australia to **boost exports**

Exploration spending has risen solidly from its low point in 2020 and 2021

SOURCE: DISR; OCE

8.1 Summary

- Uranium prices have settled in a US$80-90 a pound range after declining from a peak above US$100 a pound in early 2024.
- Price pressures are expected to persist until 2026, with the price likely reaching almost US$90 a pound by the end of 2026.
- Price and volume growth are projected to lift Australian export values from A$1.3 billion in 2024–25 to A$1.5 billion by 2025–26.

8.2 World consumption

Demand for energy in India and China drives global uranium demand

Worldwide demand for uranium is driven by demand for reactor fuel (see Figure 8.1). Demand for unenriched uranium oxide concentrate (U3O8) reactors is forecast to be 93 kilotonnes (kt) in 2024 (excluding inventory build), before falling slightly to 91kt in 2025, then rebounding to 97kt in 2026 (see Figure 8.2). The variation reflects new reactors coming online. More uranium is needed for a reactor's first fuelling than for subsequent operation.

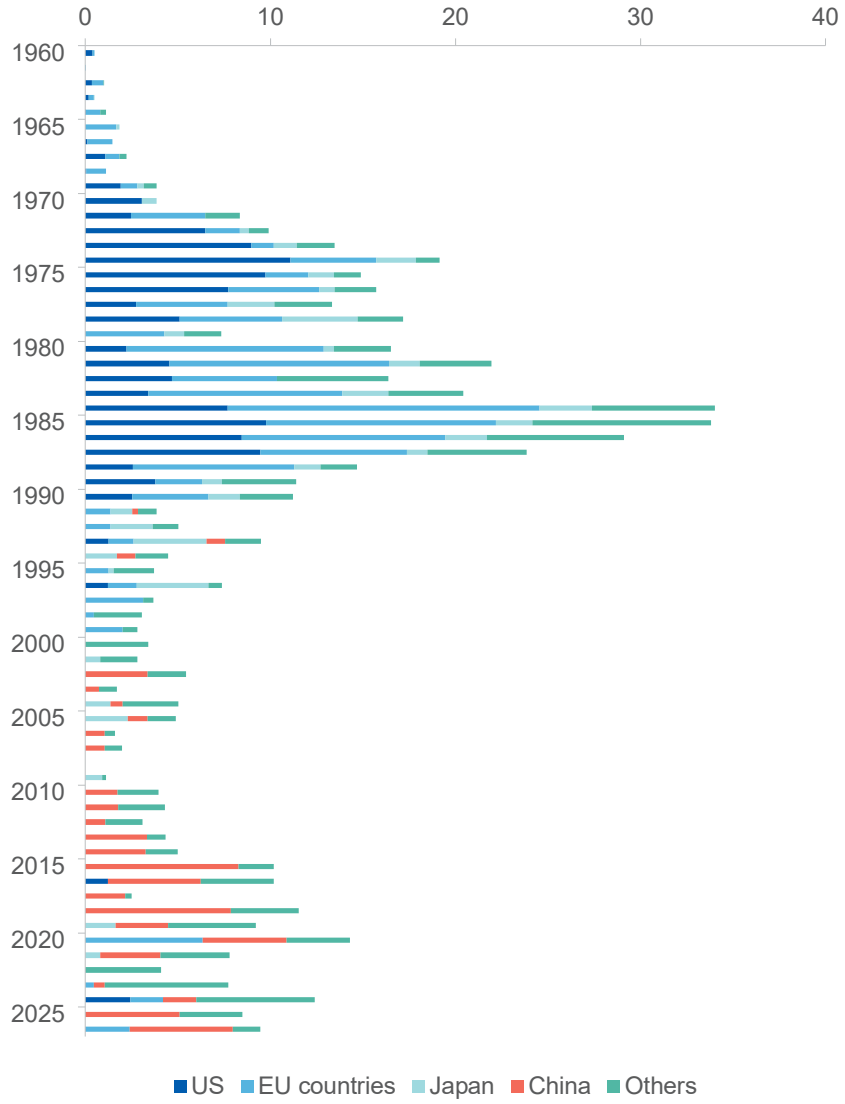
In addition to the 30 reactors currently under construction in China, India is building reactors in 'fleet mode'. 700 megawatt hours electricity (MWe) reactors are being built in rapid succession to capitalise on associated economies of scale. Two units in Gujarat have already entered commercial operation, with a further 10 planned or under construction. The reactors are of Indian design and represent an expansion in global reactor building capability that will improve the rate at which nuclear reactors can be constructed globally.

8.3 World production

Higher prices incentivise additional investment and mine re-openings

Around the world, new mines are coming online, some existing mines are being taken out of 'care and maintenance' and operating mines are having their lives extended to meet growing uranium demand (see figure 8.3).

Figure 8.1: Nuclear power generation capacity completed by year (GWe)



Source: International Energy Agency (2024); World Nuclear Association (2024); Department of Industry, Science and Resources (2024)

Mine supply is expected to lift from 64kt in 2023 to 77kt in 2026. Some of the increases in mined supply will be offset by falling secondary supply.

African supply will increase. Amongst the new supply due to come online is Aura Energy's Tiris mine in Mauritania. Tiris has received its final environmental approval and is expected to reach final investment decision in 2025. Further, the Rössing mine in Namibia recently received approvals to operate until 2036 as higher prices incentivise life extensions.

Kazatomprom exceeded its 2024 targets but 2025 targets downgraded

Kazatomprom — the world's largest producer of uranium — reported in its half yearly report that it was likely to exceed 2024 production targets (on a 100% basis) by 2kt. This additional unexpected volume of uranium on the global market is putting downward pressure on prices. Despite the increased output predicted for 2024, Kazatomprom has revised down its expected 2025 production by 5kt — or about 5% of global supply. The revision in production targets is due to continued sulphuric acid shortages. If these localised sulfuric acid shortages continue into 2025, there could be further delays to additional capacity coming online.

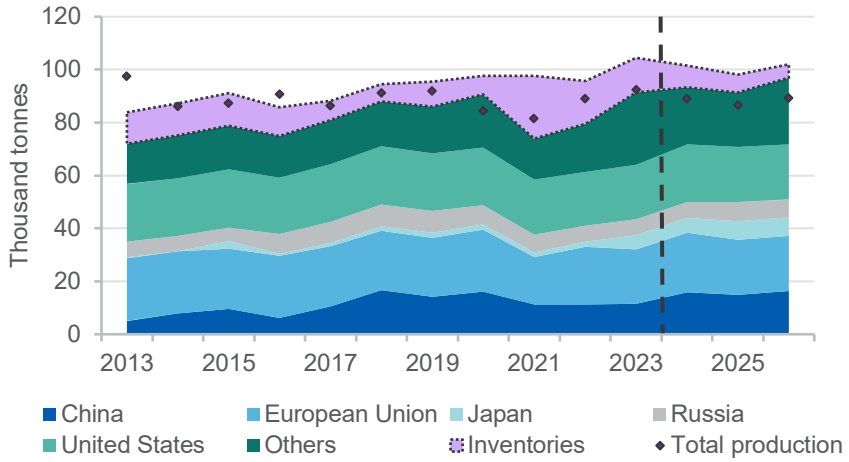
Despite ambitions for increased output in Kazakhstan, further development could also be stifled by increased taxes on mineral extraction. The mineral export tax rate will increase to 9% of export values in 2025, before rising to a maximum of 20.5% of export values in 2026. The exact tax rate that will be charged from 2026 onwards is a function of the current price of uranium and the quantity of uranium produced by the mine.

8.4 Prices

Steady gains expected as structural shortfall persists

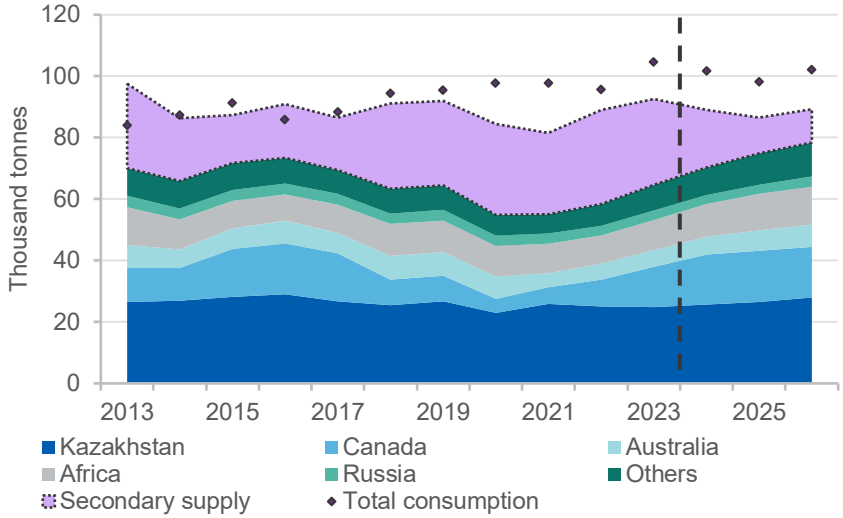
Prices rose to reach a short-term peak in the March quarter 2024, hitting US$105/lb. Prices have since fallen and steadied in a US$80-90/lb range (see Figure 8.3). Over the outlook period, higher prices are likely to incentivise the development of new mines and increased output from existing mines, however, this is unlikely to be sufficient to meet the forecast supply shortfall. With a primary market shortfall expected to

Figure 8.2: World uranium consumption and inventory build (U3O8)



Source: International Energy Agency (2024); World Nuclear Association (2024); Ux Consulting (2023)

Figure 8.3: World uranium production (U3O8)



Source: International Energy Agency (2024); World Nuclear Association (2024); Ux Consulting (2023)

persist, prices are forecast to remain high and continue rising until 2026, as inventories and existing mine capacity come under pressure. In 2026, the price is expected to average US$89 a pound up from US$85 a pound in 2024.

8.5 Australia

Higher prices and volumes are set to boost export earnings

Australia's uranium exports are currently produced at the Four Mile, Olympic Dam and the newly-opened honeymoon mine. The Honeymoon mine remains in its ramp-up phase and is this expected to push up Australia's export earnings to about $1.3 billion in 2024–25 (Figure 8.4), with exports forecast at $1.5 billion in 2025-26.

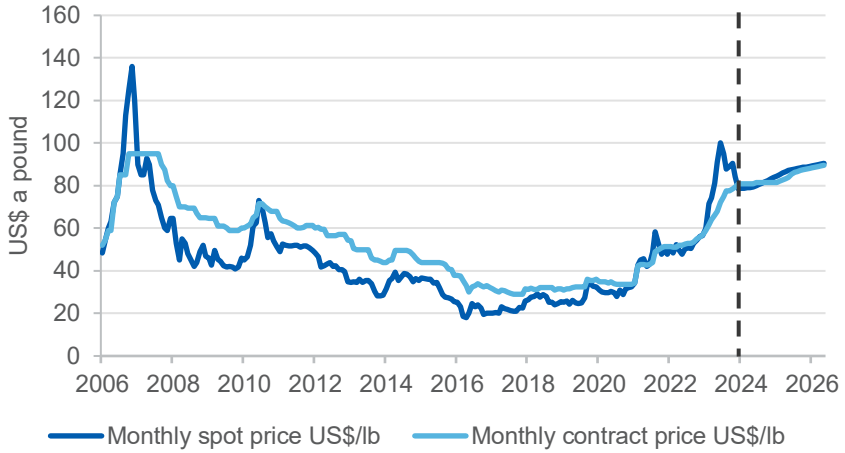
Exploration

Uranium exploration has picked up following the lift in prices. Uranium miners spent $15.2 million on exploration in the June quarter 2024. This compares to $3.4 million spent in the March quarter 2021.

Revisions to the outlook

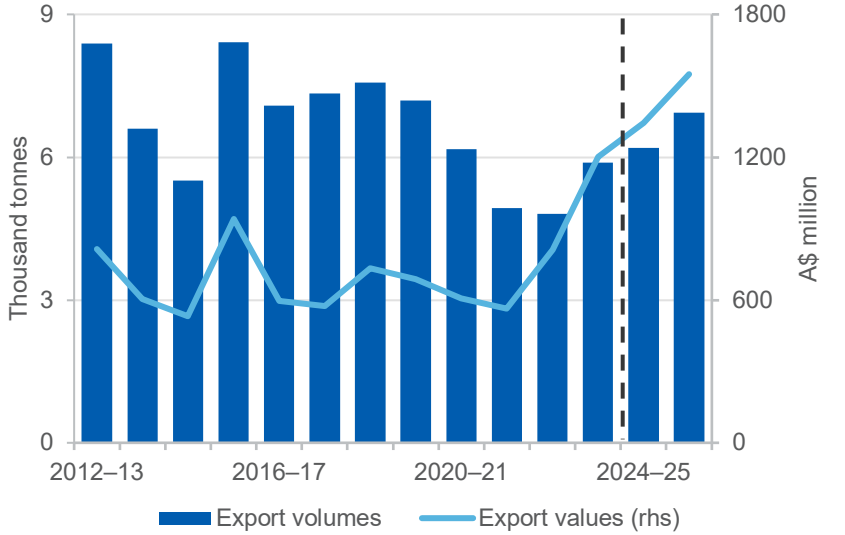
Since the June 2024 *Resources and Energy Quarterly*, the forecast for Australia's uranium export earnings have been revised down by $100 million to $1.3 billion in 2024–25. Forecast export earnings in 2025-26 have been revised down by $200 million to $1.5 billion.

Figure 8.3: Uranium price outlook



Source: Cameco Corporation (2024) Uranium Spot Price; Ux Consulting (2024) Uranium Market Outlook

Figure 9.4: Australia's uranium exports



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

Table 8.1: Uranium outlook

						Annual percentage change		
World	Unit	2023	2024 [f]	2025 [f]	2026 [f]	2024 [f]	2025 [f]	2026 [f]
Primary Production	kt	64.6	70.3	74.8	78.5	8.9	6.4	4.8
Africa [b]	kt	9.8	10.5	11.8	12.4	6.8	12.8	5.1
Canada	kt	13.0	16.3	16.7	16.6	25.9	2.0	-0.5
Kazakhstan	kt	24.9	25.7	26.6	27.9	3.0	3.6	5.2
Russia	kt	3.2	3.1	3.1	3.2	-3.8	0.0	5.9
Consumption	kt	91.3	93.4	91.3	97.0	2.3	-2.3	6.3
China	kt	11.5	15.9	14.9	16.2	37.6	-6.4	9.2
European Union 28	kt	20.4	22.6	20.9	20.9	10.5	-7.6	0.0
Japan	kt	5.5	5.5	6.9	7.2	0.0	25.8	4.1
Russia	kt	6.0	6.0	7.3	6.6	0.0	21.2	-9.5
United States	kt	20.5	21.8	20.8	20.8	6.2	-4.7	0.0
– nominal	US$/lb	62.5	85.0	83.5	89.0	36.0	-1.7	6.5
– real [c]	US$/lb	64.4	85.0	81.9	85.5	31.9	-3.7	4.4
Australia	**Unit**	**2022–23**	**2023–24**	**2024–25 [f]**	**2025–26 [f]**	**2023–24**	**2024–25 [f]**	**2025–26 [f]**
Production	t	5,409	5,797	6,199	6,933	7.2	6.9	11.8
Export volume	t	4,809	5,883	6,199	6,933	22.3	5.4	11.8
– nominal value	A$m	812	1,200	1,345	1,549	47.9	12.1	15.1
– real value [d]	A$m	871	1,236	1,345	1,498	41.9	8.9	11.3
Average price	A$/kg	168.7	204.0	217.0	223.4	20.9	6.4	2.9
– real [d]	A$/kg	181.0	210.1	217.0	216.0	16.0	3.3	-0.4

Notes: **b** Includes Niger, Namibia, South Africa, Malawi and Zambia; **c** In 2024 US dollars; **d** in 2024–25 Australian dollars; **s** estimate; **f** forecast; **r** Annual growth rate; **z** Projection.
Source: Department of Industry, Science and Resources (2024); Cameco Corporation (2024); Ux Consulting Uranium Market Outlook (2024)

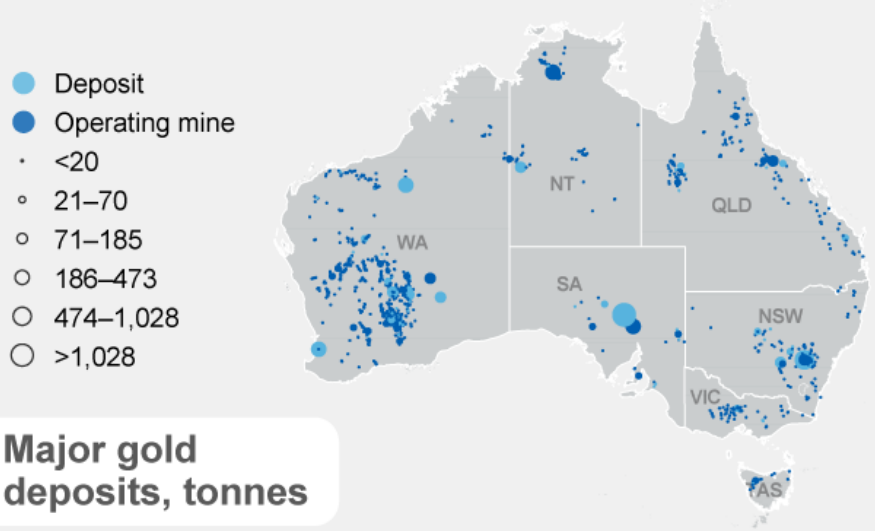
Gold

Australia's gold sector

World's 3rd
largest **producer** of gold, 2023

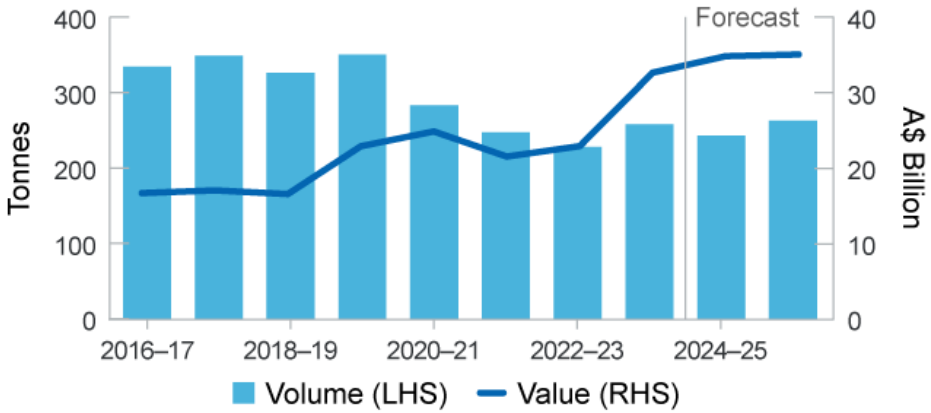
22%
of gold resources, the **largest** global share

258 tonnes
exported in 2023-24, valued at **$33 billion**



Major gold deposits, tonnes

Australian gold exports



Outlook

Prices elevated due to global monetary policy easing and geopolitical uncertainty

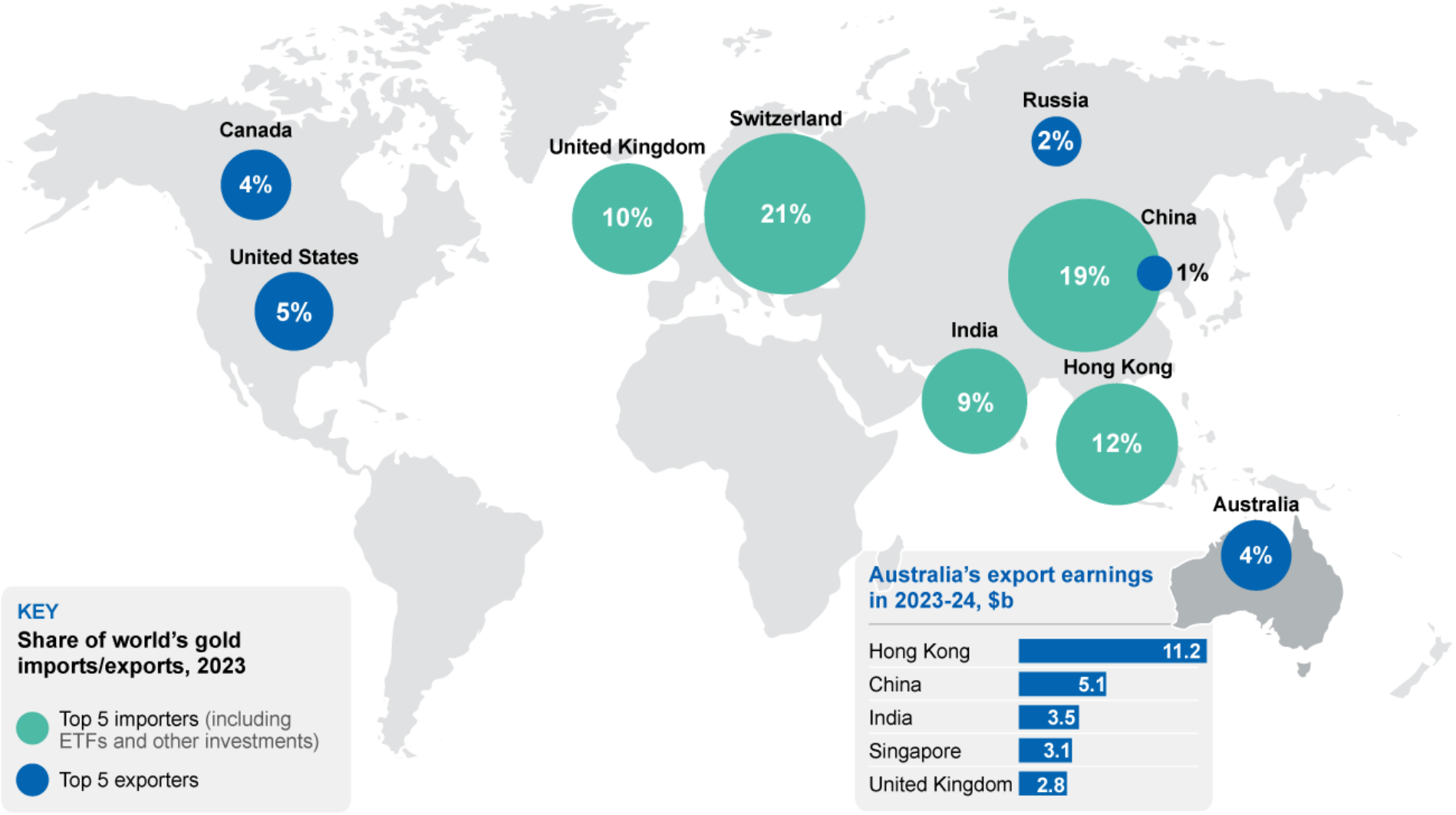
Higher prices and export volumes set to lift export earnings to **$35b**, 2025–26

Production to **increase** as new projects and expansions come online

Exploration spending **declined** for the last 2 financial years.

SOURCE: GA; DISR; OCE

Gold TRADE MAP



SOURCE: UN ITC; ABS

Note: Reflects trade in HS code 7108 (gold, inc. gold plated with platinum, unwrought or not further worked than semi-manufactured or powder form)

10.1 Summary

- The gold price recently made a new record and has risen by 30% since the start of 2024. The gains are the result of continued and increasing geopolitical uncertainty, coupled with easing in global monetary conditions. Prices are forecast to remain elevated throughout the forecast period.
- In the June quarter 2024, Australian gold production decreased by 6.0% year-on-year due to lower grades and weather-related disruptions. Yearly gold production is forecast to fall slightly in 2024 before resuming growth in 2025 as new projects and expansions come online.
- Australia's gold exports were a record $32.9 billion in 2023–24. Higher prices should lift earnings to $34.8 billion in 2024–25. Higher export volumes and prices should lift earnings to $35 billion in 2025–26.

10.2 World consumption

Reduced investment and jewellery consumption led to lower world gold demand in the first half of 2024

Global gold demand decreased by 5.4% to 2,044 tonnes in the first half of 2024. Demand fell primarily because of reduced investment and jewellery demand (falling 14% and 10%, respectively).

Gold investment demand fell as 120 tonnes of gold flowed out of gold-backed exchange traded funds (ETF outflows are counted as reducing gold demand, while inflows are counted as additional demand). In the March quarter 2024 alone, 113 tonnes of outflow occurred, as investors liquidated gold assets for higher expected returns in other asset classes.

Persistent high gold prices also moderated growth in jewellery consumption. Jewellery consumption fell in both China (-17%) and India (-8.4%), the world's two largest jewellery consumers.

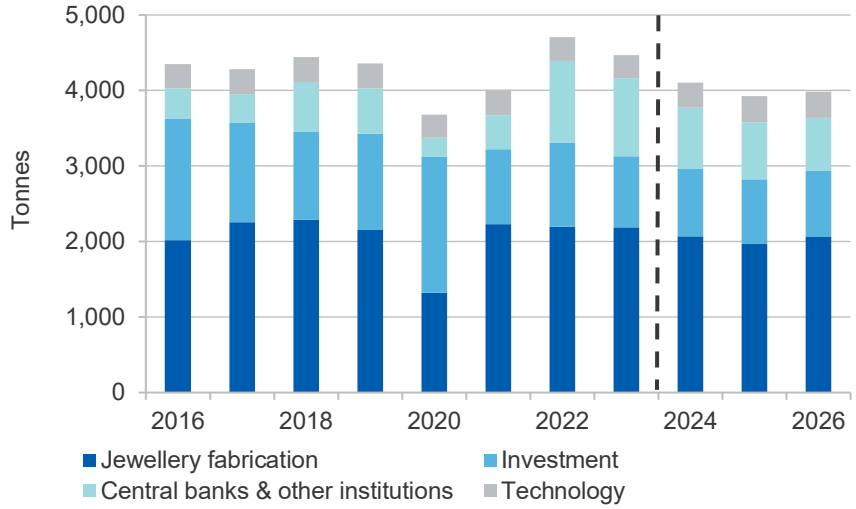
Offsetting the fall in gold investment and jewellery consumption was a rise in buying by central bank and other government financial institutions (the "official" sector). In H1 2024, the official sector increased gold purchases by 483 tonnes (5.0%) more than in the same period in 2023. In the June quarter 2024, Poland, India and Türkiye were the biggest official gold purchasers.

Gold consumption in the technology sector continues to rise. In H1 2024, gold demand for technology rose by 11% to 162 tonnes. Increased demand for gold in electronics is a result of the rising use of light emitting diodes and memory chips, coupled with the increasing use of AI-enabled consumer products.

High gold price forecasts to reduce demand in 2024 and 2025

Lower investment in gold bars and coins, falling jewellery consumption and reduced gold purchases from the official sector, are expected to reduce global gold demand by 6.3% in 2024. A further 4.3% decrease in demand is forecast in 2025 (Figure 10.1) before a minor rise is seen in 2026. Official sector demand is forecast to fall 32% between 2023 to 2026 — from 1,030 tonnes to 700 tonnes.

Figure 10.1: World gold demand by sector

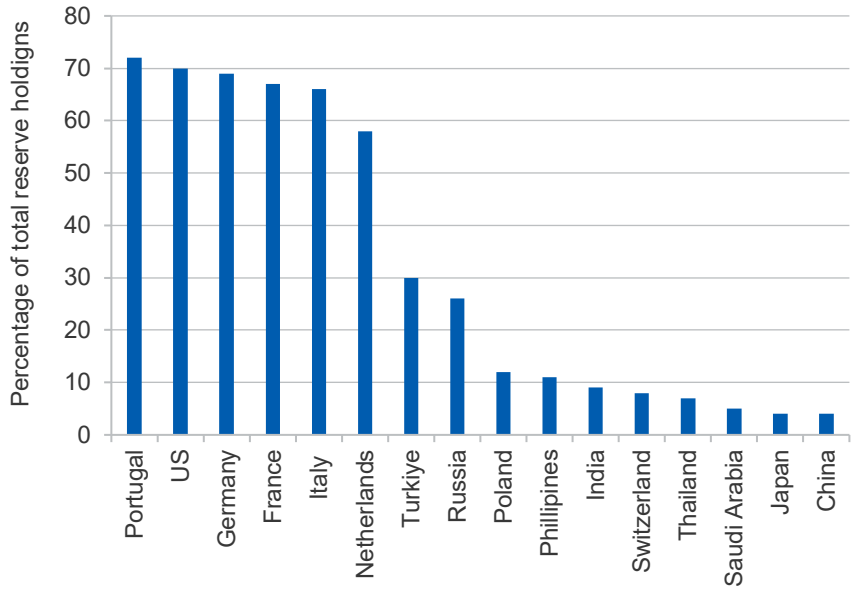


Notes: Investment includes ETFs, bars and coins. Technology includes gold used in the electronic, dentistry and other industrial sectors.
Source: Metals Focus (2024); World Gold Council (2024); Department of Industry, Science and Resources (2024).

While central banks collectively are expected to continue to purchase gold, the slower rate of buying is based on the expectation that some central banks have reached near-term targets for increasing gold reserves following two record years of buying.

Gold prices are forecast to decline slightly in 2026. As a result, gold demand is expected to grow by 2% in 2026, mainly on the back of higher jewellery demand and retail investment (Figure 10.1). Rising incomes in developing countries are also expected to contribute to gains in both jewellery and investment demand. Official gold holdings vary among jurisdictions (Figure 10.2). Most developing economies have lower holdings than developed economies.

Figure 10.2: Gold as a percentage of total reserve holdings



Source: International Banker (2024), *What's behind China's gold buying spree?*

10.3 World production

Higher mine output and recycling boosted gold supply in H1 2024

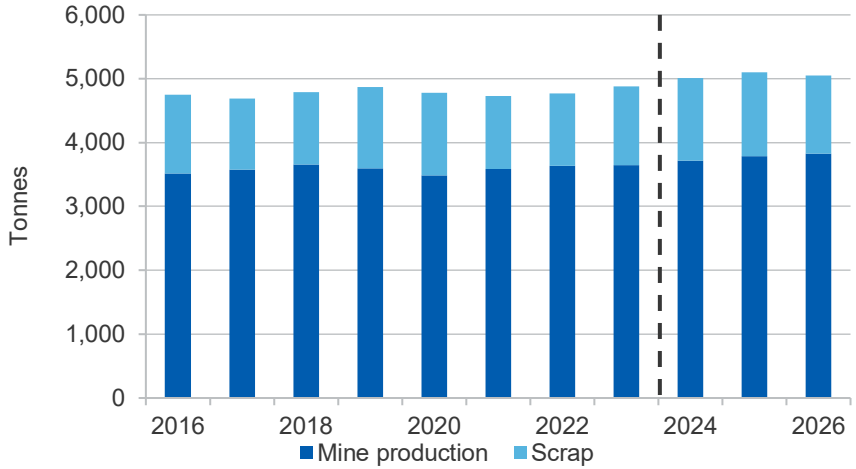
Higher mine production and increased rates of gold recycling raised global gold supply to 2,441 tonnes in the first half of 2024, a rise of just over a 1% year-on-year. Increased mine production was mainly driven by higher output in Indonesia, Canada and China. High gold prices increased rates of recycling. Recycling was up by 7.7% year-on-year to 684 tonnes.

Higher mine production and recycling drives global gold supply

Higher gold mine production and recycling rates are expected to continue to increase global gold supply by 0.6% and 2.4% in 2024 and 2025 to 4,984 and 5,104 tonnes, respectively (Figure 10.3).

Asia is expected to contribute to most of the rise in gold supply. Mongolia's gold mine output is forecast to grow by 10% in 2024, driven by the ongoing production ramp up at Rio Tinto's You Tolgoi gold mine. Indonesia's gold mine production is forecast to rise by 19% in 2024, driven by the output gains at the Batu Hijau and Grasberg gold mines.

Figure 10.3: World gold supply



Source: Metals Focus (2024); World Gold Council (2024); Department of Industry, Science and Resources (2024).

Gold recycling activity is forecast to grow at an average annual rate of 3.1% in 2024 and 2025 to 1,316 tonnes in 2025, as recycling activity is strongly corelated to the gold price.

From 2026, the forecast flattening in gold prices is expected to weaken recycling activity by 7% to 1,225 tonnes, driving a fall in total gold supply (Figure 10.3). Partly offsetting the fall in gold scrap supply is a forecast rise in global gold mine production. Mine output is forecast to rise by 1% in 2026 to 3,828 tonnes. Net global gold supply is expected to fall by 1% to 5,503 tonnes in 2026.

10.4 Prices

Gold prices rose sharply the first nine months of 2024

The London Bullion Market Association (LBMA) gold price has risen 30% in 2024 so far. Higher prices are the result of a range of factors including: interest rate cuts in the US and Eurozone; continued central bank purchases (including the new BRICS+ group); and surging demand for a 'safe-haven' asset amidst geopolitical tensions in the Middle East and Ukraine.

The LBMA gold price reached an all-time record high of US$2,657 an ounce on 24 September 2024 (Figure 10.4). There is a strong correlation between geopolitical shocks and the gold price. Over the last 20 years, the gold price has set fresh records four times: the 11 September 2001 attack on America; the COVID–19 pandemic; the Russian invasion of Ukraine; the geopolitical tension in the Middle East and the global economic slowdown.

Gold prices are expected to remain at high levels for the rest of 2024, supported by global monetary easing and ongoing elevated geopolitical uncertainty.

Falling interest rates are expected to result in the gold price rising by 20% year-on-year in 2024 to an average US$2,330 an ounce (Figure 10.5).

Gold prices to remain high over the outlook period

Gold prices are forecast to rise again in 2025. Continued geopolitical uncertainty and monetary easing are the main reasons for forecast gold price increase in 2025 — up 5.3% to US$2,451 an ounce (Figure 10.5). In 2026, the gold price is expected to fall by 4.7% to average US$2,336 an ounce (Figure 10.5). Prices are expected to fall because of higher gold mine output, lower central bank purchases and falling concerns over inflation offsetting higher jewellery demand. The key risk to forecast prices remains geopolitical uncertainty.

China's desire for increased gold holdings is expected to be the main driver of gold demand over the outlook period. Despite a pause in gold buying for a fourth straight month in August 2024, China's gold buying is expected to return at some point. The World Gold Council expects above-trend purchases from central banks to continue in the next 12 months.

Figure 10.4: US dollar gold price, daily

Source: Bloomberg (2024); LBMA (2024) Gold price PM

10.5 Australia's trade, production and exploration

High gold prices pushed export earnings higher in 2023–24

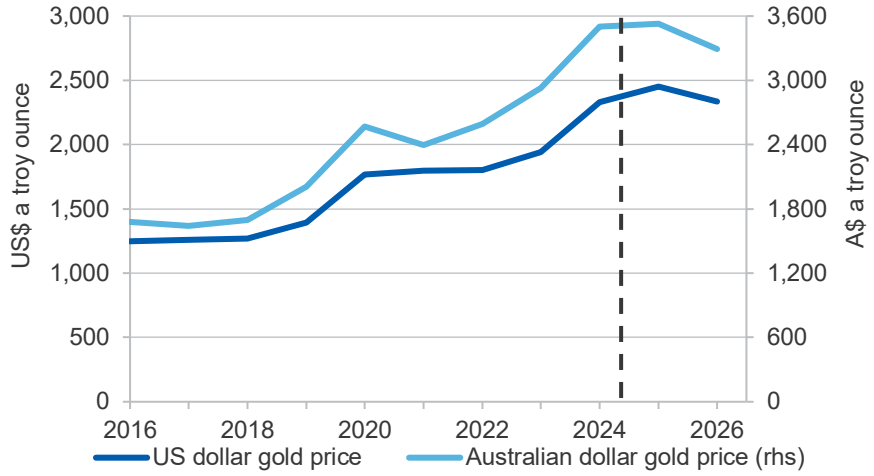
In 2023–24, Australia's gold export volumes rose by 13% to 258 tonnes on the back of higher production and rising prices. The value of gold production rose by 35% to $33 billion (Figure 10.6). Exports to our main export destinations, Hong Kong and Singapore, rose by 197% and 37% to $11 billion and $1.7 billion, respectively.

Australia's gold export earnings are forecast to rise by 5.6% in 2024–25 and by 0.7% in 2025–26, reaching $35 billion in 2025–26 (Figure 10.6). High Australian dollar gold prices and higher volumes of gold exports are expected to contribute to increased export earnings.

Australian gold mine production decreased in the first half of 2024

Australian gold production fell by 5.0% year-on-year in the first half of 2024 to nearly 142 tonnes. The decline was the result of wet weather and lower gold grades. Production at Newmont's Telfer gold mine in WA decreased by 74% in the first half of 2024 to 1.4 tonnes, as the mine operation was placed in care and maintenance in the June quarter 2024.

Figure 10.5: US and Australian dollar gold prices



Source: LBMA (2024) Gold price PM; Department of Industry, Science and Resources (2024)

Production at Agnico Eagle's Fosterville operation in Victoria decreased by 32% to 7.2 tonnes as lower ore grades reduced output.

Production at Gold Fields and Gold Roads Limited's Gruyere Joint Venture in WA was also down by 8.3% to 9.0 tonnes, with heavy rainfall flooding the primary access road (closed from 5 March to 30 April 2024), cutting off supplies of reagents and diesel.

Offsetting the production declines in Fosterville and Gruyere gold mines is higher production in Evolution Mining's Cowal gold mine in NSW (up 18% year-on-year in the first half of 2024, driven by higher grade) and Northern Star's Thunderbox gold mine in WA (up 35% year-on-year in the first half of 2024, driven by higher mill throughput).

Australian gold production to be supported by major project expansions

Australian gold production is forecast to fall by 0.8% to 286 tonnes in 2024–25. However, in 2025–26, production is forecast to grow by 7.9% to 309 tonnes. Over the next two years, quarterly production will be variable as the impact of new projects and mine expansions is offset by mine closures and potential start-up delays.

Northern Star's recently expanded Thunderbox mill ramped up to reach nameplate capacity in the second half of 2023. Further expansions of Thunderbox output are expected in 2024–25, as high-grade ore feed commences and mill optimisation continues.

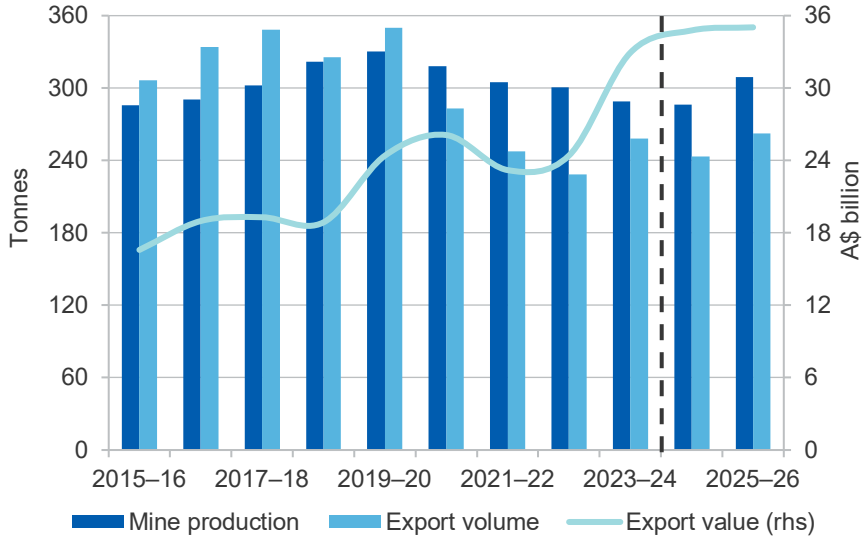
Production will continue to ramp up at recently commenced projects such as Pantoro's Norseman project, Calidus' Warrawoona gold project and Bellevue Gold's namesake gold project. Genesis Minerals' Ulysses project is under construction, with production expected to commence later in 2024. Westgold's 1.4 tonnes a year Great Fingall project continues to be developed and is also expected to achieve first production in the first half of 2025. Production from Newmont's Tanami and Boddington projects is expected to decline in 2024, due to lower ore grades (as part of planned mine sequencing). The company has plans to begin lifting Tanami's output from 2027, as its Tanami Expansion 2 project reaches completion.

Northern Star Resources' Super Pit gold operation is scheduled to begin a long-term expansion in 2024, rising to about 20 tonnes by 2025–26. In 2023, Northern Star committed to a $1.5 billion mill expansion at KCGM to double processing capacity by 2029. The expansion will lift the Super Pit's output to 28 tonnes in 2028–29, up from 13 tonnes in 2022–23.

Newmont's Telfer gold mine in WA is expected to resume production in December 2024, producing an average 0.9 tonne of gold a month for the next 15 months.

In August 2024, the Australian Government's Northern Australia Infrastructure Facility agreed to provide a $150 million loan to support the development of De Grey Mining's Hemi gold project in WA. The mine is expected to come online in the second half of 2026 — subject to regulatory approvals — with an estimated annual production of 17 tonnes a year in its first 5 years of operation.

Figure 10.6: Australian gold exports and mine production



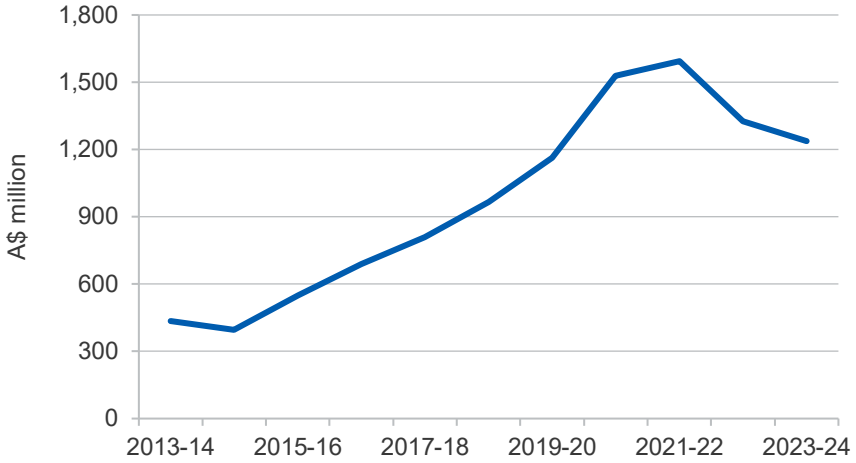
Sources: ABS (2024); Department of Industry, Science and Resources (2024)

Gold exploration expenditure declined in 2023–24

Australia's gold exploration expenditure decreased by 6.7% year-on-year in 2023–24 to $1.24 billion (Figure 10.7). As a result, gold's share of Australian mineral exploration expenditure declined to 29% in 2023–24, down from 32% in 2022–23. This decline in exploration occurred despite high Australian gold prices, which have historically motivated high exploration expenditure. Western Australia remained the centre of gold exploration activity in Australia, accounting for 71% of total gold exploration expenditure.

Figure 10.8 shows the major gold discoveries by country from 1990 to 2024. Since 2020, there have been only a few countries that have made major gold discoveries, including the US, other countries (Guyana, Sweden and Serbia) and Ecuador. Australia has not discovered any major gold mines in the 2000–24 period.

Figure 10.7: Australian gold exploration expenditure



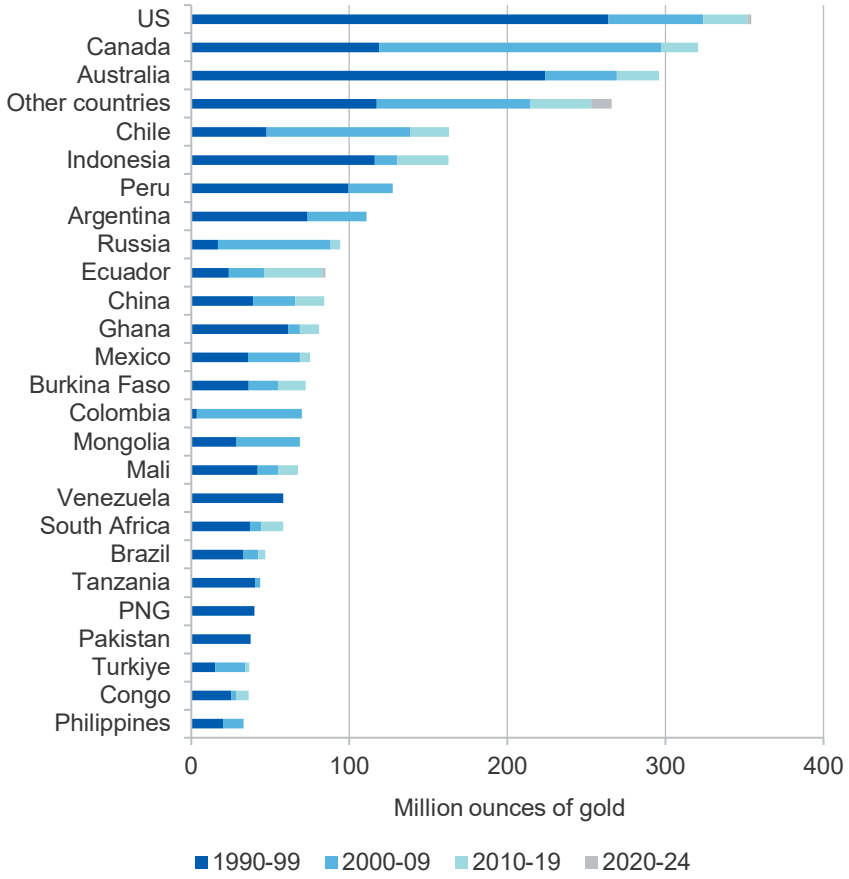
Source: ABS, Mineral and Petroleum Exploration (cat. no. 8412.0) (2024)

Revisions to the outlook

Compared with the June 2024 *Resources and Energy Quarterly*, the average gold price in 2024 has been revised up 4.4% to around US$2,330 an ounce, up 11% in 2025 to around US$2,450 an ounce and up 14% to around US$2,335 an ounce in 2026.

Reflecting upgrades made to price forecasts, compared with the June 2024 *Resources and Energy Quarterly*, Australia's forecast gold export earnings have been revised up across the board: up by $3.3 billion in 2024–25 and by $3.0 billion in 2025–26.

Figure 10.8: Major gold discoveries by country



Source: S&P Global (2024).

Table 10.1: Gold outlook

World	Unit	2023	2024[f]	2025[f]	2026[f]	Annual percentage change 2024[f]	2025[f]	2026[f]
Total demand	tonnes	4,467	4,100	3,922	3,989	-8.2	-4.3	1.7
Fabrication consumption [b]	tonnes	2,495	2,399	2,310	2,412	-3.8	-3.7	4.4
Mine production	tonnes	3,645	3,718	3,788	3,828	2.0	1.9	1.1
Price [c]								
– nominal	US$/oz	1,943	2,329	2,451	2,336	19.9	5.3	-4.7
– real [d]	US$/oz	2,003	2,329	2,403	2,244	16.3	3.2	-6.6
Australia	**Unit**	**2022–23**	**2023–24**	**2024–25[f]**	**2025–26[f]**	**2023–24**	**2024–25[f]**	**2025–26[f]**
Mine production	tonnes	301	289	286	309	-4.0	-0.8	7.9
Exports								
– volume	tonnes	228	258	243	263	13.1	-5.7	7.9
– nominal value	A$m	24,406	32,930	34,776	35,030	34.9	5.6	0.7
– real value [e]	A$m	26,182	33,901	34,776	33,879	29.5	2.6	-2.6
Price								
– nominal	A$/oz	2,721	3,171	3,621	3,382	16.5	14.2	-6.6
– real [e]	A$/oz	2,920	3,264	3,621	3,271	11.8	10.9	-9.7

Notes: **b** includes jewellery consumption and industrial applications; **c** London Bullion Market Association PM price; **d** In 2024 US dollars; **e** In 2024–25 Australian dollars; **f** Forecast; **s** Estimate.
Source: ABS (2024); Department of Industry, Science and Resources (2024); London Bullion Market Association (2024) gold price PM; S&P Market Intelligence (2024); World Gold Council (2024).

Aluminium

Australia's aluminium sector

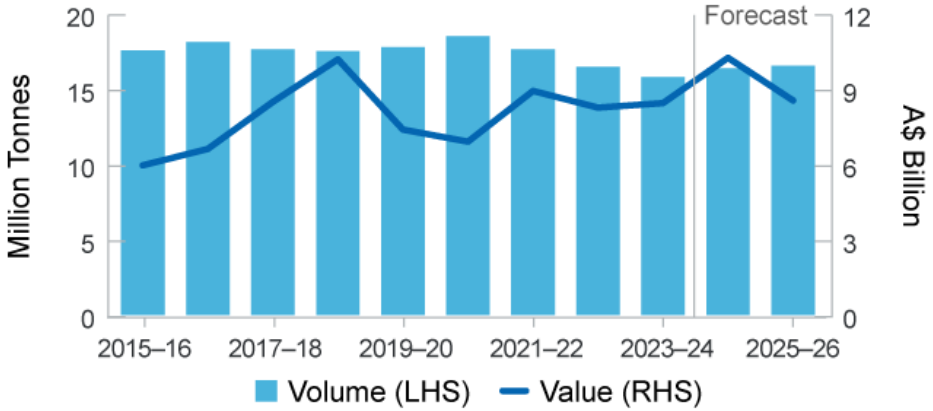
11%
of global primary aluminium exports are **Australian**

$16 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

Australian aluminium sector earnings set to reach **$19 billion** in 2024–25.

Exports set to reach **$10 billion** in 2024-25, driven by higher alumina prices

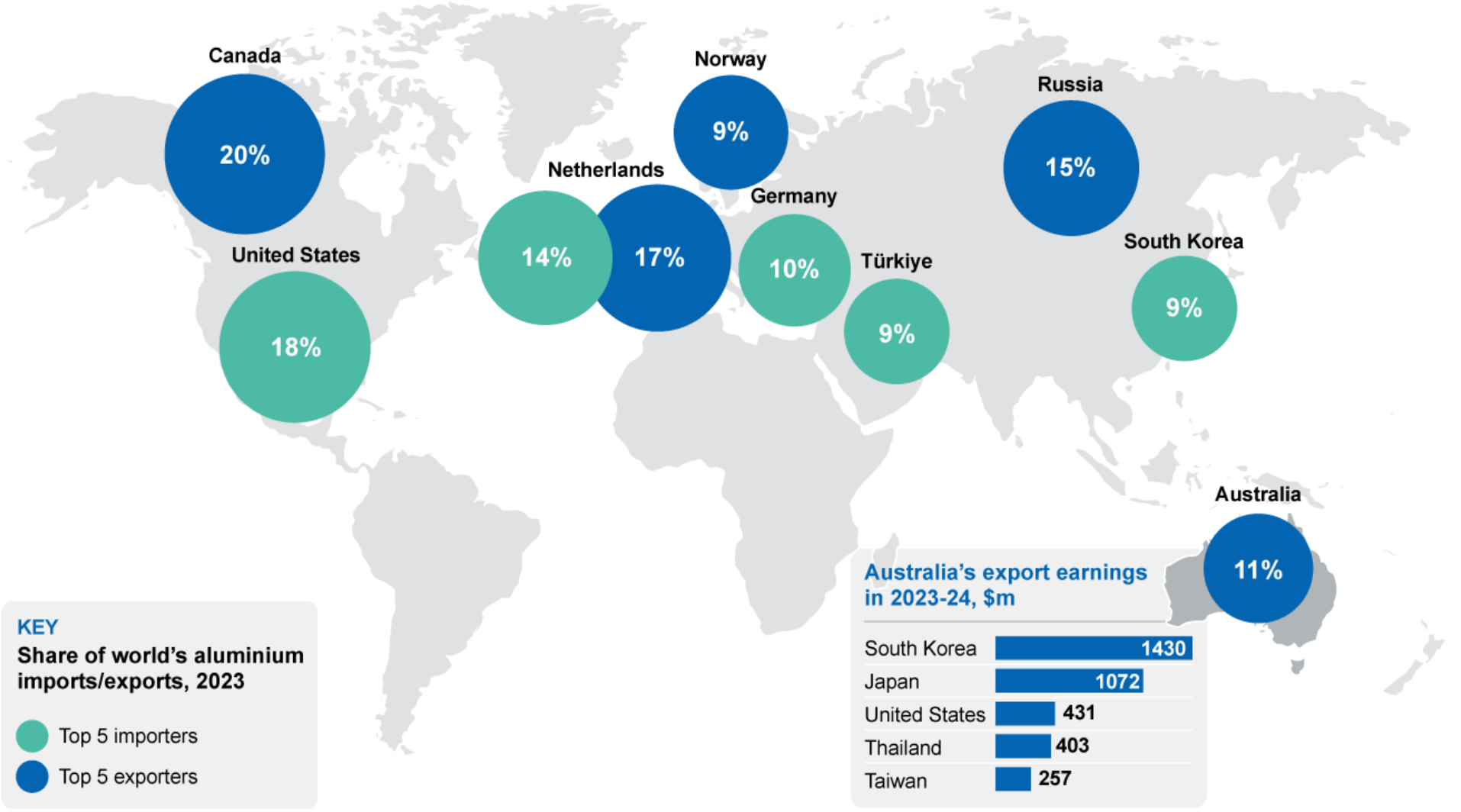
Australian bauxite alone is a **$2 billion** export industry

Prices set to rise, driven in part by **growing demand** for new energy efficient cars and tech

*High Purity Alumina

SOURCE: DISR; OCE

Aluminium TRADE MAP



SOURCE: WBMS; ABS

11.1 Summary

- The London Metal Exchange (LME) primary aluminium spot price has increased by 8.8% so far in 2024. The price is expected to rise further over the outlook period, driven by monetary policy easing and rising global demand from electric vehicles (EV) and energy efficient technologies.
- Stable Australian primary aluminium output (at 1.6 million tonnes a year), lower Australian alumina output (at 19 Mt a year) and higher Australian bauxite output (over 100 million tonnes a year) are expected over the outlook period.
- Higher aluminium prices and production ramp-ups at existing bauxite operations are likely to boost Australia's aluminium, alumina and bauxite (AAB) exports to nearly $19 billion in 2024–25.

11.2 World consumption

Vehicles boosted global aluminium consumption in the first half of 2024

Higher Chinese primary aluminium consumption boosted global primary aluminium consumption in the first half of 2024. Global primary aluminium consumption is up by 3.1% year-on-year to nearly 35 million tonnes (Mt). Helping demand was strong passenger vehicle sales, with nearly 12 million units sold in China in the first half of 2024, up 6.3% year-on-year.

World secondary aluminium consumption rose by 3.3% year-on-year in the first half of 2024 to nearly 13 Mt, as automotive makers in Asia, Europe, and the US sourced secondary — rather than primary — aluminium to cut input costs. In Asia, secondary aluminium usage in South Korea and Japan rose by 5.9% and 2.3% year-on-year in H1 2024, respectively.

In Europe, subdued activity in the housing and construction sectors — the sectors affected most by high interest rates — cut primary aluminium consumption by 3.1% year-on-year in the first half of 2024. Italy and Greece's primary aluminium demand fell by 2.2% and 4.6% year-on-year to 465,000 and 208,000 tonnes, respectively.

Higher global primary aluminium production boosted demand for alumina by 3.7% year-on-year to 69 Mt in H1 2024.. Demand in China and India rose by 5.1% and 2.2% year-on-year, respectively, as Chinese and Indian aluminium smelters required more alumina to accommodate increased primary aluminium production.

Higher global alumina production increased global bauxite consumption by 0.8% year-on-year in H1 2024.

Electric vehicles and clean energy technology drive aluminium demand

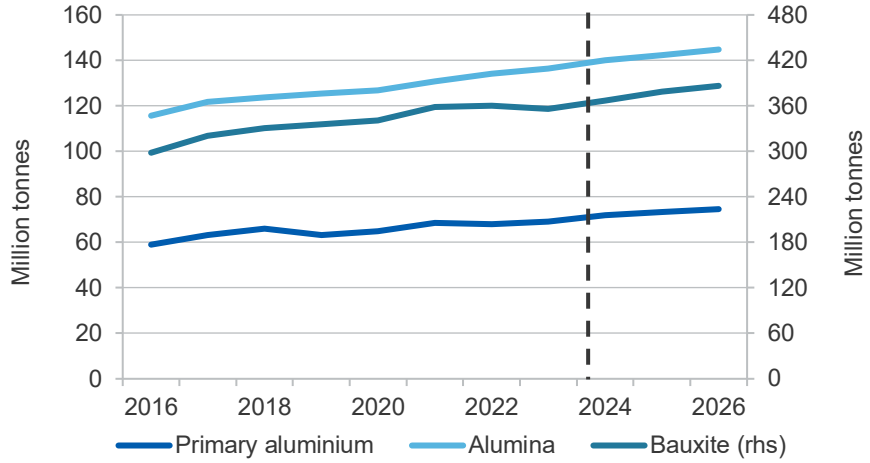
Strong demand from the EV manufacturing and clean energy sectors — where aluminium is used in the making of EV, solar components and wind turbines — is expected to boost global aluminium demand from 72 Mt in 2024 to 75 Mt in 2026 (Figure 11.1).

According to Bloomberg New Energy Finance, China has outspent the rest of the world when it comes to clean energy. It has broken wind and solar installation records in recent years. China's wind and solar capacity has surpassed the target of 1,200 gigawatts almost six years earlier than planned. The rapid growth in wind and solar capacity is likely to continue, and will increase the demand for aluminium.

On 25 July 2024, the Chinese Government announced it will double vehicle scrappage subsidies — first introduced in late April 2024 — to boost domestic vehicle demand. Chinese consumers receive either US$2,760 to scrap an old and high emitting vehicle and replace it with an EV, or US$2,070 to replace it with a fuel-efficient internal combustion engine car. The Chinese Government estimated that there will be about 1.1 million new EV sales under the scrappage program. This program will support aluminium demand from the Chinese automotive industry.

In Europe, primary aluminium demand is expected to be higher during the outlook period, driven by increased EV production. China's electric carmakers are expanding into Europe by teaming up with local industry to minimise the impacts of the European Union (EU)'s duties on Chinese EVs — a new tariff of 37.6% on top of an existing 10% import duty. For example: Chinese maker Leapmotor is producing at Jeep and Fiat-maker Stellantis' factories in Poland; Chinese EV producer BYD announced plans in July

Figure 11.1: World primary aluminium, alumina and bauxite consumption



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

2024 to set up its own factory in Hungary, with another factory to be built in Türkiye in the coming years.

Rising primary aluminium prices and the use of low carbon aluminium are expected to boost secondary aluminium consumption. Secondary aluminium is 95% less energy intensive than primary aluminium. World secondary aluminium demand is forecast to rise by 3.3% year-on-year in 2024 to 26 Mt, and then by 4.9% a year over the rest of the outlook period to 2026.

An expected rise in global primary aluminium production is likely to drive higher demand for alumina over the outlook period. In line with world primary aluminium production, world alumina consumption is forecast to grow by 2.7% in 2024, 1.6% in 2025 and 1.8% in 2026.

An expected rise in China and Indonesia' alumina production is likely to increase global bauxite consumption over the outlook period, reaching 386 Mt by 2026 (Figure 11.1).

11.3 World production

Aluminium and alumina output grew in the first half of 2024

An increase in production in China contributed to a 3.6% year-on-year rise in the global primary aluminium output in the first half of 2024. Over this period, China produced 21 Mt of primary aluminium (up 5.1% year-on-year), with producers reacted to rising prices in April/May. Outside of China, Canada's primary aluminium production increased by 3.7% year-on-year to 1.7 Mt in the first half of 2024.

Driven by the increasing demand for recycled aluminium, global secondary aluminium output rose by 0.8% year-on-year to 16 Mt in the first half of 2024. The US accounted for most of this increase, with secondary aluminium production increasing by 4.8% year-on-year.

Higher alumina output in Indonesia (up 14% year-on-year) led to a 1.0% year-on-year rise in global alumina output in H1 2024 to 69 Mt.

Higher bauxite output from Guinea and Australia boosted global bauxite output by 0.5% year-on-year in H1 2024 to nearly 200 Mt.

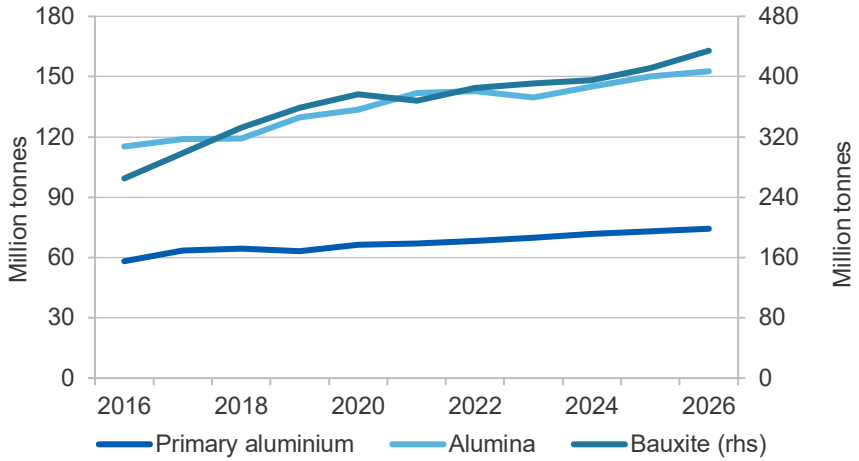
Aluminium, alumina and bauxite output set to rise over the outlook period

China's primary aluminium output is likely to grow at a slower pace in 2024 and beyond. On 3 July 2024, the Chinese National Development and Reform Commission released a plan to cut emissions for the Chinese aluminium industry. In the plan, the Chinese Government will support Chinese aluminium producers to consume more renewable energy, including wind and solar. No new coal-fired generators for aluminium smelting are to be approved. No new aluminium capacity will be allowed in key air pollution control areas and the utilisation rate of renewable energy for aluminium smelters is expected to reach 25% by the end of 2025.

As a result, the global primary aluminium output is forecast to grow by 2.7% year-on-year in 2024 to nearly 72 Mt (Figure 11.2).

After 2024, world primary aluminium production is forecast to rise by 1.7% a year over the outlook period, reaching 74 Mt by 2026 (Figure 11.2).

Figure 11.2: World primary aluminium, alumina and bauxite production



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

The gains will be driven by China, as more output is produced from greenfield aluminium smelters. China's primary aluminium production is forecast to reach nearly 44 Mt by 2026. This is close to the capacity cap of 45 million tonnes per year introduced — in response to environmental and oversupply concerns — by the Chinese Government in 2017.

Driven by higher output from China, the US and Europe, global secondary aluminium output is forecast to reach 36 Mt in 2026.

Rising output from new/existing refineries in China, Spain and Indonesia is expected to increase global alumina output over the outlook period. China's alumina production capacity has continued to rise. By the end of June 2024, excluding the capacity that has been idled and shut down, the total built capacity of Chinese alumina reached over 100 Mt. Indonesian output is forecast to rise by 8.7% year-on-year in 2024 to 2.5 Mt, driven by the H2 2024 commencement of the 2 Mt a year Mempawah alumina refinery, a joint venture between the China Aluminium Company and its Indonesian partners, PT Indonesia Asahan Aluminum and PT Antam Tbk.

After 2024, world alumina output is forecast to rise by 2.8% a year over the outlook period, reaching 153 Mt by 2026 (Figure 11.2). The gains are forecast to be driven by Indonesia, with eight new alumina refineries (capacity addition of around 10 Mt) will be built in the coming years.

Higher output from Australia — the world's second largest bauxite producer — is expected to push global bauxite output up by 1.5% year-on-year in 2024 to 408 Mt (Figure 11.2). After 2024, world bauxite production is forecast to increase by 5.0% a year, reaching 450 Mt by 2026 (Figure 11.2). Australia and Guinea are expected to contribute most to this rise.

Green investment will reduce the sector's climate impacts

In July 2024, Rio Tinto announced it has installed a carbon free aluminium smelting cells using ELYSIS technology at its Arvida aluminium smelter in Quebec, Canada. The ELYSIS technology is expected to replace traditional smelting, eliminating all direct greenhouse gas emissions and producing oxygen instead. Rio Tinto also signed a 20-year electricity arrangement with an energy supplier to supply renewable electricity for its Tiwai Point aluminium smelter in New Zealand.

Hydro Alunorte alumina refinery in Brazil has commenced using natural gas in alumina production, replacing fuel oil. When the transition from fuel oil to natural gas is completed, the refinery is expected to reduce its carbon emissions by 30% a year (equivalent to 700,000 tonnes of CO_2).

11.4 World trade

Sanctions on Russian aluminium reduced global exports in H1 2024

Lower exports from Russia reduced global primary aluminium exports by 13% year-on-year in the first half of 2024 to 6.3 Mt. On 12 April 2024, the US and UK governments announced new sanctions banning the LME and the Chicago Mercantile Exchange from taking delivery of Russian aluminium produced after 12 April 2024. As a result, Russia's share of world primary aluminium exports fell from 18% in the first half of 2023 to 6.9% in the first half of 2024.

The stronger than expected rise of primary aluminium output in Europe increased world secondary aluminium exports in the first half of 2024. European aluminium users turned less to secondary aluminium as a substitute for primary aluminium. As a result, more secondary aluminium was available for export, which increased by 1.9% year-on-year in the first half of 2024.

Lower alumina exports from Australia led to a 3.1% reduction in global alumina exports in the first half of 2024. Over this period, Australia — the world's largest alumina exporter — exported 7.6 Mt of alumina, down by 4.5% year-on-year. China exported nearly 1 Mt of alumina in the first half of 2024, up 33% year-on-year.

Higher bauxite exports from Guinea and Australia — the world's two largest bauxite exporters — boosted the global bauxite exports by 1.1% year-on-year to 91 Mt in the first half of 2024.

China's imports of primary aluminium and bauxite rose in H1 2024

Weak primary aluminium consumption in Europe reduced global primary aluminium imports by 2.6% year-on-year in the first half of 2024. However, over the same period, China's primary aluminium imports increased by 209% year-on-year. Most of the growth in Chinese demand was met by Russia; Russian primary aluminium accounted for 58% of China's total primary aluminium imports in the first half of 2024.

Lower secondary aluminium consumption in Europe, due to sluggish construction activity, reduced global imports of secondary aluminium by 15% year-on-year in the first half of 2024 to 1.6 Mt.

Lower Russian imports reduced global alumina imports by 5.8% year-on-year to 17 Mt in the first half of 2024. Over the same period, Russia imported 1.3 Mt of alumina, down by 41% year-on-year. Russian imports fell as Russian domestic alumina output rose. China imported 1.2 Mt of alumina in the first half of 2024, up 55% year-on-year.

Higher bauxite imports from China and India led to a 7.1% year-on-year rise in global bauxite imports in the first half of 2024. Over this period, China and India imported nearly 77 Mt and 2.2 Mt of bauxite, up 7.4% and 35% year-on-year, respectively.

On 26 August 2024, the Canadian Government announced a 25% tariff on Canadian imports of Chinese aluminium. The new tariff rate is to commence on 15 October 2024. Canada imported 144,000 tonnes of primary aluminium in 2023, accounting for 0.9% of global primary aluminium imports. Over this period, Chinese primary aluminium accounted for just 2.0% of Canada's total primary aluminium imports.

11.5 Prices

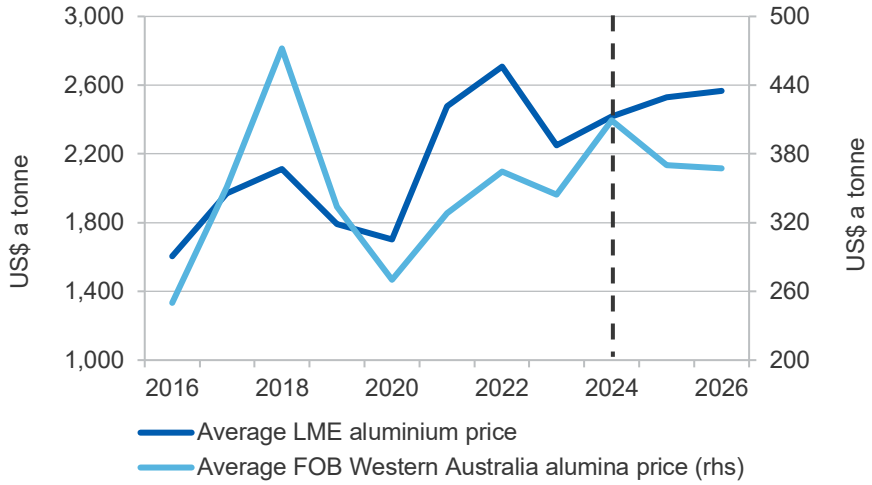
Aluminium price has retreated from a two-year high in May 2024

The LME primary aluminium spot price has retreated from a two-year high of US$2,695 a tonne on 29 May, as the LME market adjusts to the move to ban Russian aluminium from LME warehouses after 12 April 2024. The LME spot price has risen by 8.8% so far in 2024, to US$2,541 a tonne on 25 September 2024 — compared to an average US$2,172 a tonne in the second half of 2023. The LME aluminium price is forecast to rise by 6.2% year-on-year in 2024 to average around US$2,390 a tonne (Figure 11.3).

Large amounts of Russian aluminium appear to have been held off-warrant — aluminium stocks that are sitting in the warehouses owned by LME warehouse operators but not currently on warrant (on sale) — in the LME warehouses prior to 13 April 2024. However, since 13 April 2024, holders of Russian aluminium have switched their holdings back on-warrant. As a result, LME aluminium stocks rose from 490,750 tonnes in April 2024 to 809,025 tonnes in September 2024 (Figure 11.4).

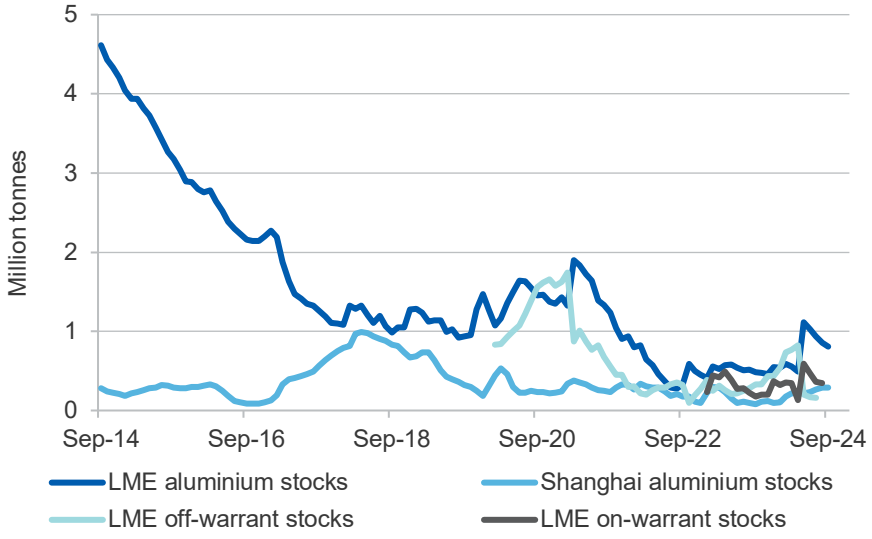
The phasing out of production in Australia's Kwinana alumina refinery and an ongoing shortage of alumina in China have pushed the free on board (FOB) Western Australia alumina price up by 57% so far in 2024 — to US$545 a tonne on 25 September 2024 compared to an average of US$335 a tonne in the second half of 2023. The production curtailment at the Kwinana alumina refinery is likely to keep the Western Australia alumina price at historically high levels, averaging around US$432 a tonne (FOB) in 2024, up 25% year-on-year (Figure 11.3).

Figure 11.3: Primary aluminium and alumina prices



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

Figure 11.4: Exchange aluminium stocks



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

Higher aluminium prices expected in the short term

After 2024, the LME aluminium price is forecast to rise, averaging about US$2,525 and US$2,565 a tonne in 2025 and 2026, respectively (Figure 11.3). Monetary policy easing and growing global demand for new, energy-efficient cars and technologies will lift aluminium usage and keep stocks relatively low. The FOB Western Australia alumina price is forecast to decrease in 2025 and 2026, due to an expected rise in Chinese production and the supply recovery in Australia.

11.6 Australian exports and production

Higher alumina prices and bauxite exports boosted earnings in 2023–24

Higher alumina prices and bauxite export volumes and values boosted Australia's AAB exports by 5.0% to nearly $17 billion in 2023–24 (Figure 11.5). A 5.8% year-on-year rise in the FOB Western Australia alumina price in 2023–24 increased Australian alumina export values by 2.2% year-on-year to $8.5 billion in 2023–24.

Australia's bauxite export values increased by 59% year-on-year to over $2.0 billion in 2023– 24, propelled by a 19% year-on-year rise in bauxite export volumes. A ban on bauxite exports by Indonesia — which started on 10 June 2023 — seems to have assisted Australian bauxite exporters.

A 2.9% year-on-year fall in the LME aluminium price in 2023–24 reduced Australian primary aluminium export values by 3.4% in 2023–24 to $5.1 billion. In 2023–24, Australian primary aluminium export volumes were down by 0.2% year-on-year to 1.44 Mt.

Higher aluminium prices and bauxite exports drive export earnings higher

An expected rise in aluminium prices and bauxite exports in 2025 is likely to boost Australia's AAB export earnings to nearly $19 billion in 2024–25, up 13% year-on-year (Figure 11.5). Australia's AAB exports are forecast to fall by 8.1% in 2025–26 to $17.4 billion, on the back of a forecast decline in alumina prices (Figure 11.5).

Australia's aluminium and bauxite production rose in 2023–24

Australian primary aluminium output rose by 2.3% year-on-year in 2023–24 to 1.56 Mt, driven by a 9.5% year-on-year rise at Rio Tinto's Boyne Island aluminium smelter in Queensland. Lower production at Rio Tinto's Yarwun and QAL alumina refineries in Queensland — due to a disruption to gas supply — cut Australian alumina output by 1.5% in 2023–24 to 18.7 Mt. Higher bauxite production in Rio Tinto's Weipa bauxite mine in Queensland boosted Australian bauxite production up by 8.2% year-on-year in 2023–24 to 107 Mt.

Higher bauxite output forecast 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 forecast to be around 1.6 Mt a year.

Starting in July 2024, the production curtailment at Alcoa's Kwinana alumina refinery in WA is likely to reduce Australian alumina output to under 19 Mt a year in 2024–25 and 2025–26. In January 2024, Alcoa announced its decision to fully curtail its 2.2 Mt a year Kwinana alumina refinery from 1 July amid rising costs, ageing plant and grade challenges.

Australia's bauxite output is forecast to increase by 1.0% year-on-year in 2024–25 to nearly 108 Mt, and will remain at this level in 2025–26. The expansion of Metro Mining's Bauxite Hills mine in Queensland — from 3.5 million tonnes a year to 7 million tonnes a year — and higher production in other bauxite mines, will drive increased output.

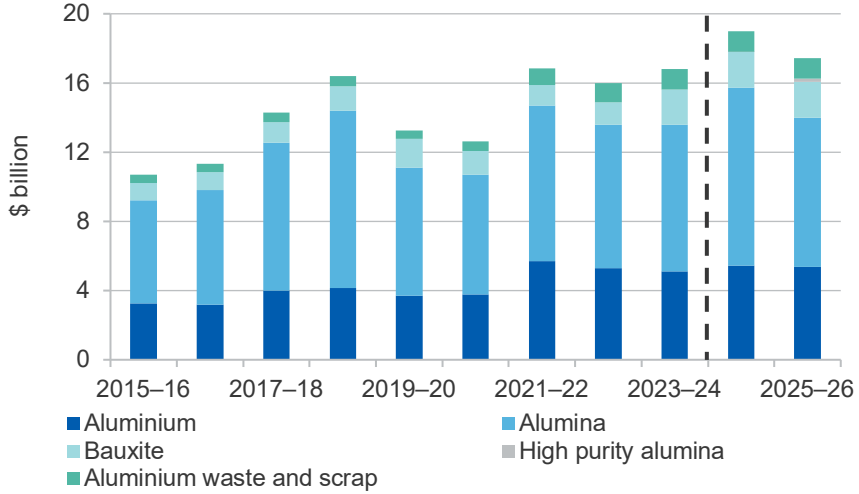
In September 2024, Alpha HPA commenced the construction of its Stage Two of the HPA First project. Once completed the expansion will boost the plant's production to 10,430 tonnes of high purity alumina a year.

Australia has the potential to make recycled products from scrap

Australia exported nearly $1.2 billion of aluminium waste and scrap in 2023–24, accounting for around 7% of Australia's total AAB exports. According to the Australian Aluminium Council (AAC), over 95% of Australia's scrap aluminium is exported for recycling. The major markets for Australian scrap are South Korea, Indonesia, the EU and India.

There are some remelting facilities in Australia, including G James and Weston Aluminium that use scrap aluminium and remelt to make recycled products. Australia's four aluminium smelters (Boyne Island, Bell Bay, Tomago and Portland) have limited capacity for remelt (AAC, *Australian Recycling Market 2021* report).

Figure 11.5: Australian aluminium/alumina/bauxite exports



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

Revisions to the outlook

The forecast for Australia's AAB export earnings in 2024–25 has been revised up from the June 2024 *Resources and Energy Quarterly* by $628 million to nearly $19 billion. The revision reflects an upward revision to the FOB alumina price forecast for 2024 and 2025. The forecast for Australia's AAB export earnings in 2025–26 has been revised down by $739 million to $17 billion. The revision reflects a downward revision to the forecast alumina price.

Table 11.1: Aluminium, alumina and bauxite outlook

						Annual percentage change		
World	**Unit**	**2023**	**2024 [f]**	**2025 [f]**	**2026[f]**	**2024 [f]**	**2025 [f]**	**2026 [f]**
Primary aluminium								
Production	kt	69,945	71,807	72,961	74,247	2.7	1.6	1.8
Consumption	kt	69,006	71,906	73,443	74,597	4.2	2.1	1.6
Prices aluminium[c]								
- nominal	US$/t	2,249	2,390	2,525	2,565	6.2	5.7	1.6
- real[d]	US$/t	2,319	2,390	2,475	2,464	3.0	3.6	-0.5
Prices alumina spot								
- nominal	US$/t	344	432	370	368	25.4	-14.4	-0.7
- real[d]	US$/t	355	432	363	353	21.6	-16.0	-2.7
Australia	**Unit**	**2022–23**	**2023–24**	**2024–25 [f]**	**2025–26 [f]**	**2023–24**	**2024–25 [f]**	**2025–26 [f]**
Production								
Primary aluminium	kt	1,532	1,567	1,574	1,574	2.3	0.4	0.0
Alumina	kt	18,971	18,690	18,303	18,506	-1.5	-2.1	1.1
Bauxite	Mt	98.5	106.2	107.7	107.7	7.8	1.4	0.0
Consumption								
Primary aluminium	kt	151	181	127	127	19.7	-30.0	0.0
Exports								
Primary aluminium	kt	1,440	1,437	1,495	1,495	-0.2	4.1	0.0
- nominal value	A$m	5,281	5,100	5,427	5,387	-3.4	6.4	-0.7
- real value[e]	A$m	5,666	5,250	5,427	5,210	-7.3	3.4	-4.0
Alumina	kt	16,566	15,877	16,473	16,655	-4.2	3.8	1.1
- nominal value	A$m	8,308	8,486	10,306	8,593	2.2	21.4	-16.6
- real value[e]	A$m	8,912	8,737	10,306	8,311	-2.0	18.0	-19.4
Bauxite	kt	34,113	40,497	45,231	45,231	18.7	11.7	0.0
- nominal value	A$m	1,284	2,039	2,066	2,103	58.9	1.3	1.8
- real value[e]	A$m	1,377	2,099	2,066	2,034	52.5	-1.6	-1.5
Total value								
- nominal value	A$m	16,005	16,812	18,986	17,439	5.0	12.9	-8.1
- real value[e]	A$m	17,171	17,308	18,986	16,866	0.8	9.7	-11.2

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 2024–25 financial year Australian dollars; **f** Forecast; **s** Estimate. Sources: 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 Metals Statistics (2024).

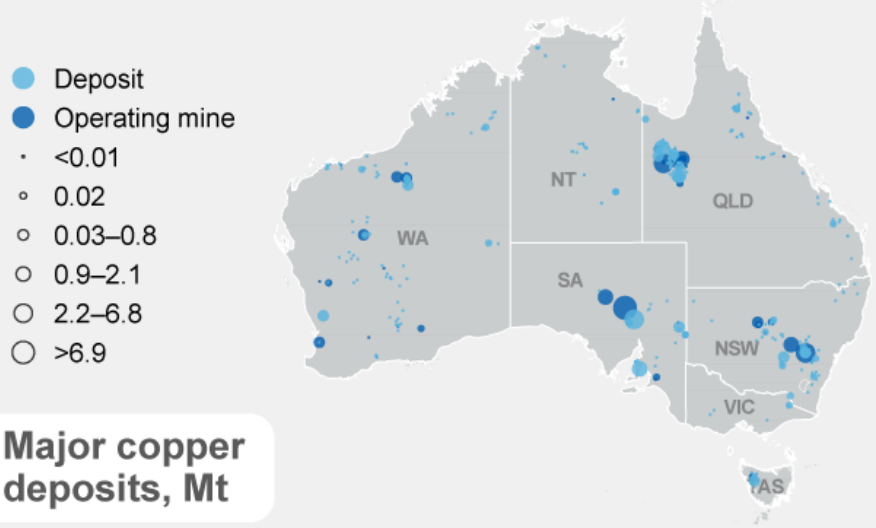
Copper

Australia's copper sector

Ranked 2nd
for world for copper reserves in 2023 (10% of reserves)

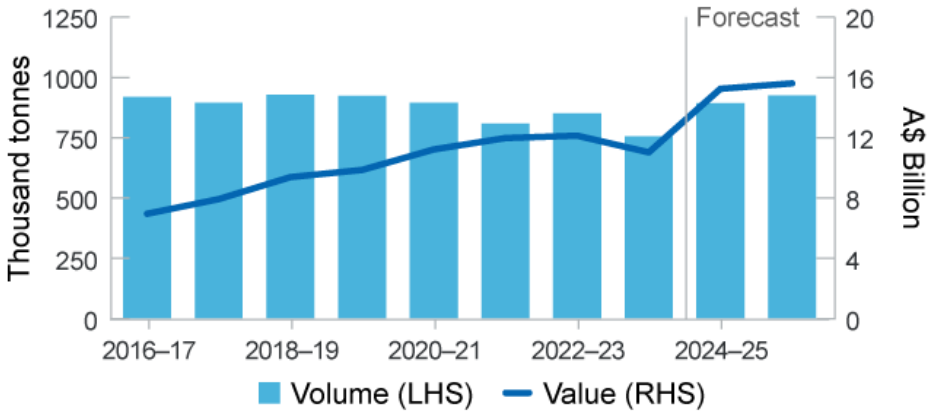
5th largest
exporter and **9th largest producer** globally, 2023

200+k tonnes
per year **production capacity** at Australia's largest mine, Olympic Dam



Major copper deposits, Mt

Australian copper exports



Outlook

Copper prices have eased, but are expected to **rebound over the next 2 years**

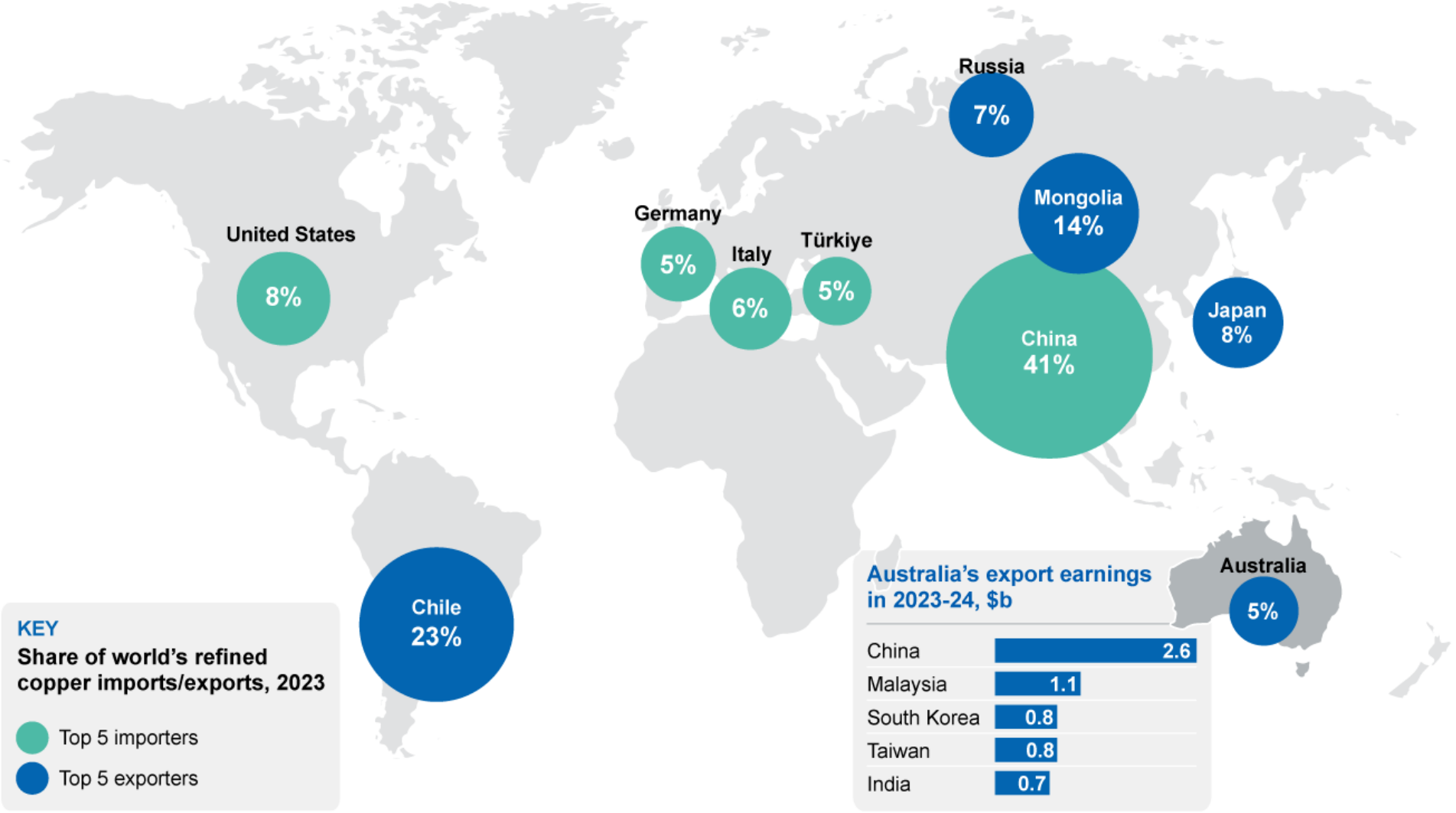
Export earnings forecast to grow to **$15.6 billion** in 2025-26

Exports volumes **expected to rise** as result of production growth

Exploration expenditure **rose 17%** in June 2024 quarter

SOURCE: GA; DISR; OCE

Copper TRADE MAP



SOURCE: ABS; GA; WBMS

Note: Reflects metal content of ores and concentrates and refined metal, export earnings may not be complete due to partial confidentialisation of trade data

12.1 Summary

- Copper prices have fallen significantly in recent months due to low demand from China and the US, and rising supply. Copper prices are forecast to average US$9,370 a tonne in 2024, rising to US$9,766 a tonne in 2026.
- Global copper consumption is forecast to grow by 2.5% in 2025 and 3.2% in 2026. Growth will primarily be driven by expanding manufacturing activity (such as EVs), large investment in energy transition, and construction - all concentrated in the US, China and India.
- Australian copper export earnings are forecast to reach around $15.4 billion in 2024–25. Growth in production and exports will then see export earnings reach $15.6 billion in 2025–26.

12.2 World consumption

China and US leading consumption to 2026

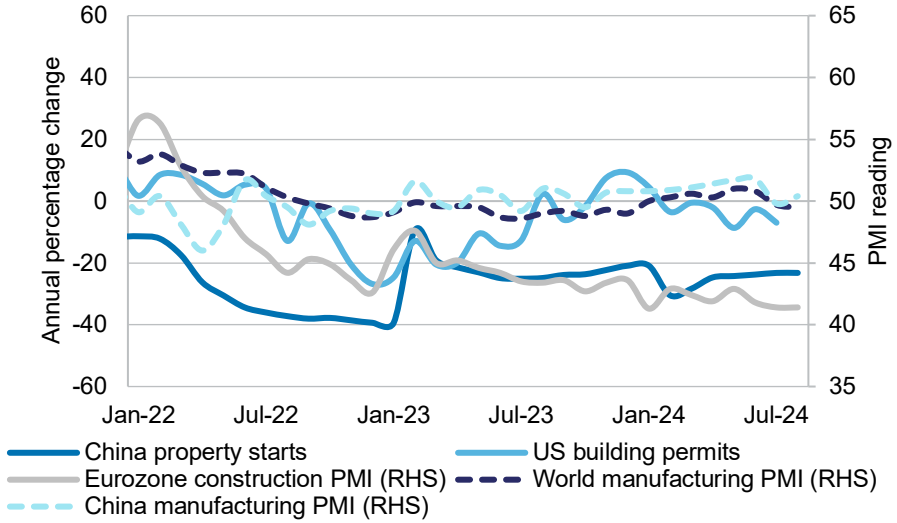
Total global copper consumption is forecast to grow by 0.5% to 28.1 million tonnes (Mt) in 2024, held back by relatively weak demand in China due to very limited recovery in the property sector and slower manufacturing and construction activities in the EU. In 2025 and 2026, global demand is expected to grow by 2.5% and 3.2% annually, reaching 28.8 Mt and 29.7 Mt respectively.

In H1 2024, global refined copper consumption reached 13.9 Mt, up 2.3% compared to H1 2023. The primary contributors to this growth were China (up 6.0%), the US (up 3.4%), ex-China Asia (up 5.1%) and the EU (up 1.5%). Refined copper consumption in the rest of the world dropped by 4.4% over the same period (see Figure 12.2).

AI and the development of data centres will accelerate copper demand

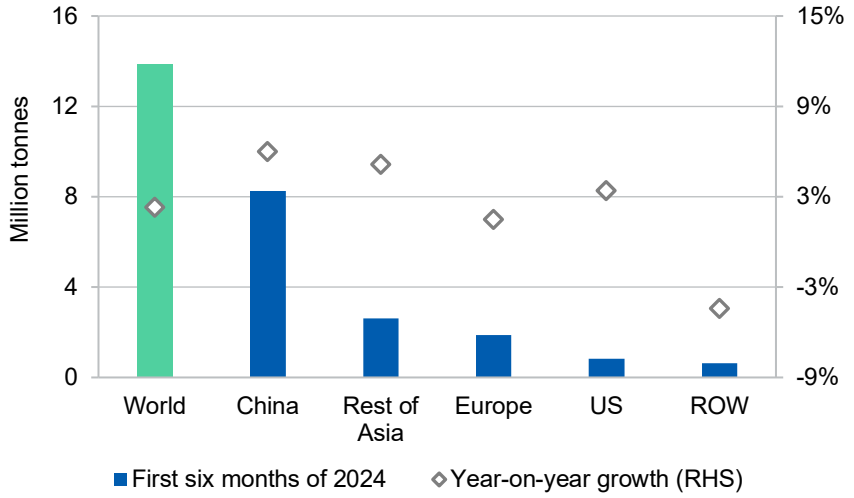
With its high electrical conductivity, copper is vital for the power grids that data centres (and hence AI) rely on. Copper demand is growing as new AI data centres are developed — the average data centre supporting AI requires 27-33 tonnes of copper per megawatt of power.

Figure 12.1: Leading global indicators for copper consumption



Source: Bloomberg (2024)

Figure 12.2: Refined copper actual consumption



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

Energy transition fuels China's copper consumption

Chinese copper demand is mainly driven by investment in renewable energy infrastructure, electric vehicle (EV) manufacturing and the construction sector.

China is expected to reach its 2030 renewable energy goal of 1,200 gigawatt of wind and solar capacity by the end of 2024. The construction of solar and wind capacity is copper intensive, driving strong copper demand. Although, additional solar and wind rollout might slow as capacity targets are hit, transmission links to correct regional power imbalances will require significant volumes of additional copper.

China's EV market remains robust, with 0.88 million EVs sold in July 2024, up 31% year-on-year. EVs are also highly copper intensive, so transitioning from internal combustion vehicles to EVs and plug-in hybrids are also contributing to Chinese copper demand growth.

EU's manufacturing and construction sectors slow

The EU region's copper consumption grew 1.5% year-on-year in H1 2024, mainly driven by Germany and Italy. In H2 2024, EU copper demand is expected to stay soft due to modest activity in manufacturing and construction. The Eurozone manufacturing and construction PMIs remained in contraction in August — unchanged from the July reading (Figure 12.1).

US economic resilience & trade policy shifts will increase copper demand

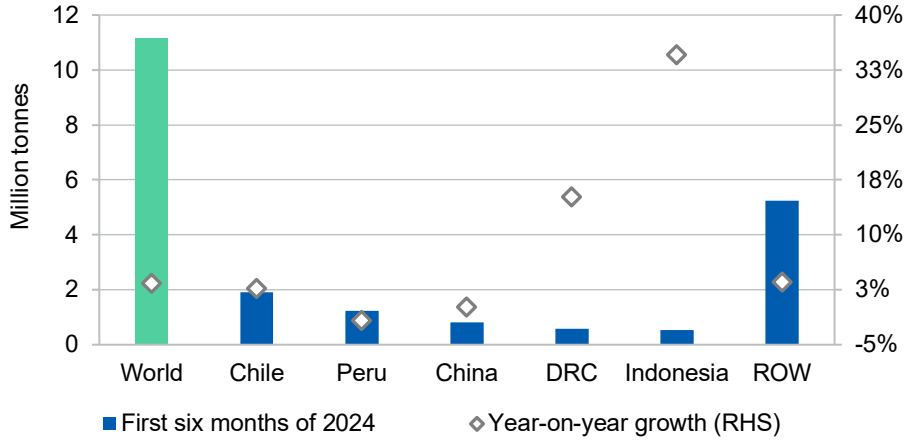
US copper demand is expected to increase to 2026 as data centres and manufacturing capacity is built, particularly in clean energy. This investment has been assisted by the Inflation Reduction Act and the Infrastructure Investment and Jobs Act. US tariff increases on various Chinese exports are expected to reroute more copper toward the US manufacturing sector.

12.3 World production

Quality grades and power stability boost mined output in 2024

Global mine production reached 11.2 Mt in H1 2024, up 3.4% compared to H1 2023 (Figure 12.3). The main contributors to this growth were Chile (up 3%), the Democratic Republic of Congo (DRC) (up 15%) and Indonesia (up 35%). This growth was broadly driven by higher grades of ore mined in major copper producers such as Chile, recovery of constrained output in Indonesia and by improved stability in the power supply in the DRC. However, Peru's copper mine output fell by 1.7% due to operational disruptions caused by community blockades and adverse weather at Las Bambas mine. Global mine output is forecast to grow to 22.9 Mt in 2024 — an annual increase of 2.3%.

Figure 12.3: Mined copper actual production



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

Capacity expansion & new projects drive mined output growth to 2026

Global mine output is expected to grow to 23.7 Mt in 2025 and 24.4 Mt in 2026 — increases of 3.3% and 3.0%, respectively (see Figure 12.4). This growth will be driven by capacity expansion in operating mines and the opening of new mines mainly in countries such as Chile, the DRC and

China. However, factors such as declining ore grades, unfavourable weather, environmental measures, community and workforce unrest, funding scarcity in some countries and transport challenges, pose risks to anticipated growth over the outlook period.

Chile — the world's largest producer — saw output rise by 3.0% year-on-year in H1 2024, driven by higher output from Escondida (15%) and Collahuasi (5%). However, Codelco — the state-owned miner, saw output fall by 8.2% in H1 2024 year-on-year, due to lower ore processing and a rock burst event at El Teniente in 2023. This decline was partially offset by higher output from some of Codelco's other divisions — such as Andina, Chuquicamata, and Gabriela. Beyond 2024, the Chilean copper commission (Cochilco), expects a 6% rise in copper output to 5.8 Mt in 2025, as new and expanded projects add 42 Kt in annual capacity.

In the DRC, output rose by 14% to 100.8 Kt in Q2 2024, due to better power grid stability. Output at the Kamoa-Kakula copper complex was strong. The phase 3 concentrator at Kamoa began operation in June 2024, and major investments by China Molybdenum Company (CMOC) in a range of projects (such as the Tenke Fungurume mine) should drive the country's output to 500 Kt in 2024 and to 600 Kt in 2025 and 2026.

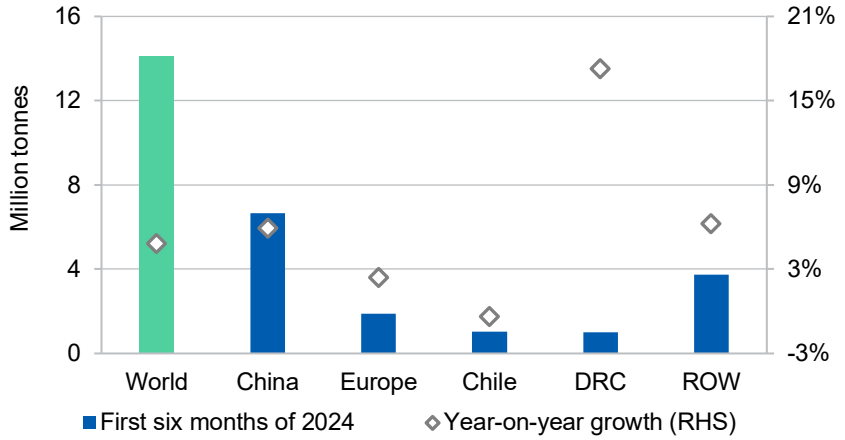
China's mine production capacity — including concentrates and leach processes — is expected to grow from 1.8 Mt in 2024 to 2.0 Mt in 2026. The expansions of big mines such as Qulong, Dexing, Duobaoshan Copper, Jiama, and Yulong will drive this growth.

Refined copper output growth driven by capacity expansion to 2026

H1 2024 saw a 4.8% increase in global refined copper output year-on-year, reaching 14.1 Mt. The main drivers of this growth were China (5.9%) and the DRC (17.0%), which helped to offset declines in the other major refined producers such as Chile (Figure 12.4).

Global refined copper production is forecast to grow to 28.7 Mt in 2025 and 29.5 Mt in 2026, representing an increase of 2.1% and 3.0% respectively. China, Indonesia and India are anticipated to be the major contributors to this expansion in refined output over the outlook period.

Figure 12.4: Refined copper actual production



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

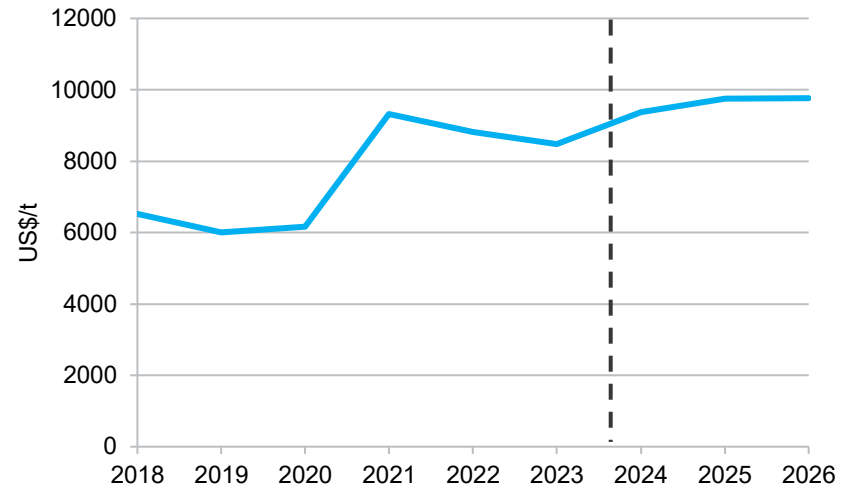
12.4 Prices

Lower copper prices driven from slow performance of end-use sectors

Refined copper prices have dropped from an average of US$9,750 a tonne in the June 2024 quarter, as market participants fret about Chinese demand and slower growth in the US. Rising inventories also pushed prices lower, averaging US$8,800 a tonne in August 2024.

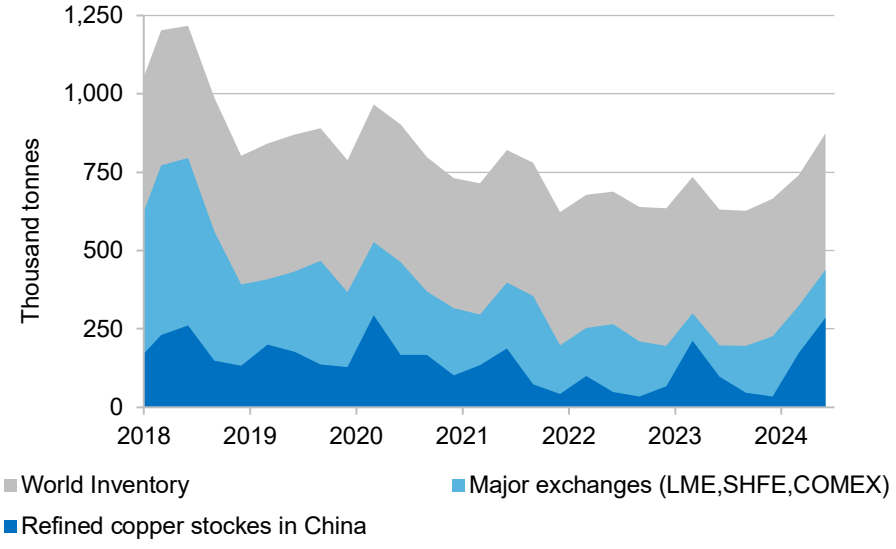
The copper price is expected to average US$9,370 a tonne over the rest of 2024, on the back of subdued consumption — due to slower economic activity in major economies. Prices are forecast to rise over the outlook period, averaging about US$9,758 and US$9,766 a tonne in 2025 and 2026 respectively. The gains will be driven by increased demand for energy transition infrastructure, EVs manufacturing and construction (Figure 12.5). In the June 2024 quarter, slow economic activity in China and other major economies saw inventories at the refined copper stocks in China and major exchanges rise by 64% and 35.1%, respectively, from the March quarter (Figure 12.6). Rising stocks have put downward pressure on copper prices during the quarter.

Figure 12.5: Copper price



Source: LME (2024) Official cash copper price (refined)

Figure 12.6: Global copper inventories



Source: Bloomberg (2024)

12.5 Australia

Capacity expansion and start of new mines boost export earnings

Export volumes are forecast to reach 893 Kt in 2024–25, downward revision by 1.3% from June forecast. Higher export volumes are expected to see export earnings reach around $15.4 billion in 2024–25, up more than a third compared to 2023-24. Export earnings are projected to grow further to around $15.6 billion in 2025-26, driven by higher export volumes (Figure 12.7).

Mine production to grow over the outlook period

Australian mine output in 2024–25 is forecast to grow to 830 Kt — an increase of 4.5% compared to 2023–24. In 2025–26, production should reach 852 Kt, an increase of 2.6% year-on-year. The projected growth comes from a range of new projects and expansions of existing projects.

The Kanmantoo copper mine in South Australia is a significant brownfield project which restarted production in early 2024. The project produced about 2,584 tonnes of copper in the June quarter 2024. The Kanmantoo project is expected to add about 12 Kt of copper to Australia's annual production over the period.

BHP's Copper South Australia operations — including Olympic Dam, Carrapateena and Prominent Hill — saw copper output grow 39% to 322 Kt in the 2023-24. This was due to the integration of more ores mined from consolidated sites, with record levels of material mined and concentrate smelted at Olympic Dam in June 2024. BHP aims to produce 310-340 Kt of copper in 2024-25 from its Copper South Australia asset.

Western Australia expected to see some major projects start operation within the next two years. In early 2025, Develop Global and Anax Metals are expected to start operation at the Sulphur Spring Copper–Zinc and Whim Creek projects, respectively. In early 2026, Caravel Minerals and Auking Mining expected to start production at Caravel (stage1) and at Koongie Park projects, respectively. Collectively, these projects are estimated to add around 135 Kt respectively to the Australian annual production capacity in the medium-term.

In Queensland, Glencore announced the Mount Isa copper mines and concentrator will close in H2 2025. Glencore's copper smelter in Mount Isa and its refinery in Townsville are expected to continue operating to 2030.

Copper is one of the five commodities included in the Government's Strategic Materials List released in 2023, along with aluminium, phosphorous, zinc and tin. Copper is often alloyed with tin to make bronze, which is widely used in machinery and consumer products including springs, fittings and motor bearings. Australia has substantial reserves of tin and accounts for around a third of global tin exports. An overview of the tin market and Australian production and exports is provided in Box.12.1.

Copper exploration has been healthy through 2023 and into 2024

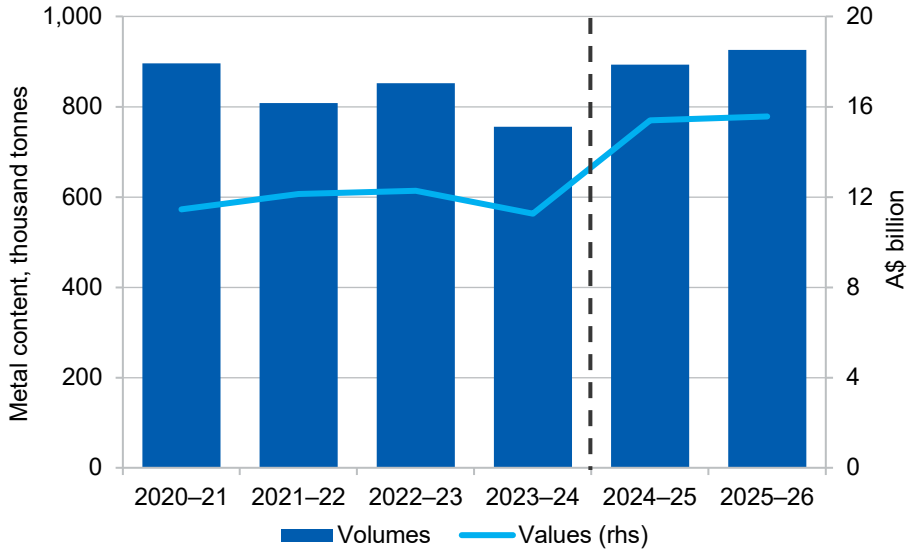
Copper exploration expenditure indicates a 17% increase in June quarter compared to the March quarter this year. Copper exploration expenditure on average rose to $165 million in 2023. This was around 15% higher compared to exploration expenditure in 2022, and continues a general upward trend seen since 2017 (Figure 12.8).

BHP is pursuing a large exploration and drilling campaign at the Oak Dam deposit in South Australia. In February 2024, BHP announced it had identified a high-grade copper deposit as part of the campaign. BHP's application for an underground decline at Oak Dam is currently under assessment. The decline would enable faster and lower cost resource definition drilling of the deposit. In August 2024, BHP announced an Inferred Mineral Resource at Oak Dam, estimated at 1.34 billion tonnes with copper grade of 0.66%. Within this, there is a high-grade mineralisation zone containing 220 Mt with a copper grade of 1.96%.

Revisions to the outlook

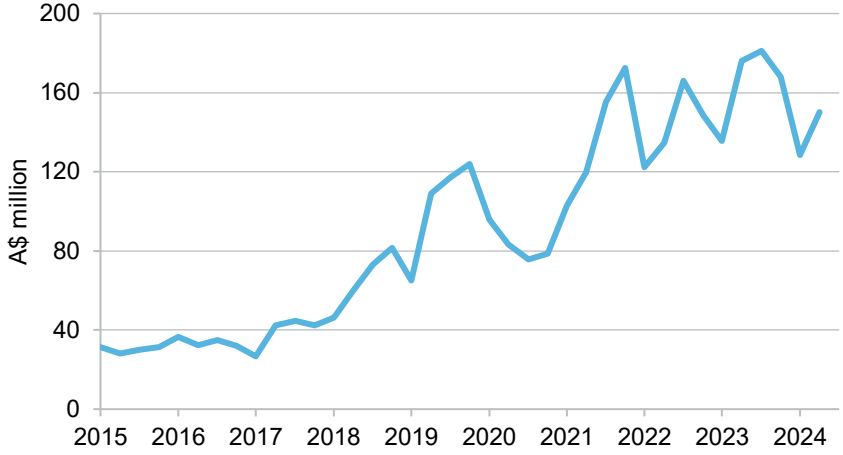
Since the June 2024 *Resources and Energy Quarterly*, the estimates of Australia's copper export earnings in 2023-24 have declined slightly (by $0.8 billion) due to lower export volumes. Likewise, export earnings in 2024–25 and 2025-26 have been revised down by $0.4 billion and $1.4 billion, respectively, due to a slightly downward revision of the forecast price.

Figure 12.7: Australia's copper export volumes and values



Source: Source: ABS (2023) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Figure 12.8: Australian copper exploration



Source: ABS (2024) Mineral and Petroleum Exploration, Australia. 8412.0

Box 12.1: Tin case study

Besides copper, tin is one of Australia's 5 strategic materials. This reflects its importance in the global transition to net zero, Australia's geological potential in tin resources, and its strong demand from strategic international partners.

Sources of demand

Tin's primary use is as an electronics solder, which accounts for around half of global tin consumption. Reflecting this, demand for tin is heavily driven by the energy and technology sectors. Tin is also used to manufacture semiconductors and batteries.

Global market

Most of the world's tin resources are located in the 'tin belt' – an area in Asia, stretching through China, Myanmar, and Indonesia. In 2022, these nations contributed 63.3% of global tin mine output (China 30.3%, Indonesia 23.7%, and Myanmar 9.3%) and held 53.0% of global reserves (China 22.4%, Indonesia 16.3%, and Myanmar 14.3%). Indonesia and Myanmar both currently face supply disruptions due to their own environmental regulations and mining and export restrictions. Since August 2023, the Man Maw tin mine located in the Wa State region of Myanmar has been suspended to preserve reserves and protect the environment. The mine accounts for around 70% of Myanmar's tin production. The suspension has reduced China's tin imports, with increase imports from Australia, Bolivia and Nigeria not covering the losses from Myanmar. In H1 2024, Indonesian tin export volumes contracted as police investigations delayed export permits.

Australia's exports and production

Australia is a relatively small producer of tin, despite holding 11% of global reserves (as of 2022) — the 4th largest globally. In 2023, Australia mined 9.8kt of tin, which was 3.2% of global output and ranking 8th in the world. Australia is the third largest exporter of tin ores and concentrates. In 2023, Australia contributed 13% of global exports, valued at $325 million, behind only Nigeria and Brazil. The majority of these exports went to China (51%), Malaysia (27%) and Thailand (20%). only Nigeria and Brazil.

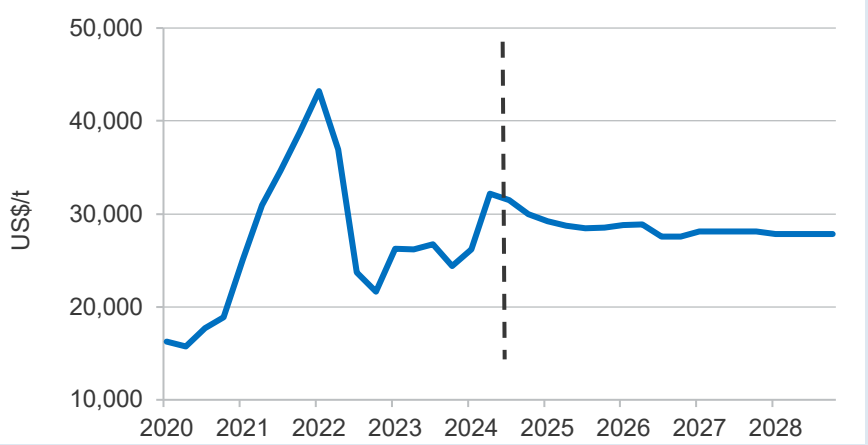
Australia's production

Australia's major tin producer, the Renison mine (owned by Metals X) in Tasmania, accounted for 97% (9.5kt) of the country's tin output in 2023. The remaining 3% (0.3kt) came from the Greenbushes mine in Western Australia, where tin is produced as by-product of tantalum processing. Stellar Resources Heemskirk mine in Tasmania is on track to become Australia's third operational tin mine. The mine – located 18km southwest of Renison – has a mineral resource estimate of 7.48 million tonnes. Drilling is currently underway to help conduct the project's Pre-Feasibility Study. Startup is expected for around 2026.

Price

The London Metal Exchange (LME) tin spot price averaged US$31,634 per tonne in July and August 2024 (combined), down from US$32,190 per tonne in the June quarter (see Figure 12.9).

Figure 12.9: Tin Price



Source: LME (2024) 99.85% cash tin price

Tin's price is expected to drop below $30,000 a tonne by end 2024. The process of miniaturising semi-conductors — thus requiring less tin — is a key driver of this predicted price fall. However, strong demand for EVs and consumer electronics is set to partially offset this fall in demand. Continued supply disruptions in Myanmar could also push up prices.

Table 12.1: Copper outlook

World	Unit	2023	2024[f]	2025[f]	2026[f]	Annual percentage change 2024[f]	2025[f]	2026[f]
Production								
– mine	kt	22,407	22,920	23,675	24,385	2.3	3.3	3.0
– refined	kt	27,505	28,112	28,709	29,570	2.2	2.1	3.0
Consumption	kt	27,981	28,131	28,833	29,757	0.5	2.5	3.2
Closing stocks	kt	666	874	749	563	31.2	-14.3	-24.9
– weeks of consumption		1.2	1.6	1.4	1.0	30.5	-16.3	-27.2
Prices LME								
– nominal	US$/t	8,483	9,369	9,758	9,766	10.4	4.2	0.1
	USc/lb	385	425	443	443	10.4	4.2	0.1
– real[b]	US$/t	8,746	9,369	9,567	9,382	7.1	2.1	-1.9
	USc/lb	397	425	434	426	7.1	2.1	-1.9
Australia	**Unit**	**2022-23**	**2023–24**	**2024–25[f]**	**2025–26[f]**	**2023–24**	**2024–25[f]**	**2025–26[f]**
Mine output	kt	804	795	830	852	-1.1	4.5	2.6
Refined output	kt	454	451	435	421	-0.6	-3.6	-3.3
Exports								
– ores and concs[c]	kt	1,511	1,259	1,595	1,776	-16.7	26.7	11.3
– refined	kt	415	396	435	421	-4.6	9.8	-3.3
– total metallic content	kt	852	756	893	926	-11.3	18.2	3.7
Export value								
– nominal	A$m	12,262	11,259	15,405	15,567	-8.2	36.8	1.0
– real[d]	A$m	13,154	11,591	15,405	15,055	-11.9	32.9	-2.3

Notes: **b** In 2024 calendar year US dollars; **c** Quantities refer to gross weight of all ores and concentrates; **d** In 2024–25 financial year Australian dollars; **f** Forecast.

Source: ABS (2024) International Trade, 5465.0; LME (2024) spot price; World Bureau of Metal Statistics (2024); Department of Industry, Science and Resources (2024).

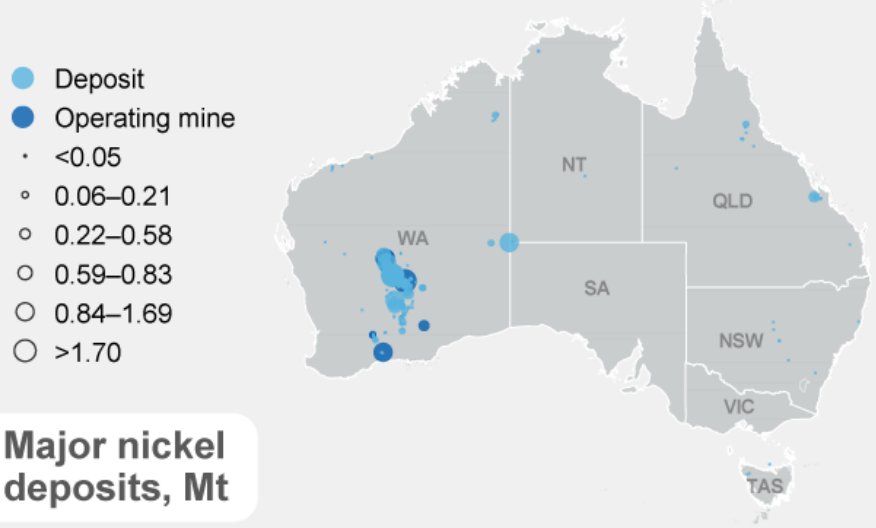
Nickel

Australia's nickel sector

18%
of global total **resources, second largest** global reserve

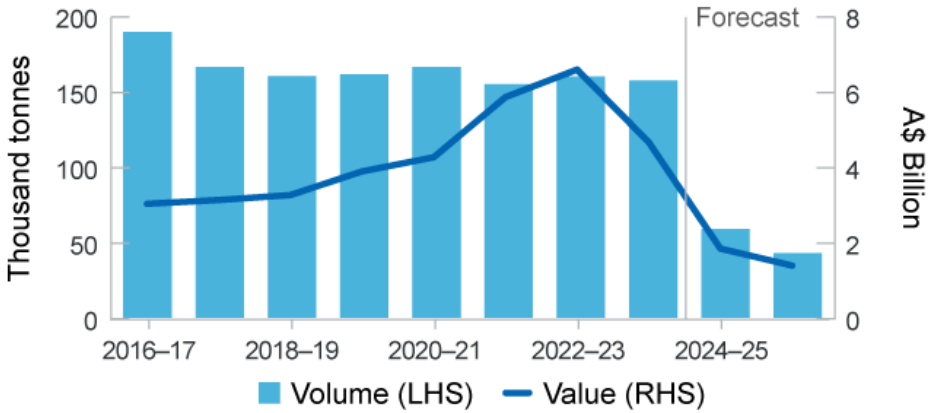
5th largest
nickel **miner** globally, 2023

7th largest
nickel **refiner** globally, 2023



Major nickel deposits, Mt

Australian nickel exports



Outlook

Prices have **stabilised** in recent months, on strong demand and supply cuts

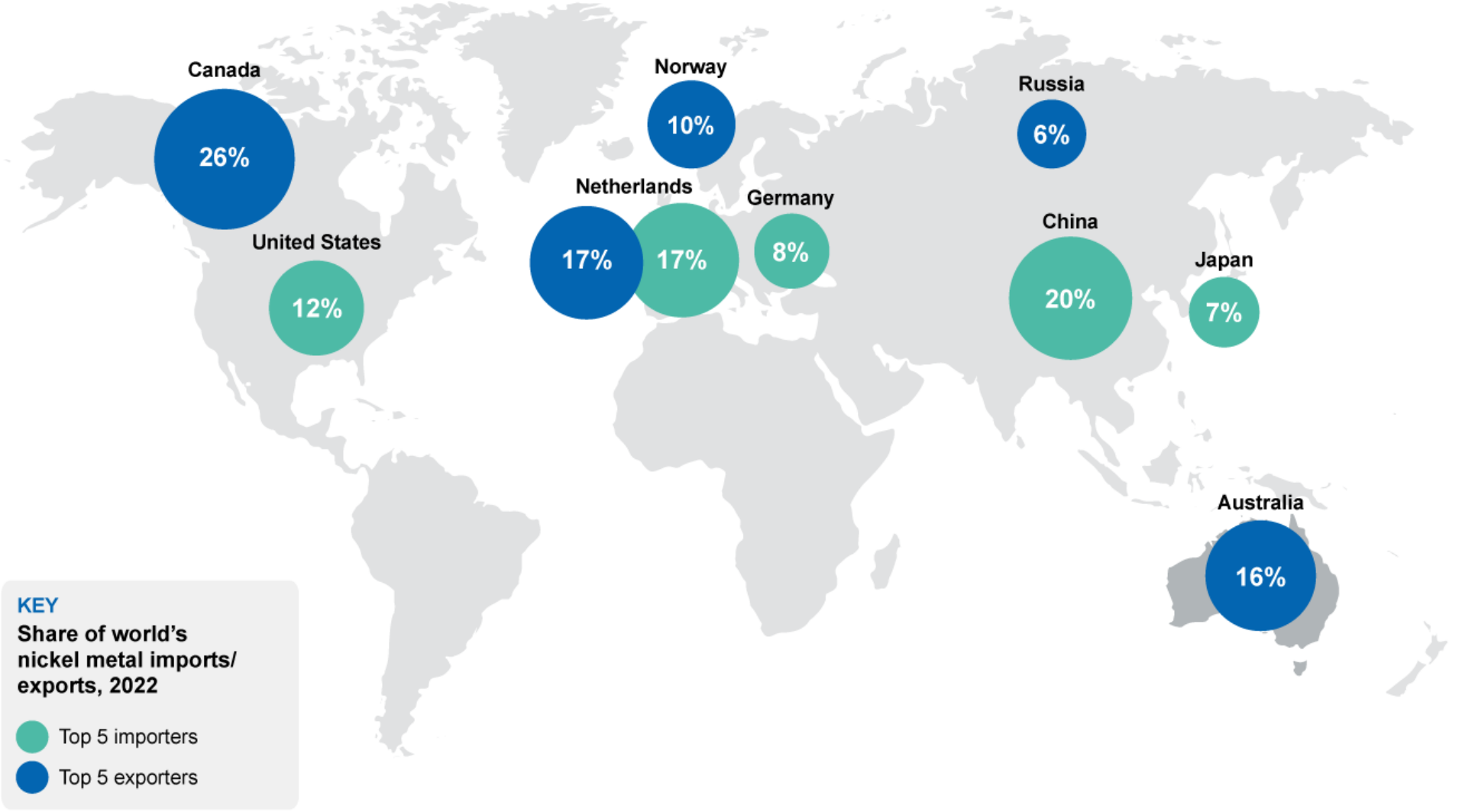
Export earnings to halve to **$1.4 billion** in 2024-25, following production closures

Oversupply in the global nickel market an **ongoing risk** in the next few years

15% of global nickel demand in 2023 for EV batteries and other low emissions tech

SOURCE: INSG; IEA; USGS; ABS; DISR, GA

Nickel TRADE MAP



SOURCE: INSG; IEA; USGS; ABS; DISR, GA.

12.1 Summary

- Nickel prices fell to US$16,200/t in the September 2024 quarter, as Indonesian supply growth outweighed production cuts in the rest of the world. The magnitude of new Indonesian supply growth and downside demand risks limits meaningful price increases over the forecast period.
- World demand for nickel remained robust in the June quarter 2024, however weakness in stainless steel production and EV sales means growth may slow for the rest of the year.
- Weaker prices and reduced production from major mine closures are expected to see Australian nickel export earnings fall by over half to $1.4 billion in 2024–25, and decline further to $1.0 billion in 2025–26.

12.2 World consumption

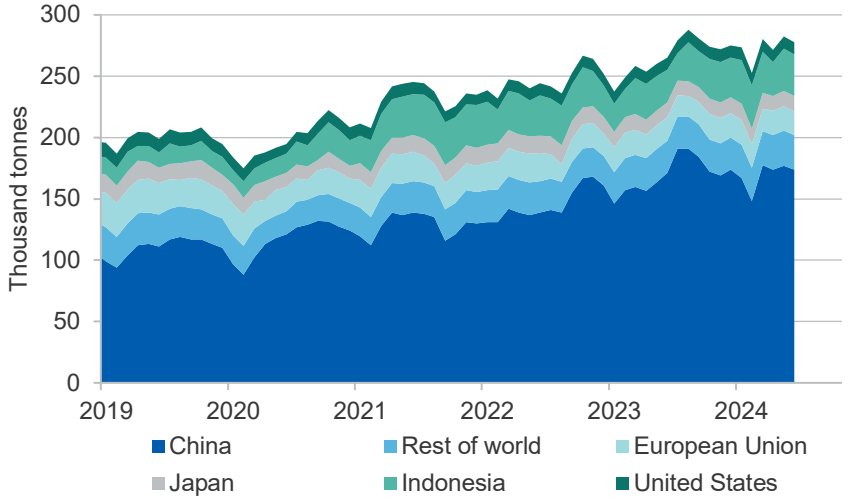
China's manufacturing and EV sectors drive growth in nickel consumption in the June quarter

Global nickel demand grew 6.0% year-on-year in the June quarter 2024, maintaining a consistent recovery from 2020 COVID-lows. The increase in global demand in the last 12 months has primarily been led by Indonesia and China, with other major markets such as Europe and the US stable in year-on-year terms (Figure 13.1).

Despite ongoing weakness in China's construction sector, a recovery of China's manufacturing sector from early 2023, and the rapid rise of its EV sector has bolstered nickel usage. Nickel consumption is also benefitting from China's build out of its renewable and nuclear energy infrastructure (Figure 13.2).

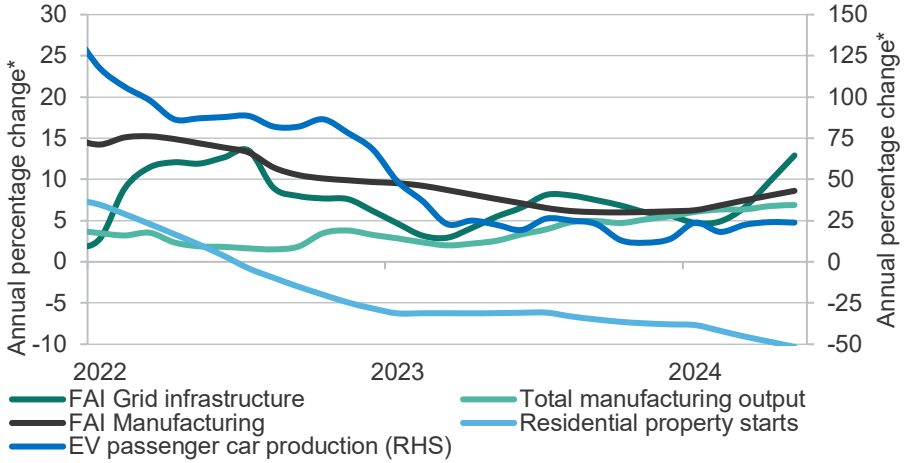
Ex-China global nickel demand has been muted in 2024. Tighter monetary conditions have act as a drag on broader economic conditions, though this has been partially offset by ongoing strength in infrastructure-led construction. However, Indonesia has rapidly expanded its nickel consumption, rising 14% year-on-year in the June quarter 2024. The country has emerged as the world's second largest producer of stainless steel in recent years and is expected to produce its first EV battery in 2024.

Figure 12.1: World nickel demand



Source: International Nickel Study Group (2024); Department of Industry, Science and Resources (2024)

Figure 12.2: Major drivers of China's nickel consumption



Notes: FAI = Fixed Asset Investment; *6-month average growth rate

Source: International Nickel Study Group (2024); Department of Industry, Science and Resources (2024)

Slower economic growth to weigh on stainless production and nickel use across the rest of 2024

Despite seeing growth in stainless production in H1 2024, small or negative steel making margins in China are likely to slow growth for the rest of the year. Economic indicators such as production and investment remain bearish globally, while declining ore grades in Indonesia are keeping input prices high. Stainless steel production in June 2024 was 3% lower than month-on-month, and is expected to fall a further 4% in July.

While stainless steel production in the US and the EU is projected to remain weak, strong growth is expected in India. A decision by the Finance Ministry of India to remove the 2.5% import duty on ferronickel should moderately reduce production costs and boost domestic production, building off strong growth in H1 2024.

Nickel consumption growth in batteries is expected to slow, driven by slowing EV sales and improvements in nickel-free chemistries

While EV sales growth continues in China, growth in other markets is subdued. EU sales suffered as subsidies were removed in Germany, and US automakers such as Ford and General Motors struggle with production and sales ramp up. Weak consumer sentiment and easing of EV sales targets present downside risks to future EV demand in these markets.

Penetration rates of nickel-free lithium iron phosphate (LFP) batteries is rising, and the IEA expect LFP penetration to reach 50% by 2030 (see Lithium chapter). While a key advantage of nickel-based batteries (over LFP) has been its higher energy density the gap is closing. BYD's recently updated Blade battery increased energy density by over a quarter, and is approaching energy densities typical of nickel-based batteries. Sodium-ion batteries are also emerging as a future challenger in the battery space.

World nickel demand is projected to grow by 3.6% annually over the outlook period. Clean energy technologies, including EVs and low emission power generation technologies — such as wind, hydro and geothermal — are expected to be the primary driver of growth.

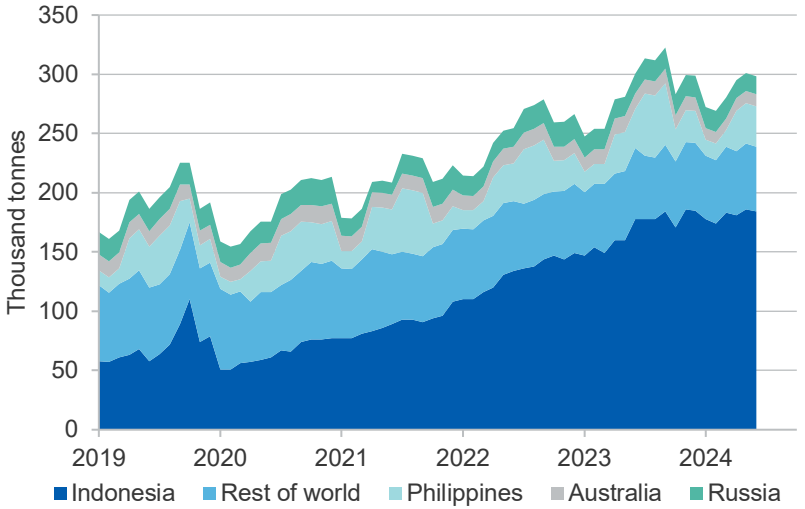
12.3 World production

Supply disruptions slowing global mined nickel output

World mined nickel production increased by 0.9% year-on-year in the June quarter 2024. The weaker growth rate — compared to recent history — was driven by supply disruptions related to political unrest in New Caledonia. This is despite Indonesia continuing to expand its nickel operations, increasing mined nickel production by 11% year-on-year in the June 2024 quarter. Indonesia 's recent expansion has driven cuts to production by other major producers in 2024 — estimated to be about 10% of total global supply capacity.

World mine output is forecast to rise by 5.7% on average over the outlook period, driven by increased Indonesian supply. The continued ramp up of existing industrial parks such Weda Bay and Morowali, and prospective projects such as the IGP Pomalaa project will add to supply.

Figure 12.3 World mined nickel production



Source: International Nickel Study Group (2024); Department of Industry, Science and Resources (2024)

Indonesia driving refined nickel growth as the nation pivots to an EV future

Global production of intermediate products — which can then be refined into nickel metal or directly into the battery supply chain — continued to see strong growth in the June quarter 2024, rising 16% year-on-year. Over 70% of intermediate production in 2024 come from Indonesia, after technological innovation commercialised by Chinese firm Tsingshan in 2021 allowed lower-quality, laterite nickel pig iron (NPI) to be processed into grade 1 'battery grade' nickel products (via the production of matte).

The rapid growth of Indonesian refining capacity in recent years reflects ongoing government policies to grow the nation's downstream processing of minerals. The country also aims to establish a domestic EV sector and expects its first EV battery cell factory to start production in 2024.

World refined nickel production is forecast to grow 4.7% per year on average over the outlook period. Indonesia and China are expected to be the major contributors to this growth, and account for around 75% of global refined nickel supply by 2026.

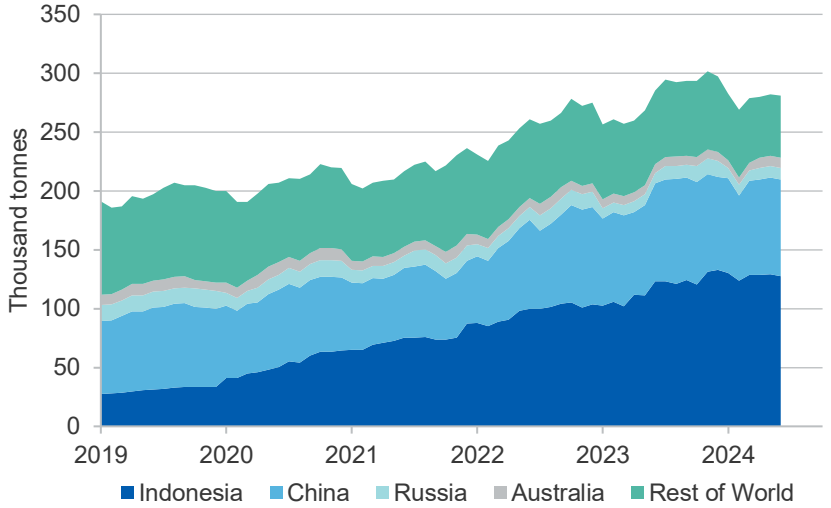
Geographical concentration of nickel risks global supply chain resilience

The ongoing geographical concentration of global nickel output will be a key trend over the outlook period. While Indonesian output ramps up and Chinese output remains strong, output in the rest of world has fallen to levels last seen in the mid-1990s, and is now just 20% of global output.

Indonesian nickel producers may look to diversify

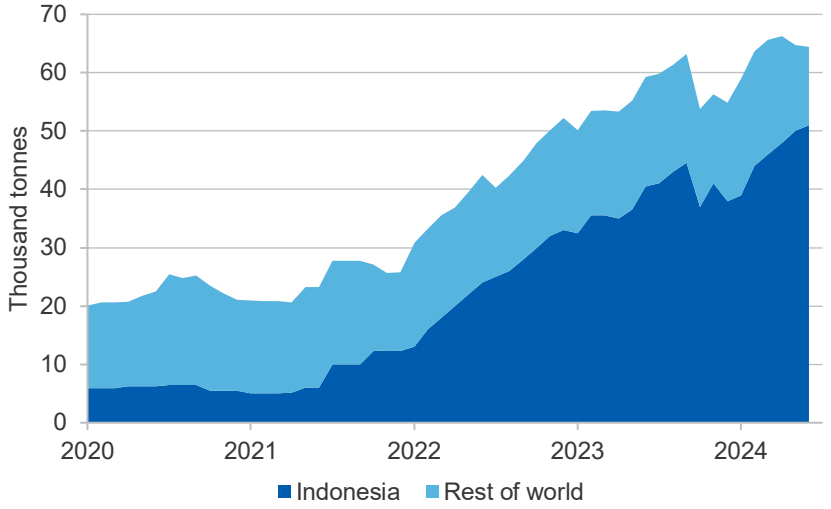
Chinese ownership has been a feature of the Indonesian nickel industry following Indonesia's 2020 ore export ban. The ban encouraged investment of up to US$30 billion by Chinese producers, and 80% of Indonesian battery-grade output is expected to come from Chinese-owned producers in 2024. Some firms operating in Indonesia are now seeking partnerships with new investors to reduce their share of Chinese ownership, to improve eligibility of US Inflation Reduction Act credits. Additional investment in Indonesian nickel may come at the expense of investment in countries outside of China and Indonesia.

Figure 12.4 World refined nickel production



Source: International Nickel Study Group (2024); Department of Industry, Science and Resources (2024)

Figure 12.5 World intermediate nickel production



Source: International Nickel Study Group (2024); Department of Industry, Science and Resources (2024)

Emissions and environmental impacts are cited as a barrier to new investment in Indonesia, though recent renewable energy developments could cut Indonesia's nickel emissions. ASX-listed Nickel Industries has signed binding long-term offtake agreement with Indonesia's largest solar project, which is expected to cut its emissions to below 10 tonnes of CO_2 equivalent per tonne of nickel at its Indonesian operations.

12.4 Prices

Production cuts fail to boost prices

Despite nickel prices rebounding in the June quarter 2024, continued oversupply has driven down prices in the September quarter. The LME closing nickel price dropped from $17,040/t on June 28 to $15,503/t July 25, its lowest this year, illustrating that the market remains oversupplied despite recent closures and cuts to production.

The estimated average price in the September quarter was US$16,200/t, around 14% lower than the previous quarter (Figure 13.6). While recent cuts in production outside of China and Indonesia should provide some support, weakening demand is likely to see nickel prices remain soft over the rest of 2024. As a result, the benchmark LME nickel price is forecast to average around US$17,100/t in 2024.

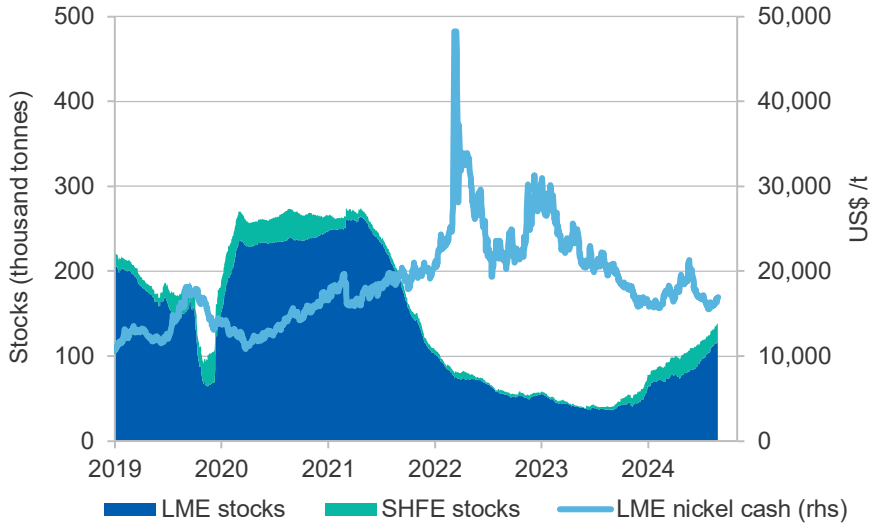
Growing exchange inventories highlight extent of market oversupply

Nickel inventories at the major exchanges have increased by 90% since the beginning of 2024, owing to production growth in China and Indonesia overtaking global nickel demand. The LME have recently approved a range of new Chinese nickel brands, which is offsetting the loss of Russian nickel after the LME's decision to ban Russian inflows in April 2024. Despite recent increases, inventories on the major exchanges (the LME and Shanghai Futures Exchange) remain below long-term averages.

Excess global supply an ongoing downside risk to prices over outlook

Despite a large loss in western producers, emerging and marginal Indonesian producers are likely to contain any price increases. The LME nickel price is expected to average US$17,400/t in 2025, and around US$17,800/t in 2026. However, nickel prices are expected to remain volatile due to short term mismatches in supply and demand.

Figure 12.6 Nickel spot price and stock at exchanges



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

12.5 Australia

Lower prices continuing to impact Australian production

On 11 July 2024, BHP announced the temporary suspension of its Nickel West operations, citing a global oversupply of nickel and low forward prices. The suspension affects the Mt Keith and Leinster mines, the Kalgoorlie smelter and the Kwinana refinery, as well as development of the West Musgrave project.

Operations at Nickel West will be suspended in October 2024 and handover activities for temporary suspension will be completed by December 2024. BHP will review the suspension in 2027.

Australian mined nickel production is projected to fall by around 44% in 2024–25, with a similar fall in refined output. Reduced export volumes are expected to persist through to end of the outlook period (Figure 13.7).

While there are a range of nickel projects in the pipeline, it is unlikely that new mines will come online in the outlook period.

Export earnings to be impacted by falling nickel prices and production cuts

Total earnings in 2024–25 are forecast to fall to $1.4 billion — a fall of over half compared to the previous year — as weaker prices and lower export volumes impact the sector. Export earnings in 2025–26 are expected to fall further, to $1.0 billion, as the full impacts of BHP's Nickel West closure are felt.

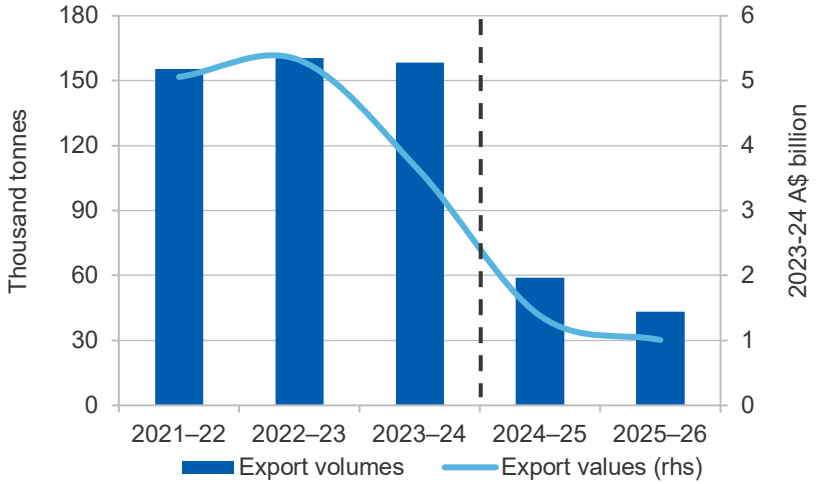
Exploration expenditure in 2024 lower on weaker nickel price

Nickel and cobalt exploration expenditure in Australia for the June quarter 2024 was $58 million — around 31% lower than the comparable period in 2023. Exploration expenditure in the last 12 months to the June quarter 2024 was also 19% lower year-on-year.

Revisions to the outlook

Compared to the June 2024 *Resources and Energy Quarterly*, nickel exports earnings have been revised down by $0.9 billion in 2024–25 and $0.5 billion in 2025–26. This is a result of a downward revision to Australian production forecasts over the period, as well as a downward revision to forecast nickel prices.

Figure 12.7 Nickel export volumes and values



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

Table 12.1: Nickel outlook

World	Unit	2023	2024[f]	2025[f]	2026[f]	Annual percentage change 2024[s]	2025[f]	2026[f]
Production								
– mine	kt	3,675	3,896	4,067	4,349	6.0	4.4	6.9
– refined	kt	3,357	3,618	3,791	3,940	7.8	4.8	3.9
Consumption	kt	3,192	3,478	3,530	3,734	9.0	1.5	5.8
Global balance		165	140	261	206			
Closing stocks	kt	856	996	1 257	1 463	16	26	16
– weeks of consumption		14	15	19	20	7	24	10
Prices LME								
– nominal	US$/t	21,470	17,051	17,400	17,750	-21	2.0	2.0
	USc/lb	974	773	789	805	-21	2.0	2.0
– real [b]	US$/t	22,136	17,051	17,059	17,052	-23	0.0	0.0
	USc/lb	1,004	773	774	773	-23	0.0	0.0
Australia	**Unit**	**2022–23**	**2023–24**	**2024–25[f]**	**2025–26[f]**	**2023–24**	**2024–25[f]**	**2025–26[f]**
Production								
– mine [c]	kt	153	134	75	68	-13	-44	-9.3
– refined	kt	97	91	50	39	-6.2	-45	-20
– intermediate		38	42	5	0	11	-87	-100
Export volume [dg]	kt	161	158	59	43	-1.4	-63	-26
Export value[g]								
– nominal value	A$m	4,956	3,503	1,380	1,041	-29	-61	-25
– real value [e]	A$m	5,317	3,607	1,380	1,007	-32	-62	-27

Notes: **b** In 2024 calendar year US dollars; **c** Quantities refer to gross weight of all ores and concentrates; **d** 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, 5465.0; LME (2024) spot price; World Bureau of Metal Statistics (2024) World Metal Statistics; Department of Industry, Science and Resources (2024).

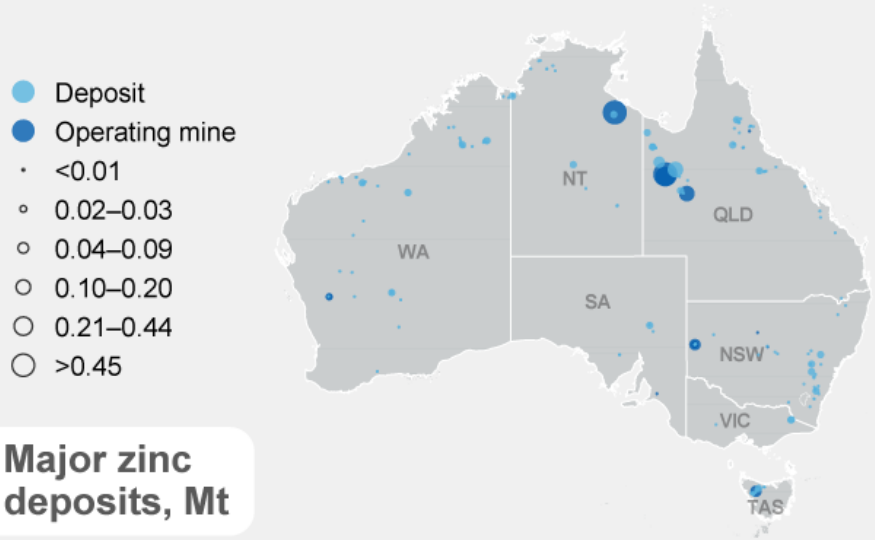
Zinc

Australia's Zinc sector

About 1/3
ores & concentrate production **refined domestically**

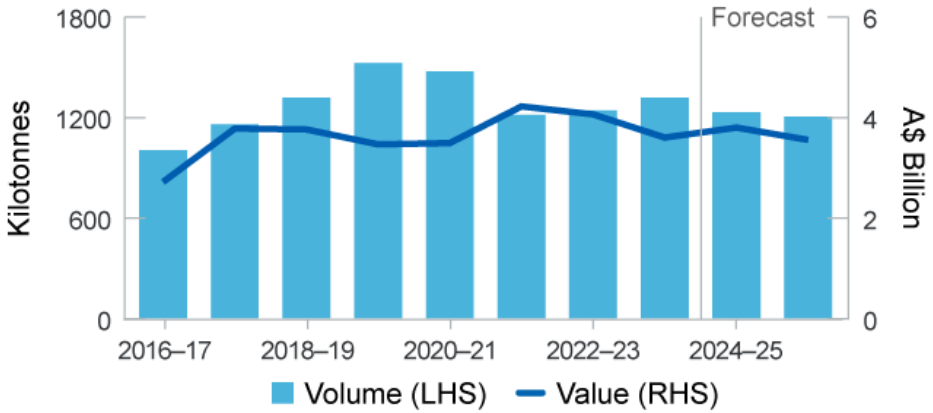
31%
of the world's known **zinc resources**

3rd largest
zinc producer globally in 2023



Major zinc deposits, Mt

Australian zinc exports



Outlook

Zinc prices **fell modestly** in the September quarter

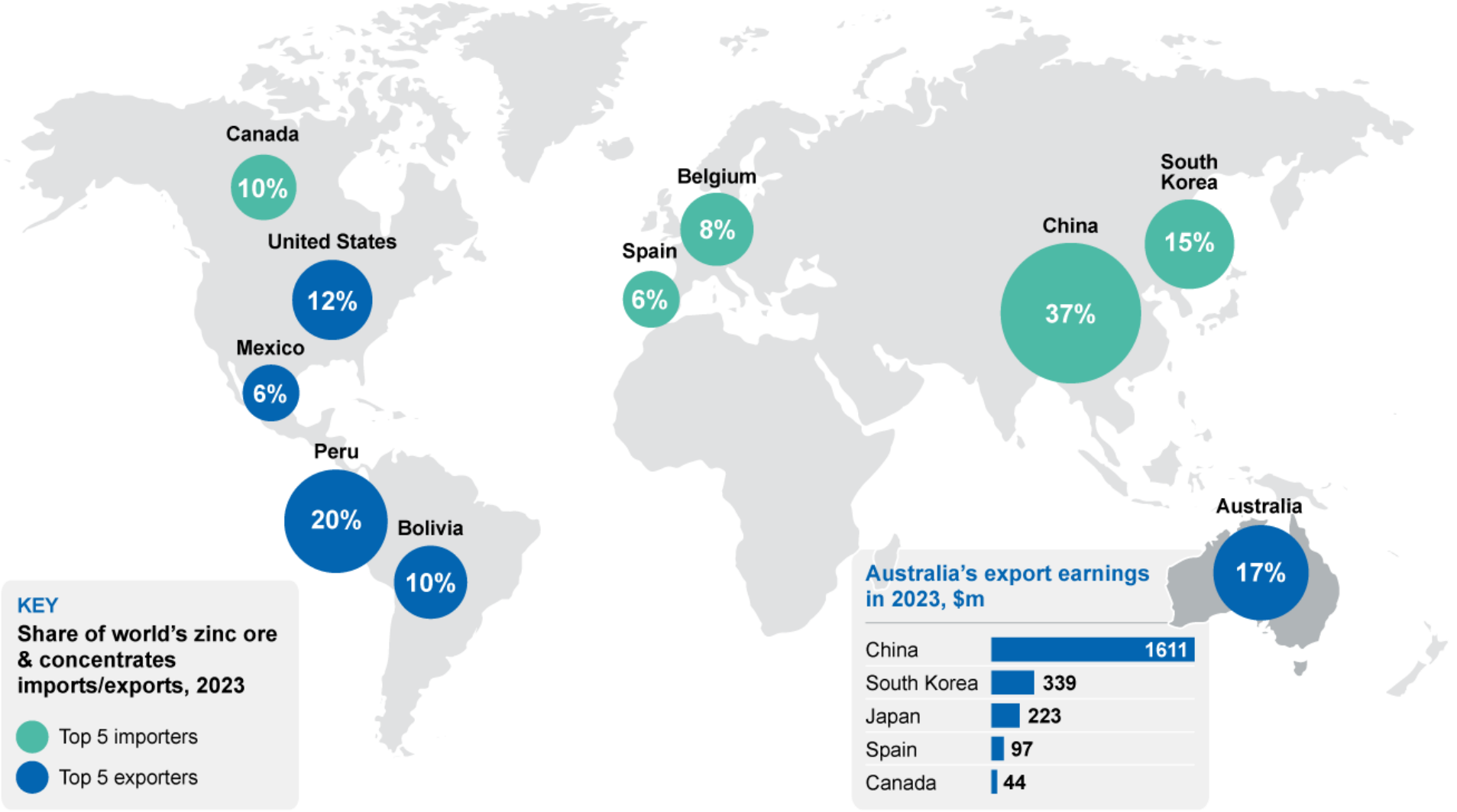
Future earnings to **remain stable**

Australian **production** outlook expected to **ease** over the outlook

Zinc exploration expenditure **rose** in June quarter

SOURCE: GA; DISR; OCE

Zinc TRADE MAP



SOURCE: ILZSG; ABS

13.1 Summary

- Zinc demand continues to strengthen. After large falls in 2023, the zinc price is forecast to steady over the outlook period, increasing from about US$2,720 a tonne in 2024 to around US$2,770 a tonne in 2025, before dipping back to about US$2,710 a tonne in 2026.
- Australia's zinc mine production is expected to ease over the outlook period, as production tapers off in some of Australia's older zinc mines. However, Australia's refined output is expected to increase.
- Price moves will drive Australia's zinc exports to rise from $3.8 billion in 2023–24 to $3.9 billion in 2024–25 but ease to $3.7 billion in 2025–26.

13.2 World consumption

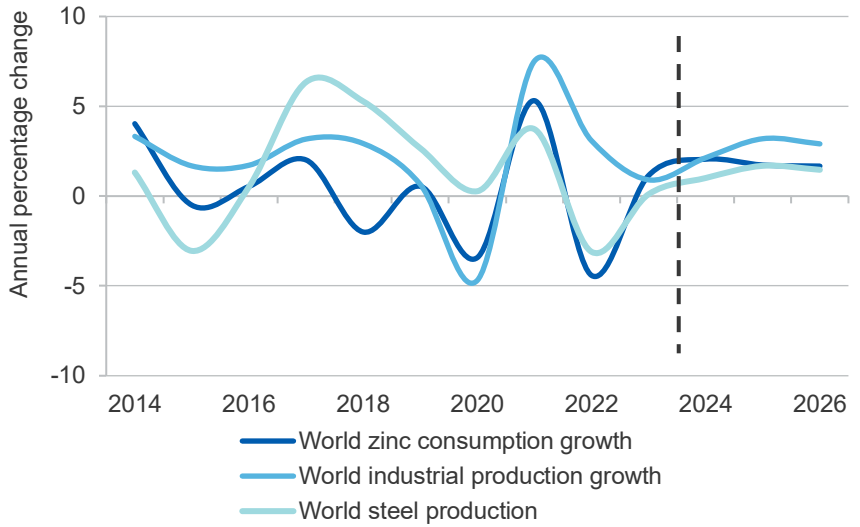
Strong consumption in June 2024 quarter driven by Asian steel demand

Zinc consumption is heavily affected by the global industrial cycle, reflecting its primary role in galvanising steel (see Figure 13.1), and through this role, its use in the manufacturing, construction and automotive sectors. Growth in these sectors pushed global refined zinc consumption up 3.5% year-on-year in the June quarter 2024. This demand growth was largely driven by Asia, with China experiencing 1.9% year-on-year growth, while ex-China Asia demand growth rose by 19%.

China is the world's largest zinc consumer (51%). China's zinc demand has been supported by manufacturing (up 6.3% in the year to July), with 9.0% growth in vehicle manufacturing in this period. China's fixed asset investment grew by 3.6% in the year to July, supporting zinc usage.

Partially offsetting the June 2024 quarter consumption growth seen in Asia were declines in the US (down 1.2% year-on-year) and the European Union (EU) (down 8.4% year-on-year). However, the outlook for US demand is improving. After weak steel production in 2023, strong growth in the construction and manufacturing sectors suggest a recovery in 2024. Total private construction grew year-on-year by 7.9%, and manufacturing output was up 25% in the first half of 2024. The US Manufacturing PMI has also strengthened in 2024 relative to 2023.

Figure 13.1: Zinc consumption vs industrial and steel production



Source: International Lead Zinc Study Group (2024); CPB Netherlands Bureau for Economic Policy Analysis (2024); Department of Industry, Science and Resources (2024).

A slowdown in China's galvanised steel production is set to constrain zinc consumption over the outlook period. The Chinese industrial sector's performance in response to recent stimulus policies and monetary easing in the West are key factors that will affect global zinc demand. Forecasts are for world zinc consumption to grow at a relatively modest 1.8% a year on average over the outlook period to 2026 (see Table 13.1).

The global energy transition will likely have mixed effects on zinc demand — increasing zinc demand for some applications but potentially reducing it for others. Growing construction and rapid deployment of renewable energy infrastructure should support zinc demand, given the complementary role zinc plays with steel as an input to wind turbines, solar panels, and transmission towers — due to its protective properties. However, growing electric vehicle adoption could weaken demand for zinc as automakers replace galvanised steel with lighter materials such as aluminium and composites to improve battery range.

13.3 World production

Effects of 2023 mine closures continues to stunt mine production

World mine output continues to fall as a result of numerous 2023 project delays and mine suspensions, dropping by 5.3% year-on-year in the June quarter 2024. This decline was largely driven by China, but with falls elsewhere including in the EU, South America, and the US. In China, (which accounts for 33% of global output) mine production fell by 3.1% year-on-year in the June quarter. The EU (5.0% of global production), South America (19%) and the US (6.0%) saw year-on-year falls of 31%, 13% and 0.9%, respectively. The fall in the EU was largely a result of price-induced mine closures. Ireland's Tara mine and Portugal's Aljustrel operation have both been suspended since July and September 2023, respectively. Peru's Antamina mine underwent an operational change at the start of 2024. As a result, the mine faces a significantly lower zinc production outlook. Antamina (21% of South America production in 2023) production fell by 59% year-on-year in the June 2024 quarter.

Mexico (which accounts for 5% of global mine production) was the biggest outlier to the declining mine production trend, with 19% year-on-year production growth in the June quarter 2024. This growth was driven by the Cerro de los Gatos mine hitting record-high production in this quarter.

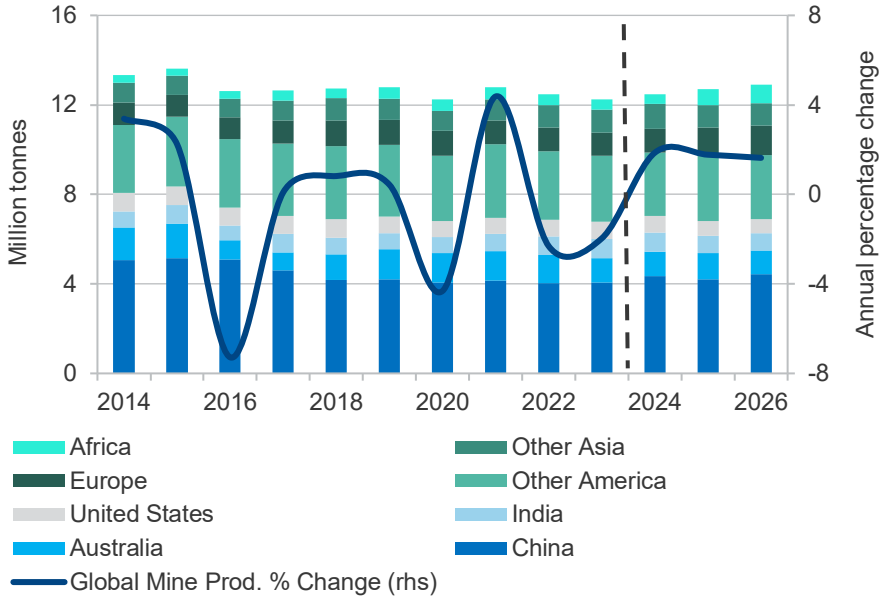
Global refined zinc production was relatively steady in the June quarter 2024. Global output declined by 0.9%, with Chinese output (accounting for just under half of global production) declining by 0.9%. Ex-China Asia saw an increase of 2.7% while EU production fell by 5.7%.

Mine production cuts since mid-2023 have caused severe tightness in the zinc concentrate market. China's imported spot treatment charge continues to fall — to minus US$20 per tonne in July — due to the shortage of concentrate, after averaging US$221 and US$181 per tonne in 2022 and 2023, respectively. A low spot treatment charge places profitability pressures on refineries. Price falls have been particularly severe in China due to a large drop in concentrate imports, with refinery production cuts and maintenance shutdowns of smelters brought forward.

Mine output set to recover with stable price

Over the outlook period, global zinc mine output is forecast to achieve average annual growth of 2.5% (Figure 13.2). Multiple price-induced mine closures have cut global mine output over the last year. However, production is expected to recover in the outlook period, as higher prices encourage production restarts. Multiple mines have re-opened in recent months. The Kipushi mine in the Democratic Republic of Congo (DRC) reopened in May 2024 following 31 years in care and maintenance. The mine has an expected annual production of 278kt. Global refined production is expected to rise by 1.3% a year over the outlook period to 2026, with most new capacity from 2025 on located in China.

Figure 13.2: Zinc mine production by country, metallic content



Source: International Lead Zinc Study Group (2024); Department of Industry, Science and Resources (2024)

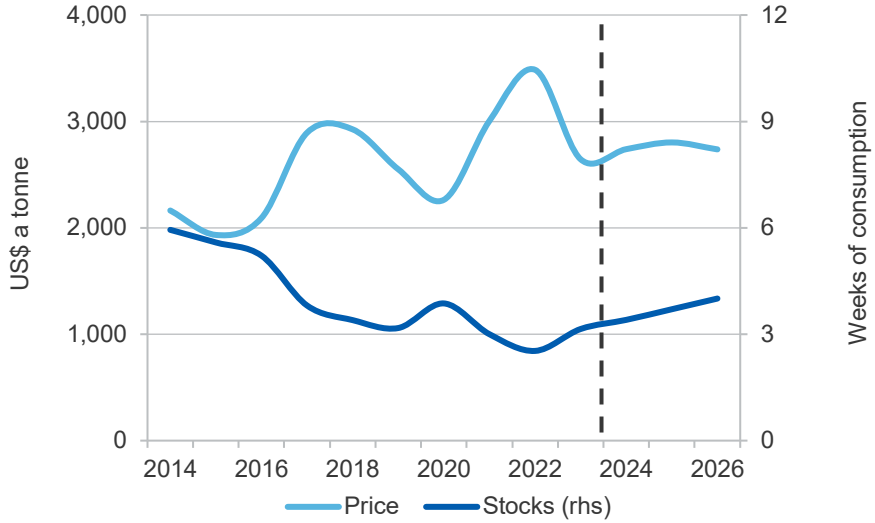
13.4 Prices

Zinc prices will be relatively steady with recovering supply

The London Metal Exchange (LME) spot zinc price thus far have been relatively steady over the September quarter 2024, averaging US$2,761 a tonne across the quarter to date (as of 19 September 2024). This represents a slight dip from US$2,833 a tonne in the June quarter 2024, which came following surging global investor interest in base metals. Prices remain well above the mid-2023 lows (of below US$2,350 a tonne), which were a result of a weakness in demand.

The LME zinc price is forecast to average around US$2,720 a tonne in 2024, a 2.8% rise from 2023. The zinc price is then forecast to pick up slightly in 2025 — to around US$2,770 a tonne — before dipping back to around 2024 levels (US$2,710 a tonne) in 2026 (Figure 13.3). Zinc prices holding up reduce the likelihood of further price-induced mine closures.

Figure 13.3: Zinc prices and stocks



Source: LME (2024); International Lead Zinc Study Group (2024); Department of Industry, Science and Resources (2024).

13.5 Australia's exports and production

Export earnings declined in June quarter due to weak ore volumes

Australia's export earnings for both zinc concentrates and refined zinc (combined) fell 5.9% year-on-year to $0.9 billion in the June quarter 2024. This decline was driven by a further fall in Australia's ore export volumes, down by 15% year-on-year in the June quarter 2024. This meant despite ore export prices strengthening (up by 8.7%), export ore values declined by 7.4%.

Australian mine production declined by 1.6% year-on-year in the June quarter 2024. This came off an already low base, with production in 2023 already adversely affected by the closure of several small mines.

Mine closures continue to affect Australian output. Aeris's Jaguar and Aurora Metal's King Vol mines remain in care and maintenance, with both ceasing production in mid-late 2023. Glencore's Lady Loretta mine in Mount Isa is also set for closure in 2025, due to a depletion of mineral reserves (announced in October 2023).

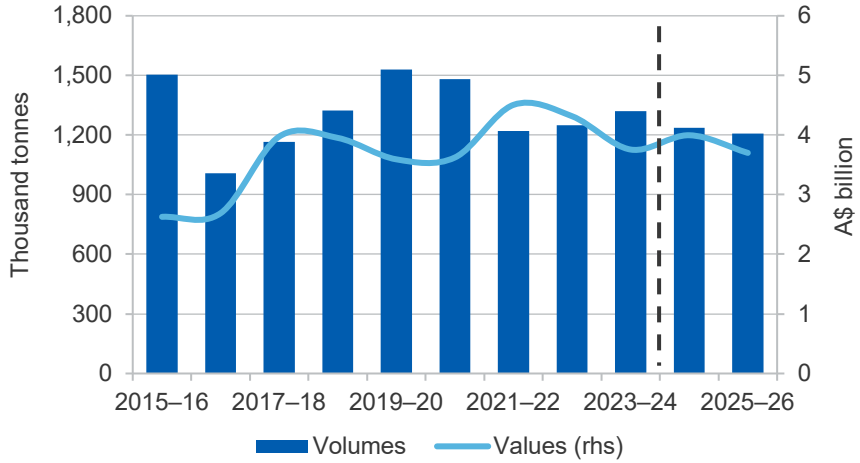
Production at Glencore's McArthur River mine (Australia's second largest zinc mine) fell by 12% (7.8kt) year-on-year in the June quarter, due to the effects of a tropical cyclone early in the year. These falls were largely offset by a 12% (8.2kt) year-on-year increase at Glencore's Mount Isa mine (Australia's largest zinc mine), with output rebounding from the heavily rain-affected disruption to production in the June quarter 2023.

Australian mine output is expected to fall by an average 1.1% per year over the outlook period, largely due to Glencore's Lady Loretta mine closing in 2025. Refined output is expected to grow by 9.4% per year over the outlook, driven by expected production growth in Sun Metals' Townsville refinery. Following the completion of a facility expansion in 2021, the Townsville refinery is projected to increase production to 270ktpa from 2025 onwards (up 26% from 215kt in 2023-24), as it moves towards 300ktpa capacity. Sun Metals sources its raw materials domestically and internationally (from Alaska and South America).

Australia's export earnings for concentrates and refined zinc (combined) fell by 13% to $3.8 billion in 2023–24, from $4.3 billion in 2022–23. A rise in export volumes was more than offset by the impact of falling prices over the year (Figure 13.4).

Australian export earnings are forecast to increase to $3.9 billion in 2024-25, before declining to $3.7 billion in 2025-26.

Figure 13.4: Australia's zinc exports, metallic content



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

Exploration expenditure increased in June quarter with recovering prices

Exploration expenditure slumped in 2020 — due to the COVID pandemic — but recovered as zinc prices rose over 2021 and 2022. Exploration expenditure saw year-on-year downturns over the first three quarters of 2023 as a result of a slump in zinc prices, before recovering in December 2023 and March 2024. Exploration expenditure for silver, lead and zinc increased 11% year-on-year in the June quarter 2024 to $25.2m.

Revisions to the outlook

Compared to the June 2024 *Resources and Energy Quarterly*, forecast zinc export earnings have been revised down by 6.4% (AU$269m) in 2024-25 and 8.2% (AU$328m) in 2025-26. The decline is being driven by a downward revision in ore export volumes, as mine production forecasts decreased, and a modest reduction in forecast zinc prices.

Australia's mine production forecast decreased by 8.2% in 2024-25 and 10.1% in 2025-26 from the June 2024 *Resources and Energy Quarterly*. The Century mine in Queensland has seen lower than expected past production, revising down the mine's forecast production numbers. Lower forecasted production from Century was the main driver in Australia's mined production downward revision.

Table 13.1: Zinc outlook

World	Unit	2023	2024[f]	2025[f]	2026[f]	Annual percentage change 2024[f]	2025[f]	2026[f]
Production								
– mine	kt	12,242	12,739	12,966	13,181	4.1	1.8	1.7
– refined [a]	kt	13,933	13,986	14,240	14,482	0.4	1.8	1.7
Consumption	kt	13,619	13,900	14,143	14,381	2.1	1.7	1.7
Closing stocks	kt	822	908	1,005	1,105	10.4	10.7	10.0
– weeks of consumption		3.1	3.4	3.7	4.0	8.2	8.8	8.1
Price								
– nominal	US$/t	2,644	2,718	2,767	2,710	2.8	1.8	-2.0
	USc/lb	120	123	125	123	2.8	1.8	-2.0
– real [b]	US$/t	2,726	2,718	2,712	2,603	-0.3	-0.2	-4.0
	USc/lb	124	123	123	118	-0.3	-0.2	-4.0
Australia	**Unit**	**2022–23**	**2023–24**	**2024–25[f]**	**2025–26[f]**	**2023–24[s]**	**2024–25[f]**	**2025–26[f]**
Mine output	kt	1,151	1,116	1,142	1,114	-3.1	2.4	-2.4
Refined output	kt	401	434	497	525	8.4	14	5.7
Export volume								
– ore and concentrate [c]	kt	1,886	1,895	1,645	1,524	0.5	-13.2	-7.4
– refined	kt	388	433	477	506	11.5	10.3	5.9
– total metallic content	kt	1,247	1,322	1,237	1,209	6.0	-6.4	-2.2
Export value								
– nominal	A$m	4,315	3,756	3,940	3,664	-13.0	4.9	-7.0
– real [d]	A$m	4,629	3,867	3,940	3,544	-16.5	1.9	-10.1

Notes: **a** Includes secondary refined zinc; **b** In 2024 US dollars; **c** Quantities refer to the gross weight of all ores and concentrates; **d** In 2024–25 Australian dollars; **f** Forecast; **s** Estimated.

Source: ABS (2024) International Trade in Goods and Services, Australia, Cat. No. 5368.0; Company reports; Department of Industry, Science and Resources (2024); International Lead Zinc Study Group (2024); Wood Mackenzie (2024); LME (2024).

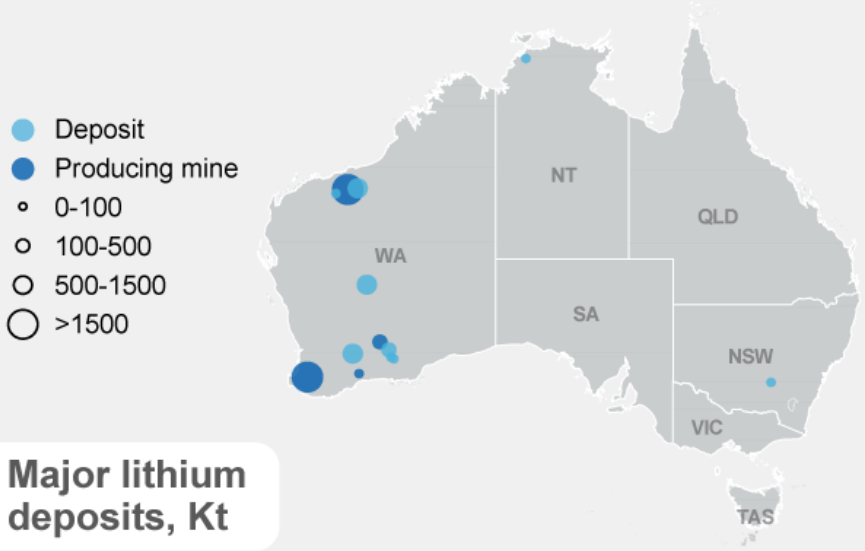
Lithium

Australia's lithium sector

96%
of spodumeme (lithium ore) **exported to China**, 2022-23

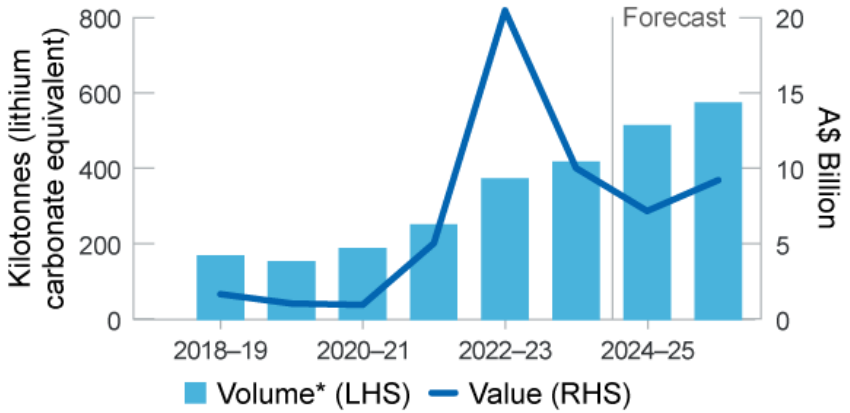
39%
of global lithium **extraction** in 2023, with **2nd** highest reserves

9%
of lithium mined in Australia to be **domestically refined** by 2026



Major lithium deposits, Kt

Australian lithium exports



Outlook

Australian export earnings **projected to fall** due to low prices

EV sales slows as governments implement policies to shift global supply chains

Australian mine production to **keep growing** due to a strong project pipeline

Argentina and Zimbabwe are expected to emerge as **major producers**

SOURCE: ABS; GA; Wood Mackenzie; WA DMIRS; DISR; OCE

*Volume in this chart reflects lithium content export in products including spodumene concentrates and lithiuim hydroxide

15.1 Summary

- Australia's lithium export earnings are forecast to fall from $9.9 billion in 2023–24 to $8.2 billion in 2025–26. The fall is set to be driven by a weaker lithium price, which is expected to be partially offset by a 55% increase in Australia's lithium mine production over the outlook period.
- Global lithium demand is forecast to rise by 17% a year between 2023 and 2026, driven by rising electric vehicle (EV) adoption. However, EV adoption is rising slower than expected as sales remain weak in the US and EU markets.
- The market surplus is expected to narrow following suspension of some production, including reportedly a major Chinese lepidolite mine in September 2024. Australia is forecast to add more lithium supply than any other country between 2023 and 2026, but substantial supply is also expected from Argentina, China and Zimbabwe.

15.2 World Demand

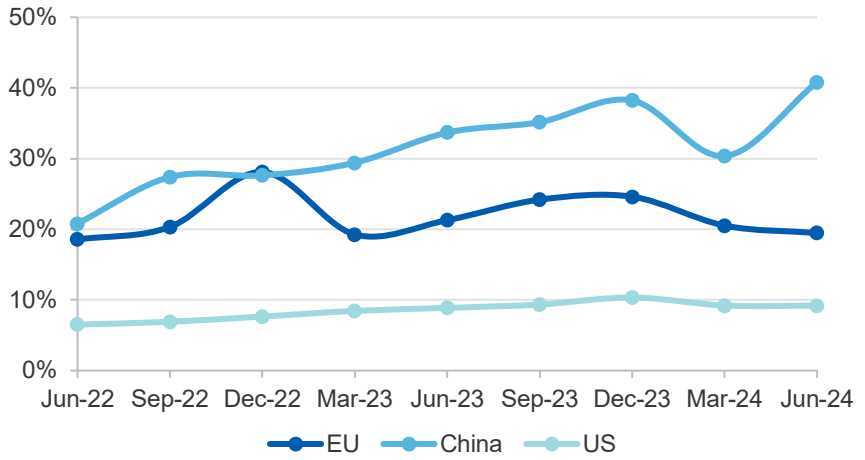
EV penetration stalls in the US and the EU, while China races ahead

Rapid lithium demand growth in recent years is primarily driven by rising adoption of EVs, with demand from EVs rising to exceed half of global lithium demand in 2022. EV penetration saw diverging trends across major vehicle markets in the world during the June quarter 2024 (see Figure 15.1). Quarter-on-quarter, EV penetration in China rebounded strongly: rising 10 percentage points and recovering from a dip in the March quarter 2024. However, EV penetration fell in the EU for a second consecutive quarter, while EV penetration in the US saw no growth.

The US tightened eligibility requirements for IRA tax credits regarding the use of EV components from China. EV models eligible for IRA tax credits shrank from 43 at end 2023 to 19 from 2 January 2024. Much of the fall in EV penetration in the EU continues to be driven by Germany, where EV subsidies of up to 4,500 euros per vehicle ended in late 2023. In November 2023, Germany's Federal Constitutional Court ruled that the subsidy's funding mechanism violated a constitutional limit on the federal deficit.

Additional factors contributing to the recent reversal in EV penetration in the US and the EU include higher interest rates raising the cost of car loans. EVs have also faced much higher depreciation costs over the last few years, as large cuts in the price of new EVs have led to falls in the value of second-hand EVs.

Figure 15.1: EV penetration rate in major vehicle markets



Notes: Data presented for the EU and China are for the passenger vehicle market, while data presented for the US is for the light duty vehicle market. EVs include both battery electric vehicle (BEV) and plug-in hybrid electric vehicle (PHEV).

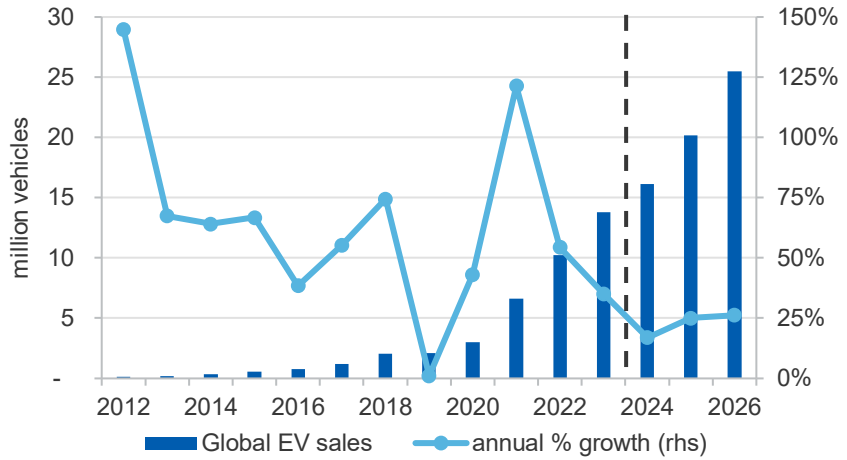
Source: European Automobile Manufacturers Association (2024), China Association of Automobile Manufacturers (2024), Argonne National Laboratory (2024)

The strong rebound in China's EV penetration rates came with the introduction of a government trade-in program in May 2024. The program offered a subsidy of 10,000 yuan (about US$1,400) when purchasing a new EV or 7,000 yuan when purchasing a new internal combustion engine vehicle (ICEV), when replacing an eligible older vehicle. Incentives under the program were doubled on 25 July 2024. China's ICE passenger vehicle sales, which are heavily influenced by government quotas for licence issuance in major cities, fell by 16% quarter-on-quarter in the June quarter 2024.

EV sales growth to remain slow as geostrategic competition drives policy

Global EV sales growth is forecast to slow to 17% in 2024, compared to an average of 46% a year between 2018 and 2023 (see Figure 15.2). EV adoption faces challenges from rising trade barriers and supply chain concerns in an environment of ongoing geostrategic competition. The required reorientation in supply chains is likely to slow EV cost declines in major vehicle markets around the world. Policy decisions in major jurisdictions earlier this year have also resulted in weaker vehicle emissions standards.

Figure 15.2: Global passenger electric vehicle sales



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

In May 2024, the US government announced that tariffs on Chinese EV exports to the US would increase this year from 27.5% to 102.5%, and tariffs on batteries and battery parts would increase from 7.5% to 25%. While Chinese EV exports to the US are insignificant, tariffs on batteries raise costs for US EV models which use these imported batteries.

The European Commission imposed import duties on Chinese BEV producers on 5 July 2024, following an investigation which concluded that BEVs from China are being subsidised. The draft decision was published in August, with adjustments to duty rates from those published in July, ranging from 17% to 36.3%, with a relatively favourable 9% duty for Tesla. These duties are in addition to a standard 10% tariff on all imported cars. The imposition of duties is likely to reduce sales or raise prices of Chinese EVs in the EU. The European Federation for Transport and Environment found that 20% of BEVs sold in the EU in 2023 were imported from China.

EV sales growth is forecast to recover to about 25% a year in 2025 and 2026, as improving battery technology promotes EV adoption. Costs per kWh for lithium-ion batteries fell by an average of 16% a year between 2013 and 2023, and technical performance has also improved. Bloomberg New Energy Finance (BNEF) forecast that average battery prices will decrease from an average of US$139/kWh in 2023 to $80/kWh in 2030, which will deliver substantial improvements to the cost competitiveness of EVs.

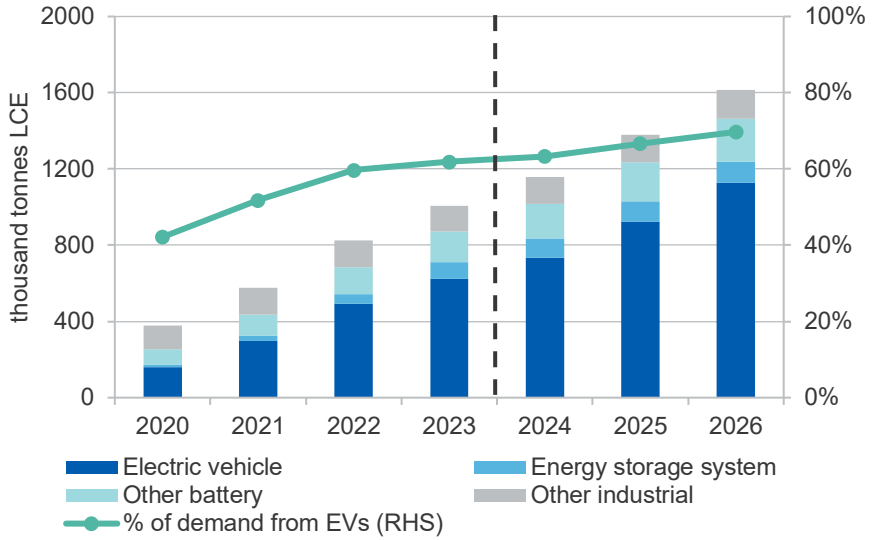
LFP/LMFP batteries cement China's dominance in battery supply chains

Battery production is expected to remain concentrated in China over the outlook period, due to the rising market share of lithium iron phosphate (LFP) and lithium manganese iron phosphate (LMFP) batteries. This is despite rising production of lithium nickel manganese cobalt (NMC) batteries outside of China (see *June 2024 Resources and Energy Quarterly, 15.2 Lithium World Demand)*. Chinese companies are expected to leverage their expertise in LFP batteries to ramp up production of LMFP batteries over the outlook period, which could deliver similar performance to older lithium-nickel chemistries at a lower cost.

Weakness from EV demand continues to suppress lithium demand growth

Lithium demand growth is expected to be weak in 2024, driven by slowing EV adoption. Demand is expected to pick up in 2025 and 2026 but could face threats from emerging battery chemistries which use less or no lithium. In lithium carbonate equivalent (LCE) terms, global lithium consumption is forecast to rise by 17% per year to 1.6 Mt in 2026 (see Figure 15.3), with demand from EVs driving the bulk of the rise.

Figure 15.3: World lithium consumption, by demand source



Notes: Projections are based on DISR analysis of Wood Mackenzie data.
Source: Department of Industry, Science and Resources (2024), Wood Mackenzie (2024)

Improving energy densities of lithium-ion batteries should reduce the lithium-intensity of batteries on a per kWh basis. Technologies that could deliver these increases include LMFP batteries and improved NMC batteries — such as the anticipated NMC 955 and NMC 9525 batteries. Sodium-ion batteries, which use no lithium, are expected to take a small share of the EV market over the outlook period.

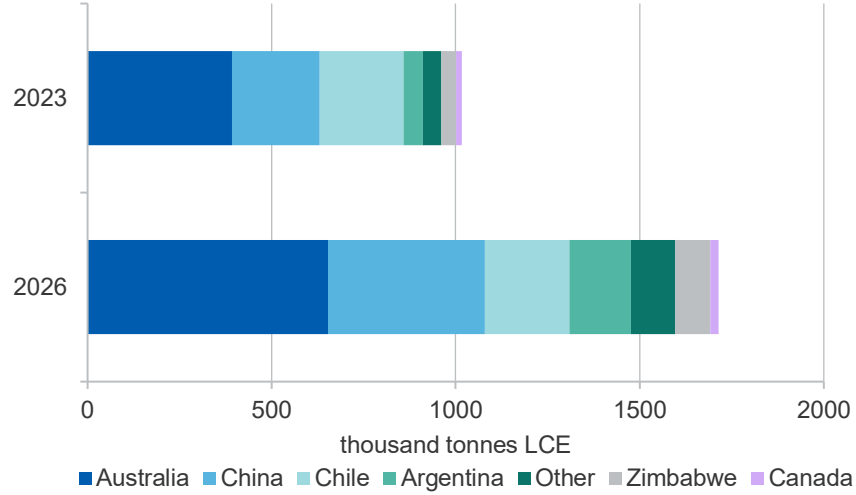
Growth in the average size of battery packs is expected to offset some of this loss in demand, as improving battery technology makes EVs more competitive in markets for larger vehicles.

15.3 World production

Supply to rise rapidly despite production suspension at some mines

Global lithium extraction is forecast to rise by 20% per year to 1.8 Mt LCE by 2026 (see Figure 15.4). Australia, China and Argentina are expected to drive supply growth over the outlook period. In absolute terms, Australia is forecast to add more lithium extraction than any other country between 2023 and 2026 (see Australia section). However, Australia's share of global lithium extraction is projected to fall slightly from 39% in 2023 to 38% by 2026.

Figure 15.4: Primary lithium extraction, 2023 vs 2026



Notes: Measured on a recoverable lithium basis. Brines do not have to be further processed at refineries. Projections are based on DISR analysis of Wood Mackenzie data.
Source: Department of Industry, Science and Resources (2024), Wood Mackenzie (2024)

Argentina's lithium extraction is expected to rise from 50 kt in 2023 to 166 kt by 2026, or about 10% of global extraction, as a series of large brine operations come online. Argentina holds 12% of global lithium reserves and has access to lower cost brine resources compared to Australia's more costly hard rock resources. Companies continue to invest in new lithium projects in Argentina, despite the fall in lithium prices, with investors encouraged by the Argentinean government's devaluation in the Argentinian Peso and promises to lift capital controls. Recent investment commitments include a new US$350 million project by Rio Tinto in March

2024 and a US$550 million project by UAE-owned United Mining Projects Corporation in April 2024.

China's lithium production is expected to rise over the outlook period, with its share of global production set to rise from 23% in 2023 to 25% by 2026 largely from a rise in brine production. Chinese lepidolite production is likely to remain stable to 2026 despite its large pipeline of projects, due to the reported production suspension at a major lithium lepidolite mine owned by CATL in September 2024.

The surge of lepidolite projects has come with advances in salt roasting techniques, which have improved recovery rates of refining lepidolite compared to techniques commonly used in refining spodumene. Nevertheless, the cost of mining and refining lepidolite remains higher than for spodumene.

Zimbabwe's lithium extraction is expected to rise from 41 kt in 2023 to 95 kt by 2026, accounting for 6% of global extraction. Over 2021 and 2022, Chinese companies invested about US$1 billion in hard rock lithium projects in Zimbabwe, according to CRU Group. In 2022, Zimbabwe's government banned the practice of direct ore shipment, requiring ores to be processed into lithium spodumene concentrate domestically before export. The commissioning of processing plants saw Zimbabwe's lithium extraction rise sharply over 2023.

Chile's lithium extraction is set to rise in level terms, but its share of global extraction is forecast to fall from 23% in 2023 to 13% in 2026 as other lithium producing countries are expected add capacity much faster than Chile. Chile's 2023 national strategy for lithium called for the promotion of public-private partnerships in the lithium industry. SQM, which owns 1 of 2 lithium operations in the country, signed an agreement with state-owned miner Codelco in June 2024 granting Codelco a majority stake in the company's brine operation in the country from 2025. Codelco will then take over management of the asset from 2031. Chile's government announced in July that private development proposals are being reviewed, with the goal of achieving three to four new projects in development by the end of 2026.

Box 15.1: Estimating lithium extraction from the lens of chemical supply

In this edition of the *Resources and Energy Quarterly,* we replaced our previous estimate of Australian mine production — which measured the amount of lithium contained in spodumene concentrates produced at mines — with a new measure which estimates the amount of lithium chemicals that could be recovered at refineries from spodumene concentrates produced (i.e. on a recoverable lithium basis).

Not all lithium contained in concentrates could be recovered in the refining process, and the rate of lithium recovery in the process depends on the method of refining and on the quality of the concentrate. Following consultation with members of the Australian lithium industry, we estimate that lithium recovery rates from spodumene mined in Australia range between 70 to 90 percent, with higher grade concentrates achieving a higher recovery rate. For spodumene concentrate with 6% lithium oxide (SC6), we estimate 90% of lithium to be recovered in the refining process. In LCE terms, Australian mine production is 393 kt in 2023 under the new measure, compared to 455 kt before adjustments for refining loss (see Figure 15.5).

Our estimate for Australia's share of global lithium extraction for 2023 is 39% under the new measure, compared to 45% reported in the June 2024 *Resources and Energy Quarterly*. Under the new measure, brine producers such as Chile are estimated to make up a larger share of global extraction, as these operations produce lithium chemicals directly and do not suffer from loss of lithium in the refining process. We have updated our view of the global supply pipeline, as the new measure of lithium extraction allowed for additional projects to come online in line with our view of global demand. This include more Australian spodumene mining and Chinese lepidolite mining projects.

This change does not materially affect our export earnings forecast for

Australia. Our export earnings are calculated based on the forecast lithium spodumene price and forecasted lithium spodumene exports, normalised to be equivalent SC6 in lithium oxide content (SC6 eq.). In this process, we consider the differences in refinery loss between different grades of lithium spodumene, but the effect is small. Table 15.1 includes a comparison of our estimate for Australian exports of lithium spodumene measured under both SC6 eq. and in LCE terms.

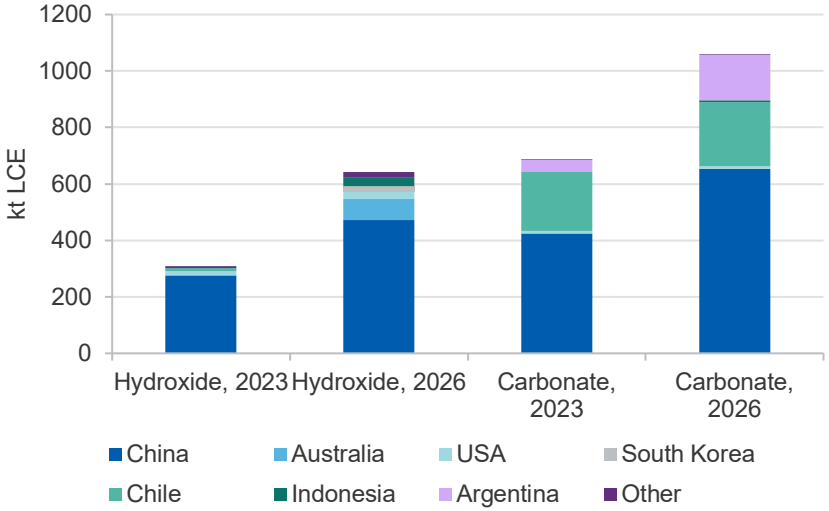
Figure 15.5: Impact of refining loss adjustment on Australian mine output

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

Less Australian hydroxide expected, slowing diversification

Global primary lithium hydroxide production is forecast to rise by 21% a year to 0.6 Mt LCE by 2026 (see Figure 15.6). China's share of global production for lithium hydroxide is forecast to fall from 88% in 2023 to 72% by 2026, due to investments in lithium refinery capacity outside of China — particularly in Australia and the US. However, weak lithium prices have impacted investment in Australian lithium refinery capacity. For example, in August 2024 Albemarle stated plans to place train 2 of its Kemerton refinery in care and maintenance, and the cessation of construction of trains 3/4. Challenging market conditions may slow ex-China diversification outside of the US.

Figure 15.6: Primary lithium chemical supply, 2023 vs 2026



Notes: Includes supply from refineries and from brines, and therefore partially overlap with supply shown under lithium extraction. Lithium carbonate may be used as feedstock to produce lithium hydroxide. Excludes supply from recycling. Projections are based on DISR assessment, informed by Wood Mackenzie research.

Source: Department of Industry, Science and Resources (2024), Wood Mackenzie (2024)

The rising popularity of LFP batteries is increasing demand for lithium carbonate relative to lithium hydroxide. After adjusting for lithium content, lithium hydroxide prices were only 1% higher than lithium carbonate spot prices in H1 2024, compared to an average premium of 24% over 2023.

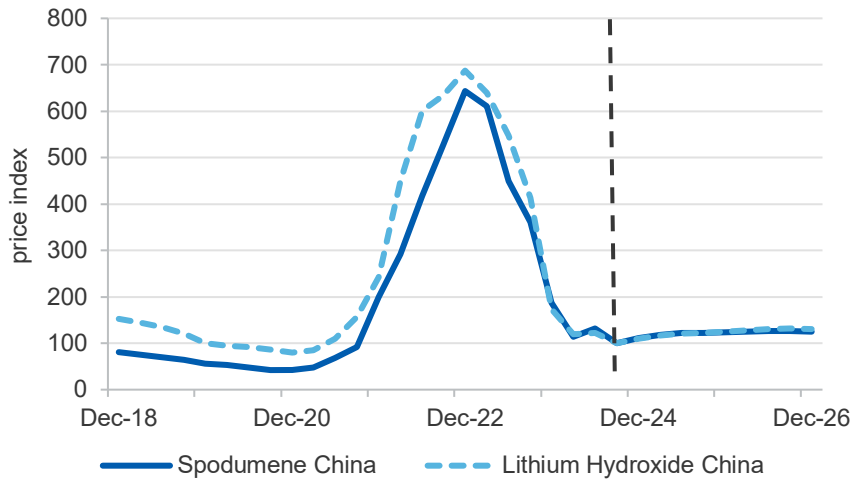
Global primary lithium carbonate production is forecast to rise by 16% a year to 1.1 Mt LCE by 2026. China's share of global lithium carbonate production is forecast to remain steady at 62% between 2023 and 2026. Most of the new supply is expected to come from Argentinian brine projects and Chinese lepidolite refineries. There is currently no substantial investment in facilities refining hard-rock lithium into lithium carbonate outside of China.

15.4 Prices

Prices to recover as production suspensions narrows market surplus

Slowing growth in EV sales has resulted in lithium demand growth falling below expectations. The wave of investment in lithium production spurred on by the high prices of 2022 has resulted in more projects coming online. As a result, overcapacity in the lithium sector has emerged. Prices recovered slightly in the June quarter 2024, but fell again in the September quarter 2024 (see Figure 15.7). In August, spodumene prices averaged US$857 a tonne, while lithium hydroxide price averaged US$10,790 a tonne.

Figure 15.7: China lithium price index, quarterly



Notes: The spodumene price is CIF (cost including freight), with an average grade of 5-6%. The lithium hydroxide price is FOB (free on board). Index is normalized to June 2024 quarter as 100.
Source: Bloomberg (2024); Department of Industry, Science and Resources (2024)

China's lithium spodumene price is forecast to recover slightly over the December quarter 2024, to average US$1,100 a tonne over the year, and pick up to US$1,200 a tonne by 2026. Prices is forecast to recover as the market surplus narrows following the suspension of some production, including reportedly a major Chinese lepidolite mine. However, ongoing weakness in EV sales growth remains a risk for lithium prices. Similarly, the China lithium hydroxide price is forecast to average about US$13,000 a tonne over 2024 before rising to about US$15,000 a tonne by 2026.

15.5 Australia

Export earnings remained weak due to low prices

Australian lithium spodumene export earnings fell 69% year-on-year in the June quarter 2024 to A$1.7 billion. This was largely driven by lower prices. On a recoverable lithium basis, export volumes rose 47% year-on-year in the June quarter 2024. This is substantially above estimated production over the quarter and suggests that miners have released some inventories being held as prices stabilised over the quarter. In value terms, 95% of spodumene exported from Australia over the March quarter 2024 was sent to China.

Australian lithium mine output is estimated to have risen 16% year-on-year to 112 kt LCE on a recoverable lithium basis in the June quarter 2024. Production gains were reported across many Australian mines. This includes Bald Hill and Mt Holland which began operations in the twelve months to June 2024, while Mt Marion, Wodgina and Pilgangoora all reported a rise in production volumes.

Production ramp up at Australian lithium refineries has been slower than expected since the completion of train 1 of the Tianqi Kwinana and Kemerton refineries, due to ongoing technical challenges. Output of lithium hydroxide at the Tianqi Kwinana refinery rose to 1.3 kt over the June quarter 2024, up 83% quarter on quarter. This represents a utilisation rate of 22%, compared to the 24 kt annual nameplate capacity of train 1. Train 1 of Albemarle's Kemerton refinery, with a nameplate capacity of 25 kt, was reported to have achieved a 50% operating rate milestone in the March quarter.

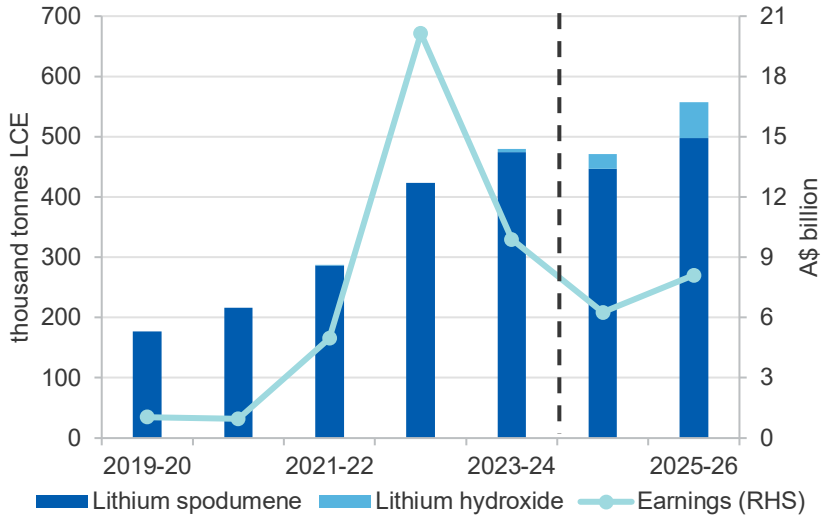
The ABS no longer publish lithium hydroxide export data on the grounds of privacy from May 2024. The lack of ongoing trade data means lithium

hydroxide export volumes and value in this publication will be an estimate by DISR staff from May 2024 onwards, based on company disclosures, media reporting, consultation with industry, and other available information.

Export earnings to fall as prices are unlikely to recover to past levels

Lithium export earnings are expected to fall from $9.8 billion in 2023–24 to $6.7 billion a year in 2025–26 (Figure 15.8). While prices are forecast see moderate recovery, they are not expected to return to recent highs in 2022 and 2023. Partially offsetting the price impact is rising production of both lithium spodumene and hydroxide over the period.

Figure 15.8: Australia lithium export volumes and earnings



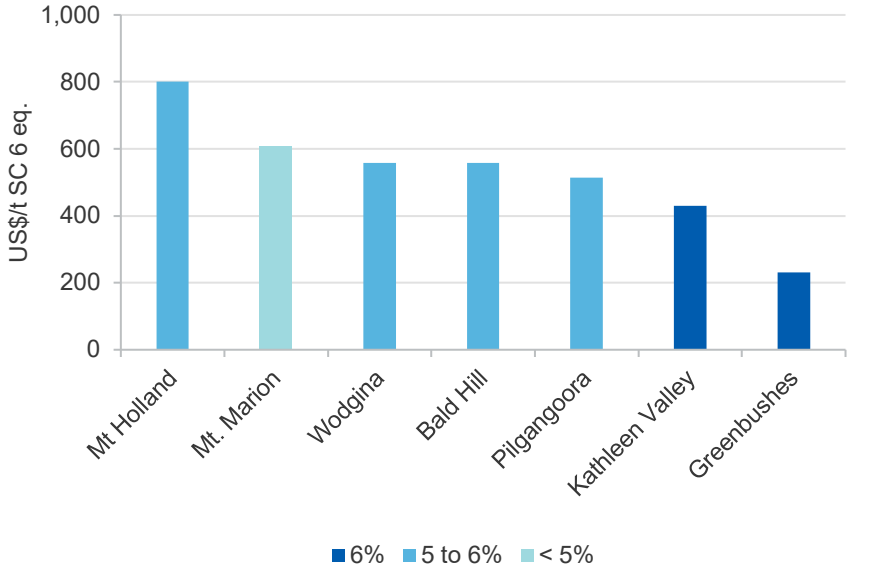
Notes: Lithium volumes measured on a recoverable lithium basis.

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

Mine production is expected to rise by about 16% a year from 2023–24 to 2025–26 in LCE terms. Three projects have been completed so far in 2024: Mt Holland achieved first ore in February 2024 and Kathleen Valley and the Pilgangoora P680 expansion both achieved first ore in July 2024. Greenbushes CGP 3 and Pilgangoora P1000 expansions are both currently under construction and are expected to be completed in 2025.

Nevertheless, weak market conditions may result in the curtailment of some mine production. Benchmark Mineral Intelligence's Australian FOB price for SC6 averaged US$888 a tonne in August 2024, closing in on operating costs of some Australian mines (see Figure 15.9). The weak price environment has led to a pause in the ramp up of Wodgina's third train in February. Arcadium lithium announced Mt Cattlin will transition to care and maintenance by mid-2025.

Figure 15.9: Australian mines cash costs, by concentrate grade



Notes: Normalised to be equivalent in lithium oxide content to SC6. Cash costs are based on company guidance for financial year 2025 where available. Kathleen Valley and Mt Holland costs are company estimates from 2023 and 2022 respectively. Cash cost excludes royalties, which is 5% of the value of the lithium concentrate in Western Australia.

Source: ASX company reports (2023, 2024), SQM (2022)

Australian output of lithium hydroxide is forecast to reach 60 kt in LCE terms by 2025–26, which means about 9% of Australia's lithium

spodumene production will be refined domestically. Production ramp-ups at train 1 of Tianqi Kwinana and Kemerton refineries are expected to continue. Construction at the Covalent Kwinana refinery is ongoing, and the facility is expected to begin production in H1 2025.

In August 2024, Albemarle placed train 2 of the Kemerton refinery into care and maintenance and cancelled plans to build trains 3 and 4, as part of a comprehensive review in their cost and operating structure. Albemarle said the review is due to (among other reasons) weak western demand, a shift towards carbonate-based LFP batteries, overcapacity in Chinese refineries, and final US Department of Energy Foreign Entity of Concern rules restricting their Australian product eligibility.

The IGO/Tianqi joint venture is reviewing train 2 of the partially constructed Tianqi Kwinana refinery and conducting additional front-end engineering and design work, which will inform a potential FID to re-commence construction.

Revisions to the outlook

Since the June 2024 *Resources and Energy Quarterly*, the forecast for Australia's lithium earnings has been revised down from $9.1 billion to $8.2 billion for 2025–26. This is due to a lower price forecast for lithium spodumene (see Prices section). Forecast for lithium hydroxide production have also been revised down due to train 2 of the Kemerton refinery entering care and maintenance. Partially offsetting these downward revisions is a higher forecast for lithium spodumene production (see Box 15.1).

Table 15.1: Lithium outlook

						Annual percentage change		
World	**Unit**	**2023**	**2024[f]**	**2025[f]**	**2026[f]**	**2024[f]**	**2025[f]**	**2026[f]**
Production [b]	LCE[a] kt	1,040	1,282	1,530	1,793	23.3	19.3	17.2
Demand	LCE[a] kt	1,008	1,158	1,381	1,615	14.8	19.3	17.0
Spodumene price								
– nominal	US$/t	3,730	1,056	1,131	1,167	-71.7	7.1	3.1
– real [c]	US$/t	3,845	1,056	1,109	1,121	-72.5	5.0	1.0
Lithium hydroxide price								
– nominal	US$/t	50,288	12,775	13,755	14,775	-74.6	7.7	7.4
– real [c]	US$/t	51,847	12,775	13,485	14,194	-75.4	5.6	5.3
Australia	**Unit**	**2022–23**	**2023–24[s]**	**2024–25[f]**	**2025–26[f]**	**2023–24[s]**	**2024–25[f]**	**2025–26[f]**
Production								
– Mine (spodumene)	LCE[a] kt	345	418	471	558	21.2	12.7	18.5
Export volume								
– Ore and concentrate (spodumene)	SC6[e] eq. kt	2,962	3,355	3,513	3,887	13.2	4.7	10.6
– Ore and concentrate (spodumene)	LCE[a] kt	381	427	528	586	12.0	4.8	11.2
– Refined (lithium hydroxide)	LCE[a] kt	-	3	23	60	n/a	310.5	156.3
– Total lithium exports	LCE[a] kt	381	433	471	558	13.5	8.8	18.5
Export value								
– Total (nominal) [d]	A$m	20,149	9,887	6,353	8,215	-50.9	-35.7	29.3
– Total (real) [d h]	A$m	21,616	10,179	6,353	7,945	-52.9	-37.6	25.0

Notes: **a** Lithium carbonate equivalent measured on a recoverable lithium content basis; **b** Refined lithium products include lithium hydroxide and lithium carbonate; **c** In 2024-25 calendar year US dollars; **d** Revenue from spodumene concentrate, lithium hydroxide and other lithium products; **e** equivalent in lithium content to spodumene concentrate with 6% lithium oxide; **h** In 2024-25 financial year Australian dollars; **f** Forecast; **s** Estimate.

Source: ABS (2024); Bloomberg (2024); Company reports; Department of Industry, Science and Resources (2024); Wood Mackenzie (2024)

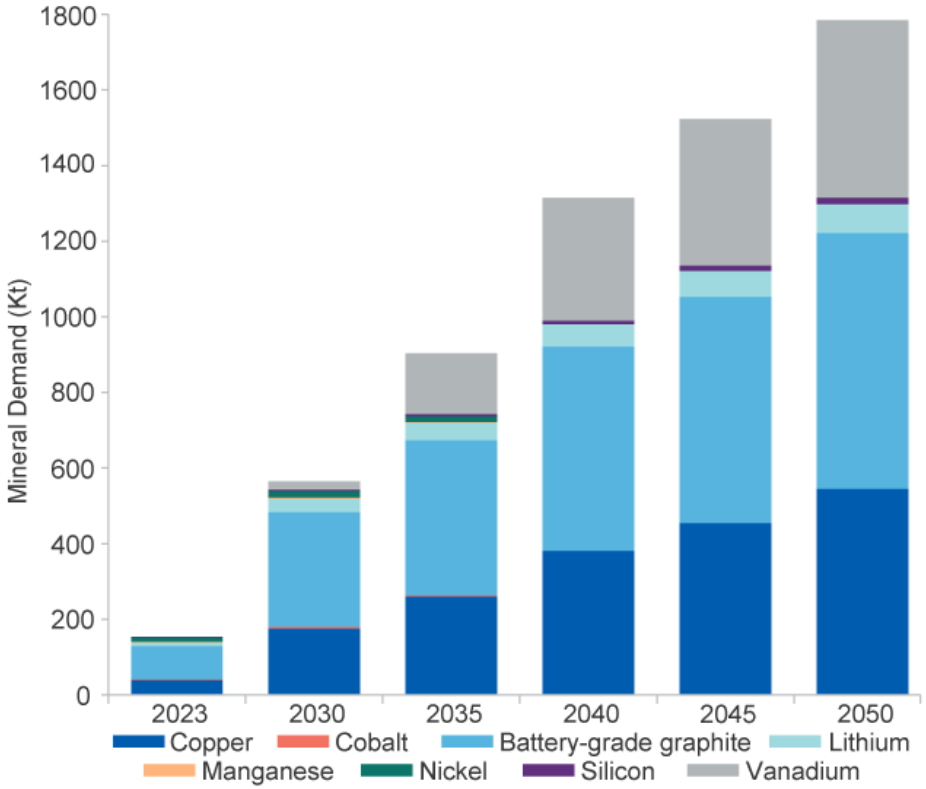
Opportunities in Battery Energy Storage Systems (BESS)

The BESS market

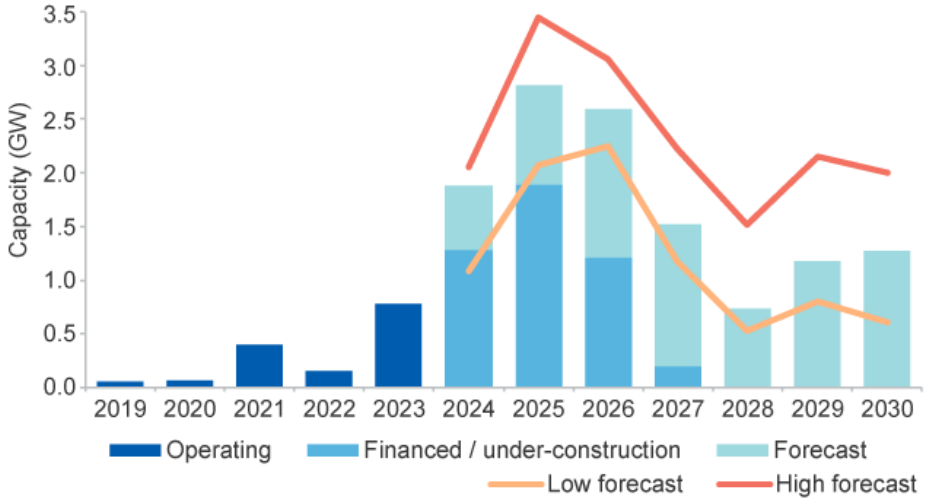
9x
increase in global installed BESS capacity by 2030

13.5GW
of Australia installed BESS capacity by 2030

Mineral demand for BESS



Australian projected BESS uptake



BESS market insights

Demand will increase with global efforts to transition power grids to renewables

Lithium-ion batteries currently dominant but **sodium-ion and flow** emerging alternatives

Australian BESS **industry is set to grow** driven by renewables and government support

Australia **well positioned** to provide raw materials and manufacturing capability

16.1 Summary

- Battery energy storage systems (BESS) will play a key role in the energy transition, through the balancing of gaps in renewable-generated power to stabilise grids.
- While lithium-ion batteries are set to remain the dominant technology for stationary storage under 4 hours, alternative technologies could outcompete them at longer storage durations. The outlook for emerging BESS technologies depends on the outcomes of research and development, effective scale-up of manufacturing and the cost of raw materials.
- Australia is well-placed to support increasing BESS demand through the provision of raw materials, particularly mined lithium and vanadium, and manufacturing capability. Sustained renewable deployment and government support is expected to facilitate the development of the Australian BESS industry.

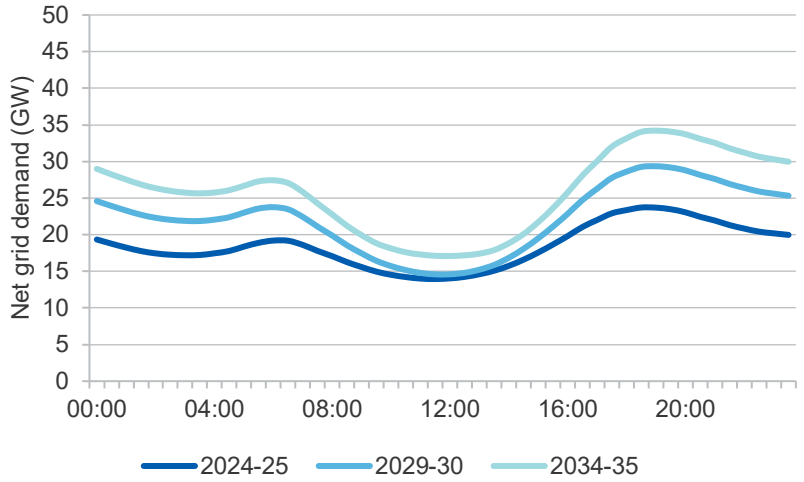
16.2 The role of stationary storage in decarbonisation

Stationary storage demand will increase with global efforts to transition power grids to variable renewable energy

Stationary storage is used to stabilise and balance power grids by providing energy on demand. Applications of stationary storage include providing energy during periods of high demand or low supply, black starts and frequency response. The market for stationary storage ranges from utility-scale grid applications to household level storage to supplement rooftop solar, as well as off-grid applications.

Gaps in power generation (for example during extreme weather events) are a consistent feature of power generation. However, variable renewable energy (solar and wind) deployment is increasing stationary storage demand. Daily power gaps are becoming larger with increased renewable deployment (Figure 16.1), creating arbitrage opportunities for technologies that shift energy across time. Deployment of renewables without adequate storage risks power disruptions and could slow down the energy transition.

Figure 16.1: Average grid demand by time of day in the NEM



Notes: Grid demand is net of behind-the-meter generation and storage assets, which reduces grid demand during daylight hours (eg. rooftop solar). Average summer demand is provided for the National Energy Market (NEM), which operates in the Australian Capital Territory, Queensland, South Australia, Victoria, and Tasmania.

Source: Australian Energy Market Operator (2024)

Batteries are an increasingly popular form of stationary storage

There are a wide range of stationary storage applications. Mechanical storage technology is currently the most widely used type of stationary storage (IEA, 2024a) and is well adapted to long term storage, for example, seasonal balancing. Gravitational storage is a type of mechanical storage. Mature gravitational storage options include pumped hydro, although other technologies are being explored. Some of these, such as the use of ballasts in mine shafts to store energy, offer end of mine life revenue streams. In mine shaft ballast storage, renewable energy is used to lift the ballast. The ballast is then lowered to convert potential energy into electricity using an electric generator.

While mechanical storage options are well adapted for longer durations, battery energy storage systems (BESS) are a better solution for shorter durations. BESS are well suited to daily and sub-daily balancing due to

quicker response times and the ability to charge and discharge instantaneously. These features make BESS able to respond to the steep, intra-day net demand profiles seen in Figure 16.1. By 2030, the International Energy Agency (IEA) (2024a) projects global installed battery storage capacity will increase ninefold to 760 GW in its Stated Policies Scenario (STEPS).

16.3 BESS market dynamics

Efficient scalability and long lifespans are key requirements for BESS technologies

BESS needs to discharge larger amounts of energy (often for longer durations) than other types of batteries, such as those in electric vehicles (EVs). This means BESS must be able to effectively scale to larger sizes, which for most technologies involves the stacking of discrete cells and components. Efficient scalability of BESS is achieved when battery power (maximum output level) and energy (how long an output level can be maintained) can be scaled separately, to adapt the BESS to a specific storage need. For larger BESS to be cost competitive with other storage options, the technical complexity and marginal production costs cannot increase significantly with battery size.

Long lifespans (the ability to withstand many charge and discharge cycles without performance deterioration) are also important to compensate for the longer and more capital-intensive construction process for BESS compared to alternate technologies.

While having high energy density is a priority for EV battery technologies, it is less important in stationary storage applications because there are less limitations on space and weight.

Stationary storage demand is shifting towards longer durations

Traditionally, most demand for shorter-term energy balancing has been satisfied by BESS with durations up to 4 hours. Additionally, various financial incentives in electricity markets have created a robust market for BESS with durations under 4 hours (Box 16.1). However, changing weather conditions, the energy transition and the ramp-up of electrification is extending energy demand peaks beyond 4 hours (National Renewable Energy Laboratory, 2023). Longer demand peaks require the support of medium (4-8 hour) and long (8-24 hour) duration storage to balance to the grid.

Box 16.1: Sources of revenue for utility-scale BESS projects

Utility-scale BESS projects generate revenue for providing storage through two main avenues: financial arbitrage and capacity credits.

Firstly, producers can use electricity market price fluctuations to generate revenue through financial arbitrage, which involves purchasing electricity for a low price before selling it back to the market at a high price. Wholesale prices are usually low — or even negative — during the middle of the day when solar generation is at its peak, with prices increasing during the evening when demand is at its highest (Figure 16.1). The relatively short duration of these price fluctuations means that the revenue generated by arbitrage is highest for the first few hours of storage and declines over time — particularly as durations extend over four hours.

A second source of revenue is through capacity credits awarded by electricity markets for providing excess power during high demand. Historically, four hours of storage has been sufficient to provide capacity during peak periods, hence capacity credits typically have not rewarded batteries with durations above 4 hours. For example, under the American '4-hour capacity rule', credits increase for each hour of storage provided up to 4 hours, with no additional credits awarded for further storage.

Producers seek to maximise value from both capacity credits and financial arbitrage, thereby 'stacking' revenue. For incumbent lithium-ion batteries, the marginal cost of adding a 5th hour of capacity is high, with revenue from the 5th hour rarely exceeding the cost of adding the extra capacity. This is why most currently operational BESS have durations of 4 hours or less.

Table 16.1: BESS technology specifications

BESS Technology	Levelized Cost of Electricity ($ per kilowatt-hour)	Feasible Storage Range
Lithium-ion batteries	170-402 (304 average)	0-8 hours
Flow batteries	227-774 (444 average)	2-24 hours
Sodium-ion batteries	N/A	0-8 hours

Notes: The 'feasible storage range' reflects how long a battery can technically operate, and does not necessarily imply cost effectiveness for the entire range. A levelized cost of electricity measure is not given for sodium-ion batteries, as they are not currently well developed for stationary storage applications. Levelized cost of electricity measures are calculated by averaging reported costs from different projects, over all operating battery durations.

Source: BloombergNEF (2024a), IEA (2024a)

16.4 Established technologies: lithium-ion batteries

Lithium-ion batteries are set to remain the dominant technology for storage up to 4 hours

Lithium-ion batteries are currently the most popular type of BESS, accounting for 80% of new storage capacity additions in 2023 (IEA, 2024a). Lithium-ion batteries consist of an anode and a cathode connected by an electrolyte, allowing the flow of ions to release energy.

Lithium-ion batteries are well-adapted to non-stationary applications such as EVs and consumer electronics, given their high energy density. Lithium-ion batteries are also cost competitive for stationary storage under 4 hours, as high investment in lithium-ion battery technology (primarily for EV applications) has created economies of scale that have resulted in a comparatively low levelized cost of electricity (Table 16.1).

Lithium-ion batteries are not as well-adapted to longer duration storage

While lithium-ion batteries can notionally be used for stationary storage beyond 4 hours (Table 16.1), a number of their properties present barriers for applications in longer duration storage. Firstly, the limited life cycle of lithium-ion batteries restricts their cost effectiveness at larger scales.

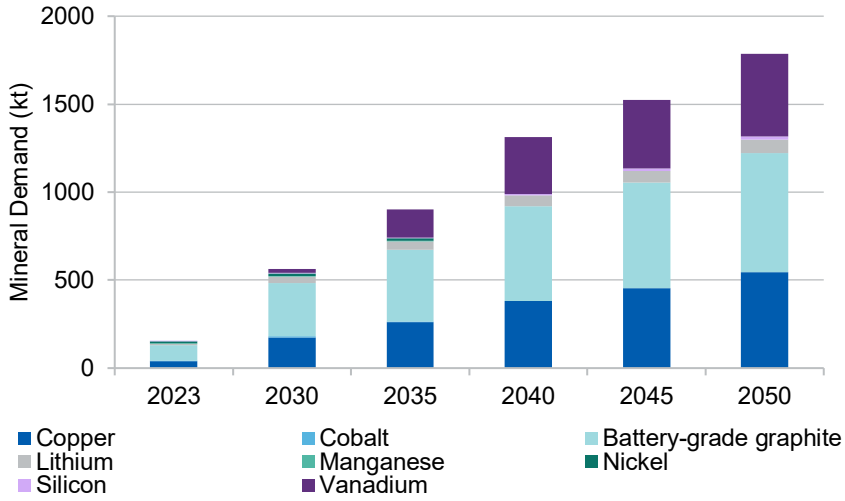
Additionally, power and energy cannot be scaled separately in lithium-ion batteries — meaning marginal costs are higher for larger batteries. Stacking of lithium-ion batteries required to achieve longer durations can pose safety risks, including fire.

While investment and innovation in the lithium-ion battery market could improve the viability and cost effectiveness of medium to long duration lithium-ion options, research and development is continuing to be directed towards other technologies more suited for longer duration storage.

Price and supply-chain volatility complicate the lithium-ion battery industry

Battery supply chains are concentrated and susceptible to disruptions, such as trade restrictions and market imbalances, leading to price volatility. Lithium demand for BESS is forecast by the IEA (2024b) to reach 45,000 tonnes by 2035 (Figure 16.2). Lithium has been subject to recent

Figure 16.2: Mineral demand for BESS



Notes: Mineral demand projections are shown for the IEA's Stated Policies Scenario (STEPS). IEA's projections assume that VRFB will become commercially suitable in 2030.

Source: IEA (2024b)

price volatility due to ongoing weakness in EV sales growth and over production (see Chapter 15). Additionally, lithium-ion batteries use graphite anodes. Battery-grade graphite supply chains are also vulnerable to disruptions due to the large amount of graphite required in batteries (Figure 16.2), minimal options for substitution and concentration of supply.

Investment in other stationary storage technologies (battery and mechanical) could alleviate some of the risk associated with reliance on lithium-ion batteries.

16.5 Emerging technologies: sodium-ion batteries

With cheaper inputs, sodium-ion batteries have the potential to become cost competitive in stationary storage under 8 hours

Sodium-ion batteries operate using similar technologies and processes to lithium-ion batteries, but crucially do not require any current critical minerals — using naturally abundant sodium.

Sodium-ion batteries have a lower energy density than lithium-ion batteries. While this means they are not as well-suited to EV applications, they could be used for stationary storage applications where energy density is not as important. For sodium-ion batteries to be cost competitive in short duration (less than 4 hours) stationary storage, they will have to outcompete incumbent lithium-ion batteries. Longer life cycles and safer scalability could make sodium-ion batteries a good candidate for medium duration stationary storage.

Competitiveness of sodium-ion batteries will depend on technological development, scaling up manufacturing, and lithium prices

While sodium-ion batteries could be a viable option for stationary storage, development and manufacturing are still nascent. As a result, there are few commercial examples of utility-scale sodium-ion batteries. Sodium-ion batteries are forecast to become cost competitive in coming decades as research and development brings costs down. Sodium-ion batteries are projected by the IEA (2024a) to account for 10% of annual capacity additions in 2030.

Many sodium-ion battery technologies can be manufactured using existing lithium-ion battery facilities and methods — which could reduce barriers to widespread adoption. The price of lithium-ion batteries will also be a key determinant of sodium-ion adoption. Higher lithium prices could encourage more investment into and development of sodium-ion batteries for stationary storage. Price is particularly important for BESS with durations under 4 hours, where lithium-ion batteries are the incumbent technology.

16.6 Emerging technologies: flow batteries

Flow could become a viable option for longer duration storage after 2030

Flow batteries may emerge as a medium (4-8 hours) to long (8-24 hours) duration stationary storage solution. Flow batteries consist of two ion-containing liquid electrolytes, which are stored in separate tanks. Both electrolytes are pumped into a central tank, where ions pass through a dividing membrane to transfer energy. There are a number of flow battery types undergoing research and development such as zinc-bromide and iron-chromium, although vanadium redox flow batteries (VRFB) are the most mature and commercially successful to date.

Flow batteries have lower power density, meaning they are less suited to short duration storage where a high amount of energy is required to discharge in a short period of time. However, flow batteries contain other properties that make them well-adapted to longer duration stationary storage. Unlike lithium-ion batteries, marginal production costs do not significantly increase at larger scales. Additionally, longer life cycles of flow batteries (relative to lithium-ion batteries) makes them more attractive as an investment decision.

Scaling-up manufacturing capability and raw material prices are barriers to flow batteries being a cost competitive stationary storage option

While flow battery technology is reasonably mature, manufacturing and deployment is limited. Producers are facing technical challenges in having to scale early pilot flow batteries up to utility size to make them commercially viable. Rising demand for BESS will provide opportunities for investment into the manufacturing and scale-up of flow batteries.

An additional concern is the cost of raw materials. Vanadium, used in the most commercially successful flow batteries to date, is subject to significant price volatility due to demand fluctuations in its other use cases — mainly in steel-making. China, Russia, South Africa and Brazil are the major producers of mined vanadium (US Geological Survey, 2024). The US, EU, UK and Australia class vanadium as a critical mineral due to this price volatility and its importance to strategic industries.

Cost reductions for VRFB are not expected to occur before 2030. However, increasing research and development and economies of scale could make them a cost competitive storage option for durations above 4 hours by 2035. The IEA (2024b) forecasts that global demand for vanadium in BESS will reach 160,000 tonnes in 2035 (Figure 16.2).

16.7 Opportunities for Australia

With strong deployment of renewables and government support, Australia's market for BESS is expanding quickly

The Australian market for BESS is growing fast, with capacity additions jumping to 1.3 GW in 2023 — a more than 2.5-fold increase from the previous year (BloombergNEF, 2024b). This rapidly growing demand is a response to a number of factors.

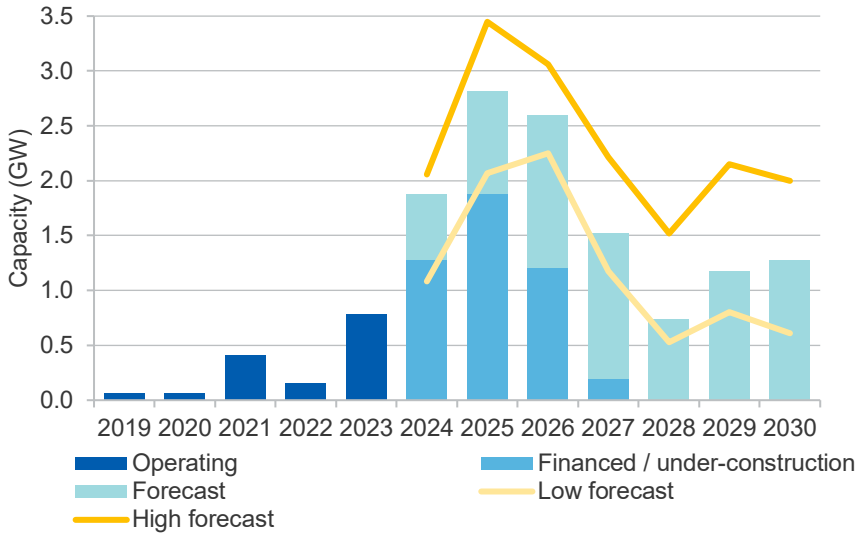
As of 2024, 39% of Australia's electricity is provided by renewables (Clean Energy Council, 2024), necessitating the deployment of BESS to balance gaps in power generation. Renewable driven changes in daily grid demand profiles (Figure 16.1) is causing volatility in Australia's National Electricity Market (NEM), increasing the arbitrage value obtained from BESS (Box 16.1). These factors have sparked an increased interest from major utility companies in investing in BESS projects (BloombergNEF, 2024b).

Government support is another key factor in encouraging investment in BESS. In particular, the Capacity Investment Scheme aims to support the installation of 9 GW of storage by 2030 by providing a long-term revenue safety-net that decreases financial risks for investors. Additionally, the Battery Breakthrough Initiative (a part of the Future Made in Australia agenda), will use production incentives to strengthen battery manufacturing capabilities in Australia. Further initiatives to support development of the Australian BESS industry are outlined in the National Battery Strategy (2024).

BESS projects in the pipeline have larger capacities and longer durations

BloombergNEF (2024b) projects that Australian cumulative BESS capacity will reach 13.5 GW by 2030 in its base case (Figure 16.3). As of the end of 2023, 5 GW of BESS capacity was under construction in Australia (Clean Energy Council, 2024). While BESS projects in the pipeline have longer durations than existing batteries — most of which have durations under 2 hours — no projects in the pipeline have durations above 4 hours. Final investment decisions have been made on two 4 hour batteries, which are scheduled to begin operating commercially in 2024 and 2025.

Figure 16.3: Australian projected BESS uptake



Notes: BloombergNEF's base case forecast (blue bars), high forecast and low forecast is shown for total installed BESS capacity. BloombergNEF's low forecast is underpinned by continued revenue uncertainty and high project costs, while its high forecast assumes sustained high demand, new business models and policy support.

Source: BloombergNEF (2024)

Australia is well placed to support BESS demand through the supply of raw materials and battery manufacturing.

Australia is a leader in lithium extraction, producing 39% of global supply in 2023. As a result, Australia has an important role to play in lithium-ion battery supply chains by securing the supply of mined lithium.

Australia also holds 32% of global vanadium economic resources (Geoscience Australia, 2022). While there are currently no operational producers of mined vanadium in Australia, there is growing interest from a number of firms. Based on projects in the pipeline, Australian vanadium production is expected to reach 39,000 tonnes by 2030 (DISR, 2023), which could support domestic opportunities in VRFB production.

Australian Vanadium — which has recently begun manufacturing vanadium electrolyte — intends to expand into vanadium mining with its proposed Murchison project. Australian Vanadium has a partnership with VSUN Energy to provide its vanadium electrolyte for VRFB manufacturing. Similarly, Vecco Group, which opened Australia's first commercial-scale VRFB electrolyte manufacturing facility in 2023, intends to begin mining vanadium in mid-2027. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has partnered with Tivan to develop emerging vanadium processing technology, aiming to build Australia's downstream capability. Additionally, a few Australian producers are developing capabilities in VRFB production, including Yadlamalka Energy, which installed Australia's first commercial-grade VRFB in 2023.

Government support is available to support critical mineral extraction and refining. The Critical Minerals Strategy includes a number of initiatives to build capability and increase investment across all stages of the value chain. In the 2024–25 Budget, the Australian Government announced a Critical Minerals Production Tax Incentive to support downstream refining and processing of Australia's 31 critical minerals from 2027–28 to 2039–4. Federal policies build on support provided by the states and territories, such the Critical Minerals Advanced Processing Hub located in Western Australia, jointly funded at the state and federal level.

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Principal markets for Australia‘s resource and energy exports

Table 17.1: Principal markets for Australia's total resource and energy exports

	Unit	2019–20	2020–21	2021–22	2022–23	2023–24	*Share (2023-24)*
China	$m	127,801	153,687	139,494	166,629	171,948	41%
Japan	$m	46,821	42,502	62,790	89,173	75,759	18%
Other Asia [a]	$m	29,546	33,491	46,261	51,439	55,910	13%
Korea, Rep. of	$m	21,568	24,861	35,079	38,305	44,265	11%
India	$m	9,748	11,880	26,713	21,203	21,274	5%
EU28	$m	18,633	15,546	13,711	14,086	13,731	3%
Other [b]	$m	35,372	26,528	97,642	85,458	32,272	8%
Total	**$m**	289,489	308,494	421,691	466,293	415,158	-

Notes: **a** Other Asia excludes China, Japan, South Korea and India **b** may include 'No Country Detail' where various confidentiality restrictions may apply, see *International Merchandise Trade, Australia: Concepts, Sources and Methods 2018 Data confidentiality* for more information.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Table 17.2: Principal markets for Australia's iron ore exports

	Unit	2019–20	2020–21	2021–22	2022–23	2023–24
China	$m	84,786	124,820	108,307	104,777	116,245
Japan	$m	7,038	9,080	10,257	8,073	8,349
Korea, Rep. of	$m	6,222	9,033	8,293	6,932	7,702
Taiwan	$m	1,876	3,070	2,793	1,974	2,203
India	$m	21	9	34	67	504
Indonesia	$m	27	40	38	38	40
Other [a]	$m	2,891	6,922	2,766	2,270	2,854
Total	**$m**	102,861	152,975	132,489	124,131	137,897

Notes: **a** may include 'No Country Detail' where various confidentiality restrictions may apply, see *International Merchandise Trade, Australia: Concepts, Sources and Methods 2018 Data confidentiality* for more information.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Table 17.3: Principal markets for Australia's LNG exports[a]

	Unit	2019–20	2020–21	2021–22	2022–23	2023–24 [c]
Japan	$m	19,928	11,649	24,800	34,508	na
China	$m	16,277	11,377	21,420	19,833	na
South Korea	$m	5,161	3,343	11,473	18,310	na
Taiwan	$m	2,593	2,237	7,521	12,070	na
Singapore	$m	1,039	175	2,377	3,165	na
Malaysia	$m	1,456	499	559	2,121	na
Other [b]	$m	1,071	1,198	2,421	2,231	68,778
Total	**$m**	47,525	30,477	70,571	92,237	68,778

Note: **a** Department of Industry, Science and Resources estimates based on International Trade Centre data. **b** may include 'No Country Detail' where various confidentiality restrictions may apply, see *International Merchandise Trade, Australia: Concepts, Sources and Methods 2018 Data confidentiality* for more information.**c** LNG country data confidentialised for 2023-24 FY"
Source: ABS (2024) International Trade in Goods and Services, 5368.0; International Trade Centre (2024); Department of Industry, Science and Resources (2024)

Table 17.4: Principal markets for Australia's thermal coal exports

	Unit	2019–20	2020–21	2021–22	2022–23	2023–24
Japan	$m	8,347	7,009	23,819	37,712	15,971
Taiwan	$m	2,386	2,060	6,636	9,456	4,829
Korea, Rep. of	$m	2,843	2,568	6,819	4,774	2,334
China	$m	3,930	487	0	3,505	8,813
Malaysia	$m	534	560	1,432	2,363	1,092
Vietnam	$m	1,041	711	1,688	2,205	1,802
Other [a]	$m	1,295	2,613	5,863	5,485	2,400
Total	**$m**	20,376	16,009	46,258	65,500	37,240

Notes: **a** may include 'No Country Detail' where various confidentiality restrictions may apply, see *International Merchandise Trade, Australia: Concepts, Sources and Methods 2018 Data confidentiality* for more information.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Table 17.5: Principal markets for Australia's metallurgical coal exports

	Unit	2019–20	2020–21	2021–22	2022–23	2023–24
India	$m	7,489	7,580	20,889	17,078	15,272
Japan	$m	6,084	4,744	14,131	15,642	12,987
Korea, Rep. of	$m	3,033	2,732	9,430	8,249	6,866
Taiwan	$m	1,993	1,332	3,967	3,752	3,076
Netherlands	$m	1,242	885	4,102	3,609	3,460
China	$m	9,777	1,668	0	492	1,958
Other [a]	$m	4,626	4,246	15,070	13,101	10,618
Total	**$m**	34,245	23,187	67,588	61,922	54,237

Notes: **a** may include 'No Country Detail' where various confidentiality restrictions may apply, see *International Merchandise Trade, Australia: Concepts, Sources and Methods 2018 Data confidentiality* for more information.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Table 17.6: Principal markets for Australia's gold exports

	Unit	2019–20	2020–21	2021–22	2022–23	2023–24
China	$m	824	2,028	8,179	8,141	5,119
Hong Kong	$m	3,341	1,410	4,893	3,778	11,223
Singapore	$m	1,423	2,933	1,607	3,480	3,053
Switzerland	$m	1,899	1,889	1,878	2,239	1,925
India	$m	66	1,474	1,928	1,508	2,812
United States	$m	3,079	3,937	1,382	1,251	1,709
Other [a]	$m	13,762	12,433	3,334	4,008	7,088
Total	**$m**	24,394	26,105	23,200	24,406	32,930

Notes: **a** may include 'No Country Detail' where various confidentiality restrictions may apply, see *International Merchandise Trade, Australia: Concepts, Sources and Methods 2018 Data confidentiality* for more information.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Table 17.7: Principal markets for Australia's lithium exports

	Unit	2019–20	2020–21	2021–22	2022–23	2023–24
China	$m	na	na	4,725	19,788	9,509
Belgium	$m	na	na	85	169	72
Korea, Rep. of	$m	na	na	46	90	129
United States	$m	na	na	37	15	19
Other [a]	$m	na	na	na	8	32
Total	**$m**	na	na	4,899	20,069	9,762

Notes: **a** may include 'No Country Detail' where various confidentiality restrictions may apply, see *International Merchandise Trade, Australia: Concepts, Sources and Methods 2018 Data confidentiality* for more information.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Table 17.8: Principal markets for Australia's copper exports

	Unit	2019–20	2020–21	2021–22	2022–23	2023–24
China	$m	3,787	2,747	1,958	2,351	2,576
Korea, Rep. of	$m	651	1,315	1,375	1,410	826
Malaysia	$m	824	850	961	1,084	1,076
India	$m	463	626	941	457	687
Japan	$m	2,126	17	18	1	0
Other [a]	$m	2,357	5,885	6,875	6,959	6,095
Total	**$m**	10,208	11,440	12,128	12,262	11,259

Notes: **a** may include 'No Country Detail' where various confidentiality restrictions may apply, see *International Merchandise Trade, Australia: Concepts, Sources and Methods 2018 Data confidentiality* for more information.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Table 17.9: Principal markets for Australia's alumina exports[a]

	Unit	2019–20	2020–21	2021–22	2022–23	2023–24
Bahrain	$m	0	0	923	1,559	1,614
UAE	$m	0	0	747	1,075	1,238
South Africa	$m	577	na	433	660	766
Canada	$m	0	0	424	638	611
Mozambique	$m	453	54	431	573	493
Other[b]	$m	6,401	6,894	6,019	3,804	3,763
Total	**$m**	7,431	6,948	8,977	8,308	8,486

Note: Department of Industry, Science and Resources estimates based on International Trade Centre data; **b** may include 'No Country Detail' where various confidentiality restrictions may apply, see *International Merchandise Trade, Australia: Concepts, Sources and Methods 2018 Data confidentiality* for more information.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; International Trade Centre (2024); Department of Industry, Science and Resources (2024)

Table 17.10: Principal markets for Australia's aluminium exports[a]

	Unit	2019–20	2020–21	2021–22	2022–23	2023–24
Korea, Rep. of	$m	1,138	905	1,029	1,538	1,430
Japan	$m	1,016	956	1,505	1,319	1,072
United States	$m	247	256	596	533	257
Thailand	$m	290	349	521	347	403
Taiwan	$m	360	417	618	319	431
Indonesia	$m	95	111	164	143	170
Other [b]	$m	546	769	1,278	1,083	1,336
Total	**$m**	3,692	3,763	5,710	5,281	5,100

Note: Department of Industry, Science and Resources estimates based on International Trade Centre data; **b** may include 'No Country Detail' where various confidentiality restrictions may apply, see *International Merchandise Trade, Australia: Concepts, Sources and Methods 2018 Data confidentiality* for more information.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; International Trade Centre (2024); Department of Industry, Science and Resources (2024)

Table 17.11: Principal markets for Australia's nickel exports

	Unit	2019–20	2020–21	2021–22	2022–23	2023–24
China	$m	479	307	244	572	171
India	$m	0	0	3	60	34
Other [b]	$m	2,922	3,204	4,405	4,956	3,503
Total	**$m**	2,443	2,898	4,158	4,324	3,299

Note: Department of Industry, Science and Resources estimates based on International Trade Centre data and company reporting; **b** may include 'No Country Detail' where various confidentiality restrictions may apply, see *International Merchandise Trade, Australia: Concepts, Sources and Methods 2018 Data confidentiality* for more information.
Source: ABS (2024) International Trade in Goods and Services, 5368.0; Department of Industry, Science and Resources (2024)

Appendices

Appendix A
Definitions and classifications

A.1 Exchange rates

In this report, the AUD/USD exchange rate (Australian dollar relative to the US dollars) is based on the median of economic forecasters at the time that the report is prepared. The source is the Bloomberg survey of economic forecasters.

World commodity prices are typically denominated in US dollars, and exchange rate movements can have a significant effect on the actual outcomes of commodity prices and export earnings. A change in the value of the US dollar against other floating international currencies can influence movements in world resources and energy prices. A change in the Australian dollar against the US dollar will impact on export earnings for domestic commodity exporters and producers. There is substantial uncertainty surrounding any exchange rate forecast, with changes to exchange rates influenced by changes in financial market sentiment, sometimes resulting in strong volatility.

A.2 Conversion to real dollars

Nominal values and prices are converted to real dollars using Australian and US consumer price indexes (CPI). The Australian and US CPI forecasts are based on the median of economic forecasters at the time that the report was prepared. The source is the Bloomberg survey of economic forecasters.

A.3 Time periods

The terms 'estimate', 'forecast' and 'projection' refer to different time periods in this report. Estimate refers to a time period that has passed, but for which full historical data is not yet available, while 'forecast' and 'projection' refer to different periods in the future. It is important to distinguish between different future time horizons, as factors affecting production, consumption and prices in the short-term differ from factors affecting these components in the medium to long-term. Forecasts also become increasingly imprecise over longer time horizons, due to increased risk and uncertainty. For these reasons, the Department of Industry, Science and Resources' Office of the Chief Economist (DISR OCE) uses different terminology to distinguish between short-term forecasts and medium to long-term projections, as outlined in *Table A2*.

Table A1: OCE terminology for different time periods/horizons

Period	Years	Terminology
Historical	Time period has passed but complete data for the period is not yet available	Estimate
Short-term	1 to 2 years	Forecast
Medium-term	3 to 5 years	Projection
Long-term	Beyond 5 years	n/a

Source: Department of Industry, Science and Resources (2022)

A.4 Commodity classifications

The DISR OCE defines exports for each commodity by a selected set of 8-digit Australian Harmonised Export Commodity Classification (AHECC) codes. Where possible, the choice of AHECC codes is based on alignment with international trade data, to ensure that direct comparisons can be made. For example, groupings for various commodities are aligned with classifications used by the International Energy Agency, World Steel Association, International Nickel Study Group, International Lead and Zinc Study Group, International Copper Study Group and World Bureau of Metal Statistics.

In this report, benchmark prices and Australian production and exports are forecast for 21 commodities, as shown in *Table A2*. In estimating a total for Australia's resources and energy exports, the remaining commodities, defined as 'other resources' and 'other energy', are forecast as a group.

Table A2: Resources and energy commodities groupings and definitions

	Resources (non-energy)	Energy
Definition	Resource commodities are non-energy minerals and semi-manufactured products produced from non-energy minerals	Energy commodities are minerals and petroleum products that are typically used for power generation
Australian Harmonised Export Commodity Classification (AHECC) chapters	25 (part); 26 (part); 28 (part); 31 (part); 73 (part); 74; 75; 76; 78; 79; 80; 81	27 (part)
Commodities for which data is published, forecasts are made and analysed in detail in this report	Aluminium; alumina; bauxite; copper; gold; iron ore; crude steel; nickel; zinc, lithium	Crude oil and petroleum products; LNG; metallurgical coal; thermal coal; uranium

Notes: The AHECC chapter is the first two digits of the trade code. Groupings are made at the 8-digit level.

Source: Department of Industry, Science and Resources (2022)

Appendix B Glossary

Term	Description
A$	Australian dollar
ABS	Australian Bureau of Statistics
AHECC	Australian Harmonized Export Commodity Classification
AISC	All-In Sustaining Cost — an extension of existing cash cost metrics and incorporates costs related to sustaining production.
Base metals	A common metal that is not considered precious (includes aluminium, copper, lead, nickel, tin, zinc)
Bbl	Barrel
Bcm	Billion cubic metres
Benchmark	A standard specification used to price commodities.
BF and BOF	Blast furnace and basic oxygen furnace — used in an integrated steelmaking process that uses iron ore and coal.
Bulks	Non-liquid and non-gaseous commodities shipped in mass and loose (iron ore, coal, bauxite)
CAGR	Compound annual growth rate
Capex	Capital expenditure
CFR	Cost and freight — Seller clears exports, and pays freight.
CIF	Cost, Insurance, and Freight
Coal Seam Gas (CSG)	Natural gas found in coal seams. Also known as Coal Bed Methane (CBM)
Coke	Made by heating coal at high temperatures without oxygen, and used to reduce iron ore to molten iron saturated with carbon, called hot metal

Conventional gas	Natural gas that can be produced from reservoirs using traditional techniques. Contrasts with unconventional gas.
COVID-19	2019 Novel Coronavirus
CPB	CPB Netherlands Bureau for Economic Policy Analysis
CPI	Consumer Price Index — measures quarterly changes in the price of a basket of goods and services which account for a high proportion of expenditure by the CPI population group (i.e. metropolitan households).
Crude steel	Steel in the first solid state after melting, suitable for further processing or for sale.
DES	Delivered Ex Ship — price of LNG including shipping and insurance.
DISR	Department of Industry, Science and Resources
DMO	Domestic Market Obligation — a policy to reserve energy commodities for domestic usage
DRC	Democratic Republic of the Congo
ECB	European Central Bank
Economic growth	An increase in the capacity of an economy to produce goods and services, compared from one period of time to another. It is measured in nominal or real gross domestic product (GDP).
EIA	The United States Energy Information Administration
EAF	Electric arc furnace — a furnace that melts steel scrap using the heat generated by a high power electric arc.
ETF	Exchange Traded Fund — an exchange traded fund that allows investors to invest in gold on the exchange.
EUV	Export unit value — export value/volumes exported
EV	Electric vehicle
f	Forecast — a two year outlook
FEED	Front end engineering design
FID	Final investment decision

FOB	Free on board — seller clears export, buyer pays freight.
GAD	Gross air dried basis — For measuring coal quality.
GAR	Gross as received basis — For measuring coal quality.
GBP	Great Britain Pounds
GDP	Gross Domestic Product — measures the value of economic activity within a country/group.
GFC	Global Financial Crisis — the period of extreme stress in global financial markets and banking systems between mid-2007 and early 2009.
GJ	Gigajoule
GST	Goods and Services Tax — a value-added tax levied on most goods and services sold for domestic consumption.
HCC	Hard coking coal — The best grade of metallurgical coal used in the steel production process. Australian hard coking coal is regarded as the industry benchmark.
IEA	International Energy Agency
IMF	International Monetary Fund — an international organisation that promotes international financial stability and monetary cooperation.
IMO	International Maritime Organisation
IP	Industrial Production — measures the output of the industrial sector that comprises mining, manufacturing, utilities and construction.
IPO	Initial public offering — a process of offering shares of a private corporation to the public in a new stock issuance.
ISM	US Institute for Supply Management
ISM	Institute of Supply Management
JCC	Japan Customs-cleared Crude (or Japan Crude Cocktail) — average price of crude oil imported by Japan and a common price index in long-term LNG contracts.
JFY	Japanese fiscal year
kcal/kg	Kilocalories per kilogram

kt	Thousand tonnes
ktpa	Kilotonnes per annum
LBMA	London Bullion Market Association
LCE	Lithium Content Equivalent
Li OH	Lithium Hydroxide
LME	London Metal Exchange
LNG	Liquefied natural gas
LNY	Lunar New Year
LPG	Liquefied petroleum gas
LVPCI	Low volatile pulverised coal injection — a type of low volatile coal used in the PCI process
m	Million
MMbtu	Million British thermal units
Mt	Million tonnes
mtpa	Million tonnes per annum
MW	Megawatts
Nameplate capacity	The theoretical maximum annual production capacity
NAR	Net as received basis — For measuring coal quality
NDRC	China’s National Development and Reform Commission
NEV	New energy vehicle — term used for plug-in electric vehicles eligible for public subsidies (battery electric vehicles and plug-in hybrid vehicles)

OCE	Office of the Chief Economist
OECD	Organisation for Economic Co-operation and Development
OPEC	Organisation of Petroleum Exporting Countries, a formal alliance of 14 countries to collaborate to manage the world oil market
OPEC+	Informal term for agreements between OPEC and ten other oil-producing countries (which are not members of OPEC)
Oz	Ounce
PCE	Personal Consumption Expenditure — a measure of the changes in price of consumer services and goods.
PCI	Pulverised coal injection — PCI coal is used for its heat value and injected directly into blast furnaces as a supplementary fuel, which reduces the amount of coke required.
PCI	Pulverised coal injection — a process used in blast furnace operations
PM	The afternoon price of gold set at 3.00pm each business day at the London Bullion Market Association
PMI	Purchasing Managers Index — an indicator of economic health for manufacturing and service sectors.
PPP	Purchasing Power Parity — a way of measuring economic variables in different countries that equalise the purchasing power of different currencies
RoW	Rest of world
s	Estimate — Incomplete data or subject to revision
Shale gas	Natural gas found in shales
SDR	Special drawing right
SHFE	Shanghai Futures Exchange
SSCC	Semi-soft coking coal — A type of metallurgical coal used in the steel production process alongside hard coking coal, but results in a lower coke quality and more impurities.
Tariff	A tax on imports or exports that is used by governments to generate revenue or to protect domestic industries from competition.
Tight gas	Natural gas found in low quality reservoirs

TWI	Trade Weighted Index — a measure of the foreign exchange value of the US dollar against a basket of major foreign currencies.
U3O8	Triuranium octoxide — a compound of uranium.
UAE	United Arab Emirates
UK	United Kingdom
Unconventional gas	Natural gas that is more difficult to extract, including coal seam gas, shale gas and tight gas. Contrasts with conventional gas.
US	United States
US$	United States dollar
WEO	The International Energy Agency's World Energy Outlook
WTI	West Texas Intermediate crude oil price
z	Projection a five year outlook

About this edition

The *Resources and Energy Quarterly* (REQ) contains forecasts for the value, volume and price of Australia's major resources and energy commodity exports.

The 'medium term' (five year) outlook is published in the March quarter edition of the *Resources and Energy Quarterly*. Each June, September and December edition of the *Resources and Energy Quarterly* features a 'short term' (two year) outlook for Australia's major resource and energy commodity exports.

Underpinning the forecasts/projections contained in the *Resources and Energy Quarterly* is the outlook for global resource and energy commodity prices, demand and supply. The forecasts/projections for Australia's resource and energy commodity exporters are reconciled with this global context. The global environment in which Australia's producers compete can change rapidly. Each edition of the *Resources and Energy Quarterly* factors in these changes and makes alterations to the forecasts and projections by estimating the impact on Australian producers and the value of their exports.

The *Resources and Energy Quarterly* uses IMF economic growth forecasts as the basis of its world growth forecasts.

In this report, commodities are grouped into two broad categories, referred to as 'resources' and 'energy'. 'Energy' commodities comprise metallurgical and thermal coal, oil, gas and uranium. 'Resource' commodities in this report are all other mineral commodities.

Unless otherwise stated, all Australian and US dollar figures in this report are in nominal terms. Inflation and exchange rate assumptions are provided in tables 2.1 and 2.2 in the *Macroeconomic outlook* chapter.

Information in this edition of the *Resources and Energy Quarterly* is current as of 20 September 2024.

Resources and Energy Quarterly publication schedule

Publication	Expected release date	Outlook period final year
December 2024	20 December 2024	Australian data: 2025–26 World data: 2026
March 2025	31 March 2025	Australian data: 2029–30 World data: 2030
June 2025	30 June 2025	Australian data: 2026–27 World data: 2027
September 2025	29 September 2025	Australian data: 2026–27 World data: 2027

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