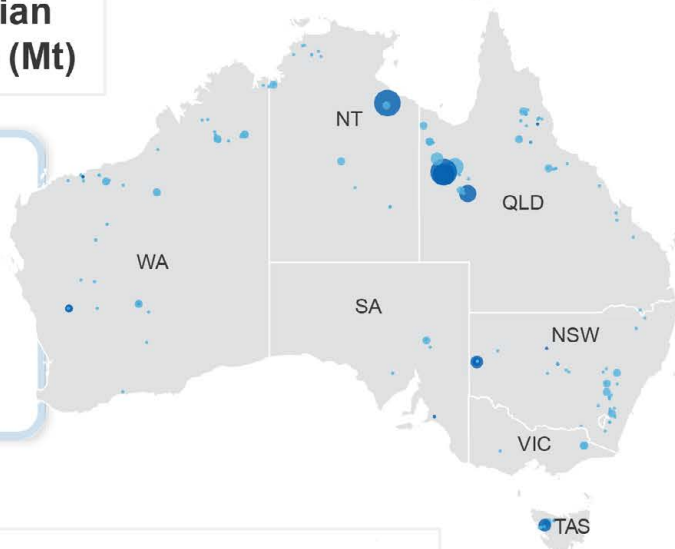
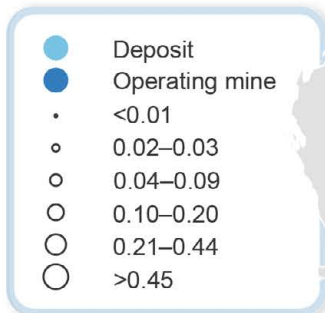


Major Australian zinc deposits (Mt)



World consumption



50%
Galvanise steel



17%
Diecasting



17%
Brass & bronze alloys



6%
Rolled zinc



6%
Chemicals



4%
Other

Zinc facts



Zinc exports are tipped to grow by 14% to **1.5m tonnes in 2020**



Mined zinc production increased to 1.3m tonnes in 2018–19



Zinc exports contributed A\$4b to the Australian economy in 2018–19



Zinc is an **emerging battery mineral**

Australia's zinc



Holds **29%** of world zinc resources



3rd highest producer of zinc in the world



2nd highest zinc exporter in the world

14.1 Summary

- Zinc prices are expected to decline in real terms over the next five years, as production starts to respond to the high prices of recent years. A down-tick in prices in real 2020 terms is projected by the end of the outlook period as production comes on line and stocks build with most price reduction in the short term. Prices are projected to decrease from US\$2,605 a tonne in 2019 to US\$1,864 a tonne in 2025, in real terms.
- Australia's zinc production is projected to increase from 1.2 million tonnes (in metallic content) in 2018–19 to 1.8 million tonnes in 2024–25.
- Increasing production, combined with falling prices is expected to see the real value of Australia's zinc exports decrease from \$4.0 billion in 2018–19 to \$3.1 billion by 2024–25.

14.2 Prices

Price declines reflect macroeconomic uncertainty

Zinc has been affected by US-China trade tensions and resultant dampening manufacturing and automotive activity but has benefitted from the Phase One deal. The average London Metals Exchange (LME) zinc price in 2019 was 16 per cent lower than in 2018, ending the year at US\$2,293 a tonne. At the time of writing, prices have continued to fall in early 2020, as market concerns grow over the impact of the COVID-19 outbreak.

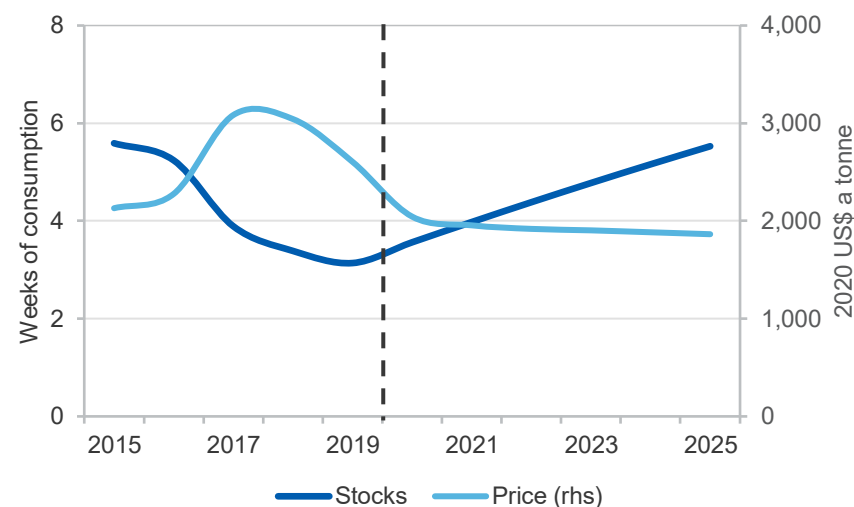
Zinc stocks remain low

Inventories of zinc remain low, despite recent price falls on the back of the COVID-19 outbreak. This suggests that market participants are anticipating — rather than actually experiencing — a swing towards a more balanced market. LME data shows stocks hit a 20 year low of 51,000 tonnes in December 2019, down from 129,000 tonnes in December 2018. Shanghai Futures Exchange (SHFE) inventories ended 2019 at 46,000 tonnes, having peaked in March 2019 at 110,000 tonnes. Supply shortages reflect environmental constraints on smelter production and a consequent failure by smelters to keep pace with concentrate supply.

The LME zinc spot price is forecast to average US\$2,045 a tonne during 2020 (Figure 14.1). The impact of COVID-19 is expected to weigh on prices in the first half of the year. Much will depend on the depth and length of the COVID-19 outbreak: China refines a large amount of the world's zinc, and could be impacted by worker shortages.

Beyond 2020, rising inventories are expected to place a tight cap on prices. The price should come under downward pressure over the outlook period, averaging a projected US\$1,864 a tonne in real terms in 2025.

Figure 14.1: Zinc prices and stocks



Source: London Metal Exchange (2020) and Department of Industry, Science, Energy and Resources (2020)

Zinc price upside wildcard

A wildcard for zinc prices includes the increasing potential for zinc-bromine based batteries as an alternative to lithium ion batteries, particularly in the energy storage space. It is early days yet, but towards the end of the outlook period, this potential source of demand may see consumption rise, putting upward pressure on prices.

14.3 World consumption

The COVID-19 outbreak is assumed to affect China's GDP growth in the first half of 2020 with the IMF suggesting that COVID-19 would decrease 2020 Chinese growth by 0.4 percentage points from their baseline forecasts. This may lower Chinese zinc consumption in the short term with potential for a 2 per cent annual drop in Chinese zinc consumption, depending on Chinese government stimulus measures (see the *macro* chapter). This, despite February inventory levels at the LME and the SHFE, has led to price falls. The easing of trade tensions between China and the US signified by the Phase One deal has given prospects for the medium-term for global zinc demand a boost. However, this is tempered by the outlook for its uses.

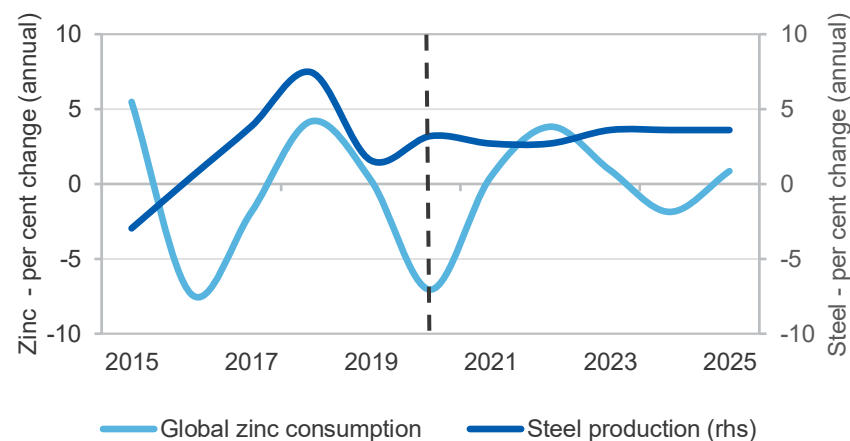
Zinc's primary use is galvanising steel, either through hot dipping or cold plating. Therefore consumption is expected to move with steel production (Figure 14.2), which is in turn influenced by global industrial production, construction spending and vehicle production. On the vehicle production front, apart from the electric vehicle component, the automotive industry is very sluggish; producers have been impacted by delayed purchases by consumers who are worried about uncertain economic conditions and changing emission requirements in major countries/regions.

Other applications for zinc are in aerospace and the emerging field of energy storage in domestic and commercial applications, according to ASX listed Redflow, United States based Aerojet Rocketdyne and ZAF Energy and Canadian, Zinc8. Zinc8 recently won a competition for storage with the New York State Power Authority. Zinc energy storage has pros and cons compared with lithium energy storage but may find increased use with utilities. This is likely to start playing out towards the end of the outlook period, as the demand for lithium rises and prices potentially increase for that metal (see the *lithium* chapter). Additionally, as zinc can often be a by-product of other mining — compared to largely singular production for lithium — this has price implications for the metal, and consequently makes other applications potentially more attractive.

China is expected to continue to dominate global zinc consumption, though rising construction spending in India is expected to boost its market share over the outlook period.

Global zinc consumption is projected to rise modestly over the outlook period, from 14 million tonnes in 2019 to 15 million tonnes in 2025. However, with mine supply of concentrate set to increase and smelter capacity for uptake limited, this may place mines under pressure to review output to match offtake agreements or scale back production.

Figure 14.2: Annual change in global steelmaking and zinc consumption



Source: International Iron and Steel Institute (2020); Department of Industry, Science, Energy and Resources (2020)

14.4 World production

Mine production is set to rise slowly over the outlook period

Global mine output is expected to rise slowly over the outlook period, reaching 13 million tonnes by 2025. Production gains are predominantly from Africa, with Canada assisting towards the end of the outlook period but higher grade production in diverse locations is a specific feature of the outlook period.

High grade production is due to come online in 2020–21 from a number of deposits. Production from Peru is set to decline slightly, based on minor movements from numerous deposits but higher grade ore at Antamina will see output recover from the 2019 dip. Antamina’s production should be more than 450,000 tonnes per annum of zinc over the outlook period. High grade production is also scheduled to come on line from the Dairi project in Indonesia. The resource grade of 11.5 per cent zinc and is one of the higher grade undeveloped resources.

High grade production is also due from the refurbishment of Kipushi in the Democratic Republic of Congo. Resource grades average just below 11 per cent but higher grade zinc rich sections average over 35 per cent zinc. Production is likely to initiate around 130,000 tonnes per annum, increasing to 200,000 tonnes per annum over the outlook period. In Eritrea, the Bisha poly-metallic deposit is likely to phase out and be replaced by Asmara at around 100,000 tonnes per annum of zinc. Gamsberg in South Africa is ramping up in 2020 towards 200,000 tonnes per annum and higher beyond the outlook period. Production in southern Africa is also growing, providing further concentrate supply for processing.

Canadian production is likely to be bolstered towards the end of the outlook period as a result of by-product from other polymetallic deposits, where these deposits contain other ‘battery metals’ required for electric vehicle manufacture. Prairie Creek in Canada’s Northwest Territories is likely to head towards production soon, after receiving final permits in 2019. Production from the United States remains relatively flat, despite movements in individual mines. Additionally, IMIDRO’s Mehdiabad Mine in Iran is slated for production in 2020 ramping up over the outlook period towards 400,000 tonnes per annum of zinc.

Refinery production may struggle to keep pace with mine output

Refinery production is expected to largely follow the trajectory of mined production. Capacity utilisation at smelters in China is currently high, reported at 85 per cent in late 2019. Smelter utilisation is expected to remain above 80 per cent in 2020, with output rising by around 200,000 tonnes, encouraged by high treatment and refining charges of around

US\$240 a tonne. With mine supply of concentrate set to increase and smelter capacity for uptake limited, this may place mines under pressure to review output to match offtake agreements or scale back production.

India’s smelter capacity is expected to increase over the outlook period, with expansions across several smelters owned by Hindustan Zinc expected to add 113,000 tonnes per annum in new capacity.

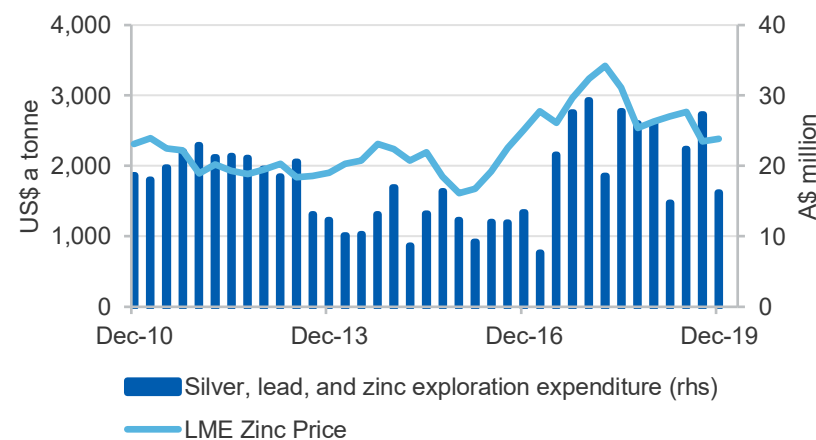
14.5 Australia’s exploration, production and exports

Exploration expenditure declined

The outlook for exploration for zinc is subdued based on the present outlook for the metal. As exploration for copper continues on the back of battery materials demand, zinc is likely to be a side beneficiary. This may depress the price of zinc but give an impetus for other uses.

Exploration expenditure for silver, lead and zinc has declined 38 per cent based on a quarter to quarter comparison between December 2018 and December 2019, following a decline in zinc prices. Zinc prices have declined further since and the decline in exploration expenditure is in the same order of magnitude as the zinc price.

Figure 14.3: Australia’s exploration expenditure on silver, lead and zinc versus zinc prices



Source: Company reports; Department of Industry, Science, Energy and Resources (2020)

Australian mine production is increasing

Australia's zinc mine production was largely unchanged during the December quarter 2019 at 344,000 tonnes (in metal content terms). Production is projected to expand towards around 1.8 million tonnes a year (in metallic content terms) over the outlook period (Figure 14.4).

Increasing production at McArthur River, in the Northern Territory, as well as the ramp-up of Century in Queensland (capitalising on the low capital cost processing of tailings), is likely to continue to support Australian production growth, albeit with a limited mine life based on tailings. Offsetting this, Mt Isa is expected to decline over the outlook period with production at Cannington and Dugald River expected to remain steady.

However, production from smaller deposits outside Queensland and the Northern Territory is forecast to decline and then cease at Jaguar, Elura and Rosebery. Meanwhile, production may be initiated at Sulphur Springs. Increasing production for Queensland in particular is expected to be seen over the outlook period (Figure 14.5). Production in Queensland is likely to be bolstered by zinc produced as a by-product from other polymetallic deposits, particularly where these deposits contain other 'battery metals' required for electric vehicle manufacture.

Refined production of zinc projected to rise modestly

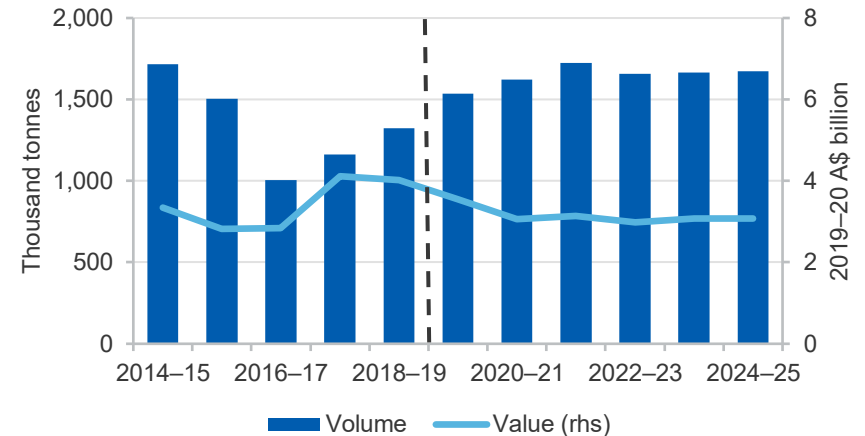
Australia refines about 3.4 per cent of the world's zinc. There are two zinc refiners in Australia: Nyrstar, which refines zinc at its Hobart refinery, and Korean-owned Sun Metals, which operates a smelter near Townsville.

At around 500,000 tonnes, Australian refined zinc production has remained largely flat — with occasional small declines — since 2001. This trend is expected to persist over the outlook period, although there is potential for a small increase from 2021, following an expansion at the Sun Metals facility.

Exports declining in real terms

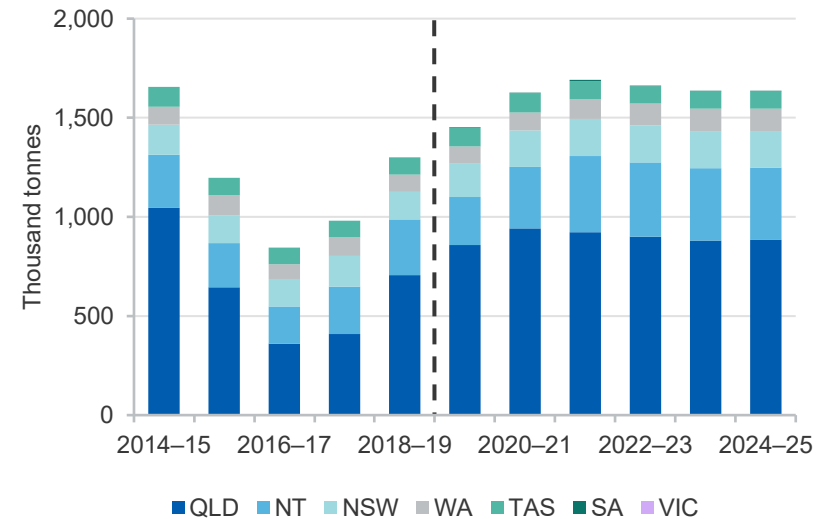
Increasing production, combined with falling prices is expected to see the real value of Australia's zinc exports decrease over the outlook period, from \$4.0 billion in 2018–19 to \$3.1 billion by 2024–25.

Figure 14.4: Australia's zinc exports, metallic content



Source: ABS (2020) International Trade in Goods and Services, 5368.0; Department of Industry, Science, Energy and Resources (2020)

Figure 14.5: Australia's zinc mine production by state



Source: Company reports; Department of Industry, Science, Energy and Resources (2020)

Table 14.1: Zinc outlook

World	Unit	2019 ^s	2020 ^f	2021 ^f	2022 ^f	2023 ^z	2024 ^z	2025 ^z	CAGR ^r
Production									
– mine	kt	12,929	12,449	12,719	13,101	13,252	13,139	13,158	0.3
– refined	kt	13,149	14,057	14,220	14,385	14,556	14,732	14,917	2.1
Consumption	kt	13,772	13,934	14,097	14,262	14,432	14,609	14,794	1.2
Closing stocks	kt	829	952	1,076	1,199	1,322	1,445	1,569	11.2
– weeks of consumption		3	4	4	4	5	5	6	9.9
Price									
– nominal	US\$/t	2,550	2,045	1,996	2,005	2,035	2,060	2,085	-3.3
	USc/lb	116	93	91	91	92	93	95	-3.3
– real ^a	US\$/t	2,605	2,045	1,955	1,919	1,904	1,884	1,864	-5.4
	USc/lb	118	93	89	87	86	85	85	-5.4
Australia	Unit	2018–19	2019–20 ^f	2020–21 ^f	2021–22 ^f	2022–23 ^z	2023–24 ^z	2024–25 ^z	CAGR ^r
Mine output	kt	1,235	1,428	1,627	1,690	1,646	1,732	1,753	6.0
Refined output	kt	480	450	477	522	504	499	506	0.9
Export volume									
– ore and concentrate ^b	kt	2,091	2,684	2,895	3,035	2,935	3,132	3,179	7.2
– refined	kt	420	352	337	382	364	359	366	-2.3
– total metallic content	kt	1,325	1,529	1,606	1,713	1,651	1,731	1,759	4.8
Export value									
– nominal	A\$m	3,952	3,542	3,128	3,277	3,187	3,360	3,456	-2.2
– real ^c	A\$m	4,026	3,542	3,067	3,146	2,988	3,073	3,083	-4.4

Notes: **a** In 2020 US dollars; **b** Quantities refer to gross weight of all ores and concentrates; **c** In 2019–20 Australian dollars; **f** Forecasts; **r** Compound annual growth rate; **s** Estimate; **z** Projection.
Source: ABS (2020) International Trade in Goods and Services, Australia, Cat. No. 5368.0; Company reports; Department of Industry, Science, Energy and Resources (2020); International Lead Zinc Study Group (2020); LME (2020); World Bureau of Metal Statistics (2020)