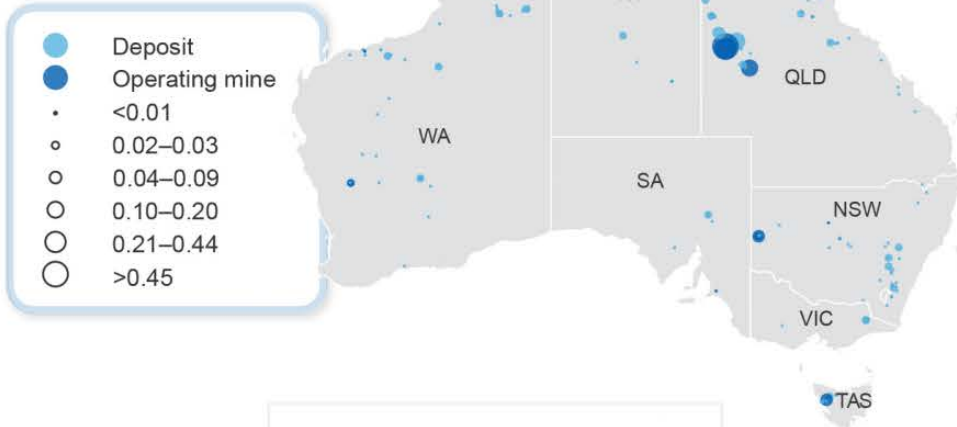


## Major Australian zinc deposits (Mt)



## Zinc facts



Zinc ore was used in ancient Greece to produce brass



Zinc is used by the human body to **fight infection**



Zinc is used in wound-care and sunscreen



Zinc is an **emerging battery mineral**

## World consumption



**50%**  
Galvanise steel



**17%**  
Diecasting



**17%**  
Brass & bronze alloys



**6%**  
Rolled zinc



**6%**  
Chemicals



**4%**  
Other

## Australia's zinc



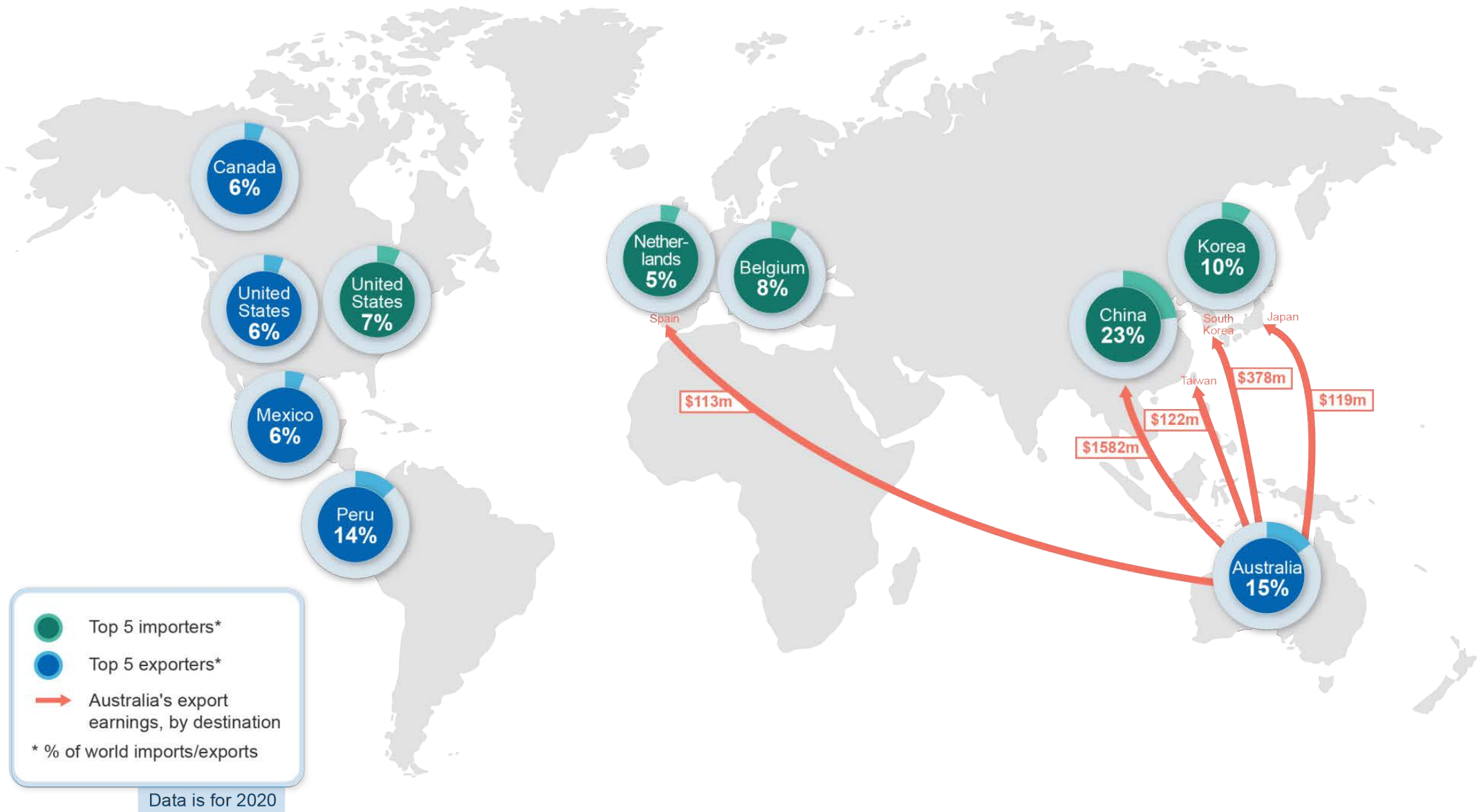
**3rd highest producer of zinc** in the world in 2020



One of world's **top zinc exporters** in 2020



Holds **29%** of world zinc resources



## 14.1 Summary

- The LME zinc spot price is forecast to average US\$2,990 a tonne in 2022, with government infrastructure programs helping to support prices. Prices are expected to fall to around US\$2,675 a tonne in 2023, as production increases and consumption growth normalises.
- Australia's zinc production is forecast to increase from an estimated 1.3 million tonnes in 2020–21 to 1.4 million tonnes in 2022–23.
- Australia's zinc export earnings are forecast to increase from \$3.3 billion in 2020–21 to around \$4.1 billion in 2021–22, and to \$3.6 billion in 2022–23. Rising refined production is expected to offset the impact of lower prices.

## 14.2 World consumption

### Infrastructure spending promises to boost zinc consumption

World refined zinc consumption increased by 5.4% year-on-year in the September quarter 2021. China's consumption decreased by 0.6% year-on-year, while ex-Chinese consumption increased by 12% year-on-year. This saw the world refined metal balance decrease to a barely positive position in the September quarter 2021.

Changes in zinc consumption correlate well with the world industrial production (IP) cycle (Figure 14.1) and with steel production because of its primary role in galvanising steel, both of which grew strongly in 2021 (Figure 14.2). Global automotive sales for the September quarter 2021 decreased by 15% quarter-on-quarter and by 16% year-on-year, as supply chain issues from the impacts of the COVID-19 pandemic continued.

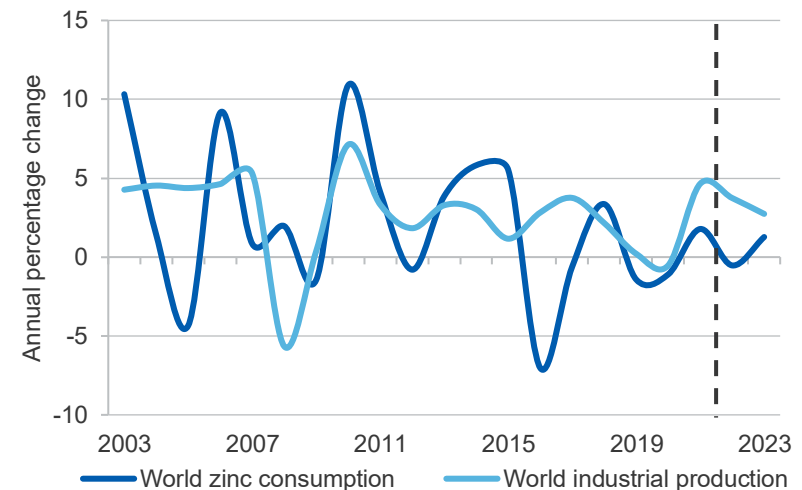
Firm economic growth should see zinc consumption rise modestly over the outlook period, growing from 14.1 million tonnes in 2021 to 14.4 million tonnes in 2023 — up an average of 1.2% a year (Table 14.1). The US\$1.2 trillion stimulus package is likely to boost the demand for refined zinc during the outlook period and beyond. Infrastructure spending in India may also grow boosting zinc demand.

### Zinc becomes a critical mineral

The US Geological Survey has proposed the US Government place zinc on its critical minerals list. The US has a high reliance on imports for its refined zinc consumption, importing most of its product from Canada and Mexico. Nickel was also recommended by the USGS for placement on the critical minerals list, due to its role in battery production. However, placing zinc on the list also allows for zinc's potential for battery storage, as well as in its traditional use in galvanising steel.

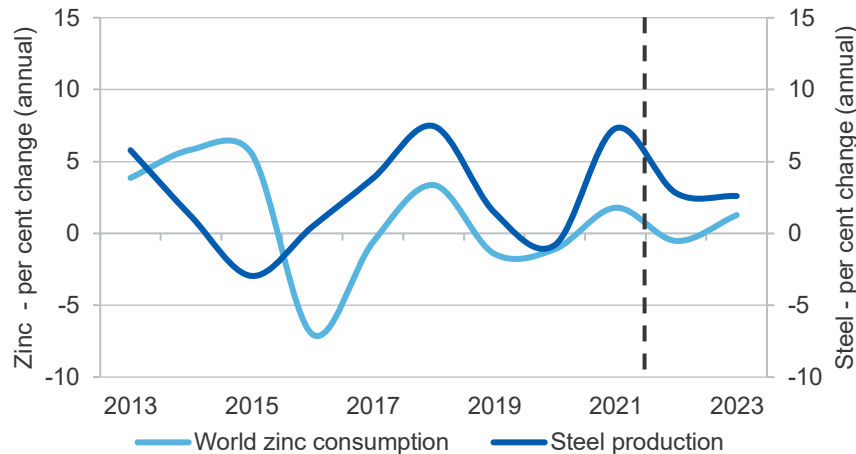
ASX-listed Redflow is continuing its US-focused expansion for zinc bromine batteries. The company anticipates that production of its Gen3 battery will commence in 2022. The company suffered some delays in production at its Thailand base, due to supply chain disruption caused by the COVID-19 pandemic. Canadian Zinc8 has relocated its factory, in order to gear up for commercial production of its zinc air batteries, which the company plans to produce in 2023.

**Figure 14.1: World zinc consumption vs industrial production**



Source: International Iron and Steel Institute (2021); CPB Netherlands Bureau for Economic Policy Analysis (2021); Department of Industry, Science, Energy and Resources (2021).

**Figure 14.2: Steel production vs world zinc consumption**



Source: International Iron and Steel Institute (2021); Department of Industry, Science, Energy and Resources (2021).

### 14.3 World production

#### Mine production continues to recover from the COVID-19 pandemic

In the September quarter 2021, world zinc mine production decreased by 0.9% quarter-on-quarter but was virtually unchanged from the September quarter 2020. China's mine production decreased by 1.8% in the September quarter 2021 and by 5.3% from September 2020. However, China's year to date production for the 9 months ending September 2021 was up 2.2% compared to the same period in 2020.

Production from Peru decreased by 2.5% quarter-on-quarter and by 0.5% year-on-year, with production of 379,000 tonnes (metallic content) remaining at near-normal levels after the COVID-19-pandemic-affected low of 166,000 tonnes recorded in the June 2020 quarter. Peru's government is considering changes to the mining framework as well as to the legislation to set royalties for mining operations.

In the September quarter 2021, Australia's mined zinc production decreased by 2.3% quarter-on-quarter, but rose by 1.4% year-on-year.

#### Mine production is expected to rise over the outlook period

World mine output is estimated at 13.0 million tonnes in 2021, and is forecast to rise by 1.0% per year to 13.2 million tonnes by 2023, as new mine capacity raises output (Figure 14.3).

Nexa Resources' Aripuana mine in Brazil, will increase zinc supply once construction is completed, with production expected in 2022. The Juanicipio project in Mexico, operated by Fresnillo Plc, is continuing its development, with possible zinc production in 2022. The mine may produce around 25,000 tonnes of zinc initially, ramping up to 40,000 tonnes a year after 2025.

Production ramp up from Glencore's Zhairem in Kazakhstan is ongoing, with the company expecting steady state by the June quarter 2022.

Vedanta Zinc's Gamsberg mine in South Africa also has finalisation of ramp up to complete. Full capacity is expected in 2023. Asmara in Eritrea, operated by Sunridge Gold, may also see zinc production in 2024, after first mining gold and copper.

#### World refinery production steady

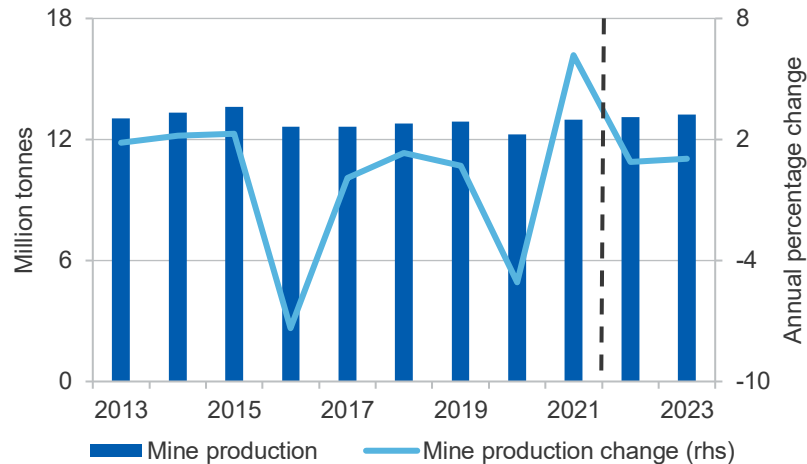
World zinc refined production decreased by 0.3% quarter-on-quarter in the September quarter 2021 and by 0.4% year-on-year. While China's refined metal production decreased by 0.4% year-on-year for the September quarter of 2021, it increased by 2.8% quarter-on-quarter, despite the ongoing power issues.

China's concentrate imports were 30% lower quarter-on-quarter in the September quarter 2021 at 281,000 tonnes, due to ongoing power shortages as well as China's lowering of steel production. In Chinese provinces where zinc is refined, power rationing continues to be a concern, with some provinces ordered to cut power consumption by 20-30%.

Refined production from primary and secondary sources is expected to increase by an average of 1.5% a year over the outlook period, reaching 14.4 million tonnes in 2023.

Based on likely rising Indian infrastructure spending, Vedanta plans to scale up production capacity by 25% over the next 10-15 years. A lift in smelting capacity may follow an expansion in Gamsberg, with additional capacity in India or via a restart of the Skorpion smelter in Namibia.

**Figure 14.3: World zinc mine production, metallic content**



Source: International Lead Zinc Study Group (2021); Wood Mackenzie (2021); Department of Industry, Science, Energy and Resources (2021).

## 14.4 Prices

### Price increases reflect tightness in supply

Zinc prices averaged US\$2,991 a tonne during the September quarter 2021 — up 2.6% quarter-on-quarter and 28% year-on-year. Rising metal consumption, due to spending on infrastructure, is placing upward pressure on prices.

Prices have been supported by cuts in the production of refined zinc, as rising power costs have impacted major refining countries. Spot treatment and refining charges are still low compared with contract treatment and refining charges (year-to-date) at US\$159 a tonne, and stable at the same levels over the September 2021 quarter — down from US\$300 a tonne in 2020.

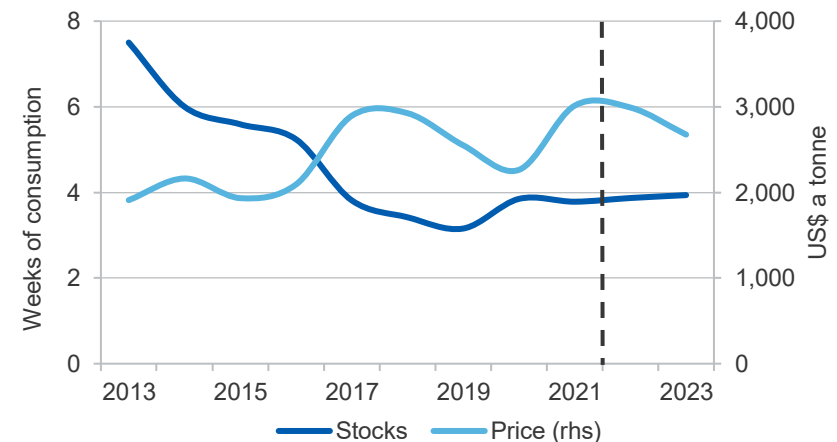
Power rationing and cuts to refined zinc production, combined with a high zinc price are encouraging the miners, and will likely see some appreciation in the treatment charges and perhaps rebalance some of the lost profits of the smelters, who have had to cut production.

In an attempt to push down prices, the Chinese Government released 50,000 tonnes from its strategic reserves at auction in September, after releasing another 50,000 tonnes in late July.

London Metals Exchange (LME) and Shanghai Futures Exchange zinc inventories are around 272,000 tonnes — down from 289,000 tonnes in the June quarter 2021.

The LME zinc spot price is estimated to average US\$3,013 a tonne in 2021, decreasing to around US\$2,991 a tonne in 2022 and US\$2,675 a tonne in 2023, as world production increases (Figure 14.4). Ongoing supply disruptions — such as power shortages at zinc smelters in China, gas supply and high power prices in Europe — would likely support prices. Producers cutting production in Europe due to high gas prices include Glencore and Nystar.

**Figure 14.4: Zinc prices and stocks**



Source: London Metal Exchange (2021); Department of Industry, Science, Energy and Resources (2021).

## 14.5 Australia

### Export earnings expected to increase before returning to 'baseline'

In 2020–21, Australia's exports of zinc decreased by 9.0% year-on-year to 1.4 million tonnes (in metal content terms), but decreased by 8.1% in value to \$3.3 billion with concentrates declining in volume but refined zinc increasing in volume. The decline in concentrates year-on-year for 2020–21 is in part due to a very high volume of exports in 2019–20 compared with 2018–19, as Australia took up volumes that Peru could not supply due to the COVID-19 pandemic. The increase in refined zinc exports reflects expansion at the Sun Metals refinery in Townsville.

Australia's zinc export earnings (for both concentrate and refined metal) are forecast to increase from \$3.3 billion in 2020–21 to around \$4.1 billion in 2021–22, but decline to \$3.6 billion in 2022–23, as rising production (including for refined metal) offsets the impact of lower prices.

### Australia's production decreased slightly in the September quarter 2021

In the September quarter 2021, Australia's mined zinc output decreased by 5.9% year-on-year and decreased by 2.5% quarter-on-quarter, largely as a result of decreased production from Mt Isa in Queensland.

Glencore's Australian production decreased by 2.8% year-on-year in the September quarter 2021, with output declining from the Mt Isa and McArthur River operations in Queensland and the Northern Territory. Production declined at McArthur River, from 74,200 tonnes of zinc in concentrate to 69,900 tonnes. Production at Mt Isa was 82,800 tonnes of zinc in concentrate — down from 86,400 tonnes, but broadly similar to the prior year's production.

Production at Century Tailings Reprocessing in Queensland decreased by 14.1% year-on-year in the September quarter 2021, and decreased by 8.9% quarter-on-quarter, after a ball mill bypass during the quarter.

Production at South32's Cannington operation in Queensland increased by 24% year-on-year in the September quarter 2021, and decreased by 21% quarter-on-quarter, with processing of planned lower grades stopes

extracted from underground operations, as well as planned surface maintenance. The company has decided to streamline underground extraction using truck haulage instead of truck and shaft, commencing in June 2022.

Output from MMG's Dugald River in Queensland increased by 5.0% year-on-year in the September quarter 2021, after recovering from technical issues and planned maintenance in the previous quarter. At Rosebery in Tasmania, output decreased by 12% year-on-year, due to lower grades as well as lower mining due to a rock-fall causing 'dilution' of the ore.

### Refinery and concentrate exports declined

Australia's zinc concentrate exports decreased by 15% quarter-on-quarter to 477,000 tonnes in the September quarter 2021, but were up 4% year-on-year (65% year-on-year in value terms). Australia's concentrate exports to China increased by 0.6% quarter-on-quarter and were up 7.2% year-on-year, as trade stabilised after the normalising of concentrate imports from Peru to China in the prior quarter.

Australia's exports of refined zinc declined by 43% year-on-year and by 19% quarter-on-quarter to 58,200 tonnes in the September quarter 2021. Expansion of Sun Metals zinc refinery in Townsville is underway.

### Australia's mine production is expected to increase

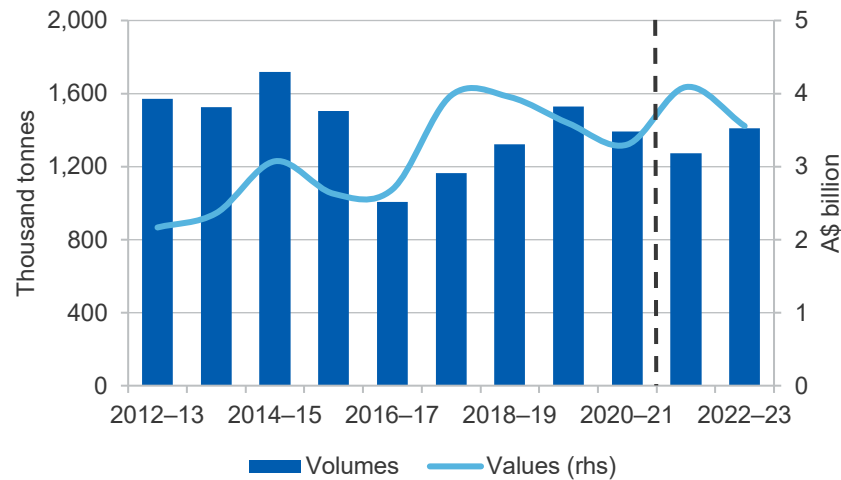
Australia's production is expected to continue growing over 2021–22, with stronger growth in 2022–23 (Figure 14.5). Australia's zinc mine output is expected to increase from 1.3 million tonnes in 2020–21 to 1.4 million tonnes in 2022–23. This rise will be driven by Century in Queensland with increasing contribution from Golden Grove in Western Australia, along with solid production from Mt Isa in Queensland and McArthur River in the Northern Territory.

### Project development

New Century is examining a number of hard rock resources beyond the current tailings retreatment operation, which is due to end in 2027.

New Century believes hard rock resources have the potential to increase mine life to 2030 and are mostly contained on the existing mining lease. Century Zinc earlier reported positive results to their feasibility study of potential operations at Silver King and East Fault Block. The company is targeting a financial investment decision (FID) in the March quarter 2022 and possible first production in the March quarter 2023. They estimate additional zinc production of 22,000 tonnes a year.

**Figure 14.5: Australia's zinc exports, metallic content**



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

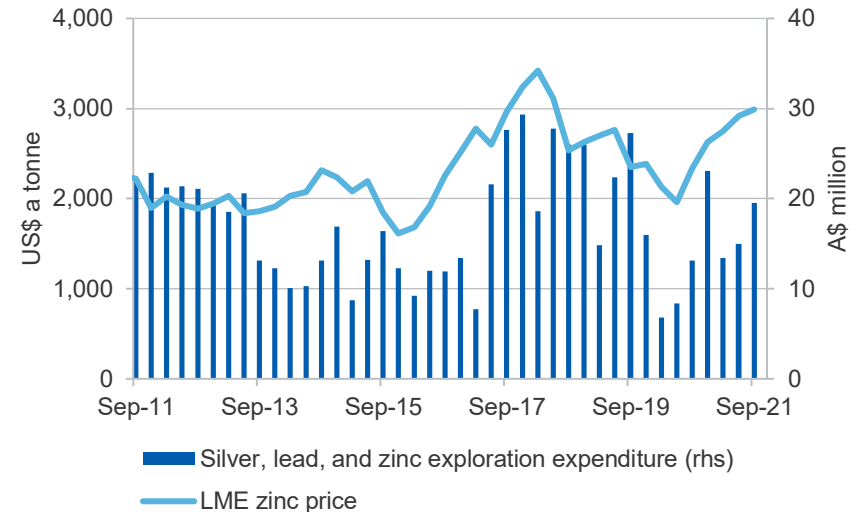
Galena Mining has commenced mining at Abra, with zinc production as a zinc-lead-silver concentrate expected by the company in 2023.

**Exploration expenditure increased in the September quarter 2021**

Exploration expenditure for silver, lead and zinc increased by 30% quarter-on-quarter for the September quarter 2021. Over the same period, the zinc price appreciated by 2.6% quarter-on-quarter (Figure 14.6). This increase in exploration is likely related to ongoing zinc price appreciation. When comparing year-on-year, exploration increased by 49% for the

September quarter 2021, while the zinc price appreciated by 28% over the corresponding period, thus demonstrating the more traditional relationship between commodity prices and exploration. Promising drill results at Jaguar suggest potential for its life of mine to be extended.

**Figure 14.6: Quarterly exploration expenditure**



Source: ABS (2021) Mineral and Petroleum Exploration, Australia, 8412.0; Company reports; Department of Industry, Science, Energy and Resources (2021).

**Revisions to the outlook**

Compared with the September 2021 *Resources and Energy Quarterly*, forecasts for export revenue are up 0.3% at \$4.1 billion in 2021–22, and down 8.4% to \$3.6 billion in 2022–23.

**Table 14.1: Zinc outlook**

World	Unit	2020	2021 <sup>s</sup>	2022 <sup>f</sup>	2023 <sup>f</sup>	Annual percentage change		
						2021 <sup>s</sup>	2022 <sup>f</sup>	2023 <sup>f</sup>
Production								
– mine	kt	12,238	12,994	13,108	13,246	6.2	0.9	1.0
– refined <sup>a</sup>	kt	13,690	13,970	14,221	14,366	2.0	1.8	1.0
Consumption	kt	13,212	14,062	14,266	14,404	6.4	1.5	1.0
Closing stocks	kt	975	1,020	1,059	1,087	4.6	3.7	2.7
– weeks of consumption		3.8	3.8	3.9	3.9	-1.7	2.3	1.8
Price								
– nominal	US\$/t	2,263	3,013	2,991	2,675	33	-0.7	-10.6
	USc/lb	103	137	136	121	33	-0.7	-10.6
– real <sup>b</sup>	US\$/t	2,346	3,013	2,891	2,518	28	-4.0	-12.9
	USc/lb	106	137	131	114	28	-4.0	-12.9
Australia	Unit	2019–20	2020–21	2021–22 <sup>f</sup>	2022–23 <sup>f</sup>	2020–21	2021–22 <sup>f</sup>	2022–23 <sup>f</sup>
Mine output	kt	1,345	1,335	1,360	1,450	-0.8	1.9	6.6
Refined output	kt	418	461	493	505	10.3	7.0	2.5
Export volume								
– ore and concentrate <sup>c</sup>	kt	2,556	2,118	2,027	2,225	-17.1	-4.3	9.7
– refined	kt	390	408	339	376	4.8	-17.0	10.5
– total metallic content	kt	1,530	1,392	1,273	1,409	-9.0	-8.6	9.8
Export value								
– nominal	A\$m	3,592	3,301	4,089	3,555	-8.1	24	-13.0
– real <sup>d</sup>	A\$m	3,739	3,381	4,089	3,480	-9.6	21	-14.9

Notes: **a** Includes secondary refined zinc; **b** In 2021 US dollars; **c** Quantities refer to the gross weight of all ores and concentrates; **d** In 2021–22 Australian dollars; **f** Forecast; **s** Estimate.

Source: ABS (2021) International Trade in Goods and Services, Australia, Cat. No. 5368.0; Company reports; Department of Industry, Science, Energy and Resources (2021); International Lead Zinc Study Group (2021); Wood Mackenzie (2021); LME (2021).