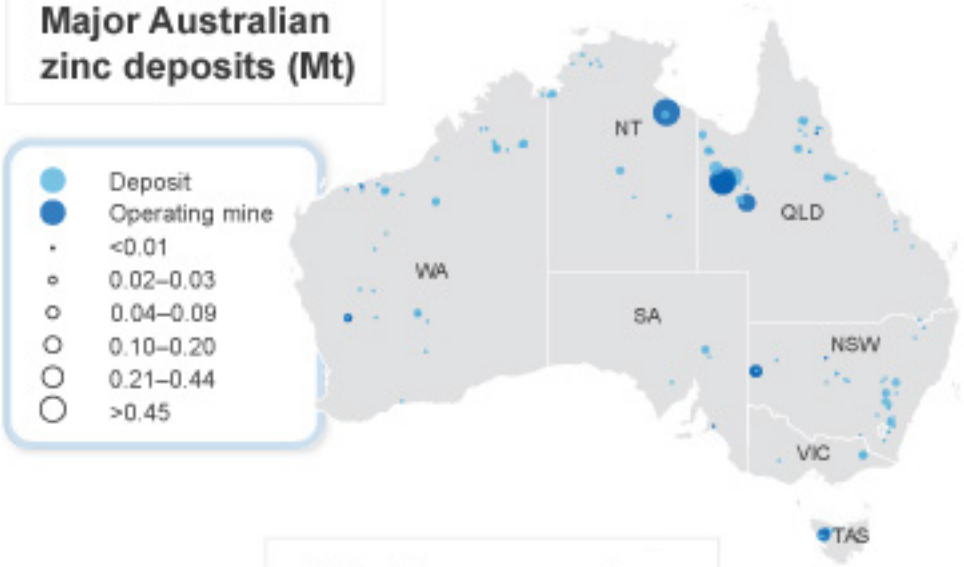
30 Zn 65.38 Zinc

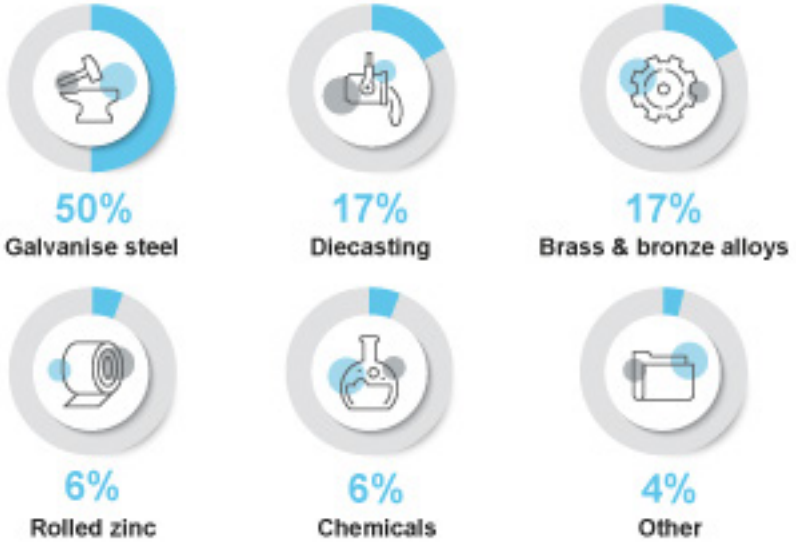
Major Australian zinc deposits (Mt)



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

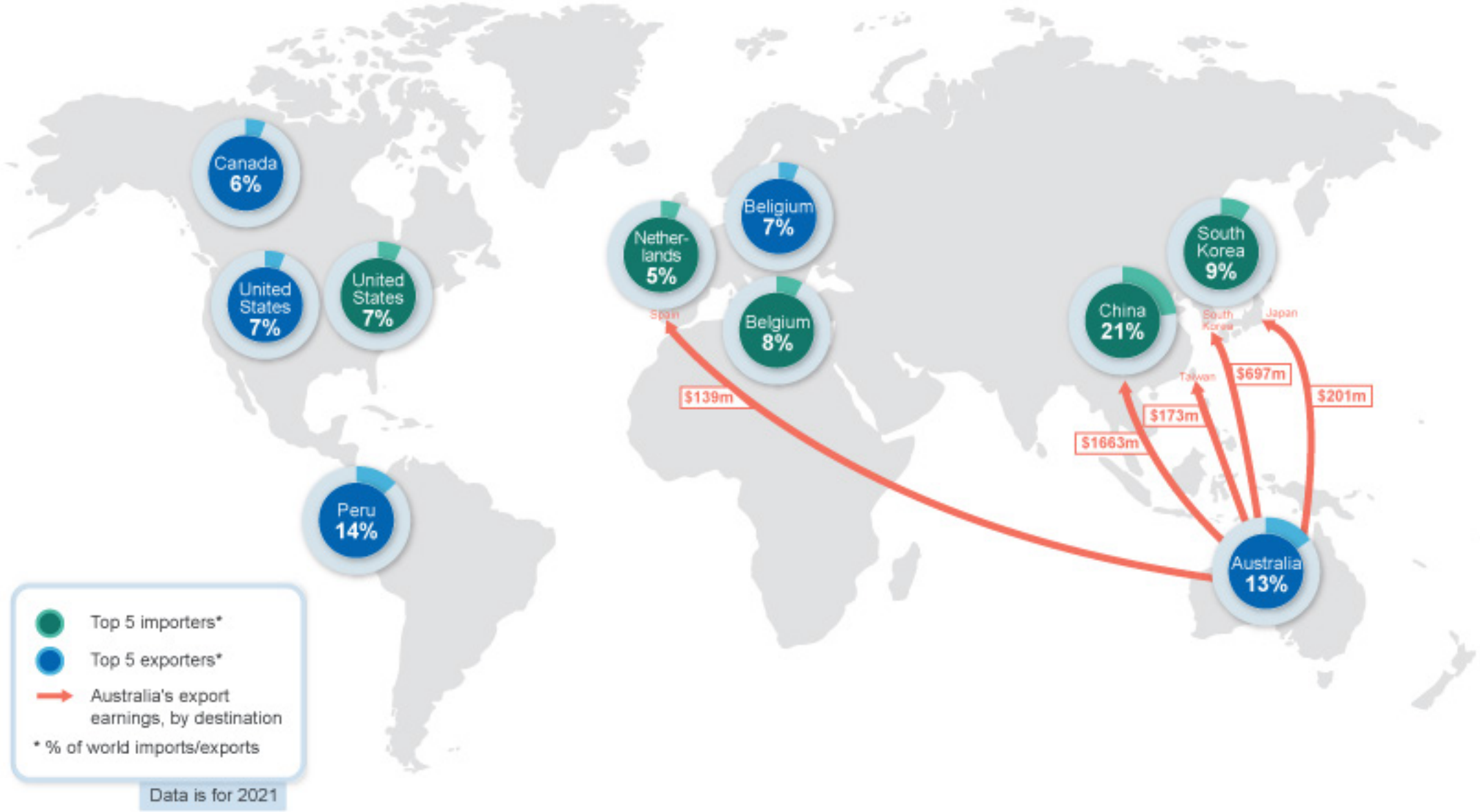


Australia's zinc

- 3rd highest **producer of zinc** in the world in 2021
- 2nd largest **exporter of zinc** in the world in 2021
- Holds 29% **of world zinc resources**

Zinc

Trade map | March 2022



14.1 Summary

- The LME zinc spot price is forecast to average around US$3,600 a tonne in 2022, with robust global construction activity expected this year, as well as continued refined supply shortages (particularly in Europe).
- Prices are expected to ease over the outlook to reach around US$2,400 a tonne (in real terms) by 2027, as global supply rises and consumption growth normalises.
- Australia's zinc production is forecast to be around 1.4 million tonnes in 2021–22, and rise by 7.8% to almost 1.5 million tonnes in 2022–23. Over the outlook, production is expected to remain relatively flat to 2026–27.
- Australia's zinc export earnings are forecast to increase to around $4.3 billion in 2021–22. Earnings are then forecast to ease to $4.0 billion in 2022–23 (in real terms). Export earnings are then projected to fall over the outlook, to reach $2.8 billion in 2026–27.

14.2 World consumption

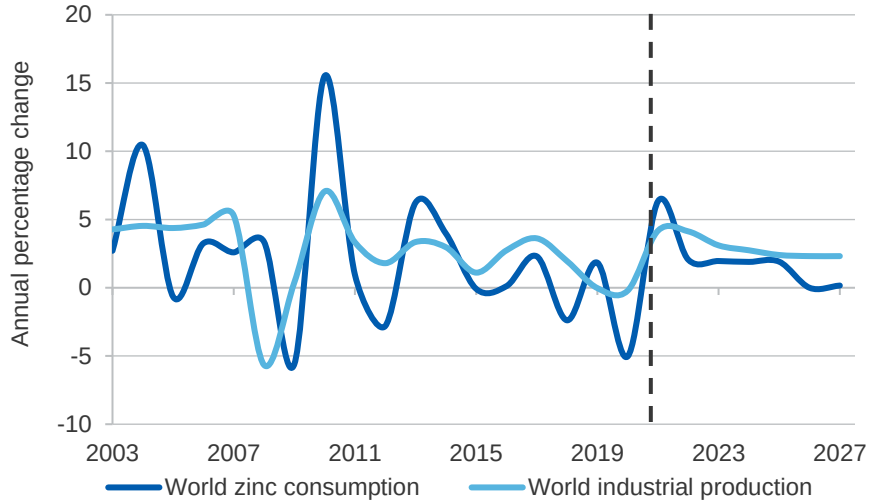
Infrastructure spending providing a boost to world zinc demand

World refined zinc consumption increased by 6.3% year-on-year in 2021 to reach just over 14 million tonnes. This was 1.0% higher than world consumption in 2019 (before global impacts of the COVID-19 pandemic).

This expansion included strong growth for the three largest consumer markets for zinc globally. China's total consumption grew by 4.4% year-on-year in 2021 (to be 3.0% higher compared with 2019), EU consumption grew 11% (to be 3.0% higher compared with 2019), and the rest of Asia (exc. China, Japan, India and South Korea) grew by 15% (to be 8.4% higher compared with 2019).

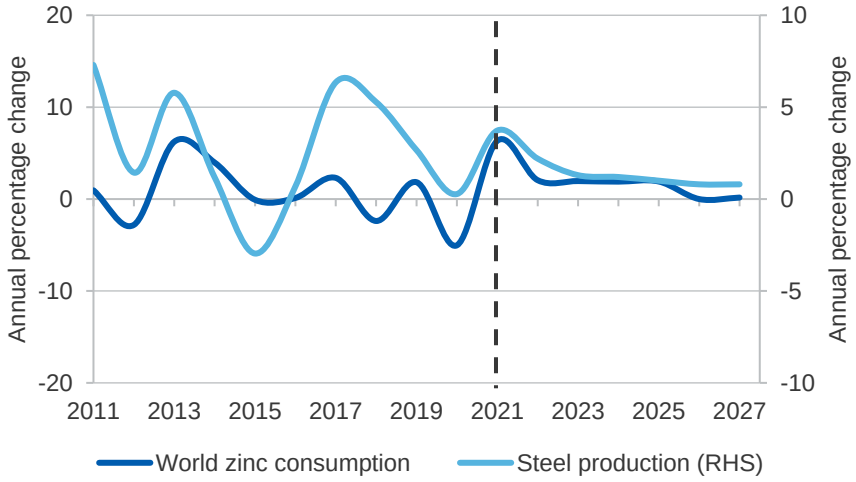
Zinc consumption tends to follow the world industrial production cycle and steel production, given its primary role in galvanising steel (Figures 14.1 and 14.2). In 2021, world industrial production and steel production grew by 4.1% and 3.7% respectively, following the release of pent up demand

Figure 14.1: World zinc consumption vs industrial production



Source: International Iron and Steel Institute (2022); CPB Netherlands Bureau for Economic Policy Analysis (2022); Department of Industry, Science, Energy and Resources (2022).

Figure 14.2: Steel production vs world zinc consumption



Source: International Iron and Steel Institute (2022); Department of Industry, Science, Energy and Resources (2022).

(supported by accommodative government policies) as major economies emerged from the COVID-19 pandemic.

The automotive sector — a major user of steel — was heavily impacted by the ongoing semiconductor chip shortage in 2021, with global car sales in December falling to their lowest levels since the 1990s. However, the construction sector — representing around 50% of global steel demand — saw strong growth over the same period. This follows infrastructure-led fiscal stimulus in many major economies — in response to the pandemic — as well as a growing transition to low emissions infrastructure.

Global zinc demand is expected to see healthy, but lower growth in 2022 compared with the previous year. This follows a slowing pace for the global recovery, as the world returns to longer-run growth levels (see *Macroeconomic Outlook* chapter), with growth of global steel production forecast to be around 2.2% in 2022.

The automotive sector was expected to see improved conditions this year as the current semiconductor shortage receded, boosting production in major markets such as China, the US and Europe. More expansionary fiscal and monetary policies in China should also boost consumption this year.

However, global demand for zinc remains susceptible to downside risks in 2022. This includes the current Russian invasion of Ukraine, and the historically high energy prices seen in Europe in recent months. The Russia Ukraine conflict has the potential to push prices for oil and gas even higher in the near term, which would severely hamper economic and industrial activity. Further weakness in China's residential construction sector could also impact steel (and zinc) demand this year.

Over the outlook, firm economic growth should see zinc consumption grow from 14.0 million tonnes in 2021 to 15.2 million tonnes in 2027 — at an average rate of 1.3% growth per year (Table 14.1). Amongst major economies, the US$1.2 trillion stimulus package and similar infrastructure-focused spending in both China and India is also likely to boost the demand for refined zinc during the outlook period and beyond.

14.3 World production

Global mine production in 2021 back to pre-pandemic levels

World mine production of zinc grew 5.3% in 2021 to reach 12.9 million tonnes. This was also just 0.1% lower than world mine production in 2019.

Of the major producers, China's total mine production was flat for the 2021 calendar year at 4.1 million tonnes. The lack of growth reflects a severely-impacted September quarter, with production down 7.5% year-on-year. However, a recovery in the December quarter (up 4.2% year-on-year) mitigated the net impact for the full year.

Production from Peru increased by 15% year-on-year in 2021 to reach 1.5 million tonnes (this was also 9.1% higher compared with 2019). This followed the re-opening of mines such as Chungar Mining Unit, El Porvenir and Cerro Lindo throughout the year as the country recovered from COVID-related shutdowns in 2020. Stronger production out of Peru's largest zinc mine — Antamina — also contributed to the recovery.

Australia's mined zinc production rose by 1.6% year-on-year in 2021 to reach just over 1.3 million tonnes. However, total output in 2021 remained around 0.3% below 2019 production levels. The result reflects continued near term impacts from the pandemic, with rising labour shortages due to the Omicron variant and related border containment measures.

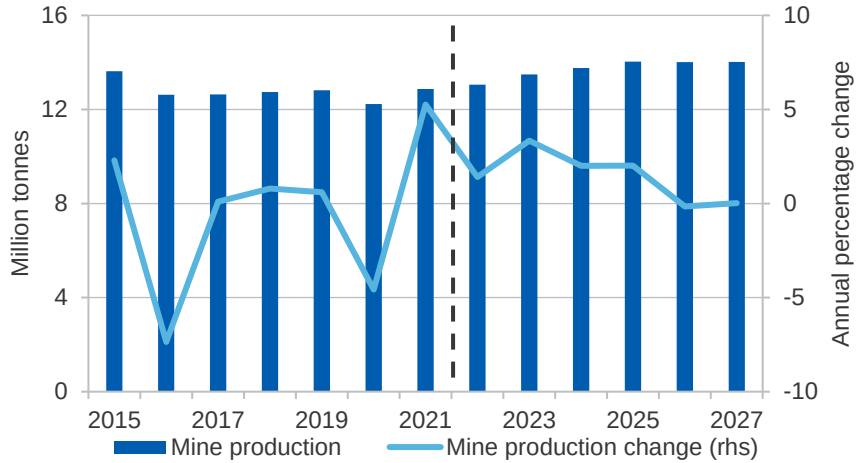
Mine production is expected to rise over the outlook period

World mine output is forecast to grow by 1.4% to reach 13.1 million tonnes in 2022. Output is then forecast to rise by 3.3% in 2023 to reach 13.5 million tonnes by 2023, as new mine capacity comes online (Figure 14.3). Over the outlook, mine production is projected to rise by 1.4% annually, to reach 14 million tonnes by 2027.

New supply over the outlook is expected to come from regions including Central and South America, Eastern Europe, and Africa.

The Aripuana zinc project in Brazil will lift zinc supply by 72,000 tonnes per year once completed, with first production now expected in the September quarter 2022.

Figure 14.3: World zinc mine production, metallic content



Source: International Lead Zinc Study Group (2022); Wood Mackenzie (2022); Department of Industry, Science, Energy and Resources (2022).

The Juanicipio project in Mexico is also expected to start production (25,000 tonnes of zinc initially) in 2022, however, recent delays in connecting to the national grid may push out the start date. The Juanicipio mine is expected to ramp up to 40,000 tonnes a year after 2025.

The Pavlovskoye project in Russia — with an estimated zinc production capacity of 223,000 tonnes a year — is currently undergoing a definitive feasibility study, and is expected to commence operations in 2023. Construction also remains underway for the Ozernoye project in the south east of Russia. Capacity is estimated to be as much 600,000 tons of zinc concentrate per year, with production to start from 2023.

Glencore's Zhairem in Kazakhstan was commissioned in May last year, however ramp up progress has again been delayed, with the company now expecting steady state production in 2023. The project is expected to produce as much as 160,000 tonnes of zinc per year once ramped up, over an initial 14-year mine life.

Vedanta Zinc's Gamsberg mine in South Africa is also ramping up to full production following a temporary closure from November 2020 due to the collapse of a pit wall. Production capacity for Stage 1 of this project is 250,000 tonnes and is expected in 2023. Further stages of this project may also see capacity increase to as much as 600,000 tonnes per year, though this is projected for beyond the outlook period.

World refinery production steady

World zinc refined production increased by 1.1% in 2021 to reach 13.9 million tonnes. This was also 2.2% higher than world refined production in 2019. Of the major refined producers, China's total production (of both primary and secondary refined zinc) increased 1.0% year-on-year to reach 6.4 million tonnes in 2021. The EU and India grew by 3.1% and 2.8% over the same period, to reach 2.1 million tonnes and 0.7 million tonnes respectively.

In 2022, total refined output is forecast to grow by 2.2% to reach 14.2 million tonnes. This comes despite a more muted outlook for European production this year, with both the Portovesme and Auby smelters suspended earlier this year and likely to resume at reduced operational rates in 2022. Current power prices in Europe and the recent Russian invasion of Ukraine, are expected to further exacerbate the current deficit in refined markets this year.

Over the outlook, total refined production is projected to grow by around 1.5% per year to reach 15.2 million tonnes by 2027. This includes substantial new capacity in China in the Guangxi, Yunnan and Inner Mongolia provinces. New capacity is also projected for both Russia and Norway over the outlook.

Last year saw a significant increase in secondary (recycled) zinc production, with global output growing by 3.8% to reach 1.7 million tonnes. This was around 12% of all refined zinc produced last year. This included 61,000 tonnes of new production in the EU (up 19% year-on-year), 39,000 tonnes in the US (up 48%) and 23,000 tonnes in Japan (up 29%).

Refined output from secondary sources is projected to lift by an average of 1.2% a year over the outlook period, to reach 1.8 million tonnes in 2027.

14.4 Prices

High prices in 2021 and early 2022 reflect global supply-demand mismatch

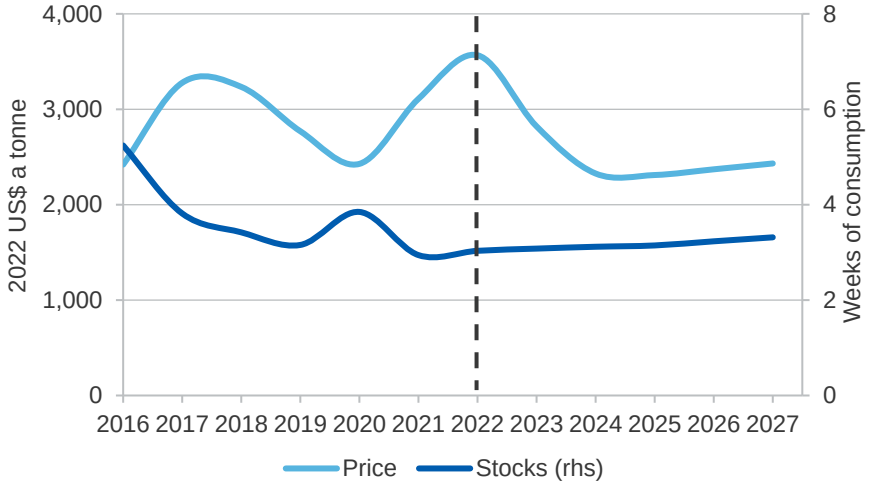
Zinc prices averaged around US$3,100 a tonne in 2021 — an increase of more than 30% compared with 2020. This reflects disrupted supply from a number of major zinc mines due to the COVID-19 pandemic, as well as impacts to refined production due to energy supply issues in both China and Europe. Weakened supply has also come in the midst of quickly-recovering global consumption, as construction activity and new infrastructure investment rebounded from the pandemic.

Price increases have been particularly acute in the second half of the year, following cuts to production of refined zinc, as rising power costs have impacted major refining countries (Figure 14.4). Power rationing — in both Europe and China in the September quarter — saw LME spot prices hit decade highs of close to US$3,800 a tonne in October. This led to the Chinese Government releasing 100,000 tonnes from its strategic reserves over the period in an attempt to ease pressure on prices.

Global inventories have fallen at the end of 2021 to just 232,000 tonnes, or 6 days' worth of global consumption. This follows disruptions to European smelter production — due to recent high energy prices and the current Russian invasion of Ukraine — creating a drawdown in LME stocks (see *LNG* chapter). And while the China's post-New Year inventory build has been underway through the March quarter 2022, continued outbreaks of the Omicron variant, and ongoing pollution curbs are suggesting the build is likely to be lower than recent years.

The LME zinc spot price is forecast to average around US$3,600 a tonne in 2022. Ongoing supply disruptions — such as power shortages at zinc smelters in China, high power prices in Europe, and the current Russian invasion of Ukraine — are expected to prolong elevated prices through much of 2022. Over the outlook, the continued recovery in mine supply and growing refined capacity is expected to see prices fall by around 4.0% annually, to reach US$2,400 a tonne (in real terms) by 2027.

Figure 14.4: Zinc prices and stocks



Source: London Metal Exchange (2022); Department of Industry, Science, Energy and Resources (2022).

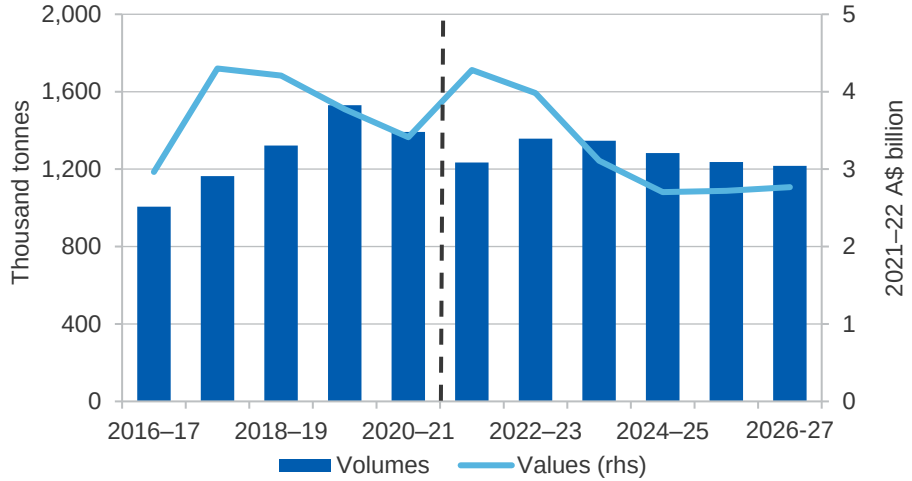
Australia

Export earnings to peak in 2021–22 before new supply lowers prices

Australia's zinc export earnings (for both concentrate and refined metal) are forecast to increase from $3.4 billion in 2020–21 to around $4.3 billion in 2021–22 (in real terms). This primarily reflects the considerable strength in prices seen in recent months, and that are expected to persist through 2022. Easing prices are then forecast to see earnings decrease to $4.0 billion in 2022–23.

Over the outlook, Australia's export earnings are projected to ease to around $2.8 billion in 2026–27, as consumption returns to lower, longer-run levels, and new mine and refined production comes online.

Figure 14.5: Australia's zinc exports, metallic content



Source: ABS (2022) International Trade in Goods and Services, 5368.0; Wood Mackenzie (2022); Department of Industry, Science, Energy and Resources (2022).

Australia's mine production stages recovery in 2021

Australia's mined zinc output is estimated to have risen 1.0% year-on-year in 2021 to reach 1.33 million tonnes. However, this remained close to 0.7% lower than total mine production in 2019.

Glencore's Australian production (including its Mt Isa operation in Queensland and McArthur River operation in the Northern Territory) produced just over 609,000 tonnes in 2021, a 4% fall from previous year. This largely reflected increased production from ore stockpile drawdowns — rather than newly mined supply — at its Mount Isa operation.

Output from MMG's Dugald River in Queensland increased by 1.0% year-on-year to reach 180,000 tonnes in 2021. This reflects a strong recovery in the second half of the year, following technical issues and planned maintenance in the June quarter 2021.

Production at New Century's Century Tailings Reprocessing in Queensland was more than 121,000 tonnes in 2021, around 5.5% lower than the previous year. This reflects a lower-than-expected September quarter 2021 (down 14% year-on-year) due to a ball mill bypass experienced during the quarter.

2021 production at South32's Cannington operation in Queensland increased by around 8.4% year-on-year to reach close to 70,000 tonnes in 2021. Cannington's 2021–22 production guidance has been raised by 5%, to 66,700 tonnes.

Refinery and concentrate exports declined

Australia's refined zinc exports decreased by 23% year-on-year in 2021, to around 990,000 tonnes. Australia's concentrate exports to China decreased by 5.7% year-on-year for the period to reach $385 million, as trade stabilised after the normalising of concentrate imports from Peru to China in the first half of the year.

Australia's mine production is expected to increase

Australia's production is expected to see solid growth to 2023, with zinc mine output expected to increase from 1.33 million tonnes in 2020–21 to 1.45 million tonnes in 2022–23 (Figure 14.5). This rise will be driven by increased production from the McArthur River operation in the Northern Territory, Golden Grove operation in Western Australia, and Century mine in Queensland.

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.

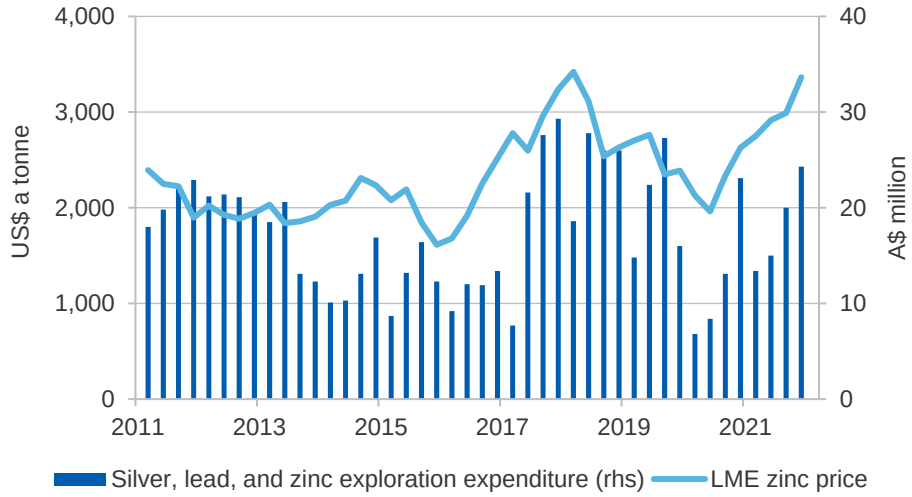
New Century believes hard rock resources have the potential to increase mine life to 2030 and are mostly contained on the existing mining lease. Century Zinc earlier reported positive results to their feasibility study of potential operations at Silver King and East Fault Block. The company is targeting 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.

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 significantly in 2021

Exploration expenditure for silver, lead and zinc increased by 22% quarter-on-quarter for the December 2021 quarter. This was also 5.2% higher than the same period in 2020 (Figure 14.6). For the calendar year 2021, exploration expenditure for these minerals was close to $73 million, more than 40% higher than the previous year. This increase in exploration is likely related to ongoing zinc price appreciation, and is expected to see ongoing strength in exploration in 2022.

Figure 14.3: Quarterly exploration expenditure and zinc price



Source: ABS (2022) Mineral and Petroleum Exploration, Australia, 8412.0; Company reports; Department of Industry, Science, Energy and Resources (2022).

Revisions to the outlook

Forecast export earnings for 2021–22 have been revised upward by 4.7% from the December 2021 *Resources and Energy Quarterly* to $4.3 billion in this edition. This reflects stronger prices seen over the second half of 2021, now expected to persist through 2022. This has also resulted in an upward revision to forecast Australian export earnings for 2022–23, which increased by around 16% to $4.1 billion.

Compared with the March 2021 *Resources and Energy Quarterly*, forecast Australian earnings in 2025–26 (in real terms) have been revised down by 23% to $2.7 billion. This reflects a downward revision in projected export volumes over the outlook period.

Table 14.1: Zinc outlook

World	Unit	2021	2022[f]	2023[f]	2024[z]	2025[z]	2026[z]	2027[z]	CAGR[r]
Production									
– mine	kt	12,901	13,053	13,487	13,758	14,036	14,014	14,017	1.4
– refined	kt	13,905	14,154	14,589	14,868	15,155	15,155	15,178	1.5
Consumption	kt	14,049	14,338	14,618	14,895	15,180	15,180	15,204	1.3
Closing stocks	kt	793	834	863	891	916	941	967	3.4
– weeks of consumption		2.9	3.0	3.1	3.1	3.1	3.2	3.3	2.0
Price									
– nominal	US$/t	3,005	3,566	2,896	2,451	2,495	2,619	2,750	-1.5
	USc/lb	136	162	131	111	113	119	125	-1.5
– real [a]	US$/t	3,109	3,566	2,821	2,327	2,311	2,371	2,432	-4.0
	USc/lb	141	162	128	106	105	108	110	-4.0
Australia	**Unit**	**2020–21[f]**	**2021–22[f]**	**2022–23[f]**	**2023–24[z]**	**2024–25[z]**	**2025–26[z]**	**2026–27[z]**	**CAGR[r]**
Mine output	kt	1,335	1,356	1,449	1,439	1,355	1,309	1,289	-0.6
Refined output	kt	461	493	506	506	506	506	506	1.6
Export volume									
– ore and concentrate [b]	kt	2,118	2,049	2,156	2,134	1,994	1,892	1,850	-2.2
– refined	kt	408	296	372	371	371	371	371	-1.6
– total metallic content	kt	1,392	1,234	1,357	1,347	1,283	1,236	1,217	-2.2
Export value									
– nominal	A$m	3,301	4,280	4,107	3,292	2,935	3,027	3,157	-0.7
– real [c]	A$m	3,413	4,280	3,982	3,109	2,703	2,720	2,768	-3.4

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; **r** Compound annual growth rate; **s** estimate; **z** Projection
Source: ABS (2022) International Trade in Goods and Services, Australia, Cat. No. 5368.0; Company reports; Department of Industry, Science, Energy and Resources (2022); International Lead Zinc Study Group (2022); Wood Mackenzie (2022); LME (2022).