

Discovery and volatility: Nickel's ongoing impact on the stainless steel industry

Nickel prices are volatile – they always have been. But recent fluctuations have led the steel industry on a rollercoaster ride of peaks and troughs. LME's price graph for 2020 shows a concerning path of instability rather than the reliable price index the industry so yearns for. This of course follows a year of pandemic-related disruption; in March, prices were at their lowest of US\$11,055 per tonne. By the end of November nickel had reached its highest level of US\$16,343 – January 2021's figure is higher still at US\$18,133 per tonne.

By Ellie Pritchard

Following a Covid-19 slump in manufacturing, global demand for nickel is looking up; it is forecasted to reach 2.52 million tonnes in 2021, up from 2.32 million tonnes in 2020, according to the International Nickel Study Group. Roskill's senior analyst Olivier Masson anticipates "demand is expected to recover in all sectors, but the stainless steel and battery sectors are expected to perform the best". As by far the single largest segment of nickel use, stainless steel will attribute to this rise in demand. Roskill also sees a continued rise of nickel pig iron capacity in Indonesia to feed the domestic stainless steel industry.

Discovery exceeds expectations

One key discovery the industry can hope will respond to this peak in demand is that of a new deep-sea nickel deposit. The world's largest untapped deposit of battery metals — nickel, cobalt, copper and manganese — is contained in polymetallic nodules that sit unattached on the Pacific seafloor in the Clarion Clipperton Zone (CCZ), between Hawaii and Mexico. Exploration and development company DeepGreen Metals has announced an upward revision to the nodule resources reported within the NORI-D exploration contract area held by its subsidiary, Nauru Ocean Resources, Inc. The nodule resource is now estimated as 4 megatons (Mt) measured, 341Mt indicated and 11Mt inferred mineral resources.

As countries invest in large-scale clean energy transition programmes and begin to phase out internal combustion engines, one attraction to the deposit discovery is the hope of securing the minerals required to build batteries



A box core brings up an intact sample of the seafloor containing polymetallic nodules. Image courtesy of DeepGreen Metals

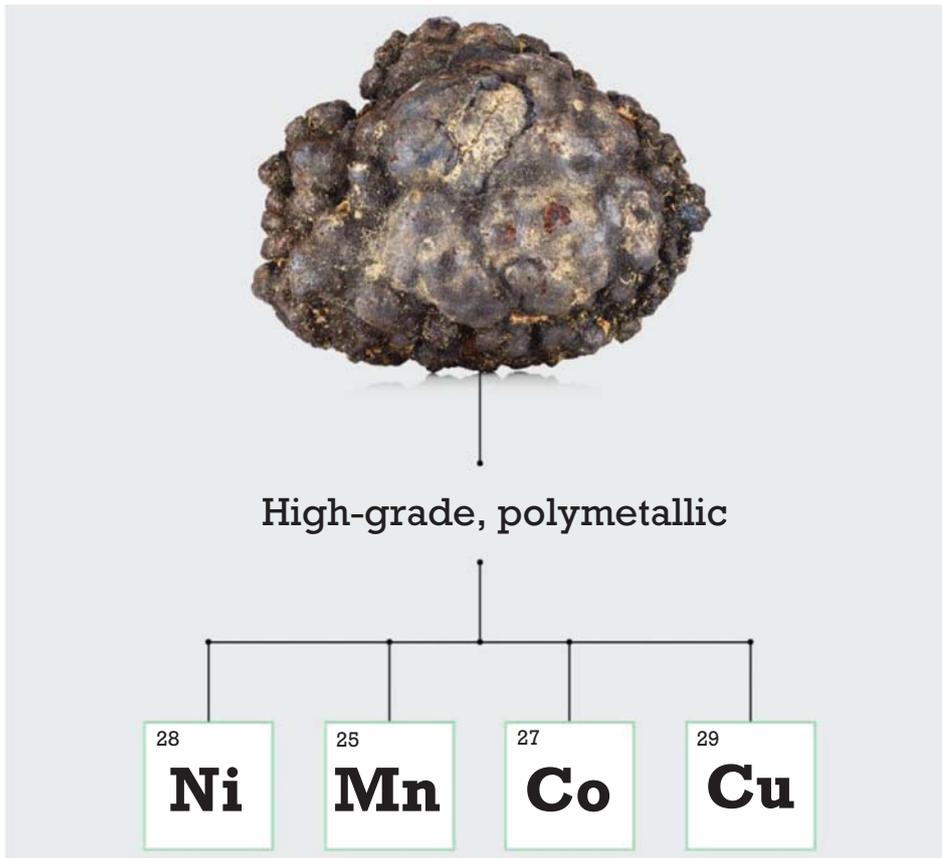
for storing renewable energy and powering electric vehicles. According to some academic forecasts, nickel demand for batteries is projected to jump thirty-fold in the coming three decades, "requiring a drastic expansion of lithium, cobalt, and nickel supply chains and likely additional resource discovery" (Xu. *et al*; nature.com). DeepGreen's updated 43-101 mineral resource estimate shows that the abundance of nodules in the company's contract area increased 5.4% compared to its 2019 estimation. In addition, the company reported a notable uplift in grades of manganese (2.2% higher), cobalt (5.4% higher) and nickel (6.1% higher).

The richer concentrations of metals noted in NORI's updated report were measured by combining the company's earlier seafloor mapping and survey work with boxcore sampling and footage taken during numerous

research campaigns conducted since 2018.

More volume, lower impact

"Unlike mineral exploration on land, resource confidence in polymetallic nodules is unusually high due to the two-dimensional nature of the resource. You can actually see the nodules lying on the seafloor," said DeepGreen's Chief Development Officer, Anthony O'Sullivan. "We have done the sampling and research to understand the fundamental variance of the nodule resource and we've found that it is very consistent". Nodules contain high grades of four battery metals in a single ore - nickel, cobalt, copper and manganese. This means several times less ore needs to be processed compared to land ores to get at the same amount of metal, resulting in smaller ESG footprints and lower-cost production. And because deep-sea nodules do not contain toxic levels of



High-grade polymetallic nodule. Image courtesy of DeepGreen Metals.

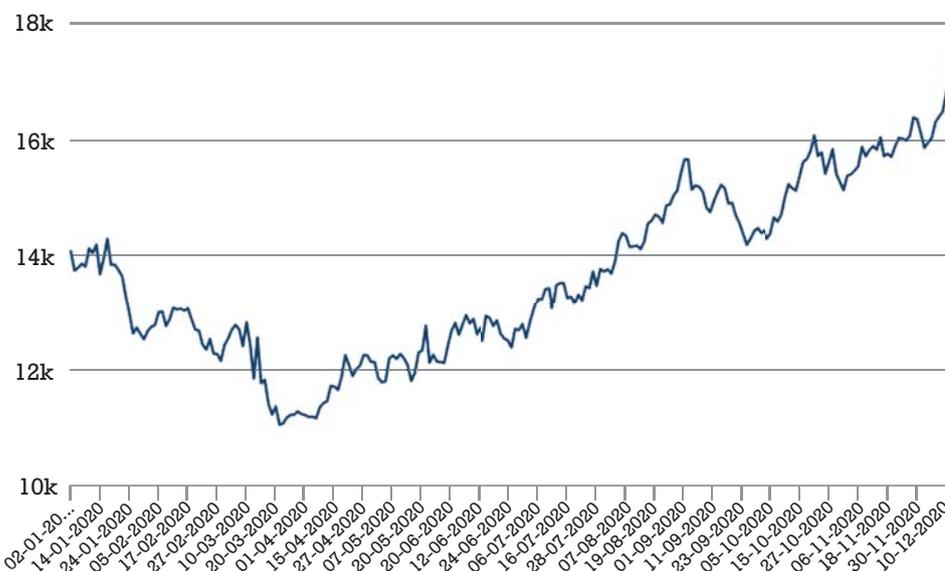
heavy elements like mercury or arsenic, all of the nodule mass can be converted into products with economic value to society. Sourcing nickel from nodules has the potential to generate zero solid waste and eliminate toxic tailings – a big problem for the conventional mining industry that generated over 189 gigatonnes of waste in 2020. The mining industry is the single largest waste stream on the planet producing

ninety-five times more waste than all the world’s cities combined.

Costs still see-saw

Returning to the wider context of stainless steel in 2020, the price of flat-rolled stainless steel in Europe saw a strong increase in the week to Friday January 29, on higher nickel costs and increasing demand. As nickel prices inch closer to US\$20,000 per tonne,

LME NICKEL HISTORICAL PRICE GRAPH



2020 nickel price performance. Chart via the London Metal Exchange.

Although lockdown measures implemented across the globe reduced demand for nickel products (indeed, for stainless steel in general), the supply of nickel remained largely unaffected and saw estimated growth of 4% in 2020. According to Roskill’s 2021 outlook report, this coming year should see demand levels recover dependant on the roll-out of Coronavirus vaccines. Stainless steel is expected to remain the top application for nickel over the next 10 years due to growing demand from China. However, stainless steel may need to share its part of the market with the lithium-ion batteries used in electric vehicles, as uptake and investment in the major players such as Tesla are expected to rise over the coming decade.

the threshold needed to encourage investment in new supply is also within reach. The LME 3 month nickel contract has not been close to US\$18,000 since September 2019, but towards the end of January 2021 the contract rose to US\$18,133 per tonne. It is understood that this rise of more than 30% is in response to the battery-grade nickel demand, rather than that of the stainless steel sector which is expected to see only a 2% rise in demand from 2020. According to Russian mining company Nornickel, demand from the plating, specialty steels, superalloys and chemical sectors fell at double-digit rates over 2020. Should the prices rise further to reach the US\$20,000 per tonne threshold, critical fresh supply could be unlocked via nickel projects. Projects such as Tsingshan Holding Group’s Morowali on the Indonesian island of Sulawesi could produce 50,000 tonnes per year of nickel and around 4,000 tonnes per year of cobalt. But, until the level of demand increases and whilst prices remain below the threshold, it is expected that the global market will be in a surplus of 75,000 tonnes this year. However, Nornickel does anticipate a growth in demand for 2021 by 6% to 2.57 million tonnes, driven mainly by Indonesian stainless steel requirements and the longer term growth in battery-grade nickel.

Sources:

- Argus Media
- DeepGreen Metals
- Fastmarkets
- International Nickel Study Group
- London Metal Exchange (LME)
- Roskill’s Nickel Outlook to 2030, 17th Edition
- Xu. et al (via nature.com)