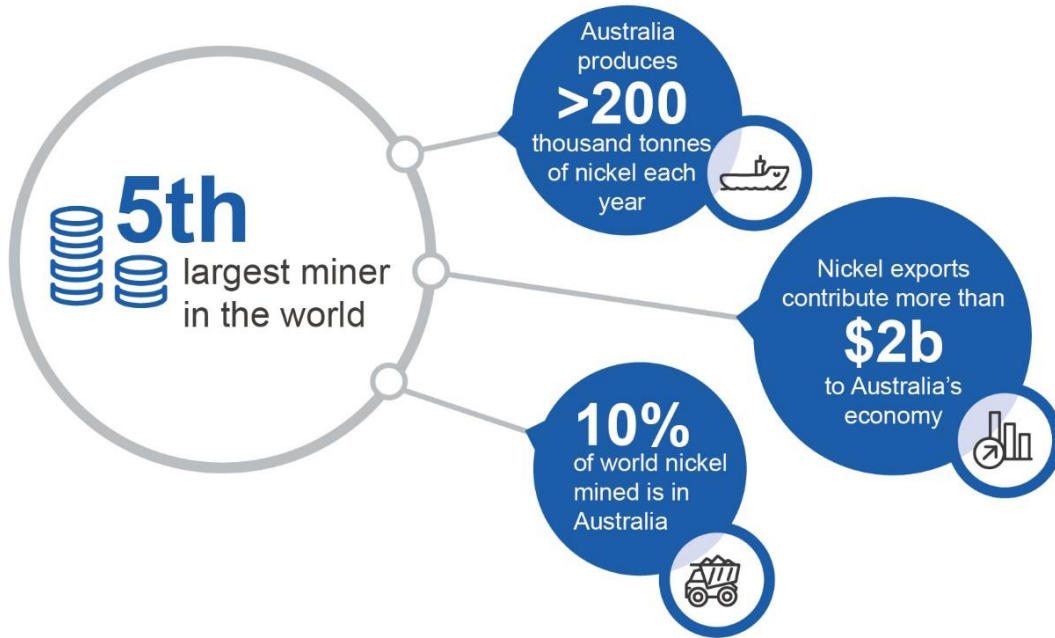


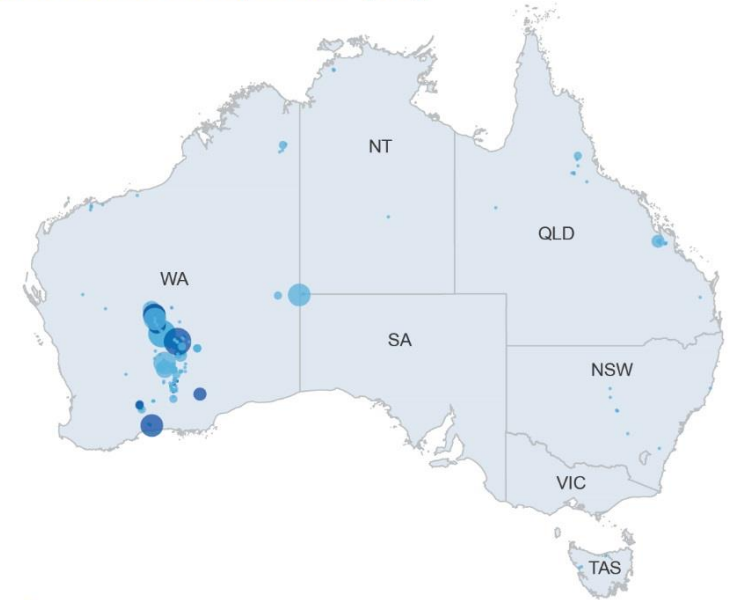
Nickel

Resources and Energy Quarterly December 2017



Major Australian nickel deposits (Mt)

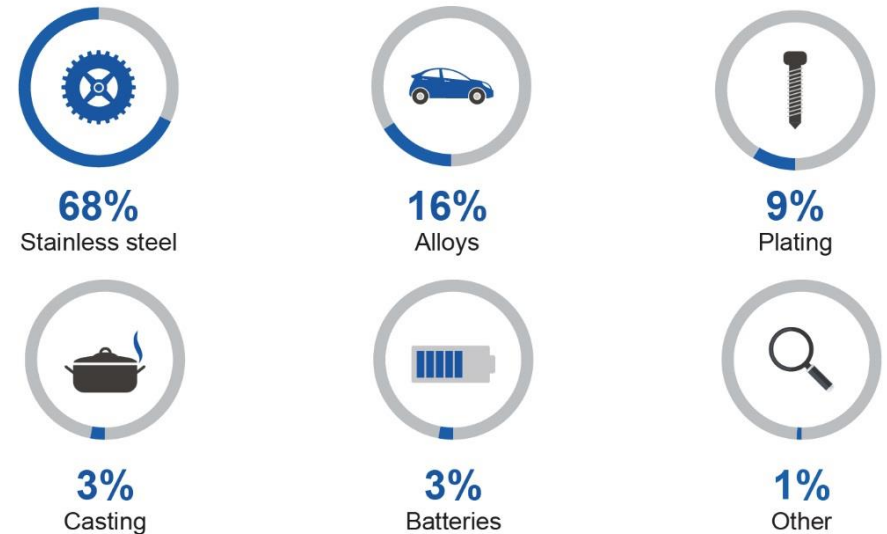
- <0.05
- 0.06–0.21
- 0.22–0.58
- 0.59–0.83
- 0.84–1.69
- >1.70
- Deposit
- Operating mine



Key nickel consumer markets (tonnes)



Global uses of nickel



13.1 Summary

- Global market conditions for nickel are strong, supported in the short-term by higher stainless steel production, and in the long-term by higher lithium-ion battery production.
- Australian mine production is expected to fall to 176,000 tonnes in 2017–18 before recovering slightly to 183,000 tonnes in 2018–19.
- Australia’s nickel export earnings are forecast to fall slightly to \$2.1 billion in 2017–18, before rebounding to \$2.3 billion in 2018–19.

13.2 Prices and stocks

Nickel prices are still growing from a low point in mid-2017

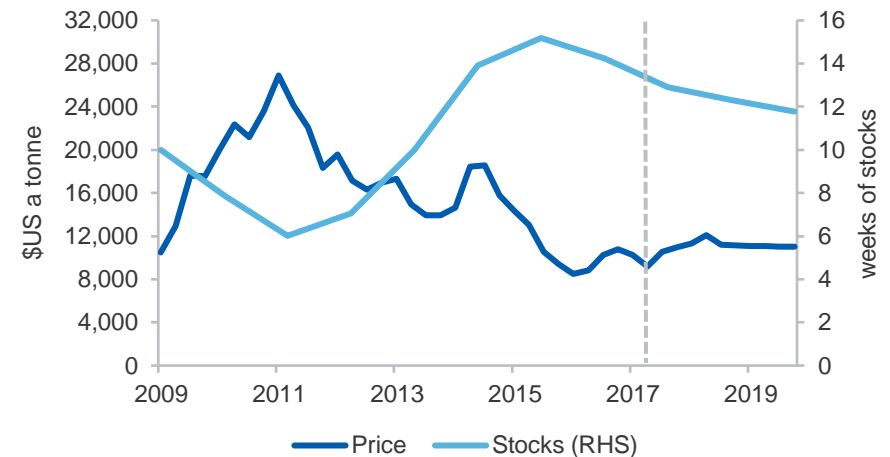
Nickel prices rose to \$US10,538 a tonne in the September quarter and are forecast to average \$US10,946 in the December quarter, with demand pressure pulling prices up until new supply enters the market. Prices are expected to lift from \$US10,200 a tonne in 2017 to just over \$US11,400 a tonne in 2018, before falling marginally in 2019.

Nickel prices have been lifted recently, as markets factor in growing demand linked to lithium-ion batteries, which include substantial amounts of nickel sulphate in their composition. It is not clear, however, that the immediate boost to prices will persist. Although sales of electric vehicles are rising sharply, at this stage, batteries still account for a small share of nickel sales, and stainless steel is still estimated to account for around two-thirds of nickel consumption over the outlook period.

Some short-term price pressure is also expected following an announcement by Vale mining that nickel output will be cut by more than 30,000 tonnes in 2018. Nickel prices rose by 2.6 per cent immediately following the announcement, though it is not yet clear whether the full set of cuts will ultimately be implemented. The company is seeking “optionality” rather than structural cuts, suggesting that production curbs may be lifted should prices continue to rise.

The outlook for nickel prices is thus relatively solid, supported in the short term by production cuts and stainless steel production, and in the longer term by battery production, which should accelerate from the early 2020s.

Figure 13.1: Nickel LME spot prices and stocks



Source: Bloomberg (2017) London Metal Exchange; International Nickel Study Group (2017); Department of Industry, Innovation and Science (2017)

13.3 World consumption

Rising stainless steel and battery output is driving nickel usage

World nickel consumption rose by 5.4 per cent year-on-year in the September quarter. This rise was driven primarily by higher output of stainless steel in China, with a small and growing contribution from battery sales in the US and EU. It is expected that growth in stainless steel output will slow slightly over the outlook period, though China and Indonesia (which are ramping up capacity) are expected to continue expanding. Global nickel consumption is forecast to grow by 4.9 per cent (to 2,259 kt) in 2018, and by a further 4.5 per cent (to 2,359 kt) in 2019.

The combination of high stainless steel demand and rising battery demand suggests a solid outlook for nickel over the outlook period and beyond.

13.4 World production

Production is rising as governments seek to remove constraints

World mined nickel production is growing strongly at present, rising by 12.5 per cent through the year to the September quarter. A total of 602 kt of nickel was mined in the quarter — the highest output since 2014.

This output growth has been supported, in part, by higher mine activity and, in part, by the relaxation of environmental and export restrictions in several countries. There are a range of signs suggesting supply may lift further over the outlook period. A temporary ban on open-pit mining in the Philippines may soon be reversed, and the Indonesian Government has hinted at plans to further relax its partial ban on exports of nickel ore.

Several new mines are also expected to come online around the world over the next few years. As a result, global mine output is expected to reach 2,278 kt in 2018 and 2,379 kt in 2018.

13.5 Australia’s exploration, production and exports

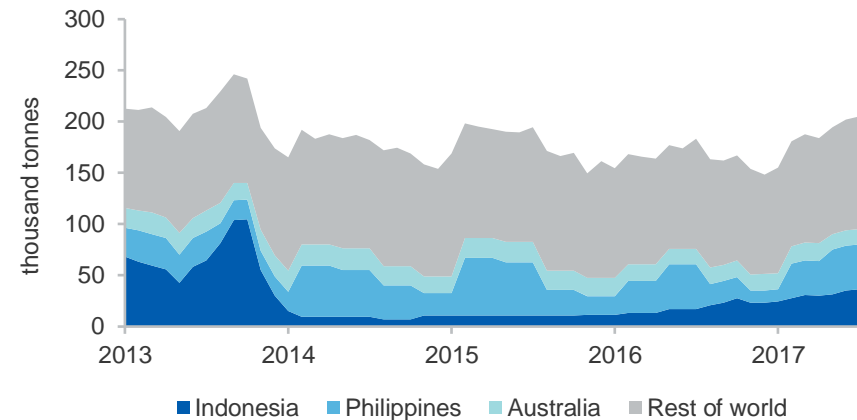
Exploration expenditure continued to rise in the September quarter

Fuelled by rising prices, nickel and cobalt exploration expenditure more than tripled year-on-year, to reach \$39.7 million in the September quarter. Around two thirds of this expenditure was in Western Australia, where substantial nickel deposits remain untapped.

Australian production is falling, due to a series of mine closures

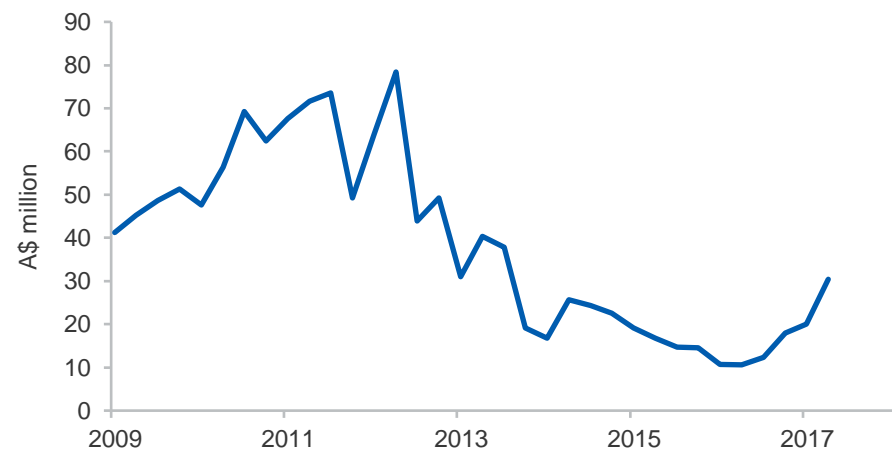
Australian nickel production is expected to remain constrained, despite the more positive price outlook in recent months. Mined production fell by 17 per cent year-on-year, reaching 41,000 tonnes in the September quarter. However, refined production picked up by 9 per cent year-on-year, to reach 29,000 tonnes in the quarter.

Figure 13.2: World mined nickel production, monthly



Source: International Nickel Study Group (2017)

Figure 13.3: Australia’s nickel and cobalt exploration expenditure, quarterly



Source: ABS (2017) Mineral and Petroleum Exploration 8412.0

A series of mine and facility closures have hampered mined and refined production in Australia, with the latest closure being First Quantum's substantial Ravensthorpe mine (which was placed on 'care and maintenance' in October). This mine previously accounted for more than 20 per cent of all Australian mined output, and its closure is expected to reduce mine output considerably from the September quarter.

Other mines have faced minor disruption due to maintenance, with operations owned by Western Area (including the Forrestania deposit) expected to reduce concentrate production by around 250 tonnes over the second half of 2017 before returning to normal by year's end.

BHP recently announced an investment of \$55 million on its stage one upgrade of the Kwinana nickel sulphate plant in Western Australia. This will expand nameplate capacity for the facility to around 100,000 tonnes a year from early 2019, making it the world's biggest producer of nickel sulphate. The company is also planning to accelerate stage two upgrades, which would lift output again to 200,000 tonnes per annum. The investment is being made in response to rising global interest in lithium-ion batteries, which contain high concentrations of nickel sulphate.

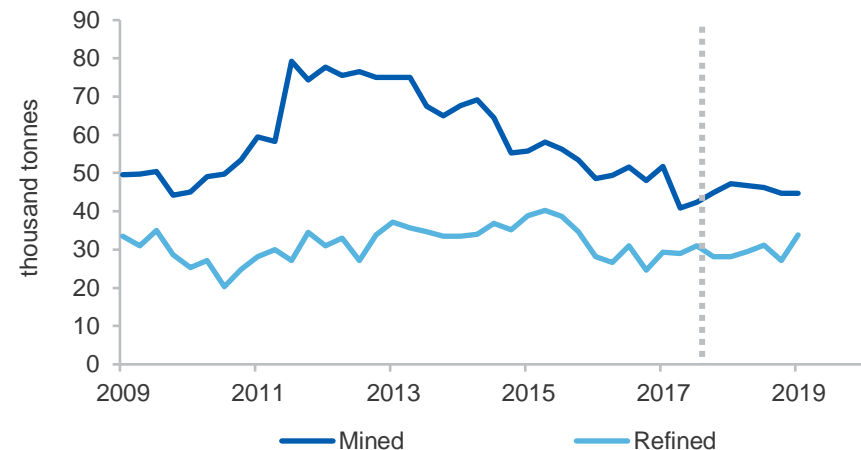
Export earnings are expected to bottom out in 2017–18

Australia's nickel export earnings lost ground in the September quarter, with provisional estimates suggesting a fall from \$552 million a year ago to \$387 million. The result was unusually low and reflects a range of previously noted mine closures as well as delays in shipping. Exports fell by 18 per cent to \$2,197 million in 2016–17 as a result of falls in both refinery and mine output, and particularly sharp declines in ores and concentrate exports.

Export values are forecast to decline to \$2,081 million in 2017–18, due to the closure of Ravensthorpe and falls in production at other mines.

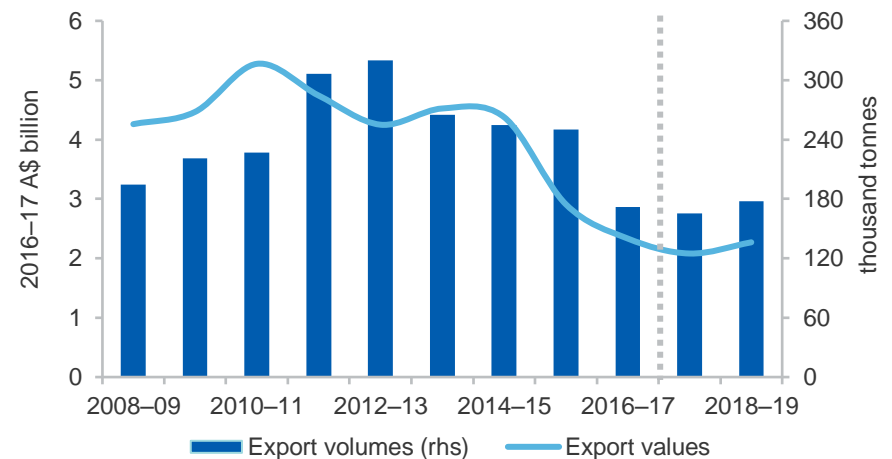
However, some recovery is expected in 2018–19, with export values expected to rise to \$2,272 million. This reflects the likelihood of higher production at Independence Group's Nova mine and greater output at BHP's Kwinana facility following the completion of its stage one upgrade.

Figure 13.4: Australia's nickel production



Source: Department of Industry, Innovation and Science (2017)

Figure 13.5: Australia's nickel export volumes and values



Source: ABS (2017) International Trade in Goods and Services, 5368.0; Department of Industry, Innovation and Science (2017)

Table 13.1: Nickel outlook

World	Unit	2016	2017 f	2018 f	2019 f	Annual percentage change		
						2017 f	2018 f	2019 f
Production								
– mine	kt	1,990	2,150	2,278	2,379	8.0	5.9	4.4
– refined	kt	1,984	2,142	2,269	2,369	8.0	5.9	4.4
Consumption	kt	2,033	2,153	2,259	2,359	5.9	4.9	4.4
Stocks	kt	555	533	533	533	-4.0	0.0	0.0
– weeks of consumption		14.2	12.9	12.3	11.7	-9.3	-4.7	-4.3
Price LME								
– nominal	US\$/t	9,599	10,245	11,438	11,053	6.7	10.9	-2.7
	USc/lb	435	465	519	501	6.7	10.9	-2.7
– real b	US\$/t	9,801	10,245	11,199	10,590	4.5	8.6	-4.8
	USc/lb	445	465	508	480	4.5	8.6	-4.8
Australia	Unit	2015–16	2016–17 s	2017–18 f	2018–19 f	2016–17 s	2017–18 f	2018–19 f
Production								
– mine cs	kt	216	201	176	183	-7.2	-12.6	4.0
– refined	kt	142	112	116	122	-21.2	4.0	4.5
– intermediate	kt	44	37	25	16	-15.9	-33.1	-35.3
Export volume ds	kt	250	175	165	178	-30.0	-5.7	7.5
– nominal value s	A\$m	2,935	2,199	2,081	2,270	-25.1	-5.3	9.1
– real value es	A\$m	3,046	2,244	2,081	2,217	-26.4	-7.2	6.6

Notes: **b** In 2017 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 2017–18 financial year Australian dollars; **f** Forecast, **s** Estimate, **z** Projection

Source: ABS (2017) International Trade in Goods and Services, Australia, Cat. No. 5368.0; Company reports; Department of Industry, Innovation and Science; International Nickel Study Group (2017); LME (2017); World Bureau of Metal Statistics (2017)