Copper

Australia is the world's 3rd largest exporter of copper ores and concentrates.

Copper is 100% recyclable and nearly 80% of the copper that has ever been produced is still in use today.

The average home contains 180 kg of copper.

Key copper consumer markets (thousand tonnes), 2017

Major Australian copper deposits (Mt)

- <0.01
- 0.02
- 0.03–0.8
- 0.9–2.1
- 2.2–8.8
- >6.9

Deposit
Operating mine

Global uses of copper

- Equipment: 31%
- Building Construction: 30%
- Infrastructure: 15%
- Transport: 12%
- Industrial: 12%
12.1 Summary

- World prices are expected to increase from an average of US$6,307 in 2017 to an average of US$8,400 a tonne in 2023, as consumption growth outpaces rising mine and refinery supply in the medium term.
- Australia’s copper exports are forecast to rise from 920,000 tonnes in 2016–17 to over 1 million tonnes in 2022–23 (in metal content terms), as new mines and expansion projects come online over the outlook period.
- The value of Australia’s copper exports is projected to increase from $7.7 billion in 2016–17 to $12 billion by 2022–23. Growth in export earnings will be supported by higher export volumes over the short term and higher copper prices over the medium term.

12.2 Prices

Copper prices reached a three-year high in 2017

The London Metal Exchange (LME) copper price averaged US$6,307 a tonne in 2017, ending five years of consecutive decline. The copper price was propelled higher by strong growth in global industrial production and several supply disruptions throughout the year.

Copper prices expected to taper over the short term

The LME copper price averaged near US$7,000 a tonne in the first quarter of 2018, but is forecast to decline over the remainder of 2018 to average US$6,500 a tonne. The world’s largest producers are performing strongly, and supply is expected to rise faster than consumption over the remainder of 2018. Rising copper supply will be driven by new mines and expansion projects across most major producing nations, with the world’s largest producer — Chile — benefiting from the recent expansion project at Escondida — the world’s largest copper mine. Rising mine supply is starting to show on the world’s major metal exchanges, where copper inventories increased by 11 per cent year-on-year in the March quarter 2018.
The global copper market is expected to record a surplus of 150,000 tonnes in 2018. Copper inventory — in terms of the number of weeks of consumption — is forecast to remain steady at around 2.3 weeks in 2018 and to then decline in 2019.

After 2020, growing copper consumption starts to outpace rising supply, leading to an expected market deficit of 227,000 tonnes in 2023. Increased demand for copper will be driven by rising energy needs in emerging markets, along with greater demand for renewable energy technologies and electric vehicles. Copper prices are projected to rise by 3.2 per cent annually over the outlook period to US$8,400 a tonne (in 2018 prices).

12.3 World consumption
Copper consumption rises in 2017
World refined copper consumption rose by 1.4 per cent year-on-year in 2017 to 24 million tonnes. Consumption was led by China where demand increased by 2.4 per cent to 12 million tonnes — 50 per cent of world consumption. Higher copper consumption was supported by firm growth in global industrial production which increased by 3.4 per cent in 2017.

Copper consumption to grow moderately over the outlook period
Global copper consumption is projected to rise from 24 million tonnes in 2017 to 27 million tonnes in 2023, increasing on average by 1.4 per cent each year. Higher copper consumption will be supported by growing global industrial production and the production of copper intensive renewable energy technologies and electric vehicles — which are expected to grow strongly over the outlook period.

China’s copper consumption is expected to grow over the outlook period, albeit at a more moderate pace than in recent years. China is expected to invest further in expanding the power grid to keep up with growing consumer demand for energy. China’s investment in fixed assets rose by 7.3 per cent in 2017. While this growth remains high by world standards, growth in fixed asset investment has been in steady decline since 2011, and is expected to moderate further over the outlook period.


China’s construction sector is expected to grow at a more moderate pace over the outlook period, weighed down by tighter monetary conditions.
China’s economy is expected to rely increasingly on domestic consumption, with household spending on motor vehicles and durable goods expected to drive China’s copper usage.

**Figure 12.5: Chinese copper usage and Fixed Assets Investment**

Growing global demand for electric cars and renewable energy globally will lead to higher copper consumption over the outlook period. Increased production of electric and hybrid vehicles — which contain an average 90 and 45 kilograms of copper, respectively, compared to 25 kilograms for regular vehicles — is forecast to raise copper consumption by an estimated 2.7 million tonnes over the period of 2018 to 2023.

Copper is used extensively in renewable energy technology and infrastructure, particularly solar energy — with around four tonnes of copper used to produce one megawatt of solar voltaics. Installed solar capacity is expected to rise over the outlook period from 230 gigawatts in 2017 to over 600 gigawatts in 2023, requiring around 2.4 million tonnes of copper. Global electricity capacity from renewable sources is expected to increase by 4.4 per cent annually over the outlook period.

**12.4 World production**

**World copper mine production falls in 2017**

World mine copper production decreased by 1.3 per cent in 2017 to 20 million tonnes. Lower production was the result of supply disruptions in the first half of the year, including strike action at Escondida — the world’s largest copper mine — and export restrictions on Grasberg in Indonesia — the world’s fourth largest copper mine. Mine supply recovered in the second half of 2017, benefiting from the ramp up in production from a mill extension at Escondida. New mines and expansion projects in Peru and Kazakhstan also helped to offset some of the yearly decline.

**Figure 12.6: World copper production and prices**
4.3 per cent per year. Growth in world mine supply will be driven by new mines and expansions across most of the major producing nations.

Mine production is expected to rise by 5.7 per cent in 2018, with 780,000 tonnes of extra capacity from committed new projects and a further 290,000 tonnes from mine expansions. First Quantum Minerals’ Cobre Panama, and the new Qulong copper mine operated by Tibet Julong Mining, will make the two largest contributions to new mine supply over the short term, with an estimated annual capacity of 330,000 tonnes and 120,000 tonnes respectively. Several large expansion projects — Codelco’s Radomiro in Chile and Southern Copper’s Toquepala in Peru — are expected to each contribute an additional 100,000 tonnes in 2018.

Figure 12.7: Global mine growth and key producers

![Graph showing global mine growth and key producers]

Notes: Selected key producers are forecast to increase production over the outlook period

In the medium term, mine production is projected to increase by 3.5 per cent annually to reach 25 million tonnes in 2023. Higher production is expected to be driven by new mines and expansion projects led by some of the world largest copper producers — ten of which are expected to account for nearly 75 per cent of additional supply expected to come online over the outlook period. Despite many mature assets facing declining ore grades, production in Chile — the world’s largest producer — is expected to increase over the outlook period. Chilean State-owned Codelco, is expected to increase production by 1.3 per cent annually to reach 1.5 million tonnes by 2023. The expansion of BHP’s Spence project in Chile is expected to increase capacity by 200,000 tonnes commencing in 2020.

World refined copper production sets record high in 2017

World refined copper production increased by 0.9 per cent year-on-year in 2017 to 23.5 million tonnes — the highest annual production on record. Higher production was led by China and Europe, which raised production by 453,000 and 87,000 tonnes year-on-year in 2017, respectively.

World refined copper output expected to rise over the outlook period

Global refined copper production is projected to rise by 2.4 per cent annually to 27 million tonnes in 2023. Higher refined production will be driven by new refineries and expansion projects in China, where production is expected to increase from 9.0 million tonnes in 2017 to 11 million tonnes in 2023 — 40 per cent of world refined supply.

Secondary production — from recycled copper — increased by 25 per cent year-on-year to 4.0 million tonnes in 2017. Secondary supply is expected to increase by 2.4 per cent annually over the outlook period to 4.6 million tonnes in 2023, driven by higher copper prices and higher availability of scrap supply, as greater quantities of copper consumed in end use goods reach the end of their useful life and return to the supply chain.

12.5 Australia

Copper exports set to increase over the outlook period

Australia’s copper export earnings declined by 1.0 per cent to $7.7 billion in 2016–17. Earnings were weighed down by lower export volumes of
refined copper, which more than offset the impact of higher world prices. Exports of refined copper to China declined by 44 per cent in 2017, however, exports of copper ores and concentrates increased by 21 per cent over the same period. China’s growing refinery capacity and Australia’s rising refinery costs have encouraged Australian producers to export ores and concentrates rather than refined copper.

Figure 12.8: Australia’s copper exports

Source: Department of Industry, Innovation and Science (2018)

The value of Australia’s copper export earnings is projected to increase from $7.7 billion in 2016–17 to $12 billion in 2022–23. Australia’s copper exports (in metal-content terms) are projected to increase by 2.1 per cent annually, from 920,000 tonnes in 2016–17 to 1 million tonnes in 2022–23. Australia’s export earnings from copper will be supported by new projects and mine expansions (described below).

Mine disruptions weigh on production in 2017

Australia’s mine output declined by 10 per cent in 2017, driven by supply disruptions affecting key producers — BHP, Glencore and Newcrest — which together accounted for over 80 per cent of the annual decline. Production at BHP’s Olympic Dam — Australia’s largest copper mine — was disrupted by ongoing expansion works to the smelter. Glencore’s Mount Isa operations were weighed down by smelter maintenance. Newcrest’s Cadia Valley mine was impacted by seismic activity earlier in the year. All three mines are expected to increase production in 2018.

Improved outlook for mine production

Australian production is projected to increase by 1.8 per cent annually, from 916,000 tonnes in 2016–17 to 1,020,000 tonnes by 2022–23. Higher Australian production will be driven by increased output at BHP’s Olympic Dam which is expected to produce over 210,000 tonnes annually after expansion works are completed in 2018–19. Production over the short term will benefit from several new mines. For example, Aditya Birla Minerals’ Capricorn copper project, which commenced late 2017, is expected to ramp up production to over 30,000 tonnes.

Over the medium term, several new mines are expected to come online and offset the closure of several mines that reach their end of life. OZ Minerals’ Carrapateena — the largest new mine to come online over the outlook period — is expected to produce over 60,000 tonnes annually, commencing in 2020. Eleven copper projects remain in the investment pipeline and higher world prices projected in the medium term will likely encourage positive investment decisions.

Exploration expenditure is on the rise

Australia’s copper exploration expenditure rose by 15 per cent in 2017 to $156 million. This was the third consecutive annual increase in exploration expenditure, reflecting an improved outlook for copper prices. Higher exploration expenditure was led by Queensland and New South Wales, where spending rose by $12 million and $8.4 million, respectively.
## Table 12.2: Copper outlook

<table>
<thead>
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<th>World</th>
<th>Unit</th>
<th>2017</th>
<th>2018 f</th>
<th>2019 f</th>
<th>2020 z</th>
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<td>–mine</td>
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<td>22,542</td>
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<td>kt</td>
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<tr>
<td>–real b</td>
<td>US$/t</td>
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<td>6,700</td>
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<td></td>
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<td>–ores and cons. c</td>
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<td>2,200</td>
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<td>334</td>
<td>376</td>
<td>366</td>
<td>366</td>
<td>366</td>
<td>360</td>
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<tr>
<td>–nominal</td>
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</table>

Notes: b In 2018 calendar year US dollars; c Quantities refer to gross weight of all ores and concentrates; d In 2017–18 financial year Australian dollars; f Forecast; s Estimate; z Projection; r Compound annual growth rate for the period from 2017 to 2023, or from 2016–17 to 2022–23.