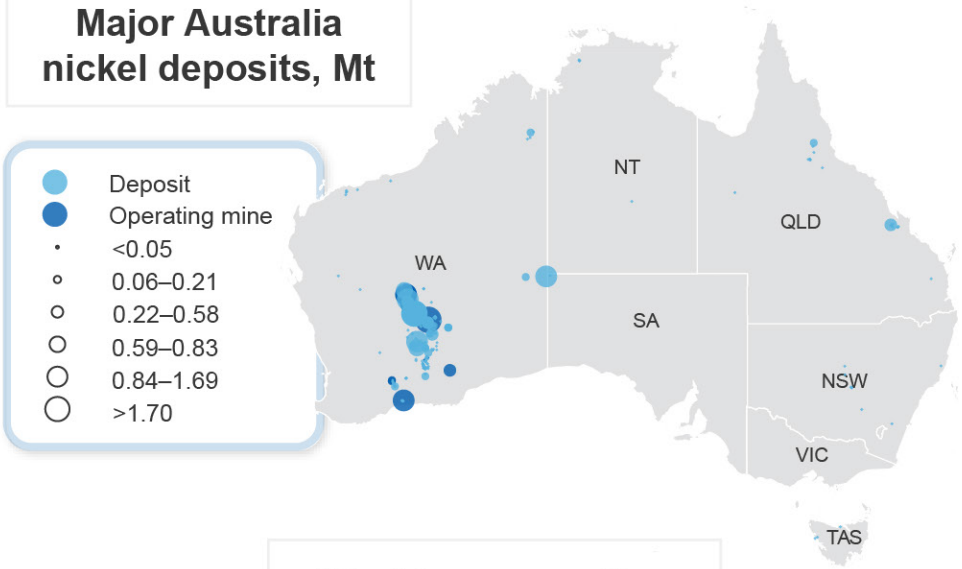
28 Ni 58.693 Nickel

Major Australia nickel deposits, Mt



Nickel facts

- Nickel is used in the **US, UK and Euro coins**
- Nickel has a growing role in **electric vehicle batteries**
- Nickel is magnetic at room temperature and is **fully recyclable**
- Nickel is the second most **abundant element** in the Earth's core after iron

World consumption

- **70%** Stainless steel
- **8%** Alloys
- **8%** Plating
- **8%** Casting
- **5%** Batteries
- **1%** Other

Australia's nickel

- **22%** of world **nickel resources**
- **200,000 tonnes** **typically produced** over a year
- **$7.5 billion** contributed to the **economy** last year

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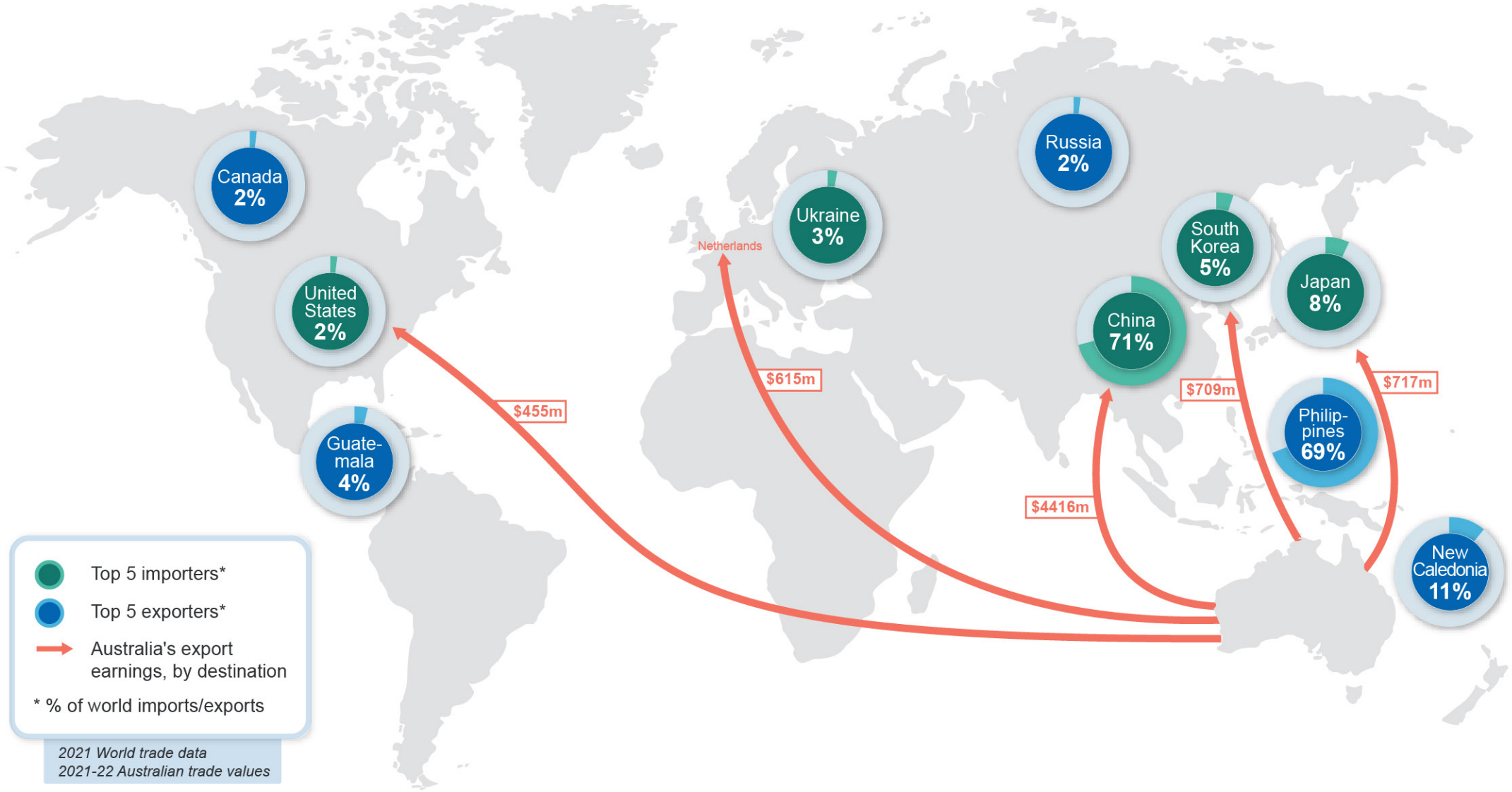
Trade map | September 2022



13.1 Summary

- Nickel prices are expected to average US$24,900 a tonne in 2022, boosted by the fallout from the Russian invasion of Ukraine. Prices are expected to ease over the outlook period, as a result of increased Indonesian production and improving liquidity in the LME nickel market.
- Recent high prices have boosted Australia's nickel export earnings, which reached $4.4 billion in 2021–22. Export earnings are forecast to rise to $5.1 billion in 2022–23, before easing to $4.6 billion in 2023–24.
- Australia's export volumes are estimated to rise from 157,000 tonnes in 2021–22 to 202,000 tonnes in 2023–24, supported by the need for Australian nickel for the transition to low-emissions technologies.

13.2 World consumption

Soft economic conditions create a short term drag on nickel demand

Global headwinds and a price spike have seen nickel consumption weaken over the past year. In the June quarter 2022, global nickel consumption rose 0.8% on the March quarter, but was 3.8% lower than in the June quarter 2021. Chinese consumption fell 5.9% year-on-year, with European consumption also falling 5.0% year-on-year.

Global nickel consumption is expected to exhibit stronger growth over the rest of the outlook period. This is largely due to its use in stainless steel for consumer white goods, dwellings and infrastructure, as well as its use in batteries — as electric vehicles (EV) gain popularity.

Nickel demand is forecast to be 3.3% higher year-on-year, at almost 2.9 million tonnes in 2022. Nickel consumption is subsequently expected to grow strongly over the next two years, increasing by 5.3% in 2023 and by 4.2% in 2024, when consumption will be 3.0 million tonnes and 3.1 million tonnes, respectively.

Stainless production contracts in major economies

Global nickel consumption saw strong growth in 2021, as the world recovered from the economic effects of COVID-19 — with a large focus on infrastructure spending to stimulate the economy.

However, stainless steel production has hit hurdles in recent months. Chinese stainless steel production undershot production guidance by around 100,000 tonnes in June, leaving national output around 10% lower than in May. In 2022, Chinese stainless output is expected to fall by 2% from 2021 levels.

US and European stainless steel production are also expected to be weak in 2022, with annual stainless steel production likely to be around 3% and 5% lower than 2021 production, respectively.

Meanwhile, Indonesia continues to ramp up stainless steel production, with growth in stainless steel expected to be around 4% this year, before surging by 27% in 2023. With most of Indonesian production being exported to China, downside production risks start to emerge if weakness in the Chinese economy extends into next year.

EV sales accelerating, but race against LFP is present

Sales of EVs hit 6.8 million units in 2021 — more than double the number of sales in the previous year. This growth is set to continue, with EV sales forecast to grow to 11 million units in 2022. Nickel use in batteries is expected to grow 33% this year as a result.

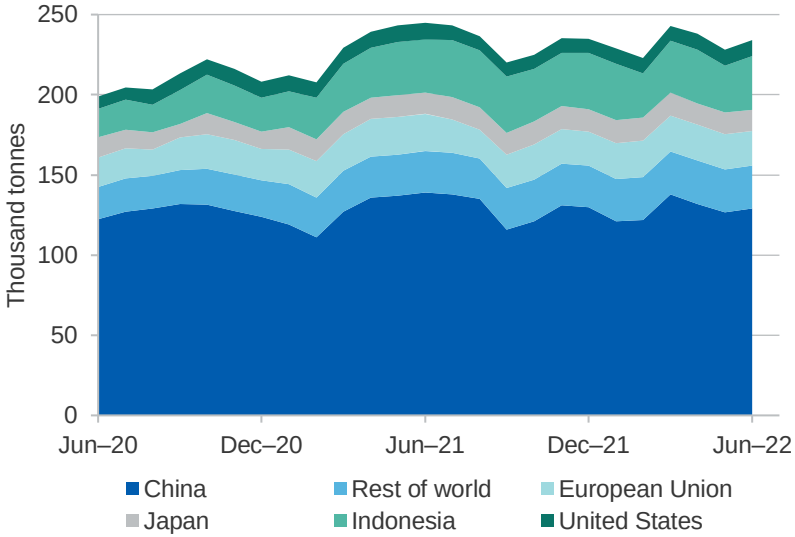
However, lithium iron phosphate (LFP) batteries are starting to emerge as a strong contender to nickel-based battery technology. While nickel-based chemistries provide higher energy density, LFP batteries are cheaper, less prone to thermal runaway and often have a longer shelf life. Further, the resources needed to produce the battery are much more readily available than nickel.

So far, LFP batteries have largely been limited to Chinese automotive manufacturers, with Western manufacturers preferring nickel-based batteries. Given that China accounts for the majority of EV sales growth, combined with the fact that 60% of Chinese EVs are sold with an LFP battery, nickel consumption in batteries will likely grow more slowly than total EV sales.

However, more manufacturers outside of China are gaining exposure to LFP battery technology. In July, Ford announced a major supply deal with China's Contemporary Amperex Technology Co. Limited (CATL) for use in some of its Mustang Mach-E (2023) and F-150 Lightning (2024) vehicles. Further, CATL has announced its new LFP/LMFP battery improves energy density by 15% over traditional LFP batteries, while being comparable on cost.

In the near term (over the outlook period), such announcements are unlikely to dampen forecast demand for nickel, given the dominance of nickel-based technologies and the consistent upward revisions of EV sales.

Figure 13.1: Composition of world nickel consumption



Source: International Nickel Study Group (INSG); Wood Mackenzie; Department of Industry, Science and Resources (2022)

13.3 World production

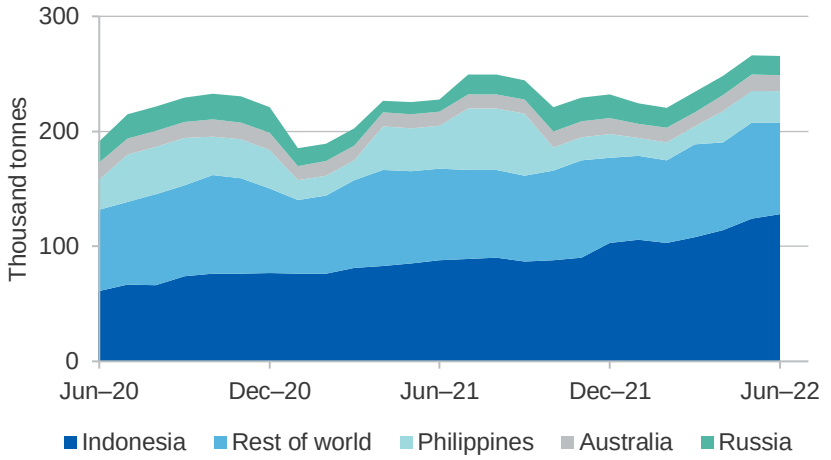
Indonesia extends its lead in mine production

Global mined production of nickel has continued to surge, with June quarter 2022 production up by 15% year-on-year. Global mine production is expected to reach 3.0 million tonnes in 2022, and is forecast to grow further to 3.4 million tonnes in 2024.

Indonesian mined production increased to 1.0 million tonnes in 2021, up by over one third from the previous year (Figure 13.2). Indonesian mined production has continued its steep upward trajectory so far in 2022: first half production is up 40% year-on-year compared to the first half of 2021.

Canadian mined nickel output showed signs of improvement after several disappointing quarters, with June quarter 2022 production recording a quarter-on-quarter growth of 34%. New Caledonia also showed strong quarter-on-quarter growth (of 16%) in the June quarter 2022.

Figure 13.2: Composition of world mined nickel production



Source: International Nickel Study Group; Department of Industry, Science and Resources (2022)

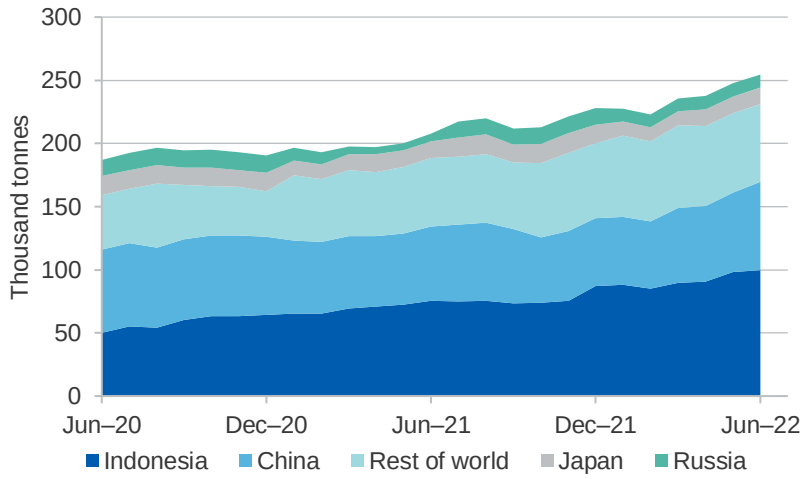
Indonesia continues growth in refined production

As with mined nickel, Indonesia is leading the way in terms of refined production growth (Figure 13.3). Production of primary nickel in Indonesia grew by 32% in the first half of the year, while production of nickel intermediates grew by 150%. This growth has been supported by a total of 40 additional furnaces being brought online since the start of the year, with another 37 furnaces planned in the second half of 2022.

While nickel pig iron still accounts for the lion's share of production, there has been considerable growth in mixed hydroxide precipitate (MHP) and nickel matte output. Most MHP and matte is being shipped to China and South Korea, where it is refined into nickel sulphate for use in batteries. MHP now accounts for 40% of the nickel used to make nickel sulphate for batteries, which is expected to rise to close to 50% by the end of the outlook period.

Indonesian refined output is expected to ramp up to about 1.1 million tonnes in 2022, and is forecast to grow to about 1.4 million tonnes in 2024.

Figure 13.3: Composition of world refined nickel production



Source: International Nickel Study Group; Department of Industry, Science and Resources (2022)

Global refined nickel production will grow as a result, increasing 11% year-on-year to 2.9 million tonnes in 2022. Refined nickel production is expected to grow by 8.8% in 2023 and 7.7% in 2024, when it is forecast to reach 3.4 million tonnes. However, with growth heavily dependent on growth in Indonesian supply, risks are skewed to the downside. Firstly, there are reports of supply infrastructure bottlenecks emerging for nickel ores. Secondly, since Indonesian nickel output largely serves the Chinese market, lower end-use demand (due to new COVID-19 outbreaks) could induce producers to ease back on planned supply growth.

13.4 Prices

Prices fall, but remain above 2021 levels. How low can nickel go?

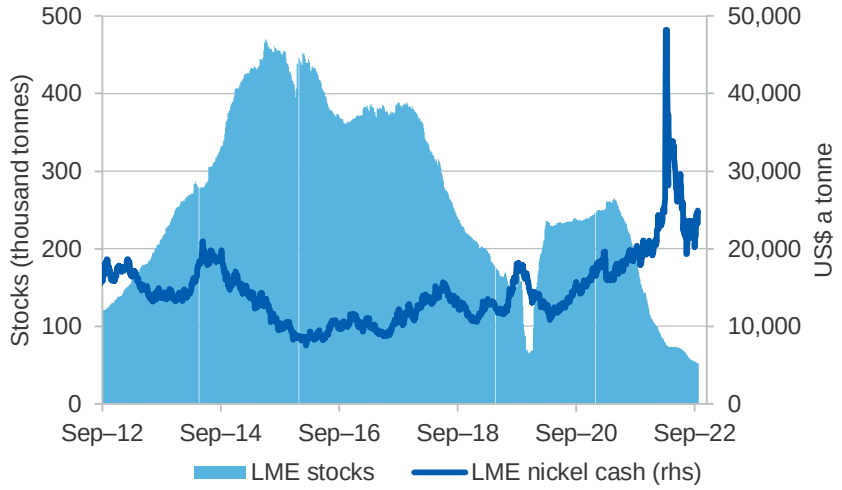
In the June quarter 2022, prices fluctuated between a high of almost US$34,000 a tonne (on 21 April) and a low of less than US$23,000 a tonne (on 30 June), averaging US$28,867 a tonne. Despite briefly dipping below US$20,000 a tonne, prices appear to have stabilised somewhat, averaging around US$22,000 a tonne in recent months.

There are several convincing reasons to think that nickel prices will come down much further. First, a hard landing in the global economy remains a significant risk; surging energy prices and tighter monetary conditions in many economies are affecting investment and spending, compounded by soft Chinese growth (resulting from ongoing lockdowns and a depressed property sector). Second, while MHP and nickel matte are not deliverable on the LME, users of first class nickel could be tempted to switch to these products if the price is right.

However, there are several factors which may support prices from falling further. First, it is possible that sanctions on Russian nickel exports might be applied if the Russia-Ukraine conflict worsens. Second, the LME market remains relatively illiquid, after LME Open Interest fell following the short squeeze event. Third, LME stocks remain at historically low levels. And fourth, global energy prices remain extremely high, placing cost pressures on metal refiners/smelters.

Near term price forecasts are relatively unchanged from the June 2022 REQ forecasts. However, prices in late 2023 and into 2024 have been revised down slightly, to account for surging Indonesian supply. This takes the price forecasts to US$21,250 a tonne on average in 2023, and US$20,250 a tonne in 2024.

Figure 13.4 Nickel spot price and stock at exchanges



Source: Bloomberg (2022); Department of Industry, Science and Resources (2022)

13.5 Australia

Export earnings to grow as production increases

Export earnings grew to $4.4 billion in 2021–22 — a rise of 37% year-on-year (Figure 13.5) — thanks to significantly higher prices for nickel exports. Export earnings will grow further — to around $5.1 billion in 2022–23 — as higher production benefits export volumes, before falling back to $4.6 billion as prices ease in 2023–24.

Export volumes are set to increase, from around 157,000 tonnes in 2021–22 to surpass 200,000 tonnes in 2023–24.

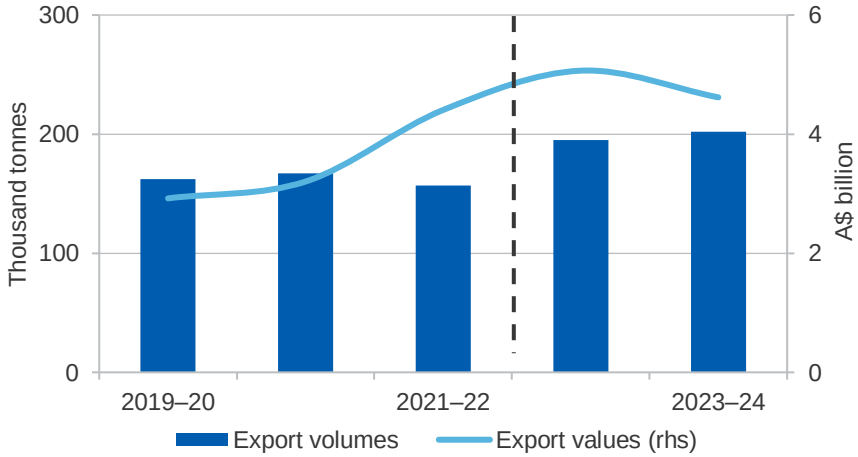
Australia's production set to expand as new production comes online

Australia's mined nickel production fell modestly in 2021–22, as COVID-19 absenteeism, workforce shortages and planned maintenance affected mine outputs. Total output for 2021–22 was 154,000 tonnes, or 4.9% less than the previous year's output.

These issues should resolve over 2022–23, and mine output is forecast to increase sharply as a result. Mine output is forecast at 204,000 tonnes in 2022–23 (+33% year on year) and 228,000 tonnes in 2023–24 (+12% year on year).

Mallee Resources has commenced ore stockpiling from its recently acquired Avebury mine in Tasmania. After being dormant for 13 years, the mine restart has ore throughput capacity of 900,000 tonnes a year when complete, at an expected ore grade of 1.0% nickel. While outside of the outlook horizon, Oz Minerals has made a final investment decision on its West Musgrave copper-nickel project. Targeting concentrate production from 2025, it will add 35,000 tonnes of nickel a year to Australia's nickel production.

Figure 13.5: Australia's exports to grow over the outlook period



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

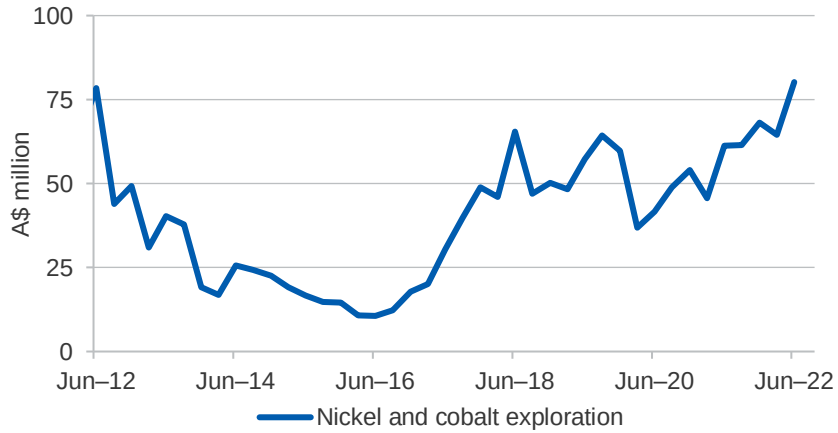
Australia's refined output is forecast to be steady over the outlook period, at 105,000 tonnes in both 2022–23 and 2023–24. However, increases in refined nickel production may occur if nickel prices are higher than expected over the outlook period.

Exploration expenditure hits 14 year high

Compared to the June quarter 2021, nickel and cobalt exploration expenditure increased 31% to $80 million in the June quarter 2022 (Figure 13.6). This is the highest exploration expenditure since the September quarter of 2008.

Looking forward, BHP has committed to increasing its exploration expenditure at its Nickel West facility. Exploration expenditure at Nickel West is expected to hit its highest level since 2005, to take advantage of current high prices driven by concerns over Russian supply.

Figure 13.6: Nickel and cobalt exploration still strong



Source: Source: ABS (2022) International Trade in Goods and Services, 5368.0

Revisions to the outlook

The Office of the Chief Economist has recently revised its nickel export methodology. The previous methodology referenced international trade data sources, due to the lack of availability of Australian refined and intermediate nickel export data. In recent years, the gap between international trade data sources and domestic production data sources has increased significantly. Consequently, the methodology for estimating nickel exports has been revised to match domestic production levels.

As a result, historical export volumes and earnings estimates have been revised down. In 2021–22, the downward revision was 102,000 tonnes and $2.3 billion. Forecasts for the outlook period have also been revised down by $2.3 billion in 2022–23 and $2.1 billion in 2023–24.

Table 13.1: Nickel outlook

World	Unit	2021	2022[s]	2023[f]	2024[f]	Annual percentage change 2022[s]	2023[f]	2024[f]
Production								
– mine	kt	2,683	3,057	3,283	3,430	13.9	7.4	4.5
– refined	kt	2,606	2,901	3,157	3,401	11.3	8.8	7.7
Consumption	kt	2,772	2,862	3,013	3,138	3.3	5.3	4.2
Closing stocks	kt	591	631	774	1,037	6.6	22.8	34.0
– weeks of consumption		11.1	11.5	13.4	17.2	3.0	16.6	28.6
Prices LME								
– nominal	US$/t	18,468	24,883	21,250	20,250	34.7	-14.6	-4.7
	USc/lb	838	1 129	964	919	34.7	-14.6	-4.7
– real [b]	US$/t	19,891	24,883	20,621	19,217	25.1	-17.1	-6.8
	USc/lb	902	1 129	935	872	25.1	-17.1	-6.8
Australia	**Unit**	**2020–21**	**2021–22**	**2022–23[f]**	**2023–24[f]**	**2021–22**	**2022–23[f]**	**2023–24[f]**
Production								
– mine [c]	kt	162	154	204	228	-4.8	33	12
– refined	kt	105	98	105	105	-6.5	6.6	0.0
– intermediate		29	31	29	29	7.5	-7.4	-0.6
Export volume [dg]	kt	167	157	195	202	-6	25	3.5
Export value[g]								
– nominal value	A$m	3,204	4,406	5,066	4,618	37	15	-8.8
– real value [e]	A$m	3,581	4,715	5,066	4,431	32	7.4	-13

Notes: **b** In 2022 calendar year US dollars; **c** Nickel content of domestic mine production; **d** Includes metal content of ores and concentrates, intermediate products and nickel metal; **e** In 2022–23 financial year Australian dollars; **f** Forecast; **g** OCE estimates based on publicly available data.

Source: ABS (2022) International Trade, 5465.0; LME (2022) spot price; World Bureau of Metal Statistics (2022); Company reports; Department of Industry, Science and Resources (2022).