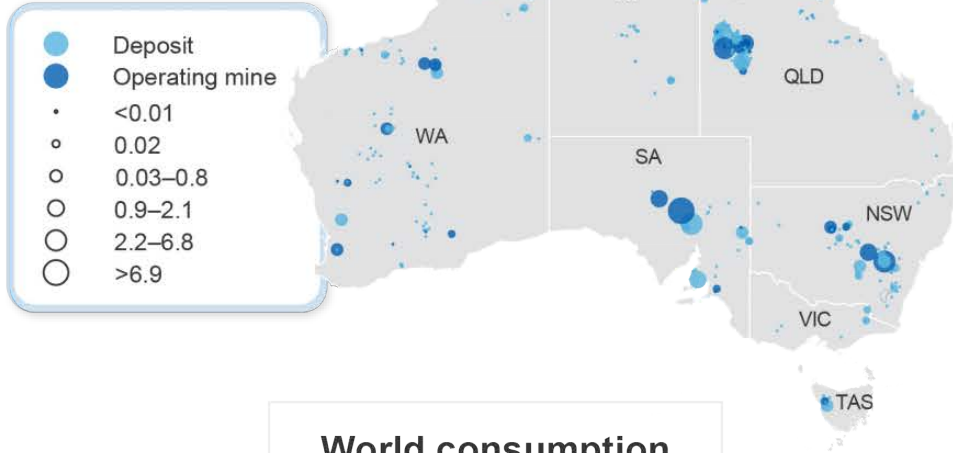
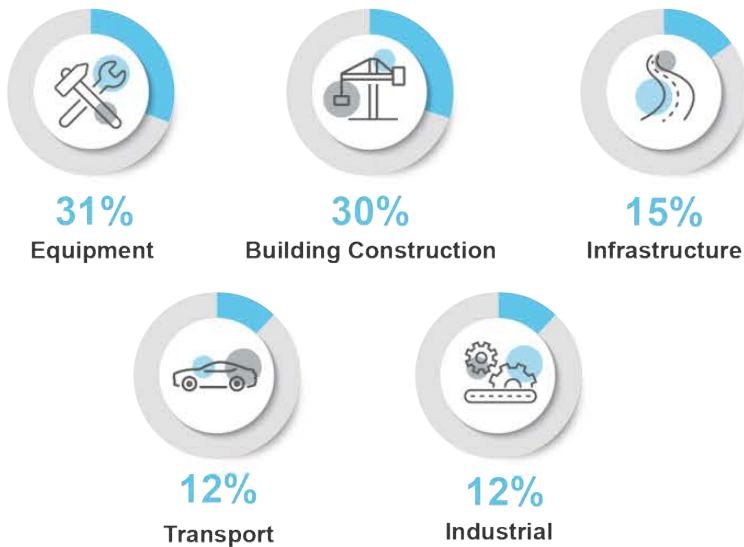


Copper

Major Australian copper deposits (Mt)



World consumption



Copper facts



The average home contains **180 kg of copper**



80% of copper ever produced **is still in use today**



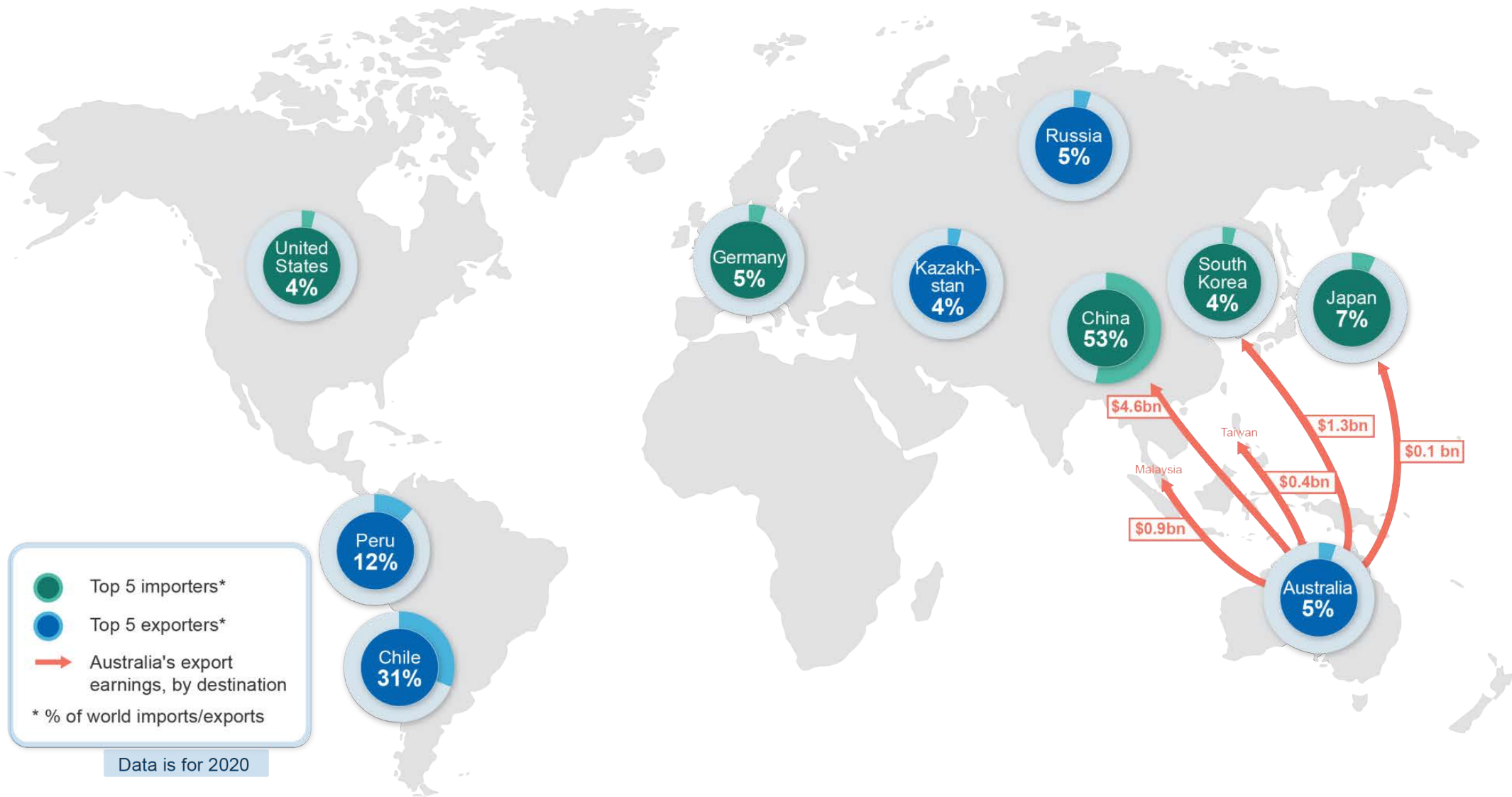
An electric car contains about **5x more copper** than an equivalent ICE car



China consumes half of the **world's copper**

Australia's copper





12.1 Summary

- Copper prices have surged in 2021, averaging US\$9,200 a tonne over the year. High prices will be supported in 2022 through the continued economic recovery and the expanding use of copper in low-emissions technology. Prices are forecast to ease slightly to US\$8,500 a tonne by 2023 as new mine supply comes online.
- Australia's copper export volumes are expected to rise slightly over the outlook period, from 898,000 tonnes in 2020–21, to around 934,000 tonnes in 2022–23 (in metal content terms) (see [Australia section](#)).
- Australia's copper export earnings are expected to increase — first from sustained price gains into 2022, then from increased export volumes in 2023. Export earnings are forecast to rise from \$11.4 billion in 2020–21 to \$14.7 billion in 2022–23.

12.2 World consumption

Consumption growth likely, but with potential short term hurdles

Copper looks likely to enter a strong demand phase over the outlook period, supported by both the post-COVID-19 economic recovery and the long term transition to renewable energy technology and battery storage. A US\$1.2 trillion infrastructure package passed by the US Congress in November 2021 will also have positive effects on copper demand.

Copper consumption will face some barriers in the short term. First, high energy prices and episodes of power rationing in China may cause manufacturing to be slower than it might have been otherwise. Second, if inflation pressures are sustained, central banks may tighten monetary policy, softening copper demand. Third, high prices and decreasing availability may moderate copper demand in the short term.

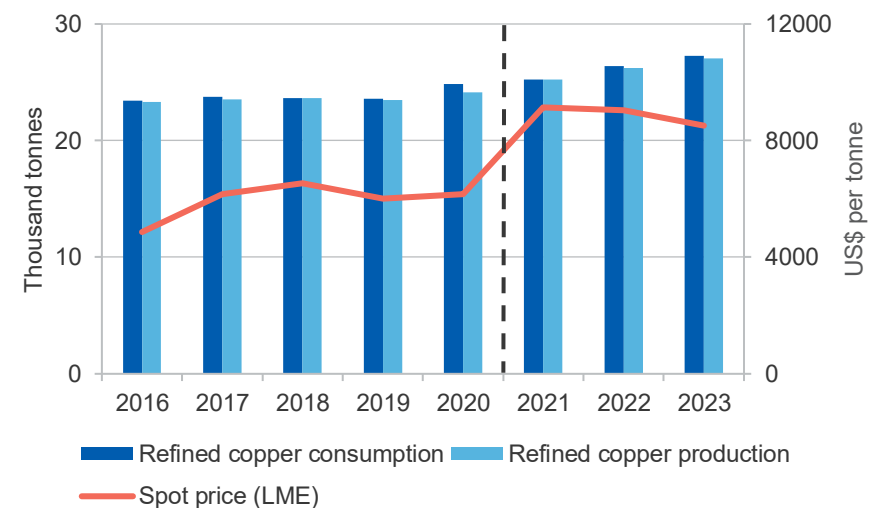
Refined copper consumption is expected to increase 3.7% to reach over 25 million tonnes in 2021 — an increase on 2020 consumption, but lower than forecast in the September 2021 *Resource and Energy Quarterly (REQ)*. Total world consumption is forecast to reach 27 million tonnes in 2023 as manufacturers fulfil a backlog of demand (Figure 12.1).

China's consumption provides significant support to the copper market

China accounted for more than half (54%) of global refined copper consumption in 2020 (Figure 12.2), in addition to being the largest refiner of copper (42%). This position at the heart of the global copper market makes China highly influential with regard to global copper prices and investment decisions.

Episodes of power rationing have seen demand for mined and intermediate products weaken in the September quarter 2021, while uncertainty in the property market has seen the demand for refined copper soften. The construction sector accounts for 20% of end-use demand, with concerns surrounding the sector unlikely to be resolved by the end of the December quarter 2021. Fortunately, fears of a renewed wave of COVID-19 infections in the September 2021 *REQ* have not been borne out, as containment measures proved effective in preventing the outbreak from spreading to other provinces.

Figure 12.1: World balance of refined copper market



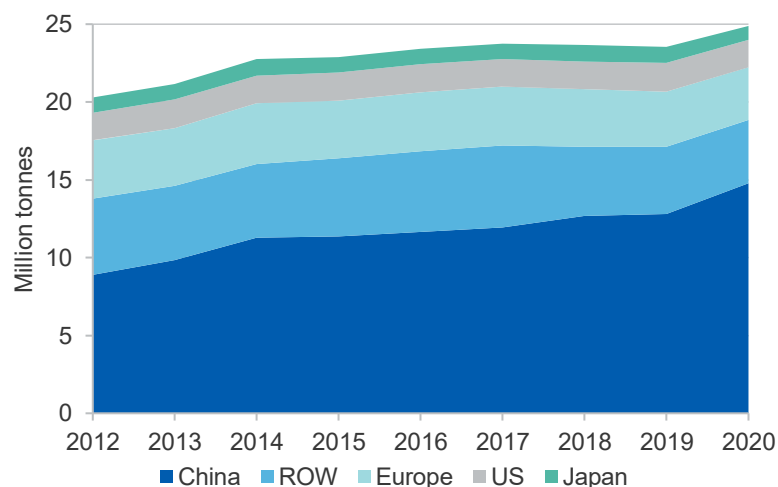
Source: LME (2021) official cash price; World Bureau Metal Statistics (2021); Department of Industry, Science, Energy and Resources (2021)

2021 growth led by ex-Chinese demand

Fiscal stimulus packages, COVID-19 containment measures, pent-up consumer demand and low interest rates have supported growth in ex-China copper demand in 2021. Refined copper usage in the US is expected to increase by 11% this year, while European copper demand is expected to bounce back to the strong levels seen in the first six months of 2021 (after recent flooding events). Medium-term prospects for copper have also been buoyed by the EU's decarbonisation targets. Growth in Asia has also been strong, however reductions in automotive manufacturing pose a downside risk, as shortages of semiconductors have forced manufacturers to reduce monthly production by between 10% (Honda) and 30% (Nissan).

Supply issues mean that copper use has been limited throughout the second half of 2021; however, medium-term demand is expected to be strong, as manufacturers meet backorders. The market is expected to continue to experience tightness over the outlook period given the rundown of exchange inventories (see *Prices* section).

Figure 12.2: Refined copper consumption by major market



Source: World Bureau of Metal Statistics (2021); Department of Industry, Innovation and Science (2021)

12.3 World production

World production to grow, despite constraining factors

Mine production is forecast to reach 24 million tonnes in 2023, up from about 22 million tonnes in 2021, as high prices and expectations of future demand growth create strong incentives for development projects. Long project development timelines may result in production taking until 2023 to come online — leaving the copper market in deficit in 2022. Over the outlook period the largest production increases are expected to come from Peru and Chile (Figure 12.3), though both countries face some short-term issues in bringing product to export markets.

Growth is also expected in Russia, with a Russian and Kazakhstani joint development finalising an agreement to mine the large Tarutinsky copper deposit in Russia's Chelyabinsk region. The mine is expected to yield a capacity of 750,000 tonnes per year, over a 9.5 year mine life, and is expected to be largely directed to export markets.

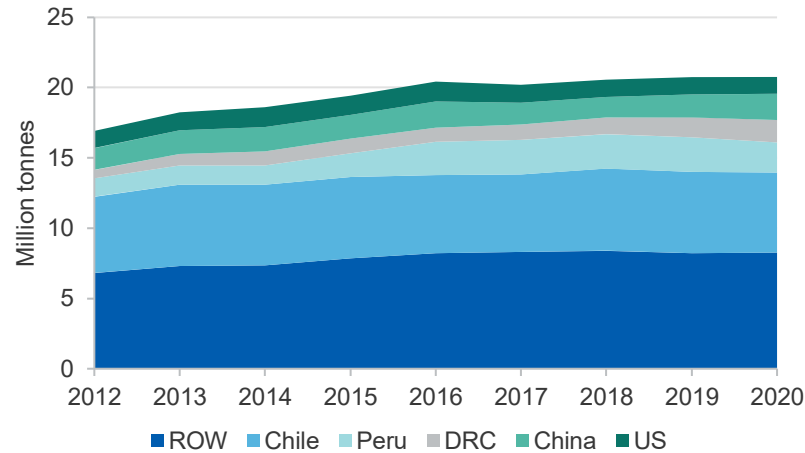
Uncertainty around Chile and Peru production

Mine production in Peru improved by 6.9% quarter-on-quarter in the September quarter 2021. However, ongoing protest activities are occurring at several mines including at MMG's Las Bambas mine, which is one of the world's largest copper mines. The mine has faced environmental issues due to heavy traffic imposed on local roads and the spread of mineral dust, which has been identified as a risk to agriculture in the region. MMG have stated that negotiations around the November blockade have failed, and that Las Bambas will cease production from mid-December. Even accounting for mine disruptions, significant growth in mine production is expected from Peru through to 2023.

In Chile, production fell by 2.5% in the September quarter 2021.

Production at BHP's Escondida mine continues to decline quarter-on-quarter due to lower feed grade, however the company successfully negotiated collective bargaining arrangements which had threatened to affect production through protest action. Mine production for 2021–22 is estimated at around 1 million tonnes.

Figure 12.3: Mined copper production by major producers



Source: World Bureau of Metal Statistics (2021); Department of Industry, Innovation and Science (2021)

Strong momentum in refined production growth

After rising by 2.8% in 2020, refined copper production is estimated to grow by 4.4% in 2021 to 25 million tonnes (Figure 12.4), as new Chinese refining capacity comes online, and as high prices encourage increased processing. Refined production is expected to grow to 27 million tonnes in 2023. This is expected to match copper consumption and thus stabilise inventories — and in turn reduce some of the upward price pressure in the global copper market.

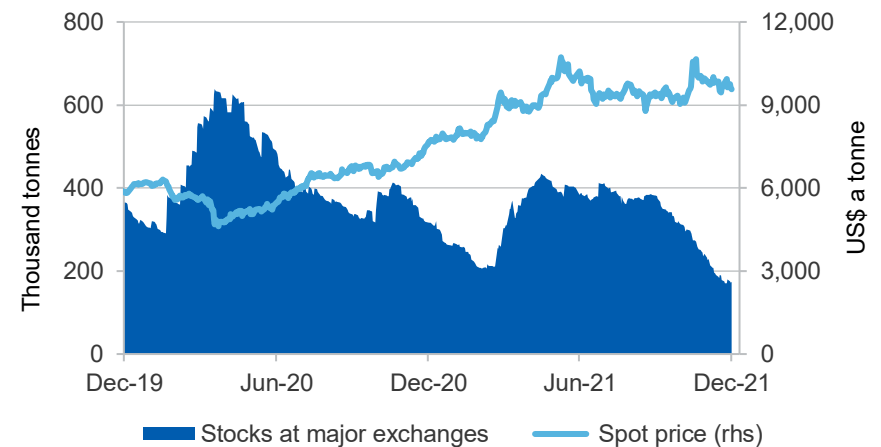
There remain some downside risks to production growth, which could potentially prevent any significant price easing over the next two years. Chinese copper production fared fairly well through episodes of power rationing in the September quarter 2021, mainly due to its relatively low energy intensity and its importance to low emissions technology. While some refineries were affected through October and November, the effects are much less than those seen in aluminium or nickel production. Modest power rationing is expected to continue into the March quarter 2022, although it is unclear to what extent copper production will be impacted.

12.4 Prices

Copper prices remain elevated but volatile

Copper prices briefly reached US\$10,452 a tonne in October, just under the record level set in May this year (US\$10,720 a tonne). Declining LME copper inventories are the driving factor for this increase in the copper price. The LME instituted special temporary measures to ensure liquidity and regulate prices from 19 October 2021. These measures have had the intended effect, with prices softening to around US\$9,500 a tonne by the end of October and into November (Figure 12.4).

Figure 12.4: Exchange inventories of copper vs price



Source: LME (2021) official cash price; Bloomberg (2021)

Prices are expected to remain high in 2022 — at around \$US9,000 a tonne — as refined producers fill the current backlog of orders, the rollout of US infrastructure projects gets underway and the Chinese property sector stabilises. With high prices for copper, there may be some thrifting and substitution. Easing of China's restrictions on copper scrap imports will help, as will clarification that the EU's Circular Economy Action Plan will not impose a blanket ban on copper scrap exports.

It is expected that significant additional mine supply will come online in 2023, helping moderate the copper price to US\$8,500 a tonne. However, any delay to mine production coming online could see this easing of prices fail to materialise.

Macroeconomic factors pose a risk over the outlook period; if inflation does not prove to be transitory, governments may seek to tighten fiscal and monetary policy, reducing copper demand.

It remains unclear how long the temporary measures instituted by the LME will stay in place, although there is likely to be little appetite to remove them when prices remain high and stocks remain low.

While China released strategic reserves of copper in July to cool prices, it may not have the capacity nor desire to do so again if prices start to rise.

12.5 Australia

Price growth is providing strong revenue to exporters

Export earnings lifted from \$10.2 billion in 2019–20 to \$11.4 billion in 2020–21. Earnings are expected to rise further over the forecast period, to \$14.7 billion by 2022–23 (Figure 12.5). This is expected to be achieved through the retention of some of the price surge recorded in late 2021, as well as export volume growth in 2022–23 as production ramps up after scheduled maintenance at several sites.

Copper export volumes to grow over outlook period

Copper export volumes are recovering from a brief fall brought about by planned maintenance at BHP’s Olympic Dam facility. Capacity upgrades under consideration at the site are expected to support a lift in export volumes over the outlook period. Australian exports of ores and concentrates are expected to rise from 1.7 million tonnes in 2020–21 to 1.8 million tonnes by 2022–23.

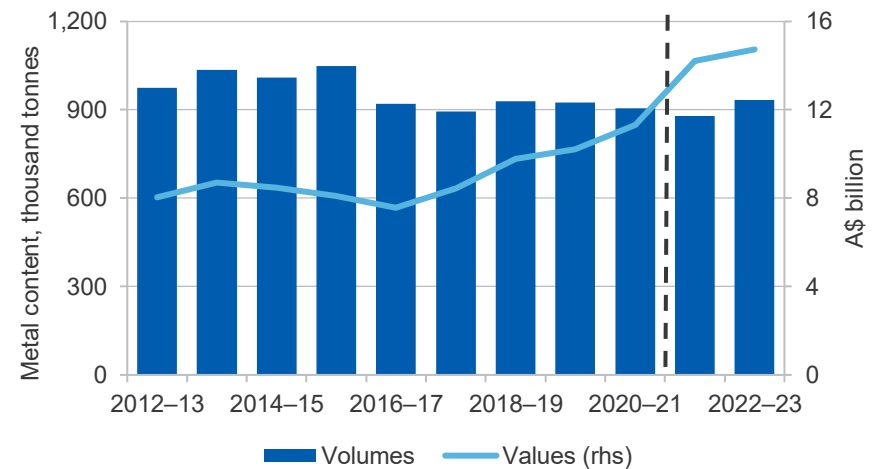
Copper production down before new capacity comes online

Mine production has been affected by lower processing rates and scheduled maintenance at a number of sites. However, a recovery is

expected over the outlook period, with mine production forecast to grow from 878,000 tonnes in 2020–21 to 904,000 tonnes in 2022–23.

Over the next few years, copper exports are expected to be supported by a number of project developments. These include Golden Cross Resources’ Copper Hill project, KGL Resources’ Jervois project and Havilah Resources’ Kalkaroo project, which are all under development.

Figure 12.5: Australia’s copper export volumes and values



Source: ABS (2021) International Trade in Goods and Services, 5368.0; Department of Industry, Science, Energy and Resources (2021)

The Nifty copper mine in Western Australia has been acquired by Cyprum, after being placed on care and maintenance in 2019. The new owners noted in their 2020 Annual Report that the processing method is expected to change to heap leaching to produce copper metal plate. Under this model, annual capacity is 20,000 tonnes, and Cyprum is targeting first production at the end of 2022.

Olympic Dam copper production decreased by 43% to 30,000 tonnes, reflecting the ramp down and commencement of a major smelter maintenance campaign (approximately one month later than planned, due to COVID-19 border restrictions impacting the availability of workforce).

The maintenance campaign is expected to be completed towards the end of the December 2021 quarter, followed by a ramp up to full capacity by March 2022.

Copper production was also affected at Newcrest's Cadia mine in NSW, as mill capacity was limited by the replacement and upgrade of the SAG mill motor.

Oz Minerals made a FID on the Wira shaft mine expansion at Prominent Hill. The \$600 million expansion extends the mine life out to 2036, raising copper in concentrate production 23% to 53,000 tonnes annually.

[Copper exploration picks up in September quarter 2021](#)

Copper exploration reached \$122 million in the September 2021 quarter, up 1.8% quarter-on-quarter and 61% year-on-year. Recent high prices have improved the prospects for most copper projects and encouraged exploration to identify new ones.

[Revisions to the outlook](#)

Export earnings for 2022–23 have been revised up by slightly to \$14.7 billion since the September *Resource and Energy Quarterly*. This is largely a result of upwards revisions to copper export volumes.

Table 12.1: Copper outlook

| World | Unit | 2020 | 2021 ^s | 2022 ^f | 2023 ^f | Annual percentage change | | |
|-------------------------------|--------|---------|-------------------|----------------------|----------------------|--------------------------|----------------------|----------------------|
| | | | | | | 2021 ^f | 2022 ^f | 2023 ^f |
| Production | | | | | | | | |
| – mine | kt | 20,670 | 21,694 | 22,655 | 23,698 | 5.0 | 4.4 | 4.6 |
| – refined | kt | 24,122 | 25,183 | 26,228 | 27,041 | 4.4 | 4.1 | 3.1 |
| Consumption | kt | 24,885 | 25,797 | 26,396 | 27,276 | 3.7 | 2.3 | 3.3 |
| Closing stocks | kt | 1 315 | 1 148 | 1 064 | 975 | -13 | -7.3 | -8.4 |
| – weeks of consumption | | 2.7 | 2.3 | 2.1 | 1.9 | -16 | -9.4 | -11 |
| Prices LME | | | | | | | | |
| – nominal | US\$/t | 6,169 | 9,228 | 9,039 | 8,518 | 50 | -2.0 | -5.8 |
| | USc/lb | 280 | 419 | 410 | 386 | 50 | -2.0 | -5.8 |
| – real ^b | US\$/t | 6,396 | 9,228 | 8,737 | 8,019 | 44 | -5.3 | -8.2 |
| | USc/lb | 290 | 419 | 396 | 364 | 44 | -5.3 | -8.2 |
| Australia | Unit | 2019–20 | 2020–21 | 2021–22 ^f | 2022–23 ^f | 2020–21 ^s | 2021–22 ^f | 2022–23 ^f |
| Mine output | kt | 905 | 878 | 878 | 904 | -3.1 | 0.0 | 3.0 |
| Refined output | kt | 421 | 452 | 442 | 444 | 7.6 | -2.4 | 0.6 |
| Exports | | | | | | | | |
| – ores and concs ^c | kt | 1,899 | 1,678 | 1,656 | 1,803 | -11.6 | -1.3 | 8.8 |
| – refined | kt | 392 | 420 | 407 | 429 | 7.2 | -3.2 | 5.3 |
| – total metallic content | kt | 924 | 898 | 880 | 934 | -2.9 | -1.9 | 6.0 |
| Export value | | | | | | | | |
| – nominal | A\$m | 10,208 | 11,446 | 14,164 | 14,734 | 12.1 | 23.8 | 4.0 |
| – real ^d | A\$m | 10,625 | 11,723 | 14,164 | 14,423 | 10.3 | 20.8 | 1.8 |

Notes: **b** In 2021 calendar year US dollars; **c** Quantities refer to gross weight of all ores and concentrates; **d** In 2020–21 financial year Australian dollars; **f** Forecast; **s** Estimate;

Source: ABS (2021) International Trade, 5465.0; LME (2021) spot price; World Bureau of Metal Statistics (2021) World Metal Statistics; Department of Industry, Science, Energy and Resources (2021)