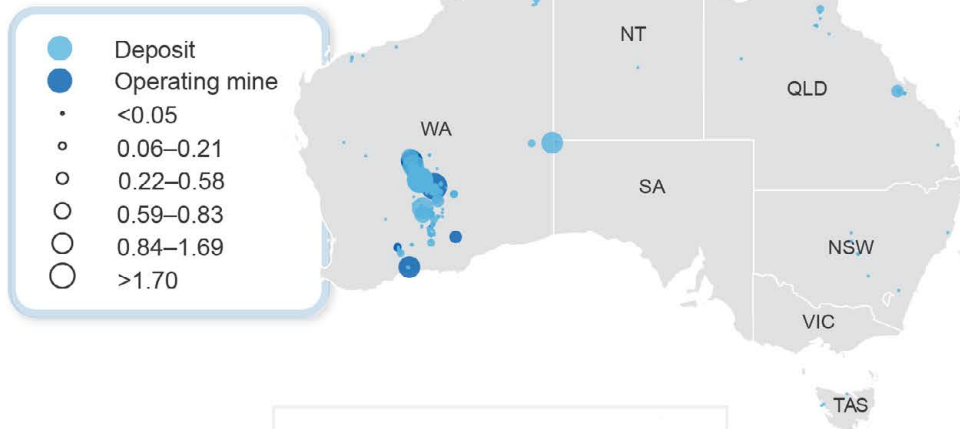
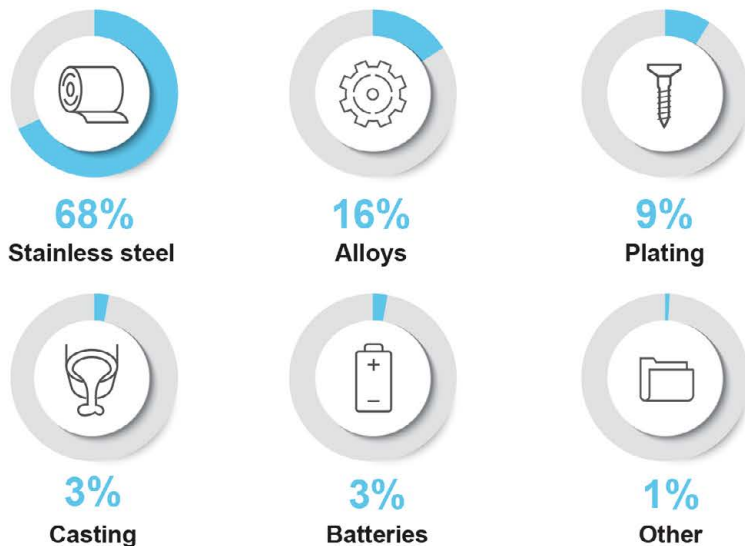


Nickel

Major Australia nickel deposits (Mt)



World consumption



Nickel facts



Nickel is used in the **US, UK and Euro coins**



A 2019 Tesla model S contains **75kg of nickel**



Name comes from German word '**kupfernickel**' which means 'devil's copper'



Nickel is the **second most abundant element** in the Earth's core after iron

Australia's nickel



13.1 Summary

- Strong nickel consumption is expected to support price rises over the outlook period. After averaging US\$14,200 a tonne in 2019, nickel prices are forecast to average US\$15,300 a tonne in 2020 and US\$15,800 a tonne in 2025 (in real terms).
- New projects and expansions are expected to lift Australia’s export volumes from 225,000 tonnes in 2018–19 to a projected 436,000 tonnes in 2024–25.
- Export earnings are expected to strengthen with higher prices and growing volumes. Australia’s export earnings are projected to reach \$6.6 billion in 2024–25, up from \$3.7 billion in 2018–19 (in real terms).

13.2 Prices

Market disruptions expected to support prices

After significant volatility in 2019, nickel prices are expected to be relatively stable in 2020. In 2019, the negative impacts of US-China trade tensions and lower stainless steel production in China were outweighed by Indonesia’s announcement of a ban on exports of nickel ore. Despite a steep fall in stocks, the price rose to over US\$18,000 a tonne in September before falling back sharply (Figure 13.1). More recently, the impacts of COVID-19 have weighed on nickel prices.

Going forward, the nickel market is expected to be characterised by a growing market deficit; as Indonesia’s export ban restricts world production amid healthy consumption growth. In 2020, the nickel price is forecast to average US\$15,300 a tonne, up 7.7 per cent on the real price of US\$14,200 a tonne in 2019.

Medium term price growth dependant on existing and new battery demand

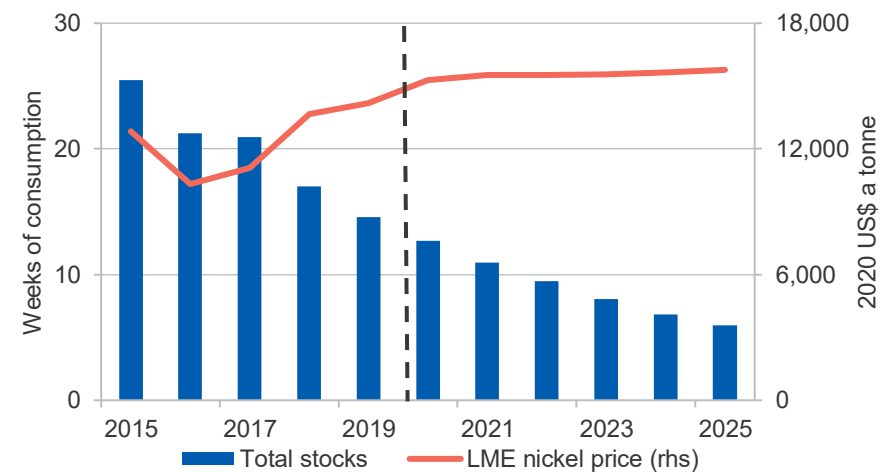
Nickel consumption is expected to drive price growth over the forecast period. Solid demand for stainless steel will likely continue, with growing momentum in nickel consumption for battery manufacturing. Nickel prices are projected to increase by an average 1.8 per cent year to reach US\$15,800 a tonne in 2025, in real terms (Figure 13.2).

Figure 13.1: Recent nickel prices and LME stock level trends



Source: Bloomberg (2020), London Metal Exchange (2020)

Figure 13.2: Projected nickel spot prices and stock levels



Notes: Total stocks include warehouse and privately held stocks.

Source: Bloomberg (2020) London Metal Exchange (2020); S&P Platts Global (2020), Department of Industry, Science, Energy and Resources (2020)

13.3 World consumption

Strong consumption growth supported by stainless steel production

Supported by ongoing stainless steel production, nickel consumption is expected to rise steadily over the outlook period, growing from 2.4 million tonnes in 2019 to a projected 2.8 million tonnes by 2025. The projected rate of consumption growth, at around 2.2 per cent a year, is lower than in recent years, reflecting a slowdown in growth in Chinese and world GDP growth. Higher nickel prices may also weigh on consumption growth.

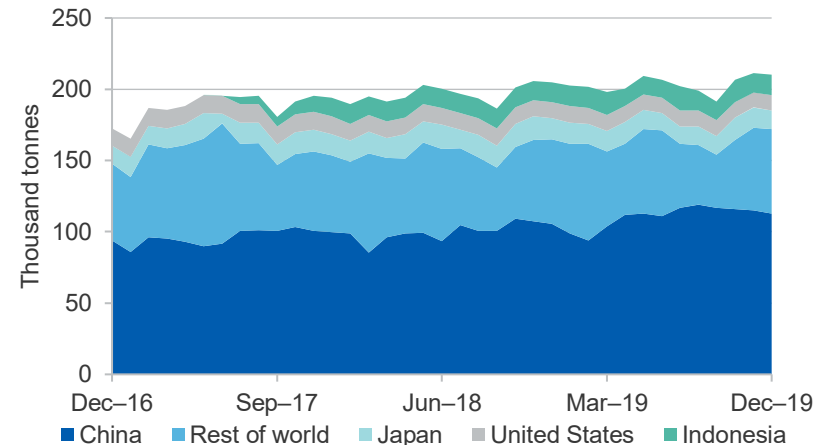
China drives consumption growth

Higher usage in China is expected to account for most of the growth in nickel consumption over the outlook period. China currently accounts for just over half of world consumption, which is expected to continue to grow, driven by rising stainless steel production and growing battery manufacturing (Figure 13.3). However, in the short-term there are challenges imposed by the impacts of the COVID-19 outbreak and the Indonesian export ban. Reduced industrial activity in February and March are expected to weigh on 2020 consumption, which may be partially offset by Chinese government stimulus. China's nickel pig iron processing is heavily reliant on imports of Indonesian nickel ore, which may be constrained by Indonesian export restrictions introduced in January 2020. Imports may be substituted with imports from the Philippines, China's existing stocks or more expensive 'class 1' nickel.

Nickel's growing role in battery manufacturing

The use of nickel in battery manufacturing is expected to expand over the outlook period, as both the scale of battery manufacturing expands and the nickel intensity of battery technologies rises. Technological advances are facilitating the manufacture of batteries with a higher amount of nickel, which is favoured for its efficiency, longevity and cost-effectiveness. The share of nickel used in battery manufacturing currently accounts for about 4 per cent of nickel usage. Growth in battery manufacturing is dependent on the trajectory of electric vehicle sales, which slowed in 2019 (with the removal of subsidies in China), but recovered towards the end of the year.

Figure 13.3: Refined nickel consumption by major country



Source: International Nickel Study Group (2019), Department of Industry, Science, Energy and Resources (2019)

13.4 World production

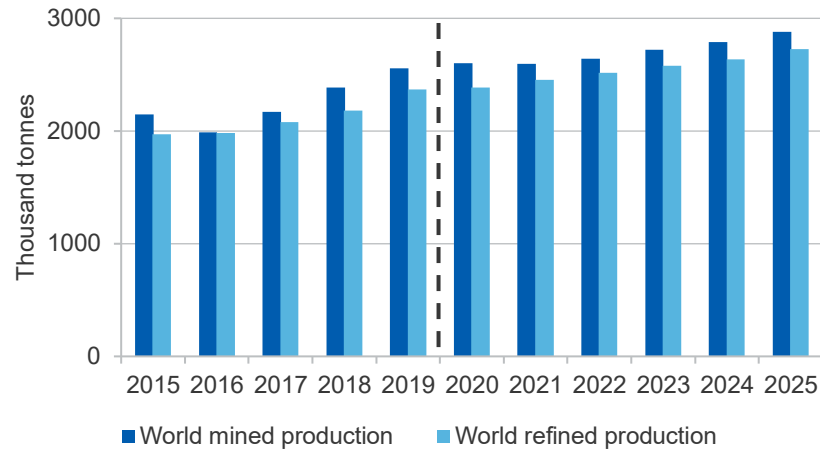
Healthy production growth in 2019

Nickel mine production grew rapidly for the third successive year in 2019, growing 7.3 per cent to reach 2.6 million tonnes (Figure 13.4). Indonesia's mine production has continued to gain momentum, with output increasing by 40 per cent over the year to an estimated 854,000 tonnes, as a result of new projects and the export rush prior to the introduction of Indonesia's nickel ore export ban in January 2020. Indonesia now accounts for around a third of world mined production.

Mine production growth expected to continue

Mine production is expected to continue expanding over the outlook period, rising by an average 2.0 per cent a year to reach 2.9 million tonnes in 2025. However, this growth path is not expected to be linear, with production contracting in the nearer term. Higher output from China, Brazil and Australia will be offset by lower production in Indonesia, as an expected reaction to the export ban in the short-term.

Figure 13.4: World nickel production



Source: International Nickel Study Group (2020), Department of Industry, Science, Energy and Resources (2020)

Refinery capacity to grow over outlook period

The outlook for refined nickel production is also positive. Growth in 2019 was significant, expanding by 8.6 per cent over the year to reach 2.4 million tonnes (Figure 13.5). Ongoing growth in refined production is expected, however at a less rapid pace.

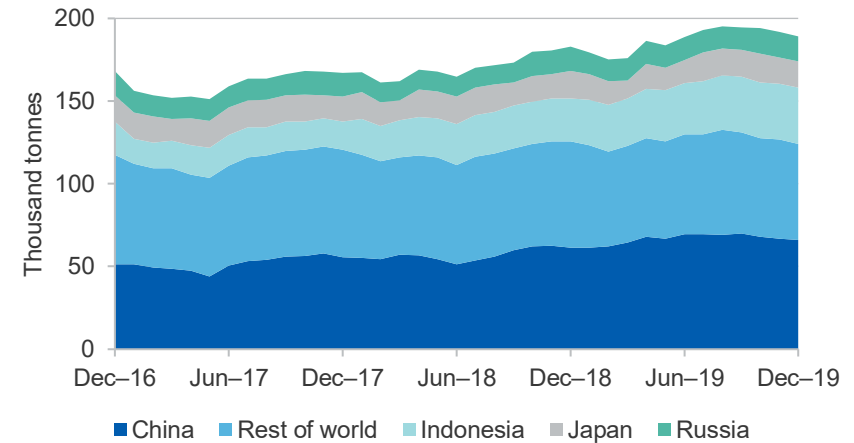
China’s refined nickel production has declined at the start of 2020, partly constrained by COVID-19 impacts. While there are no nickel pig iron plants in Hubei province, interrupted input supply-chains have disrupted production. As such, world refined production is forecast to be broadly stagnant in 2020 at 2.4 million tonnes, before increasing later in the outlook period.

New refining capacity in China, as well as expected investment in Indonesia, are likely to come online over the outlook period, provided short-term delays due to COVID-19 are overcome.

Refined production is projected to grow an average 2.4 per cent over the outlook period to reach 2.7 million tonnes in 2025. Indonesia currently

accounts for around 16 per cent of world refinery production, which is expected to expand with energised motivation under the recently introduced ban on ore exports, which increases the availability of nickel ore and incentivises investment in downstream refining capacity.

Figure 13.5: Refined nickel production by major country



Source: International Nickel Study Group (2020), Department of Industry, Science, Energy and Resources (2020)

13.5 Australia

Strong prices and growing output expected to boost export earnings

Nickel export earnings are expected to grow significantly over the outlook period, bolstered by stronger nickel prices and investment in new capacity.

In 2019–20, export earnings are forecast to be \$5.4 billion, 46 per cent higher than 2018–19 real export earnings of \$3.7 billion (Figure 13.6). This momentum is expected to continue over the outlook period, with real export earnings growing just over 10 per cent a year to reach a projected \$6.6 billion by 2024–25. While stronger prices are a significant driver behind this growth, export volumes are also expected to grow steadily. Export volumes are projected to reach 436,000 tonnes by 2024–25, up from 225,000 tonnes in 2018–19.

Positive market growth support expansions and restarts

Stronger nickel prices and expectations of (battery led) demand growth have stimulated investment in nickel capacity, as well as a number of potential mine restarts. Going forward, Australia's mine production is projected to lift from 161,000 tonnes in 2019–20 to 275,000 tonnes in 2024–25, growing an average 9.4 per cent a year. Investment in BHP's Nickel West projects in Western Australia, including the Yakadindie and Venus deposits, as well as parallel investment in processing at the Kwinana Refinery, is expected to support volumes growth. Panoramic Resources' Savannah mine, which restarted operations in late 2018, is expecting higher production over the outlook as ore grades improve.

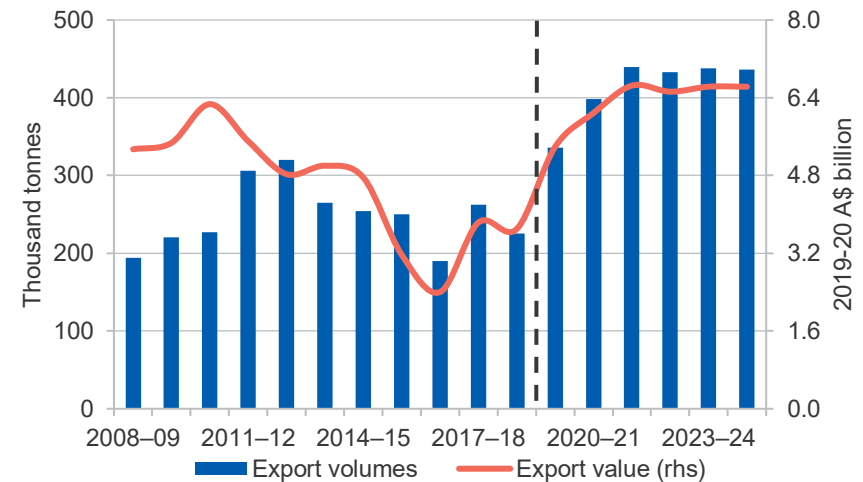
There are a number of potential restarts on the cards, including Mincor's Long and Cassini projects, First Quantum's Ravensthorpe mine and Poseidon Nickel's Black Swan project. This upside potential will be influenced by nickel prices.

In response to growing consumption of battery-grade nickel, there are a number of refinery capacity expansion plans underway. Australia's nickel sulphate capacity is expected cater to this growing demand, producing product for export to battery manufacturing facilities in China and elsewhere in Asia. With new investment in BHP's Kwinana refinery, Australia's refinery production is projected to increase from 117,000 tonnes in 2019–20 to 139,000 tonnes in 2024–25, growing an average 3.4 per cent a year. BHP have indicated the potential for further expansions at the Kwinana refinery, depending on market conditions.

Exploration expenditure

Nickel and cobalt exploration continued to increase in the December quarter, reaching \$63 million, 25 per cent higher year-on-year (Figure 13.7). Higher nickel prices and Australia's geological resource potential, as well as interest in co-products copper and cobalt, may have stimulated exploration activity.

Figure 13.6: Australia's nickel export volumes and values



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

Figure 13.7: Quarterly nickel and cobalt exploration expenditure



Source: Source: ABS (2020) Mineral and Petroleum Exploration 8412.0

Table 13.1: Nickel outlook

World	Unit	2019	2020 ^f	2021 ^f	2022 ^z	2023 ^z	2024 ^z	2025 ^z	CAGR ^r
Production									
– mine	kt	2,558	2,604	2,596	2,640	2,728	2,793	2,885	2.0
– refined	kt	2,371	2,389	2,461	2,525	2,583	2,645	2,732	2.4
Consumption	kt	2,432	2,468	2,530	2,585	2,645	2,700	2,768	2.2
Stocks									
– weeks of consumption	kt	679	600	531	471	409	353	317	-11.9
		14.5	12.6	10.9	9.5	8.0	6.8	6.0	-13.8
Price LME									
– nominal	US\$/t	13,904	15,270	15,864	16,225	16,629	17,128	17,642	4.0
	Usc/lb	631	693	720	736	754	777	800	4.0
– real ^b	US\$/t	14,203	15,270	15,538	15,529	15,557	15,666	15,776	1.8
	Usc/lb	644	693	705	704	706	711	716	1.8
Australia	Unit	2018–19	2019–20 ^f	2020–21 ^f	2021–22 ^z	2022–23 ^z	2023–24 ^z	2024–25 ^z	CAGR ^r
Production									
– mine ^{cs}	kt	161	161	228	255	268	277	275	9.4
– refined	kt	114	117	137	139	139	139	139	3.4
– intermediate		13	19	27	30	30	30	30	15.4
Export volume ^{ds}	kt	225	336	398	439	433	438	436	11.7
– nominal value ^e	\$m	3,631	5,391	6,206	6,927	6,960	7,247	7,430	12.7
– real value ^{es}	\$m	3,700	5,391	6,085	6,650	6,525	6,628	6,627	10.2

Notes: **b** In 2020 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 2019–20 financial year Australian dollars; **f** Forecast, **r** Compound annual growth rate from 2019 to 2025, and 2018–19 to 2024–25, **z** Projection.

Source: ABS (2020) International Trade in Goods and Services, Australia, Cat. No. 5368.0; Company reports; Department of Industry, Science, Resources and Energy; International Nickel Study Group (2020); LME (2020); World Bureau of Metal Statistics (2020)