



China's main nickel ore supplier is currently the Philippines and the country is looking for alternative feed sources.

The world nickel market in 2020 and 2021 – Covid-19 leading to surpluses

Around 80 government and industry representatives met online on 12-13 October 2020 for the most recent International Nickel Study Group Meeting. During the web-meeting, INSG reviewed the forecast for nickel production and use for 2020 and 2021. This article gives a brief overview of recent developments based on this data.

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The year 2020 has been marked by the Coronavirus (COVID-19) pandemic. The disease was first identified in late December 2019 in Wuhan City, Hubei Province, China P. R., and has since spread worldwide. The World Health Organization (WHO) declared the outbreak a pandemic on 11 March 2020. Countries around the world implemented lockdowns and other measures to tackle the pandemic. Those lockdowns had a negative effect on the economies and, after controlling the outbreaks, governments decided to progressively reopen them. Since September, the number of new infected people has been rising – this is being mentioned as a second wave. As a consequence, several governments

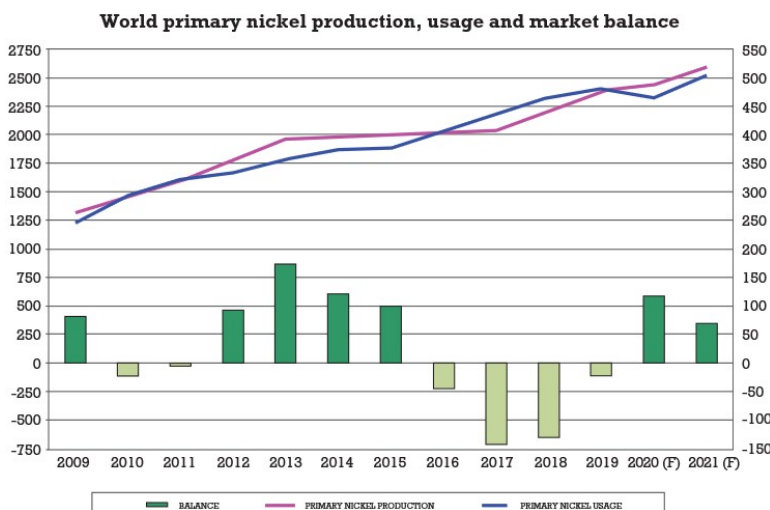
have reintroduced partial lockdowns and other measures to fight the pandemic once again. China's efforts to control the pandemic during the first wave were quite successful and the country's economy has been improving. There is positive news that a (or several) vaccine(s) to prevent this disease might be approved by the end of the current year, but this is still uncertain. INSG revised its forecast for the nickel market balance for 2020 to a surplus of 117,400 tonnes during its October 2020 meetings. Primary nickel production in 2020 is expected to reach 2.436 Mt while usage is forecast at 2.318 Mt. Preliminary figures for 2021, indicate a smaller surplus of 68,400 tonnes with production forecast to rise to 2.586 Mt and use to reach 2.518Mt.

Primary nickel production

In 2020, world primary nickel production will grow +2.3% and is expected to increase by a further +6.2% in 2021. In the current year, output is expected to rise only in Asia, mainly influenced by Indonesia. However, next year production is likely to increase in all regions.

Asia is the most important region for primary nickel production – around 64% of output will come from this region. China is the world's top producer with 710kt of production expected in 2020. However, this will decrease by around 115 kt in 2020 due to a reduction in available feed for nickel pig iron (NPI) production as a consequence of Indonesia imposing an export ban on

[NICKEL]



Source: INSG (October 2020).

unprocessed nickel ore from January 2020. China's main supplier is the Philippines and the country is looking for alternative feed sources, such as Brazil, Guatemala, the Ivory Coast, New Caledonia, Zambia. However, this will not be sufficient to support the same production level as in previous years. On the other hand, Chinese-backed NPI projects in Indonesia will continue to ramp up in 2021 and the country will become the number one producer, with primary nickel production expected to reach 830kt (an increase of +37%, y-o-y).

New nickel units aiming to supply the battery sector for electric vehicles will mainly come from high pressure acid leaching (HPAL) projects, largely in Indonesia, though there are potential projects in other parts of the world. The most advanced projects are: PT Halmahera (37kt), PT QMB New Energy (50kt) and PT Huaqai (30kt). The latest news about the first one mentioned is that it has been delayed from 2020Q3 to March 2021 due to the pandemic. Additionally, there are environmental concerns regarding the tailings disposal of the projects. One of the possibilities being discussed is deep sea tailing placement, but a number of car producers have already said that they don't want material being produced employing this method, due to its potential environmental impact.

Primary nickel usage

World nickel usage has grown since 2009, but INSG assesses that usage will decrease to 2,318 Mt in 2020 (-3.5%)

and will recover to 2,518 Mt in 2021 (+8.5%).

Asia is even more important for primary nickel usage than for production – in 2019, 79% of usage was in this region. As a reference, Asia's share in 2009 was "only" 62%. Further growth in the region is anticipated in both 2020 and 2021 of +0.5% and +8.5%, respectively. Demand in China, which uses more than half of the world's primary nickel, is forecast to increase by +3.7% in 2020 and over +6.2% in 2021. After starting production of stainless steel in 2017, Indonesia will become the second most important nickel user in 2020, with usage reaching 195 thousand tonnes (+14%), surpassing that of Japan, and increasing by a further +20.5% in 2021. Nickel usage in Europe is expected to decrease by -15% in 2020 and then to recover +9.5% in 2021. Africa and the Americas will experience similar scenarios with demand decreasing by more than -25% in 2020 and growing by almost +13% and +9% in 2021, respectively.

The stainless steel sector remains the most important first-use market for nickel, accounting for more than 70% of nickel usage in both 2020 and 2021. The International Stainless Steel Forum (ISSF) released production figures for the first half of 2020 showing that "stainless steel melt shop production decreased by 9.4% year-on-year to 23.7 million metric tonnes", after growing by +2.9% year-on-year to 52.2 million metric tonnes in 2019. Forecast figures for world stainless steel consumption show a decrease of

-5.1% in 2020 and an increase of +8.4% in 2021. For the same years and by region: Euro/Africa -14.1% and +8.1%; Americas -15% and +12%; Asia without China -15.1% and +12.7%; and China +3.2% and +6.5%. These figures show slower demand from the stainless steel sector in 2020 but higher in 2021, in line with anticipated lower world economic performance this year and a recovery next year.

Nickel usage in batteries is poised to keep increasing with the electrification of cars and it is likely that the proportion of the market accounted for by batteries should increase significantly over the coming 10-20 years.

Electric vehicles (EV) world sales reached 2.210 million in 2019 (9.5% growth), after increasing by 65% in 2018. Over the first 9 months of 2020, 1.784 million EV were sold, an increase of around 12% compared to the same period in 2019. However, it is important to take into account other developments in the analysis. These include the impact of the reduction of subsidies in China from July 2019, possible fines in Europe in 2020 (if total sales exceed a certain limit of CO2 emissions), and the effect of the pandemic. The first later combined with the third caused sales to decrease in China over the period July 2019 to June 2020. With the economic recovery, sales in China in 2020Q3 increased significantly. In Europe, sales have been positive during all months of 2020, only decelerating in Q2. All other world regions combined had negative growth year-to-date in 2020. The sector has been showing resilience during the pandemic, especially compared to internal combustion cars sales, and most analysts point to growth remaining positive in the short to medium term, though at lower levels compared to pre-Covid expectations.

Nickel stocks and prices

The London Metal Exchange (LME) saw the largest nickel stocks drawdown ever in October 2019, resulting in combined total LME and Shanghai Futures Exchange (SHFE) stocks falling to a low of 95,000 tonnes. From November 2019, nickel stocks recovered quickly, reaching 270,000 tonnes by the end of February 2020. Since March, total stocks have remained relatively stable in the range of 256,000 tonnes (in early April) to 273,000 tonnes (mid-August), ending October at a level of 268,500 tonnes.



Chinese-backed NPI projects in Indonesia continue to ramp up and the country will become the number one producer in 2021.

The nickel market moved from monthly deficits to surpluses before the COVID-19 pandemic started. This coincided with the nickel price (LME close, cash settlement) going from a peak of 18,625 USD/t in September 2019 (when the Indonesian ore export was announced to be anticipated to January 2020), to a low of 11,055 USD/t by end of March. Since then, prices have been moving upwards, surpassing 15,000 USD/t again in late August, followed by a correction downwards in early September (nevertheless staying above 14,000 USD/t). After that, prices peaked at 16,064 USD/t on 21 October, to close the month at 15,256 USD/t. This resulted in a monthly average price of 15,219 USD/t in October, recovering to a level above 15,000 USD/t for the first time since November 2019.

Nickel in circular economy and electric vehicles

Now we are all living in a fast changing world encompassing new challenges and opportunities. The world population is forecast to reach 11.2 billion by 2100 from the current 7.8 billion. This will be accompanied by substantial demographic shifts according to UN statistics. The projected population growth will mainly come from less developed and developing countries which will see a growing working age population that tend to live in cities. In contrast, an ageing society is evolving in other countries. It is therefore important that we find sustainable ways of feeding

the growing population and protecting the environment we live in through tackling climate change, developing the circular economy and scaling up the adoption of electric vehicles. Nickel plays an important role in meeting those challenges and realizing the new opportunities. As a material used in over 300,000 products in the form of over 3,000 alloys, nickel is an indispensable material for construction, automobiles, batteries, the petrochemical sector, fabrication and welding, power and renewable energy, electronics, transportation, water etc. The International Nickel Study Group (INSG) set four key parameters to gauge the importance of a certain material to the circular economy. They are the circularity of a material, the material's enabling capacity for the circular economy, the cost of cycling back into the loop and the service span of a product embedded with the material. More than 70% of primary nickel plus over 900 thousand tonnes of scrap nickel are currently used in stainless steel production. A recent study completed by Yale University for Team Stainless of which INSG is a member shows that the end of life recycling rate and recycled content of stainless steel is 85% and 44% respectively. Nickel contained in the stainless steel at the same time can be recycled back into the loop at a higher rate thanks to the higher value of high nickel-containing stainless steel scrap. Nickel is 100% recyclable without losing any of its properties. Clean energy, renewable

energy generation, energy storage and transportation electrification are key factors in developing a circular economy, reducing carbon emissions and tackling climate change. Nickel and nickel containing materials are widely found in Biomass energy production, geothermal energy utilization, wind, wave, tidal, hydro and solar power generation, fuel cells, and battery cathodes. Nickel is a host metal of other critical materials for renewable energy and energy storage systems such as cobalt. The recycling of austenitic stainless steel saves 33% of primary energy. Austenitic stainless-steel recycling reduces CO₂ emissions by 32%. Recycling 1 metric ton of steel saves 1,100 kilograms of iron ore, 630 kilograms of coal, and 55 kilograms of limestone. Average lifetimes of stainless steel were estimated to be 50 years for buildings and infrastructure, 14 years for vehicles, 30 years for other transportation modes (rail, ship and aircraft), 25 years for industrial machinery, and 15 years for both household appliances and electronics and metal goods.

The advent and accelerating adoption of electric vehicles is boosting the development of the nickel-containing lithium ion battery (LiB) sector due to its high energy density, voltage capacity and lower self-discharge rate. The battery sector currently accounts for 5-7% of gross nickel use and is the fastest growing sector for nickel use in terms of percentage. Nickel plays an essential role in maximising the energy density of LiBs. The technological route of raising the nickel content in nickel-manganese-cobalt (NMC) cathode material from NMC111, NMC433, NMC532 and NMC622 to NMC811 points to a potential exponential growth in nickel demand. The nickel content per kWh for NMC622 and NMC811 are 0.6kg and 0.75kg respectively. According to Adamas Intelligence, global deployment of nickel in passenger EV batteries amounted to 59,271 tonnes and 27,000 tonnes in 2019 and 1H2020 respectively. The International Energy Agency (IEA) estimated, in its Global EV Outlook 2020, that global electric vehicle battery capacity is going to increase from around 170 GWh per year today to 1,500 GWh per year by 2030 in the Stated Policies Scenario which translates into a demand of class I nickel of 925,000kt per year in 2030. In the Sustainable Development Scenario, demand of 3,000GWh is projected and the demand of class I nickel could double.