Copper

Resources and Energy Quarterly December 2017

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

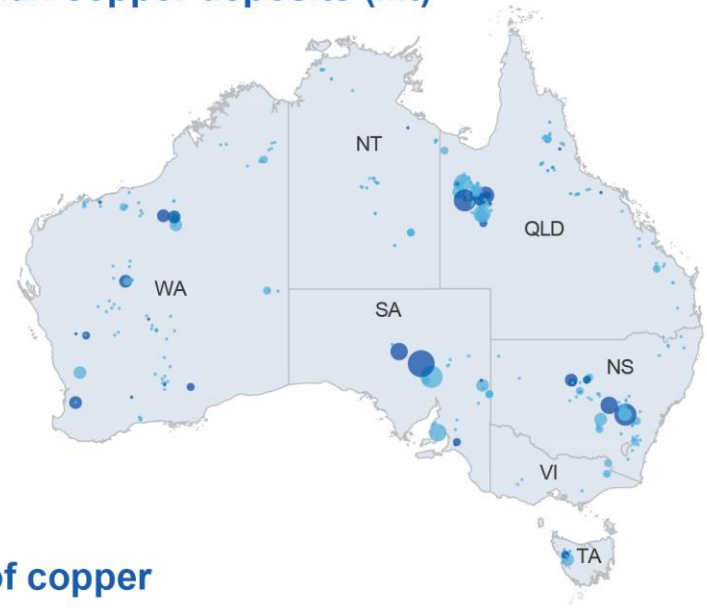
Australia is the **7th largest** producer of copper in the world

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

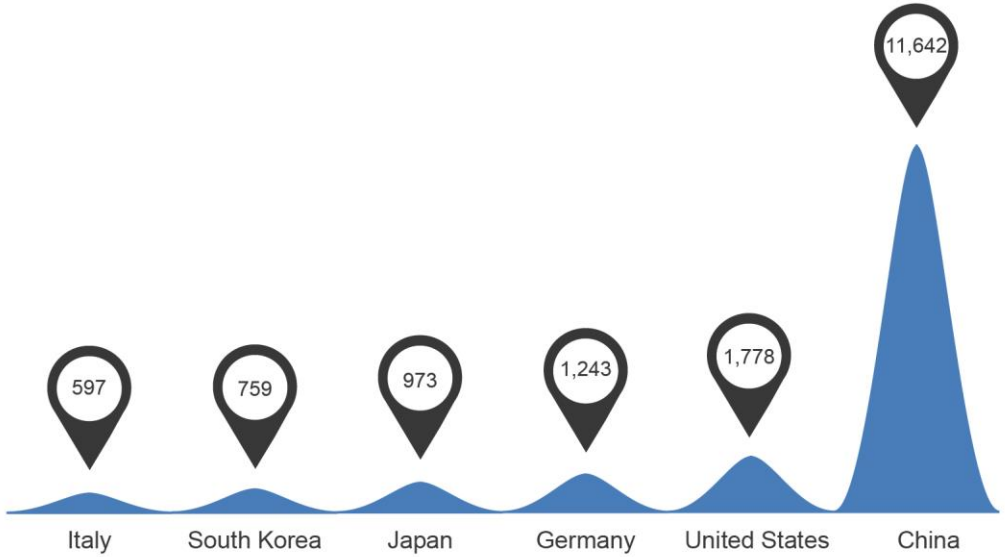
The average home contains **180 kg** of copper

Major Australian copper deposits (Mt)

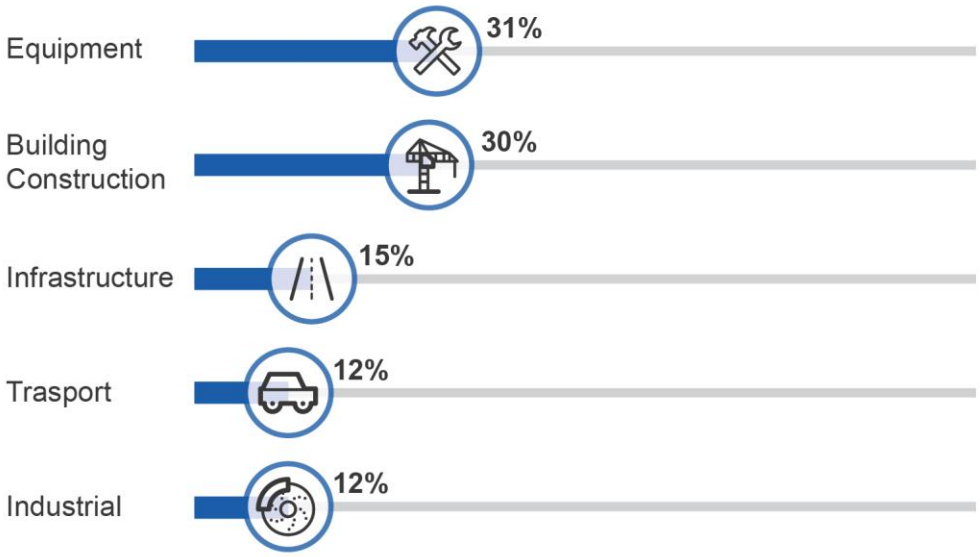
- <0.01
- 0.02
- 0.03–0.8
- 0.9–2.1
- 2.2–6.8
- >6.9
- Deposit
- Operating mine



Key copper consumer markets (thousand tonnes)



Global uses of copper



12.1 Summary

- World prices are expected to average US$6,340 a tonne in 2018 and US$6,490 a tonne in 2019, driven by steady demand from China and global industrial production.
- The value of Australia's copper exports is forecast to increase from $7.5 billion in 2016–17 to $8.7 billion by 2018–19. Growth in export earnings will be supported by higher export volumes and higher copper prices.
- Australia's copper exports are forecast to rise from 921,000 tonnes in 2016–17 to 994,000 tonnes in 2018–19, supported by new mines and expansion projects over 2018 and 2019.

12.2 Prices

Copper prices reach a three year high in December quarter

The London Metal Exchange (LME) copper price is estimated to have averaged US$6,810 a tonne in the December quarter, the highest level since September quarter 2014. The copper price was propelled higher by strong growth in global industrial production and several supply disruptions, including incidents at KGHM's Glogow smelter in Poland and Rio Tinto's Garfield operations in the US.

Copper inventories on the major global exchanges fell by 6.4 per cent quarter on quarter, which contributed to higher prices in the December quarter.

Copper prices expected to taper in 2018

The LME copper price is forecast to average US$6,340 a tonne in 2018, (falling from December quarter 2017) driven by supply surpluses. Then, the copper price is forecast to rise to US$6,490 a tonne in 2019, as consumption outpaces supply.

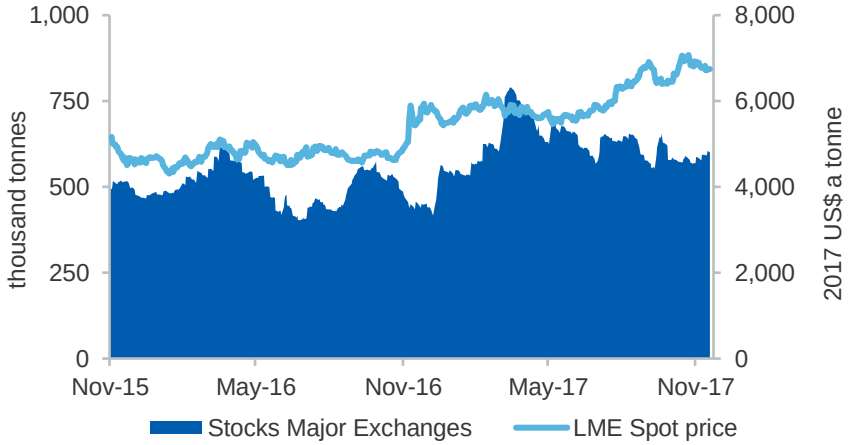
2017 was marked by a number of unexpected supply disruptions, including an industrial dispute at BHP's Escondida — where negotiations are expected to resume in mid-2018 under new Chilean labour laws — raising the possibility of further strike action next year.

Chinese demand for copper is expected to moderate in 2018 and 2019, and is a key risk to forecast copper consumption and hence prices.

The global copper market is expected to be roughly balanced in 2018, with a market surplus of 17,000 tonnes. Copper inventory — in terms of the number of weeks of consumption — is forecast to remain steady at around 2.3 weeks in 2017 and in 2018. In 2019, consumption growth is expected to outpace growth in mine supply, resulting in a market deficit of 79,000 tonnes, with stock levels falling back to 2.1 weeks of consumption.

In a market of over 23 million tonnes, projections of a roughly balanced market in 2018 and a minor deficit in 2019 suggest that the copper price is more than usually prone to problems on the supply side. So the risks to price are heavily skewed to the upside over the outlook period.

Figure 12.1: Copper prices and stocks on major exchanges



Source: LME (2017) official cash price; Bloomberg (2017) stock inventory at LME, COMEX and SHFE

12.3 World consumption

Copper consumption rises in September quarter 2017

World refined copper consumption increased by 2.6 per cent year-on-year in the September quarter 2017 to 5.9 million tonnes. Consumption was supported by higher usage growth in China and Europe, where demand increased by 8.8 per cent and 10 per cent, respectively. China's industrial production grew by 6.6 per cent, contributing to higher copper demand. European industrial production increased by 3.5 per cent in the year to the September quarter. The European Purchasing Manufacturers Index (PMI) increased continually over the four months to November, pointing to further industrial growth over the near term, which should support higher copper consumption in Europe into early 2018.

Consumption outlook improves

Global copper consumption is forecast to rise from 24 million tonnes in 2017 to 25 million tonnes in 2019, representing an average increase of 3.2 per cent each year. Higher copper consumption will be supported by firm growth in global industrial production and higher investment in energy infrastructure. Emerging economies are expected to drive much of the growth in copper consumption over the next two years.

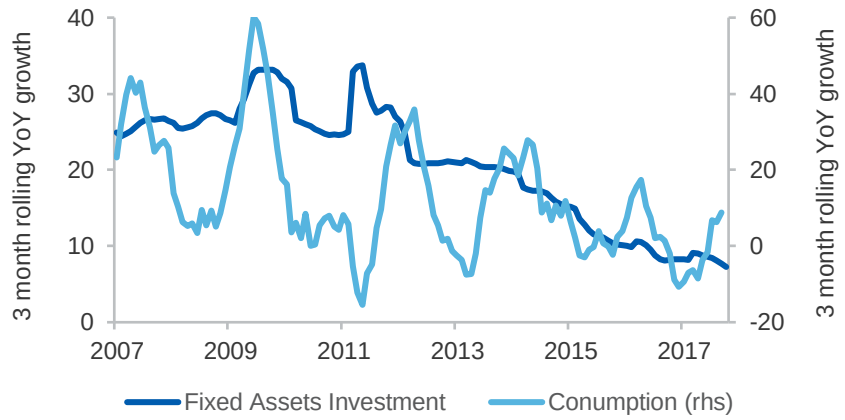
China's copper consumption — which accounts for 50 per cent of global demand — is expected to increase over the outlook period, driven by investment in the nation's power grid and firm growth in the construction and manufacturing sectors. Expenditure on China's power grid increased by 4.0 per cent year-on-year in the three months to October. In an effort to keep up with growing consumer demand for energy, China is expected to invest further in expanding the power grid, albeit at a more moderate pace over the outlook.

China's investment in fixed assets increased by 7.3 per cent year-on-year over the three months to October 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, tapering the outlook for copper usage.

Growing demand for electric cars and renewable energy globally will lead to stronger growth in copper consumption over the next two years. Increased global production of electric vehicles — which contain on average 85 kilograms of copper, compared to 25 kilograms for regular vehicles — is expected to raise copper consumption by around 300,000 tonnes annually in 2018 and 2019.

Copper is used extensively in renewable energy technology and infrastructure, spending on which is expected to increase strongly over the outlook period. Global electricity capacity from renewable sources is expected to increase by 4.4 per cent annually over the outlook period.

Figure 12.2: Chinese copper consumption and Fixed Assets Investment



Source: World Bureau of Metal Statistics (2017); National Bureau of Statistics China (2017); Department of Industry, Innovation and Science (2017)

12.4 World production

World copper mine production likely rose modestly in 2017

World mine copper production increased by 1.4 per cent year-on-year in the September quarter of 2017 to 5.3 million tonnes. The rise in production was led by increased supply from Chile — the world's largest producer. Production at Escondida — Chile's largest copper mine — increased by 14 per cent year-on-year in the September quarter, supported by a recent mine expansion and higher copper grades. Copper production in China, Peru and Kazakhstan also grew strongly, while Indonesia and the USA had the largest declines year-on-year.

World mine production expected to rise

Global copper mine production is forecast to rise from 20 million tonnes in 2017 to 22 million tonnes by 2019, representing an average increase of 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 4.8 per cent in 2018, with 780,000 tonnes of extra capacity from committed new projects and a further 290,000 tonnes from mine expansions. Cobre Panama, operated by First Quantum Minerals, is expected to make the largest contribution to new mine supply, with an estimated annual capacity of 330,000 tonnes. The new Qulong copper mine — currently under development — operated by Tibet Julong Mining, is expected to add a further 120,000 tonnes. The two largest 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.

Mine expansions are expected to increase production capacity by a further 255,000 tonnes in 2019. The largest expansion project — Chinalco's Toromocho copper mine in Peru — is expected to increase production by a further 100,000 tonnes in 2019.

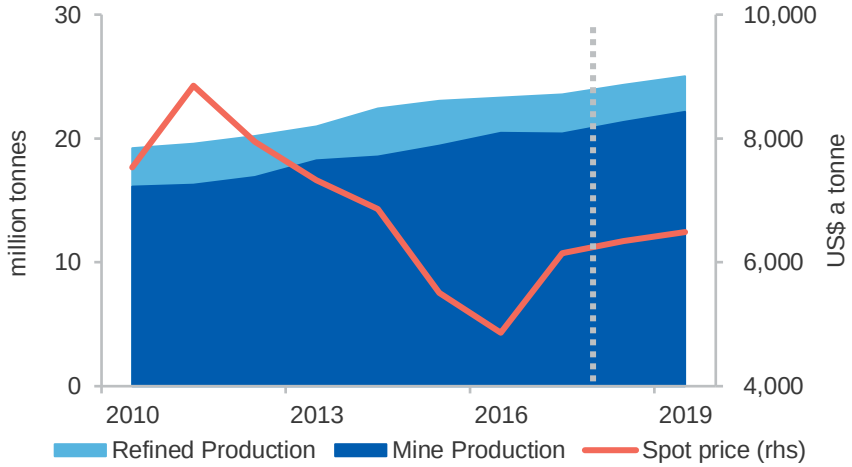
World refined copper production near historical high in September

World refined copper production increased by 1.0 per cent year-on-year in the September quarter 2017, to 6.0 million tonnes — the second highest quarterly production on record. Higher production was led by Europe and China, which increased production by 130,000 and 55,000 tonnes year-on-year in the September quarter, respectively.

World refined copper output expected to rise over the outlook

Global refined copper production is forecast to rise from 24 million tonnes in 2017 to 25 million tonnes by 2019, representing an average increase of 3.1 per cent each year. Higher refined production will be driven by new refineries and expansion projects in China, where production capacity is expected to increase by 840,000 tonnes in 2018 and a further 525,000 tonnes in 2019. Secondary production — which declined 1.4 per cent year-on-year in September 2017 — is expected to increase over the outlook, driven by higher copper prices and higher availability.

Figure 12.3: World copper production and prices



Source: World Bureau of Metal Statistics (2017); Department of Industry, Innovation and Science (2017)

12.5 Australia's production and exports

Production declines in the September quarter

Australia's mine production declined by 3.0 per cent year-on-year in the September quarter, weighed down by smelter maintenance at Glencore's Mount Isa operations and reduced output at Newcrest's Cadia Valley mine — which fell by 35 per cent year-on-year in the September quarter, as the mine continued to recover from seismic activity earlier in the year.

Improved outlook for mine production

Australian production is forecast to increase by 5.7 per cent annually, from 916,000 tonnes in 2016–17 to 1,023,000 tonnes by 2018–19.

Higher Australian production will be driven by increased output at BHP's Olympic Dam — Australia's largest copper mine — which is expected to produce 215,000 tonnes in 2018–19 after expansion works are completed. The Capricorn copper mine in Queensland, successfully produced its first copper concentrate in the December quarter, and is expected to add a further 30,000 tonnes to annual production capacity over the outlook period.

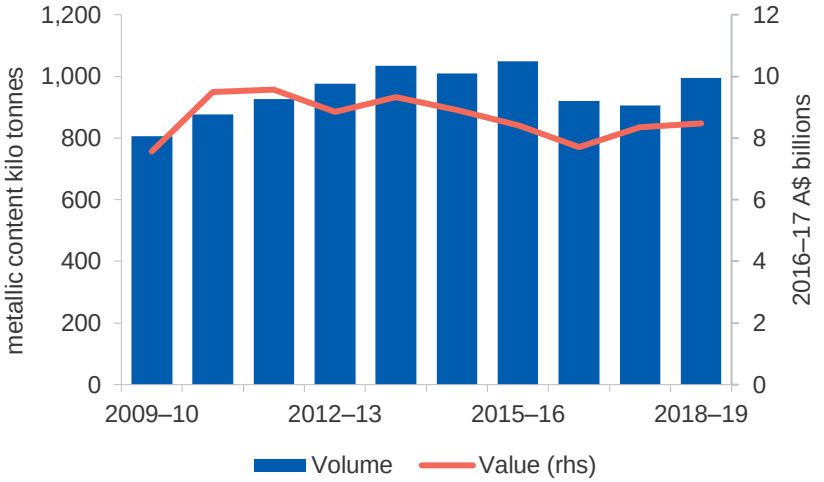
Copper exports set to increase over the outlook

Australia's copper export earnings decreased by 3.5 per cent year-on-year in the September quarter to $1.7 billion. Lower earnings were weighed down by lower export volumes, which more than offset the impact of higher world prices. Exports of refined copper to China declined by 39 per cent year-on-year in the September quarter, however, exports of copper ores and concentrates increased by 29 per cent over the same period — symptomatic of China's growing refinery capacity and Australia's rising refinery costs, as electricity prices increase.

The value of Australia's copper export earnings is forecast to increase from $7.5 billion in 2016–17 to $8.6 billion in 2018–19. Australia's copper exports (in metal-content terms) are forecast to increase by 4.5 per cent annually, from 921,000 tonnes in 2016–17 to 994,000 tonnes in 2018–19.

Australia's export earnings from copper will be supported by new projects and mine expansions.

Figure 12.4: Australia's copper exports



Source: Department of Industry, Innovation and Science (2017)

Exploration expenditure improves

Australia's copper exploration expenditure increased by 28 per cent year-on-year in the September quarter 2017 to $45 million. This was the third consecutive quarterly increase in exploration expenditure, reflecting an improved outlook for copper prices.

Higher exploration expenditure in the September quarter was led by Queensland and Western Australia, where spending increased by 46 per cent and 13 per cent, respectively. Expenditure is expected to rise over the next two years, as higher prices encourage new exploration.

Table 12.1: Copper Outlook

						Annual percentage change		
World	**Unit**	**2016**	**2017 s**	**2018 f**	**2019 f**	**2017 e**	**2018 f**	**2019 f**
Production								
mine	kt	20,451	20,379	21,349	22,149	-0.4	4.8	3.7
refined	kt	23,310	23,557	24,313	25,023	1.1	3.2	2.9
Consumption	kt	23,412	23,589	24,296	25,102	0.8	3.0	3.3
Closing stocks	kt	1 095	1 063	1 080	1 002	-2.9	1.6	-7.3
weeks of consumption		2.4	2.3	2.3	2.1	-3.7	-1.3	-10.3
Price LME								
nominal	US$/t	4,863	6,144	6,340	6,490	26.4	3.2	2.4
	US$/lb	221	279	288	294	26.4	3.2	2.4
real b	US$/t	4,965	6,144	6,208	6,218	23.7	1.0	0.2
	US$/lb	225	279	282	282	23.7	1.0	0.2
Australia	**Unit**	**2015–16**	**2016–17 s**	**2017–18 f**	**2018–19 f**	**2016–17 e**	**2017–18 f**	**2018–19 f**
Mine production	kt	990	916	950	1,023	-7.4	3.6	7.8
Refined production	kt	514	448	455	478	-12.9	1.6	5.2
Export Volume								
ores and cons. c	kt	1,870	1,754	1,692	1,959	-6.2	-3.5	15.8
refined	kt	507	413	407	431	-18.5	-1.6	6.1
total metallic content	kt	1 050	921	905	994	-12.3	-1.7	9.8
Export value								
nominal	A$m	8,110	7,540	8,346	8,680	-7.0	10.7	4.0
real d	A$m	8,419	7,695	8,346	8,478	-8.6	8.5	1.6

Notes: **b** In 2017 calendar year US dollars; **c** Quantities refer to gross weight of all ores and concentrate s; **d** In 2017–18 financial year Australian dollars; **f** Forecast; **s** Estimate
Source: ABS (2017) International Trade, 5465.0; LME (2017) spot price; World Bureau of Metal Statistics (2017) World Metal Statistics; Department of Industry, Innovation and Science (2017)