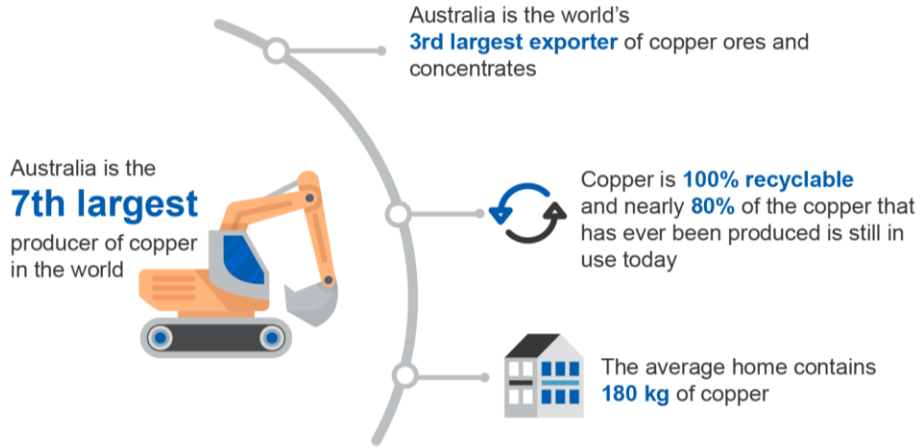


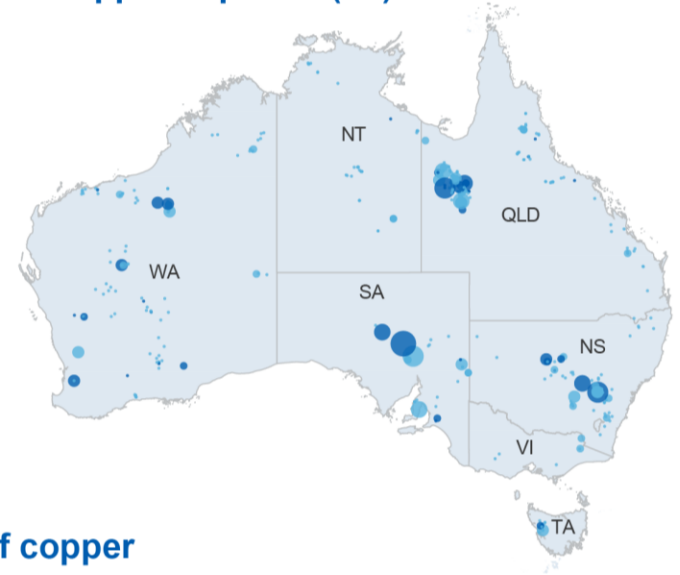
# Copper

Resources and Energy Quarterly September 2017

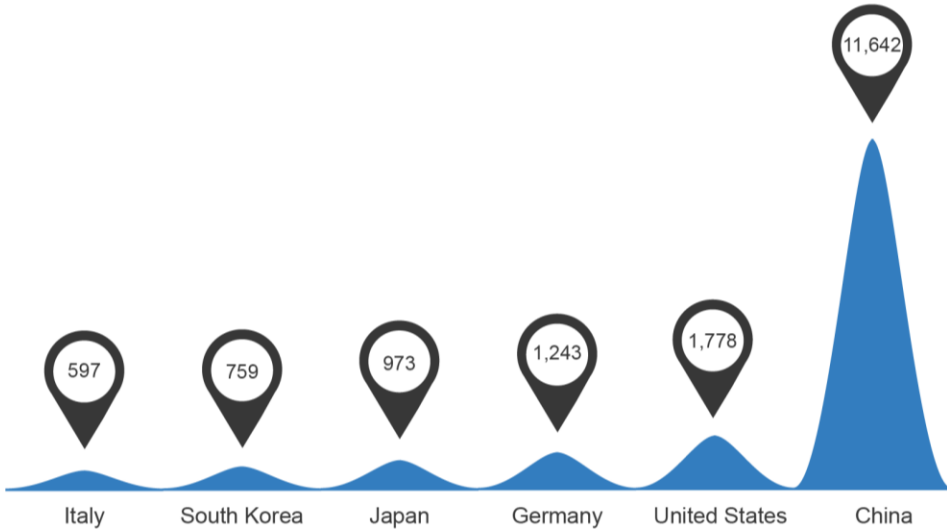


## Major Australian copper deposits (Mt)

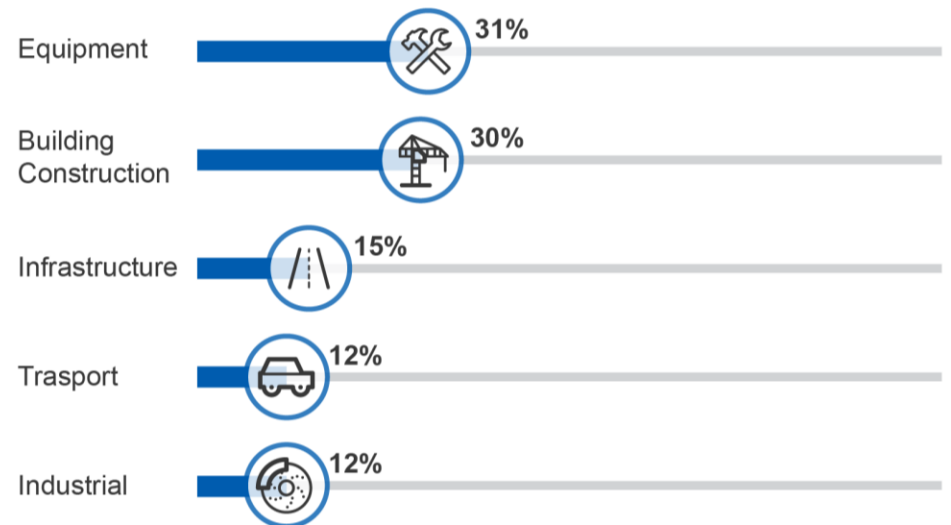
- <0.01
- 0.02
- 0.03–0.8
- 0.9–2.1
- 2.2–6.8
- >6.9
- Deposit
- Operating mine



## Key copper consumer markets (thousand tonnes)



## Global uses of copper



## Summary

- World prices are expected to average US\$6,050 a tonne in 2017, supported by steady demand from China and stronger industrial production. Copper prices are expected to decline to US\$5,630 a tonne in 2018, as a result of firm growth in mine supply, and then rebound as consumption growth outpaces supply in 2019.
- The value of Australia's copper exports is forecast to increase from \$7.5 billion in 2016–17 to \$8.3 billion by 2018–19. Growth in export earnings will be supported by higher export volumes, while copper prices are forecast to rise in 2019.
- Australia's copper exports are forecast to rise from 922,000 tonnes in 2016–17 to 1 million tonnes in 2018–19, supported by new mines and expansion projects over 2018 and 2019.
- Rising energy costs remain a key risk to the outlook for Australia's exports of refined copper. Electricity costs are expected to rise over the outlook period, adversely impacting energy-intensive smelters and refineries. Higher energy costs will drive the export of more copper ores and concentrates and less refined copper.

## Prices

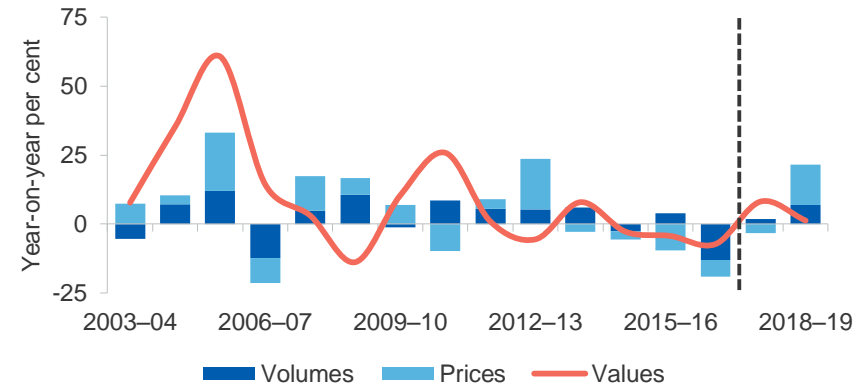
### Copper prices reach a three year high in August

The London Metal Exchange (LME) copper price averaged US\$6,350 a tonne in the September quarter, up from US\$5,665 in the June quarter. The copper price was propelled higher by an improved outlook for copper consumption in China, a lower US dollar and news of industrial action in Chile and Peru — the world's two largest copper producers. The September quarter price gain came despite ample copper inventories. Copper inventories on the major global exchanges averaged 630,000 tonnes in the September quarter. While stock levels have fallen somewhat over the last two quarters, they remain near a three-year high.

### Copper prices expected to taper in 2018

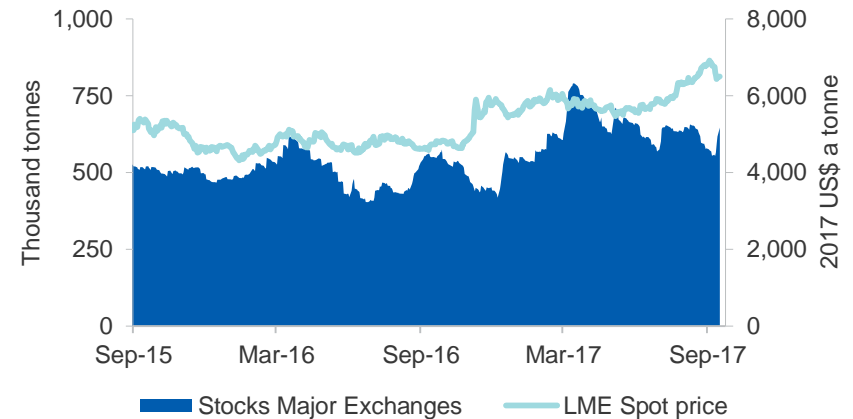
The LME copper price is forecast to decline to US\$5,630 a tonne in 2018, driven by firm growth in mine supply, which will significantly outpace consumption growth. The copper price is forecast to rise to US\$6,025 a tonne in 2019, as consumption outpaces supply.

**Figure 12.1: Annual growth in Australia's copper export values, contributions from prices and export volumes**



Source: ABS (2017) *International Trade*, 5465.0; LME (2017) official cash price; Department of Industry, Innovation and Science (2017)

**Figure 12.2: Copper prices and stocks on major exchanges**



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

Higher mine supply is expected to result in a market surplus of 478,000 tonnes in 2018. Copper inventory — in terms of the number of weeks of consumption — is forecast to rise from 2.6 weeks in 2017 to 2.9 weeks in 2018. Consumption growth is expected to outpace growth in mine supply in 2019, resulting in a market surplus of 295,000 tonnes, with stock levels falling to 2.7 weeks of consumption.

China's demand for copper remains a key risk to the forecast. China's copper consumption intensity may start to taper over the outlook period, as the economy transitions more towards services and consumer driven growth. On the upside, an acceleration in demand for electric cars and renewable energy globally will lead to stronger growth in copper consumption. The average electric vehicle contains 85 kilograms of copper, compared to 25 kilograms for regular vehicles. Global sales of eclectic vehicles increased by 40 per cent year-on-year in the first eight months of 2017 to nearly 600,000 sales.

## World consumption

### *Copper consumption weighed down by key markets*

World refined copper consumption decreased by 1 per cent year-on-year in the June quarter 2017, to 6.1 million tonnes. Consumption was weighed down by lower usage in China and Europe, where demand fell by 2.9 and 1.7 per cent, respectively. Nonetheless, better than expected results for China's June quarter GDP (which grew by 6.9 per cent), firm growth in global industrial production, and a rising world Purchasing Manufactures Index (PMI) in August, point to a healthier outlook for copper consumption as 2017 comes to an end.

### *Consumption outlook improves*

Global copper consumption is forecast to rise from 23 million tonnes in 2016 to 25 million tonnes in 2019, representing an average increase of 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.

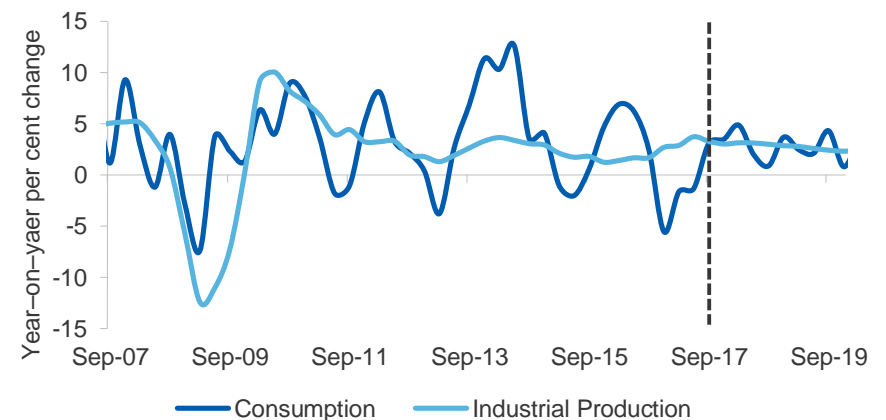
China's copper consumption — which accounts for 50 per cent of global demand — is expected to increase over the outlook period, driven by investment in the nation's power grid and firm growth in the construction and manufacturing sectors.

Growth in investment in the power grid has picked up after a slow start to the year, and is expected to rise in the second half of 2017.

Expenditure on China's power grid increased by 9.1 per cent year-on-year in the three months to August. China's copper consumption will also be supported by growth in the construction sector. Commercial 'floor-space started' — a leading indicator for China's construction sector — increased by 3.2 per cent year-on-year in the three months to August, pointing to higher copper consumption over the next 12 months.

Copper is used extensively in renewable energy technology and infrastructure, spending on which is expected to increase strongly over the outlook period. South Korea's new President, Mr Moon Jae-In's energy policy is expected to sharply increase the share of renewable energy in the country's electricity grid, from around 5 per cent to 20 per cent by 2030. South Korea was the world's fifth largest copper consumer in 2016.

**Figure 12.3: World Copper Consumption Vs Industrial Production**



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

## World production

### *World copper mine production continues to grow at a steady pace*

World mine copper production increased by 0.7 per cent year-on-year in the June quarter of 2017 to 5,249,000 tonnes. The steady rise in production was led by increased supply from Africa and Kazakhstan, which offset declines in Canada and Chile. Industrial action in Chile and Peru threatened to disrupt supply in July, but appears to have proven largely immaterial. New labour agreements averted strikes at Antofagasta's Centinela and Zaldívar copper mines in Chile, while there was little impact on production from a five day nationwide strike in Peru.

### *World mine production expected to rise*

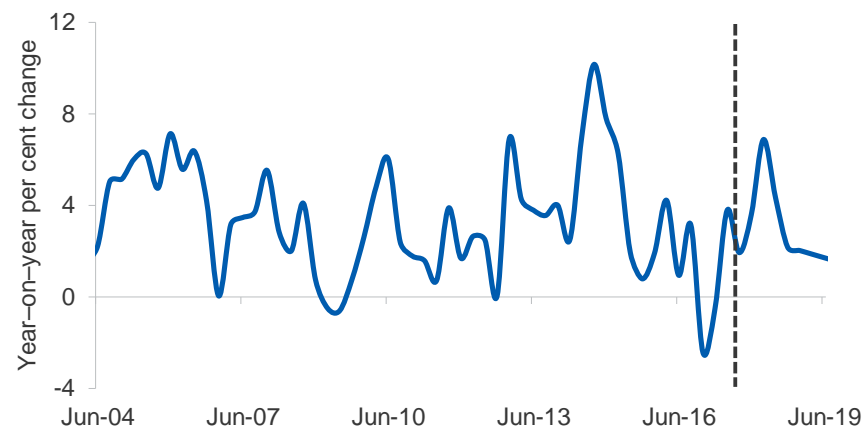
Global copper mine production is forecast to rise from 21 million tonnes in 2016 to 22 million tonnes by 2019, representing an average increase of 1.7 per cent per year. Growth in world mine supply will be driven by new mines and expansions across most of the major producing nations.

Eight out of thirteen expected new mines and expansion projects for 2017 are currently producing — accounting for almost half of the additional 430,000 tonnes of copper expected to come on line in 2017.

Mine production is expected to rise significantly in 2018, with over 1 million tonnes of additional supply (equal to a 4.1 per cent rise in total mine supply) expected to come on line. 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 Qulong copper mine, operated by Tibet Julong Mining, is expected to be the second largest new project in 2018, with an annual production capacity of 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 and new projects are expected to increase production capacity by a further 450,000 tonnes in 2019. The expansion of Chinalco's Toromocho copper mine in Peru will be the largest source of new supply, with an expected additional 100,000 tonnes to come on line in 2019. Several Australian mines are expected to contribute a further 87,000 tonnes of new and expanded production capacity in 2019, including Oz Minerals Carrapateena and BHP's Olympic Dam.

**Figure 12.4: World Copper Refined Production**



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

### *World refined copper production rises in June*

World refined copper production increased by 2.8 per cent year-on-year in the June quarter 2017, to 5.9 million tonnes. Higher production was led by China and Europe, which increased production by 183,000 and 92,000 year-on-year in the June quarter, respectively.

### *World refined copper output expected to rise over the outlook*

Global refined copper production is forecast to rise from 23 million tonnes in 2016 to 25 million tonnes by 2019, representing an average increase of 2.5 per cent each year. Higher refined production will be driven by new refineries and expansion projects in China. New refineries and expansion projects in China are expected to raise production capacity by 600,000 tonnes in 2017. The expansion in China's refinery output is expected to continue over the rest of the outlook period, with an additional six projects expected to provide a combined output of 570,000 tonnes in 2018. Yunnan Copper in China is expected to add 675,000 tonnes in 2019, by expanding their Chifeng refinery and new Dongnan copper project.

## Australia's production and exports

### Copper exports set to increase over the outlook

Australia's copper export earnings increased by 3.5 per cent year-on-year in the June quarter to \$2.1 billion. Higher earnings were underpinned by higher world prices, which offset a year-on-year fall in export volumes (down by 2.9 per cent). Exports of refined copper and copper ores and concentrates to China declined by 45 and 11 per cent year-on-year in the June quarter, respectively.

The value of Australia's copper export earnings is forecast to increase from \$7.5 billion in 2016–17 to \$8.3 billion in 2018–19. Australia's copper exports (in metal-content terms) are forecast to increase by 4.5 per cent annually from 922,000 tonnes in 2016–17, to 1 million tonnes in 2018–19. Australia's export earnings from copper will be supported by new projects and mine expansions.

Rising electricity costs will be a key risk to the outlook for Australia's export earnings from refined copper. Rising electricity costs reduce the competitiveness of Australia's smelter and refinery operations, and will encourage producers to export larger quantities of ores and concentrates.

### Production was declines in the June quarter

Australia's mine production declined by 7.3 per cent year-on-year in the June quarter, weighed down by interruptions at several mines including seismic activity at Newcrest's Cadia Valley, where production fell by 52 per cent year-on-year in the June quarter. Operations at Cadia Valley are expected to return to normal levels later this year.

### Improved outlook for mine production

Australian production is forecast to increase by 5.7 per cent annually from 917,000 tonnes in 2016–17, to 1,025,000 tonnes by 2018–19.

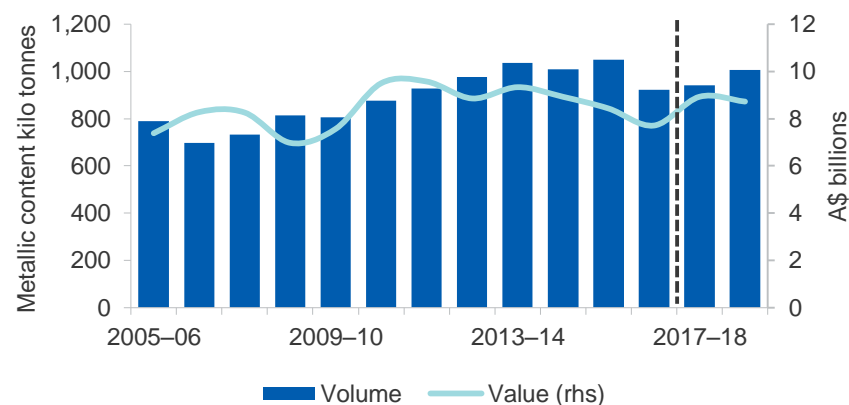
Higher Australian production will be driven by improved output at BHP's Olympic Dam — Australia's largest copper mine. BHP is investing \$350 million on improvements to the Olympic Dam smelter. Production is expected to decline to 150,000 tonnes in 2017–18 while the changes take place; upon completion production from the smelter will increase, with output expected to rise to 215,000 tonnes in 2018–19.

### Exploration expenditure improves

Australia's copper exploration expenditure increased by 31 per cent year-on-year in the June quarter 2017, to \$42 million. This was likely driven by an improved outlook for copper prices.

The rise in the June quarter took 2016–17 copper exploration expenditure to \$136 million, an increase of 4 per cent. This was the first yearly improvement since low prices triggered a steady decline in 2012. Higher exploration expenditure in 2016–17 was led by Queensland and New South Wales, where spending increased by 5 per cent and 11 per cent, respectively. Expenditure is expected to rise in 2017, as higher prices encourage new exploration.

Figure 12.5: Australian copper export volume and values



Source: ABS (2017) *International Trade*, 5465.0; Department of Industry, Innovation and Science (2017)

**Table 12.1 Copper outlook**

World	Unit	2016	2017 f	2018 f	2019 f	Annual percentage change		
						2017 f	2018 f	2019 f
Production								
– mine	kt	20,794	20,688	21,537	21,890	-0.5	4.1	1.6
– refined	kt	23,343	23,858	24,767	25,173	2.2	3.8	1.6
Consumption	kt	23,411	23,618	24,289	24,878	0.9	2.8	2.4
Closing stocks	kt	1,095	1,203	1,367	1,273	9.8	13.6	-6.9
– weeks of consumption		2.4	2.6	2.9	2.7	8.9	10.5	-9.1
Price LME								
– nominal	US\$/t	4,863	6,054	5,630	6,025	24.5	-7.0	7.0
	USc/lb	221	275	255	273	24.5	-7.0	7.0
– real b	US\$/t	4,962	6,054	5,514	5,774	22.0	-8.9	4.7
	USc/lb	225	275	250	262	22.0	-8.9	4.7
Australia	Unit	2015–16	2016–17 s	2017–18 f	2018–19 f	2016–17 s	2017–18 f	2018–19 f
Mine production	kt	990	917	969	1,025	-7.3	5.7	5.7
Refined production	kt	514	448	480	478	-12.9	7.2	-0.3
Export volume								
– ores and conc. c	kt	1,870	1,759	1,703	1,971	-5.9	-3.2	15.7
– refined	kt	507	413	444	444	-18.5	7.6	-0.1
– total metallic content	kt	1,050	922	940	1,006	-12.2	1.9	7.1
Export value								
– nominal	A\$m	8,110	7,544	8,185	8,288	-7.0	8.5	1.3
– real d	A\$m	8,428	7,708	8,185	8,095	-8.5	6.2	-1.1

Notes: **b** In 2017 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.

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).