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## Quintessentially Nickel

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## MARKET SENTIMENT

In our latest issue, we described 2019 as a turbulent year for nickel. Ever since, the volatility of nickel price has kept the same magnitude of 25% and this unprecedented turbulence has continued to reshape the nickel market throughout 2020. The coronavirus (COVID) outbreak began influencing the price trend from mid-January onwards. The price dropped to \$11,000/t in the second half of March, but rallied to as much as \$16,000/t by mid-November. This considerable rebound was primarily caused by:

- Stimulus driven “V-shape” Chinese recovery, which had led to robust growth of 300 series output in China and Indonesia.
- Increase of the nickel ore price due to solid ore demand in China, export ban in Indonesia and COVID-related disruptions in the Philippines.
- General macroeconomic trends favouring commodities due to low interest rates, liquidity injections, and a weaker US dollar.

## SUMMARY

Following our May issue, we have downgraded the 2020 market surplus from the initially expected 130 kt Ni to 108 kt Ni on the back of the newly estimated 2.53 Mt Ni produced and 2.42 Mt Ni consumed over the calendar year.

<u>Nickel</u>	2019	2020E	2021E
Demand	2.44 Mt +5%	2.42 Mt -1%	2.57 Mt +6%
Supply	2.42 Mt +10%	2.53 Mt +5%	2.64 Mt +4%
Market Balance	-27 kt	108 kt	75 kt+

On the demand side, we have upgraded our 2020 stainless steel forecast to +2% YoY. Stainless nickel demand in China is likely to increase by +7% YoY due to the robust output of 300 series. We have also revised upwards the nickel demand in stainless steel in Other Asia to -1% as Indonesia has successfully ramped up its production by +16% YoY. Nickel demand in stainless in Other Asian countries such as Japan, South Korea, Taiwan, and India is seen to decline by -15% YoY due to the fragile end-use demand and strengthening competition with Indonesian and Chinese producers. The significant downturn is currently observed also in EMEA (-13% YoY) and the Americas (-15% YoY).

The plating sector is anticipated to decline by -12% YoY. Special steel, which is used in automotive, oil & gas, and chemical & petrochemical industries, is now estimated to decline by -13% YoY with EMEA and America being affected more than China and Other Asia. Standard alloys, predominantly (over 50% in 2019) used in oil & gas and aerospace industries, are anticipated to dip by -12% YoY, impacting America in particular on the back of a slump in oil prices and postponement of investment projects. We see the nickel use in superalloys falling by -18% affecting America and EMEA regions specifically due to the current crisis in the global aerospace industry and continuing travel restrictions. We also further downgrade chemical, MLCC in electronics and powder metallurgy. However, the nickel demand in batteries was upgraded to +5% YoY considering strong NEV sales in 2H 2020 primarily driven by the European countries. We maintain our positive long-term view of the NEV sector.

- Expectations of some long-run market tightness driven by the battery demand. Rising flows of investment in nickel were seen after Elon Musk’s public encouragement to ‘mine more nickel... efficiently and in an environmentally sensitive way’.

However, some market participants suggest that the current price levels might not be quite justified by the fundamentals given the market surplus, negative SHFE/LME arbitrage, fragile consumer demand in stainless outside China and Indonesia, weakness of non-stainless sectors as well as unclear prospects of the economic recovery and further lockdowns reflecting the resurgence of the COVID pandemic. On the other side, stimulus packages across the globe are expected to boost the development of green economy and battery demand. This could keep all EV-related asset prices, including nickel, elevated by sticky investment flows.

<u>Demand</u>	2019/2020 YoY
Stainless Steel	+2%
Plating	-12%
Special Steel	-13%
Standard Alloys	-12%
Superalloys	-18%
Batteries	+5%
Chemical	-10%
Electronics	-10%
Powder Metallurgy	-17%

We also increase our 2020 production forecast by +5% YoY, comparing to the earlier anticipated -1% decline, mainly due to the surge in Indonesian NPI production (+66% YoY) and less than expected decline in Chinese NPI (-13% YoY) as a result of the robust domestic output of 300 series.

In 2021, we see the primary nickel demand recovery by +6% YoY to 2,567 kt Ni. It will be driven primarily by the ramp up of Indonesian stainless steel production by +24% YoY, rebound in other countries coupled with the growth in nickel demand in the battery sector by +25% YoY. Stainless steel in China is forecasted to increase by a moderate +1% YoY. Other non-stainless industries are expected to rebound by +7% YoY alongside the improvement of end-use demand. However, all this will be fully offset by the continuous commissioning of new Indonesian NPI capacities up to 885 kt Ni (+48% YoY), which will outpace the decline in Chinese NPI supply to 300 kt Ni (-41% YoY). Additionally, possible closure of VNC as well as those FeNi assets, which are at risk due to potential substitution by NPI in stainless sector, is considered as a probable supply disruption (potentially up to ~50 kt Ni).

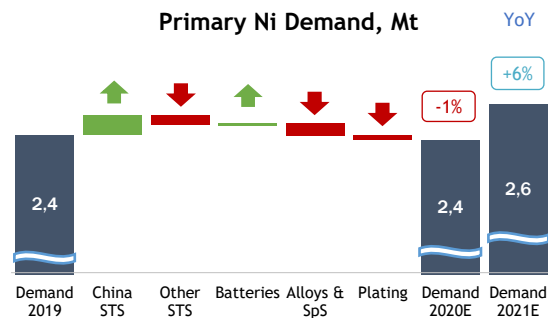
Therefore, we foresee the 2021 market surplus to be lower than in 2020.

The current nickel exchange inventories have increased by +78 kt from the beginning of the year and now stand at 266 kt Ni, which is similar to the levels seen in mid-2018. We

observe an +80 kt inflow of nickel briquettes to the registered warehouses (including the return of ~20-30 kt from off-warrant stocks in the beginning of the year), +10 kt of FPC and an -12 kt outflow of FPC from SHFE. In 2020, ~10 kt of FPC were accumulated in bonded warehouses in China, and the current stocks are seen at 24 kt Ni (21 kt of FPC, 3 kt of briquettes). Unsold producers' volumes (mostly, Class 1) are estimated at ~40 kt Ni as of November 2020, while consumers have adjusted their stock levels due to sluggish business and high uncertainty. Nickel market premiums remained at historically low levels due to the muted spot demand amid the decline in primary

nickel consumption and the introduction of new lockdown measures in some countries. Premiums are also under pressure from the market surplus and higher than expected nickel price. Chinese import arbitrage window has been closed for most of the year and currently remains in a negative zone close to -\$700/t. The registration of SHFE deliverable briquettes has now been delayed till 2021. Some market participants are worried that Australian briquettes might not be approved for SHFE delivery as a result of increasing political tensions between Australia and China over this year.

## DEMAND



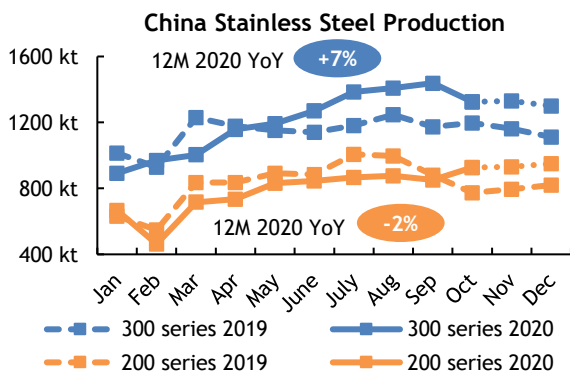
## STAINLESS STEEL

### China

In early 2020, China imposed severe preventive measures to contain the spread of COVID-19 outbreak, limiting people's mobility and flows of goods both internally and externally. As a result, Chinese 300 series output in Q1 declined by -9% YoY, and 200 series by -10% YoY.

The imposed restrictions have proved to be quite effective. By the end of March, the epidemiological situation returned to normality and most of the restrictions had been lifted. It led to a robust recovery of 300 series' production ever since April.

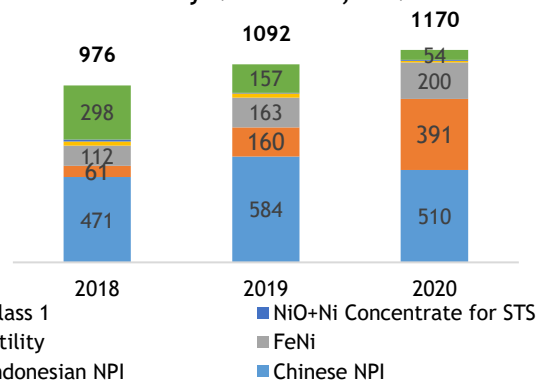
Alongside these positive developments, the Chinese government launched a stimulus package to facilitate the economic recovery, based on a CNY 3.6 trillion (\$500bn) increase in the budget deficit. The package had significantly influenced the stainless steel recovery as it boosted investments in stainless-intensive real estate and infrastructure projects. So far, China has also managed to avoid the second wave of the pandemic, currently ravaging other countries, resulting in the +15% YoY growth of 300 series' production in 2H 2020.



Source: ZIJSTEEL

For the full 2020, we expect Chinese nickel consumption in stainless to rise by +7% YoY, which translates into 1.2 Mt Ni. This strong increase in primary nickel demand will be fully offset by surging imports of Indonesian NPI and FeNi.

### Chinese Stainless Demand by Primary Nickel Feed, kt Ni

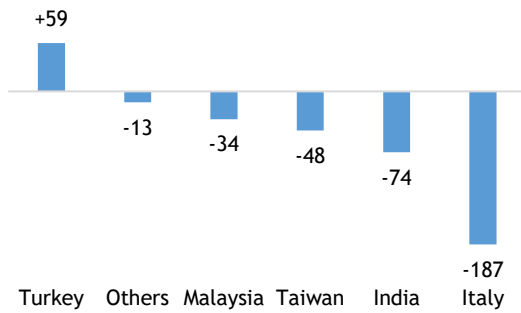


Sources: Mysteel, BGRIMM, Zijsteel, NN Analysis

Pandemic-related restrictions in Q1 had limited the availability of stainless scrap. Hence, in Q1, the average scrap ratio declined from 18% to 15%. Growing NPI imports from Indonesia led to the relatively low usage of scrap in Chinese stainless steel making throughout Q2 and Q3. However, rising nickel ore prices, decline in domestic NPI supply and a robust recovery of 300 series' production in China had resulted in NPI being traded with a premium to the LME in late September – early October, which led to the stainless scrap ratio rising to 19% in September, while FeNi discounts improved from \$1200-1500 to \$800/t Ni. Nevertheless, even with a certain premium to the LME price, NPI is likely to remain attractive for stainless steel mills as it provides free iron and chromium units. The average nickel content in NPI (including both Chinese and Indonesian NPI) is around 11% in 2020, the chromium content is 2%, and the rest are iron units at 87%. Free chromium units provide over \$300/t Ni benefit (based on the current FeCr price), iron units — \$3,000/t Ni benefit (based on the current carbon steel scrap price) totalling ~\$3,300/t Ni. Since 60% of STS mills producing nickel-containing grades are integrated with the NPI production, this incentivises them to use the captive NPI supply.

In Jan-Sep 2020, stainless steel exports from China declined by -300 kt or -11% YoY.

### China Stainless Steel Exports (Jan-Sep 2020, Δ kt)



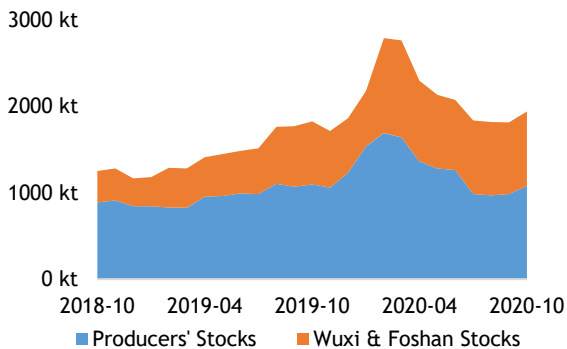
Source: Trade Data

Over 9M 2020, the biggest decline in Chinese stainless shipments was registered for Italy and India, mostly due to their severe epidemiological situation, albeit the flow from China to Italy was partly re-orientated to Turkey to avoid high import duties on Chinese stainless steel.

Stainless import volumes from South Korea, Japan and Taiwan (historically, these are among the biggest suppliers to China), decreased by -30 kt in Jan-Sep. In turn, import from Indonesia grew by +320 kt due to the ramp up of billets production by Delong. Generally, China increased its stainless imports by +250 kt in Jan-Sep.

In early 2020, stainless steel stocks in Wuxi and Foshan warehouses surged on the back of sluggish end-use demand, reaching the highest levels by mid-March. They have been steadily declining ever since as the epidemiological situation improves. In October, stainless steel stocks in Wuxi and Foshan were 18% higher than in October 2019, and 135% higher than in October 2018.

### China Stainless Steel Stocks



Source: Zljsteel

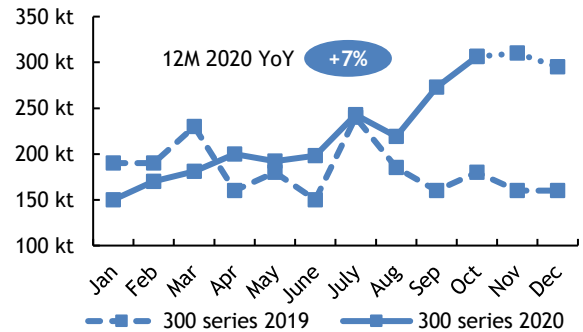
In 2020, we observe substantial growth in domestic production and imports of stainless steel into China while exports continue to decline on annual basis. Market participants see the robust demand for stainless steel in China from the construction sector, petrochemicals and food industry. We also register a growth in stainless-containing end-use products: for example, in Jan-Oct 2020, export of household appliances from China increased by +10% YoY.

### Indonesia

In Q1 2020, Tsingshan's stainless output declined by -25% YoY. The country's total stainless production declined by -19% YoY, even considering the commissioning of Delong-Obsidian project.

However, Delong managed to ramp up its stainless production during Q2-Q3. Since September, Tsingshan's output also started to bounce back. We expect the full year 300 series production to rise by +25% YoY, which translates into 200 kt of primary nickel demand.

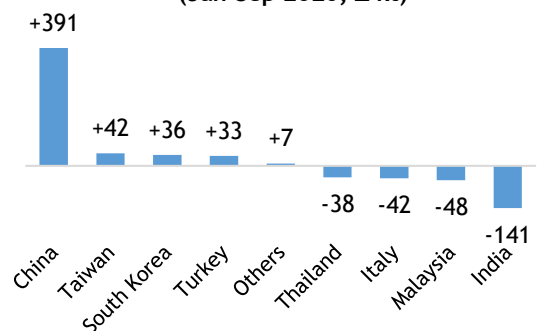
### Indonesia Stainless Steel Production



Source: Zljsteel

In 9M 2020, Delong STS output amounted to 400 kt. The company targets to produce billets mainly for the Chinese market. Indonesian billets (long products) are subject to a mere 2% import tax in China, unlike hot rolled coils and slabs, which bear a prohibitive 20.2% import tax. In Jan-Sep 2020, according to the trade statistics, Indonesian STS export to China surged by +390 kt, mainly due to the increase of billets' export. Total export of stainless steel from Indonesia increased by +240 kt.

### Indonesia Stainless Steel Exports (Jan-Sep 2020, Δ kt)



Source: Trade Data

In 2021, we anticipate some further increase of Indonesian stainless output as Delong-Obsidian plans to continue ramping up its stainless capacities from 1 Mt to 2.5 Mt.

### Europe

European stainless mills experienced a very turbulent 1H 2020, marked by nation-wide lockdowns, production stoppages and weak demand across all end-use segments, which resulted in a decline of -17% YoY in stainless steel output. However, in September, as industrial production improved, they managed to ramp up their melt rates back to the 2019 levels.

Overall, for the full year 2020, we expect nickel consumption in the entire EMEA region to decline by -13% YoY to 178 kt. Uncertainty is likely to continue into the first part of 2021 as the pandemic situation remains volatile with Europe currently experiencing the second wave of COVID. Therefore, we anticipate the primary nickel

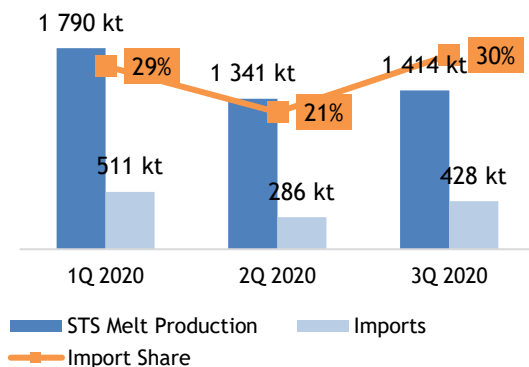
demand to improve in 2021 vs 2020, but it will stay below the pre-pandemic levels at 192 kt Ni or +8% YoY.

The currently available FeNi trade data (Jan-Sep 2020) shows that the European countries have imported ~35 kt Ni in FeNi, which is 20% lower than in the previous year.

The secondary market, i.e. stainless scrap, was rather balanced during the first half of the year. Limited collection of old and fresh scrap during the lockdowns was offset by the cuts in stainless steel production. The scrap availability remained tight in 2H 2020, as the melt output started to rise and the demand for scrap improved, payabilities for nickel in scrap increased from 61% (of the LME price) in September to 63% by the end of October. This was reflected in the 18/8 scrap prices, which rose from EUR 983/t in September to EUR 1,020/t in October and are currently at EUR 1,080/t.

Apart from the sluggish demand, European stainless steel producers continue to face competitive pressure from the low-cost Asian imports. Trade data show EU stainless imports to have had decreased overall by -24% YoY during Jan-Sep 2020, but their share compared to the local production remains rather high. July imports, in particular, spiked as new quarterly quotas under the EU's safeguard mechanism were rolled out, putting burden on stainless steel prices which reached new record low levels, according to market participants.

**Stainless Steel Melt Output vs Imports**



Sources: Trade Data, NN Analysis

Indonesia's rise to a prominent stainless steel producer led to an increase in exports to Europe from ~110 kt in 2018 to ~200 kt annualized in 2020. While previously, most of the volumes shipped were in the form of hot rolled coils and slabs, this year, following the EU's imposition of anti-dumping (AD) duties on hot rolled flat products, Indonesia focused on exporting cold rolled coils to the EU, prompting yet another AD investigation by the EU Commission.

Steel industry's June calls to cut this year's safeguard quotas for countries exporting to the EU by 75% given the difficult market situation were rejected by the Commission. However, in September, the Commission initiated AD investigations on cold rolled products from India and Indonesia, which are due for ruling in Q2 2021. This comes in addition to the already announced in February 2020 and confirmed in October 2020 AD duties on hot rolled coils from China, Indonesia and Taiwan ranging from 4% to 19%. Moreover, an expiry review is now ongoing regarding the AD case of cold rolled products from China and Taiwan,

imposed back in 2015 for 5 years, and it is likely to be extended.

It remains to be seen to what extent such trade barriers will prove effective in supporting the local producers, given that so far the safeguard measures have not raised up to the expectations of the major European market players.

### Americas

The American stainless steel market has also been severely impacted by the pandemic with the melt output estimated to plunge in 2020 by -18% to 2.1 Mt. While European mills have recently seen a partial rebound in stainless production, even if only temporary, most American plants continue operating at significantly reduced capacities. We anticipate primary demand for nickel to decline by -15% YoY in 2020, followed by some recovery of +10% YoY to 50 kt in 2021, considering the safety net provided to the US producers by the 25% tariffs under 232 Section. In the medium term, it is unclear what the position of the Biden administration on tariffs could be, but it is likely that they would remain in place given the current poor market conditions.

In 9M 2020, FeNi imports into the US accounted for ~8 kt Ni units, which was -23% lower than in the same period last year.

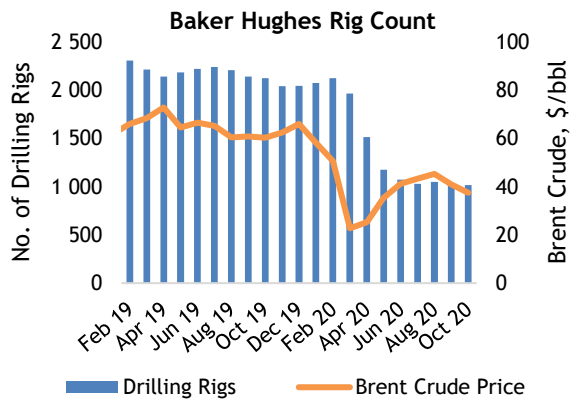
Stainless scrap availability in the USA has been rather tight this year due to less scrap generation and demolition work. Depending on the order size, payabilities for the Ni units increased from 62-70% in June to 65-70% in October. Additionally, superalloy scrap had been used in stainless steel blends to balance market tightness.

### ALLOYS & SUPERALLOYS

As we had foreseen in our latest issue, 2020 unravelled in a challenging way for the nickel alloys and superalloys sectors as the pandemic expanded.

In Q3 2020 especially, and a quarter later than in the stainless steel sector, this market's conditions deteriorated significantly and major nickel alloys producers in Europe and the USA recorded high double digit declines YoY in their shipments. It still remains to be seen whether they had hit the bottom in Q3 2020.

The existing structural issues in the oil & gas industry, an important end segment of Ni use, were further exacerbated in 2020 by the coronavirus demand destruction. In this environment of oversupply and depressed prices, drilling activity, as indicated by the Baker Hughes Rig Count, fell globally by -36% this year. In response to the worsening market conditions, oil companies cut or deferred their capital expenditures, with the top 5 oil majors slashing CAPEX by -25% to \$48bn during 9M 2020.



Sources: Baker Hughes, Thomson Reuters

Aerospace remains the hardest hit industry relevant for Ni demand. The unprecedented supercycle had already been curbed by the fleet grounding and production halt of Boeing 737 Max in 2019 with the 2020 pandemic-related global collapse in air traffic to follow. In April, the number of daily flights was 25% of the normal levels, and has since risen to 65% of the normal levels only. With airlines cutting back on purchases of new aircraft given the uncertainties with regards to the demand revival, Airbus and Boeing have been facing a year of low deliveries (-50% YoY), record high cancellations and negative net order intake. At the same time, jet engine makers such as GE Aviation and Pratt & Whitney posted declines in commercial jet engine shipments of -37% YoY combined in Jan-Sep 2020.

The travel restrictions also resulted in low MRO (maintenance, repair and overhaul) rates, which, in turn, negatively impacted nickel demand in superalloys. As a side note, every 1,000-1,500 cycles (one cycle representing one aircraft take-off and subsequent landing), aircrafts require engine overhaul and change of nickel intensive turbine blades.

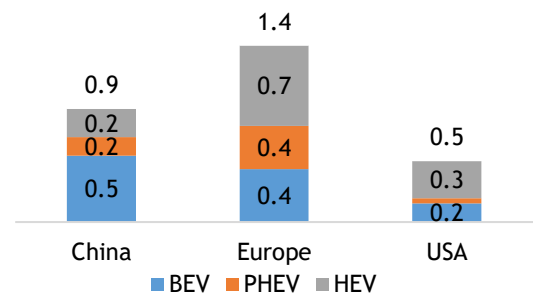
Considering the high level of accumulated inventories of commercial aircraft as well as metals in the supply chain, it is expected that the superalloys sector would not see a steady recovery until 2024-2025. The exact timeline will depend on a number of factors, such as vaccine deployment, government regulations, consumer confidence and demand for new aircraft. This year, the only sectors offering support, albeit limited, to the superalloys sector have been defence and power generation.

All in all, we estimate Ni demand in standard alloys to decline by -12% YoY in 2020 and slightly improve by +5% YoY to 132 kt in 2021. At the same time, we revise downwards our 2020 forecast for Ni use in superalloys to -18% YoY (or 48 kt Ni), with Europe and the Americas being the most troubled regions and we expect it to remain flat in 2021.

## BATTERIES

In May, we downgraded the nickel demand in the battery sector to 159 kt due to the COVID-related concerns. However, throughout Q2 and Q3, we were revising our forecast upwards on the back of strong EV sales, and now we anticipate the annual growth of +5% YoY resulting in 196 kt of primary nickel demand (163 kt Ni for Li-ion, 26 kt for NiMH and 7 kt for NiCd batteries).

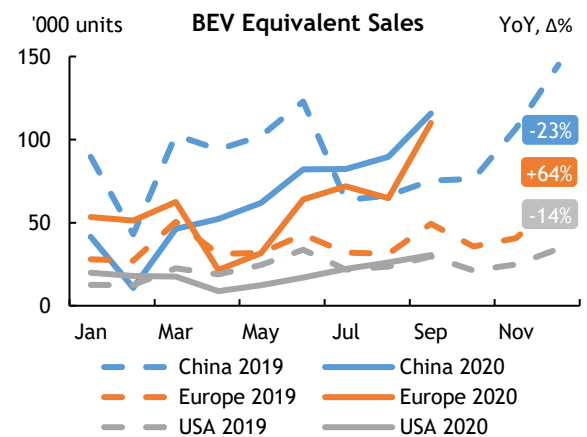
xEV Sales in Major Regions (Jan-Sep 2020, in million units)



Source: SNE Research

Amount of nickel in xEVs explicitly depends on a vehicle type and battery chemistry. To follow the impact of EV sales on nickel demand, we are introducing an indicator called a *BEV equivalent*. Under this methodology, HEVs and PHEVs are recalculated in BEV equivalents according to their relative battery capacity ratio in 2020: HEV 2 KWh vs PHEV 12 KWh vs BEV 55 KWh.

In April, global BEV equivalent sales plunged by -42% YoY, but since then started a robust recovery and in September surged by +60% YoY. Overall, in 9M 2020 global BEV equivalent sales remained almost flat declining just by -1% YoY. The biggest increase was registered in Europe, rising by +64% YoY in Jan-Sep 2020, while China and the US were lagging behind declining by -23% YoY and -14% YoY respectively. We expect that positive dynamics is likely to be maintained in Q4 and BEV equivalent sales will increase by about +5% YoY in 2020 on annual basis.



Source: SNE Research

BEV equivalent sales in China in Jan-Sep 2020 were -23% YoY lower. Since the cut of NEV governmental subsidies in China in July 2019, the domestic sales were declining for 12 consecutive months but in Q3 the trend has reversed and BEV equivalent sales increased by +40% YoY. Despite the double-digit decline in NEV sales YTD, Chinese nickel sulphate production dipped just by -2% YoY and amounted to 102 kt Ni in Jan-Oct. At the same time, PCAM output reached 84 kt Ni in Jan-Oct or +7% YoY. The recovery of PCAM and nickel sulphate production is faster than the rebound of NEV sales due to increasing PCAM exports to South Korea (23 kt Ni or +47% YoY in Jan-Sep) and time lags between the nickel consumption and sales of NEV to final consumers.

In November, China presented updated xEV sales targets for 2035. According to the new proposal, NEV sales outlook for 2025 has been slightly reduced from the previously announced 25% of total car sales to 20%, but is still set at 50% in 2035. 95% of NEV sales in 2035 are targeted as BEVs, while PHEVs and FCEVs will make up the rest. Another 50% of vehicle sales in 2035 will be HEVs. If these new targets are successfully met, battery nickel demand in China will rise more than 6-fold to over 750 kt Ni, benefiting from surging BEV and PHEV sales.

The bright spot this year has been Europe, with xEV sales soaring to a record high of 1.4 million of BEVs, HEVs and PHEVs during Jan-Sep 2020 compared to just 900,000 units during the same period last year. This translates into +64% increase YoY in BEV equivalent. This spectacular growth was stimulated by the generous incentives in the form of purchase subsidies, scrappage schemes and tax benefits offered by the European governments as part of their 'Green Deal' as well as a greater variety of car models that are now available. All countries with high xEV sales, such as Germany, France, UK, Norway, Sweden that account for almost 75% of sales, offer such incentives, which shows that government support is essential at this stage of the market development.

As OEMs are increasing xEV model launches due to upcoming stricter emissions regulations, battery makers continue building gigafactories across the entire continent to feed the future demand.

Since our May issue, 4 new projects have been announced in Europe with a combined capacity of 40 GWh by 2024, which is to be further expanded later. A fifth one was just announced last week by Tesla: the Gigafactory in Berlin could have 100 GWh capacity in its initial stage. Overall, around 25 gigafactories have been announced so far to be built over the next decade with the total capacity reaching over 700 GWh by 2030.

Cathode material production is also becoming localised and their combined capacities are estimated to account for ~100 kt Ni in PCAM/CAM by 2025. The rest of the demand from the European gigafactories will have to be met with imports from South Korea and China.

The USA have been lagging behind the global transition to vehicles' electrification with Tesla as the only prominent promotor so far. The US EV sales declined by -14% YoY in BEV equivalent during the first 9 months of 2020.

However, considering the latest political developments, the US might start focusing on e-mobility innovation in an attempt to become relevant in the global clean energy industry. The president-elect Joe Biden's long-term vision for the US is carbon neutrality by 2050, similarly to Europe's 'Green Deal', and one of the key milestones should be the achievement of carbon-free electricity by 2035, which would also catalyse the electrification of the vehicle fleet. Additionally, Biden administration intends to re-join the Paris Agreement, while his Build Back Better Plan of \$2 trillion over next 4 years includes measures supporting battery technology R&D and domestic production, consumer rebates for EVs, installation of EV charging stations and job creation in the EV supply chain.

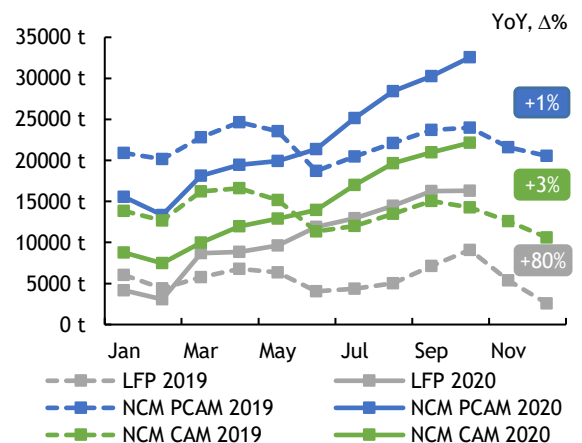
In the private sector, Tesla presented its grandest plans during the Battery Day in September. Firstly, the company

aims at adding 100 GWh in battery cell capacity by 2022 and a whopping 3 TWh by 2030 split across its plants in Nevada, Texas, Shanghai and Berlin. Secondly, Tesla intends to reduce battery costs by -56% thanks to cell re-design, cell production optimisation and anode and cathode material optimisation. And thirdly, it plans the supply chain integration with its own production of cathode materials to be launched. These announcements raise the bar for the industry, however it remains uncertain whether all of them could come to fruition within the expected timeframe.

Apart from Tesla's plans, several other gigafactories are expected to come online in the US over the next few years with a total capacity of almost 100 GWh by 2025.

In our latest issue, we have discussed the potential threat of LFP chemistries aided by the advanced *cell-to-pack* (CTP) and *cell-to-chassis* technology to the demand for nickel in batteries. In Jan-Oct, we registered a surge in the LFP battery materials production in China of +80% YoY, while NCM PCAM output increased just by +1% YoY. Currently in China, LFP battery cells with CTP cost 10-20% less than NCM 523. Considering the advantages of LFP batteries (spare LFP capacities in China, higher energy density per pack basis comparing to mainstream NCM523, lower cost cooling systems vs NCM), we see that LFP solutions are well applicable for the Chinese NEV subsidies in 2020-2022 with the base price remaining lower than CNY 300,000 (~\$42,500). It was also announced that Tesla's Model 3 and, possibly, premium Model Y could be fitted with LFP batteries in China, along with the NCM 811s supplied by LG Chem for the extended range version, to lower the vehicles' price. Given these developments, we expect the LFP in China might reach a 50% share by 2022.

**China Battery Materials Production**



Source: CIAP

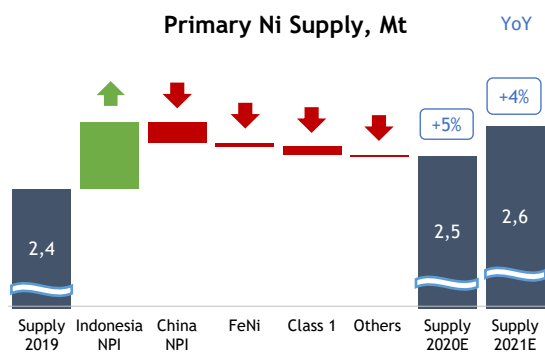
However, this resurgence in the LFP batteries' popularity in China is occurring at the expense of lower Ni chemistries NCM 523 and 622, while NCM 811+ keeps steadily expanding its market share. In the medium to long term, the prevalence of the LFP technology in China is likely to fade due to the subsidy cancellations 2022 onwards on the one hand, and mass adoption of NCM 811+ on the back of production scale-up and cost optimisation, on the other hand. We estimate LFP batteries to lose their market share to ~20% by 2026-2027.

Outside China, we do not expect LFP batteries to gain wide acceptance. Tesla was planning to export Chinese-made LFP-based Model 3 to Europe, but, according to our understanding, these exports will be only temporary and until Q2 2021 when the Gigafactory in Berlin will be launched. Additionally, the LFP technology is IP protected internationally with the patents expiring in 2022 and 2025 only, which hinders mass production elsewhere. And lastly, the EV supply chain in Europe, which is just being built up

with high investments, is based on nickel-intensive NCM 811+, making any shift towards a different technology unlikely in the medium term.

Overall, the negative impact of the pandemic on the global EV industry turned out to be lower than initially anticipated and we maintain the view that the long-term growth in nickel demand will primarily come from the battery sector at a robust pace.

## SUPPLY



Although the pandemic-related disruptions affected around 15% of the global output in 1H 2020 with various amplitude, the oversupply of nickel that emerged in Q4 2019 still persists and is likely to continue into 2021 onwards. We currently upgrade our 2020 production forecast to 2.5 Mt Ni (+5% YoY) from our earlier -1%.

The major growth is attributed to the Indonesian NPI supply at 600 kt Ni (+66% YoY). This offsets the decline in all other products including the Chinese NPI at 510 kt Ni (-13% YoY), which is decreasing due to the Indonesian Ni ore export ban. According to our current estimates, the primary nickel production will further grow to over 2.6 Mt Ni in 2021 (+4% YoY) driven by the unprecedented ramp-up of the Indonesian NPI capacities at 885 kt Ni (+4.8% YoY) outpacing the continuous decline in the Chinese NPI output, which is seen at 300 kt Ni (-4.1% YoY).

The ferronickel output in 2020 remains almost unchanged at 388 kt Ni (-3% YoY) influenced by major C&M at Cerro Matoso, furnace refurbishment at Koniambo, Pamco's decline in production and long-suffering from the financial difficulties Larco recently put for sale. We estimate that the 2021 ferronickel production will recover to 428 kt Ni (+10% YoY) on the back of Antam Halmahera production launch and Onca Puma reaching full capacity after 2020 C&M. Additionally, we believe that some ferronickel assets might be at risk of closure due to potential substitution by NPI in stainless sector and, together with a possible shutdown of VNC Goro, we identify those closures as possible disruptions with ~50 kt Ni weighting down primary nickel supply in 2021.

We forecast a decline in the Ni oxide and utility nickel output to 54 kt Ni (-19% YoY) in 2020 as a result of Vale's decision to shut down the refinery and produce nickel hydroxide cake only at their VNC site and the Dalian JV

refinery being put on care & maintenance. It is expected that the Ni oxide and utility nickel output will further decline to 42 kt Ni (-23% YoY) in 2021 as we think that Dalian JV will remain mothballed.

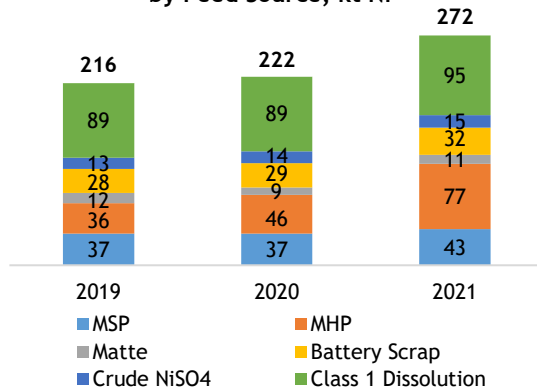
Metal nickel production was affected by both COVID-related disruptions and operational issues. South African and Canadian facilities were affected by a series of lockdowns in first half of the year while Ambatovy was put in quarantine in late March, possibly restarting in Q1 2021 the earliest. Major Class 1 nickel producers were running planned and unplanned care & maintenance on their facilities, extended both in time and the work scope, due to the pandemic restrictions. Anglo American was grappling with its Anglo Converter Plant outages that significantly affected refined output. As a result, we have slightly downgraded our class 1 nickel production forecast to 838 kt (-3% YoY). We estimate that 2021 metal nickel production will recover to 853 kt Ni (+2% YoY) as a result of Ambatovy restart, Anglo American's ACP repairs completion and the benefits from the extensive C&M completed in 2020 across the major producers, which will pave the way for sustainably higher production rates next year.

We forecast 2020 gross Ni sulphate production from all feed sources, including Class 1 Ni dissolution (although dissolution is not included in market balance calculation in order to avoid double counting), to increase to 222 kt Ni +6% YoY on the back of strong EV sales and robust nickel demand for batteries. We expect that gross nickel sulphate production in 2021 will further grow at higher rates to 272 kt Ni (+23% YoY) mainly driven by the launch of new capacities of BHP in Australia, higher MHP and MSP. Dissolution of Class 1 nickel, including powders, briquettes and pellets, which is using as a balancer for missing nickel units, will remain the major feedstock for sulphate production in both 2020 and 2021. However, the growth of gross nickel sulphate production will be predominantly covered by the rising supply of intermediates, which results in a relatively stable dynamics of dissolution volumes. MHP, the second most important feedstock in terms of volumes, will grow +27% YoY in 2020. We estimate that MHP will surge in 2021 (+67% YoY) on the ramp-up of Ravensthorpe project and re-orientation of the VNC supply (if not closed) to MHP, the probable launch of Lygend in Indonesia and possible processing of accumulated Ramu stocks. MSP is the third major source for nickel sulphate production. We forecast that MSP will stay flat YoY in 2020 but it can grow in 2021 (+15% YoY) as Terrafame reports its sulphate



production to be launched in 1H 2021, which should help to free up and process through the work-in-progress inventories and some intermediates' stocks that apparently (based on the trade flows and production data) were accumulated over Jan-Sep 2020.

**Nickel Sulphate Production by Feed Source, kt Ni**



Sources: SMM, Roskill, NN Analysis

In the coming years, the market is likely to face a considerable deficits of Class 1 nickel units available to meet the strong nickel demand in the battery sector. Given the already announced delays in Indonesian HPAL projects due to the rejection of deep-sea tailings placement (DSTP), this risk can materialise sooner. Existing high-grade nickel supply has failed to grow over the last 5 years and remains under-invested amid the multi-year depressed prices and elevated nickel inventories. Nickel exchange stocks lack consistency in quality and a premium over the LME has to be paid in order to secure a particular brand at a particular location, while Indonesian HPAL struggles because of high carbon footprint and production cost uncertainties (e.g. existing HPAL CAPEX overrun, possible delays and capacity underutilisation as well as volatility in product payabilities such as cobalt). NPI conversion to matte is also value-destructive for Class 2 producers as NPI was traded at a premium to the LME in October but at a few hundred US dollar discount now. Usually, nickel matte payability is 80-90% LME nickel, and non-captive nickel matte market is small with limited spare refining capacities. Even additional 50 ktpa Ni in matte can further depress payability to 50-60% or even less, while nickel sulphate premiums in China remain subdued within the cost Class 1 dissolution (less than \$1,000/t Ni) at the times of an oversupplied nickel market.

In order to remain competitive, battery producers must secure the most reliable nickel supply source in terms of quality stability (especially important for NCM811 and higher) and implement synergy integration, which would create a long-term competitive advantage and a platform for future growth along with the promising battery market. ESG-based approach with particular focus on carbon footprint is the best solution to secure a truly sustainable nickel value chain. Norilsk Nickel has been constantly improving its environmental standards and has always remained in the lowest quartile of the CO<sub>2</sub> footprint among the nickel producers, regardless of the methodology used to calculate the footprint.

Norilsk Nickel's gM 2020 production results were broadly in line with the guidance and did not bring any surprises. Total nickel output was almost flat year-on-year at 168 kt with a distinctive increase of carbonyl nickel production (+4 kt Ni

or +34% YoY) driven by its strategic diversification of sales into the premium products.

The gradual ramp-up of the new chlorine-leaching technology nickel refinery at Kola MMC and effective anti-COVID measures ensure the Company's meeting its 2020 guidance at 225-235 kt Ni.

The diesel fuel spill incident in Norilsk that drew significant public attention earlier this year has not had any impact on production. By the end of October, the consequences of the spill were fully remedied by the Company with over 80% of the leaked fuel collected, all contaminated soil removed and river shores treated with sorbents and washed off. The Company took the incident very seriously and responded to it by revamping its organisational structure and risk management as well as developing a comprehensive and holistic environmental programme aimed at a radical reduction of water and air pollution, cleaning up legacy contamination and permafrost monitoring.

In 2021, Norilsk Nickel expects its annual nickel production to be around 220-230 kt owing to the scheduled furnace maintenance at Nadezhda smelter.

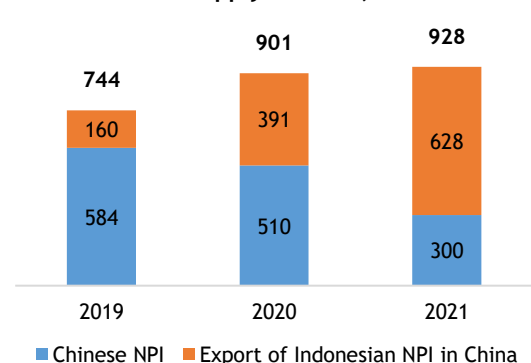
## NPI

### China

In early 2020, we estimated the Chinese NPI production at 420 kt Ni. The Indonesian nickel ore export ban, introduced in January 2020, national lockdown in the Philippines in Apr-May, and depletion of high-grade nickel ore reserves in the Philippine Tawi-Tawi region have significantly reduced the export of nickel units for the Chinese NPI production. However, demand for NPI has remained strong on the back of robust growth in domestic stainless output, which has led to active consumption of accumulated nickel ore reserves. According to our estimates, port and producers' stocks will be slashed by over 180 kt Ni in 2020, and we expect the Chinese NPI supply to amount to 510 kt Ni this year.

In 2021, the Philippines, bearing in mind the improvement in the epidemiological situation, are likely to maintain their nickel ore supply at close to the 2019 levels. We anticipate that exports of the Filipino ore to China will reach about 290 kt Ni, while supplies from New Caledonia are expected to be at 40 kt Ni. However, Chinese NPI production will decrease to 300 kt Ni due to depletion of ore stocks in China in 2020 and 2021. Lower Chinese NPI supply will be offset by higher NPI production and exports from Indonesia.

**NPI Supply in China, kt Ni**



Sources: Mysteel, BGRIMM, NN Analysis

**Indonesia**


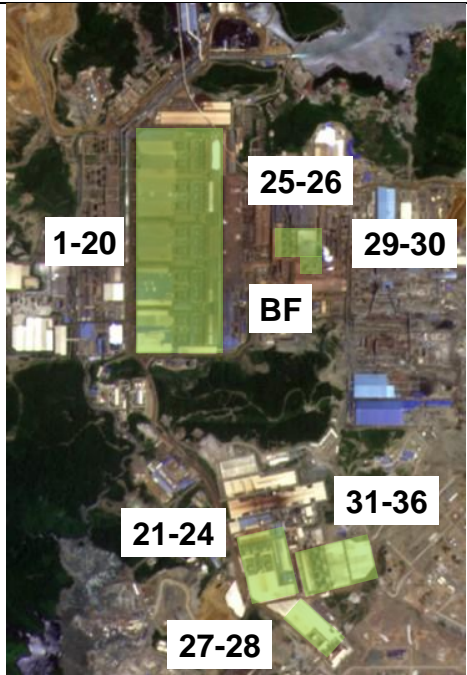
Significant NPI capacities were launched in Indonesia in 2019-2020. Most of these suppliers are non-public companies and do not disclose any financial or production results. Therefore, to trace this market we are closely following the NPI trade flows and gathering information from the local and Chinese sources. In addition to that, we are happy to share with you now the analysis of some satellite images, which reveal the existing infrastructure and new capacities' development in three main production clusters of the country: Morowali, Delong Industrial Park and Weda Bay.

**Morowali (IMIP)**

In early 2020, there were 28 operating RKEFs at Morowali: 12 RKEFs with 39KVA capacity (9 ktpa Ni each) and 16 RKEFs with 42KVA capacity (10 ktpa Ni). Additionally, there was one BF (18 ktpa Ni). In Jan-Jun, further 8 new 42KVA RKEFs were ramped up.

In Jan-Oct, the average nickel content on the NPI produced at Morowali increased from 12.9% to 14.9%, with some batches being close to even 18%. If the current trend continues, the productivity of RKEFs is also expected to rise.

We estimate the 2020 NPI production at IMIP to be around 360 kt Ni. In 2021, they plan to ramp up another 4 furnaces, which, together with the previously commissioned capacities, will result in 400 kt Ni supply.


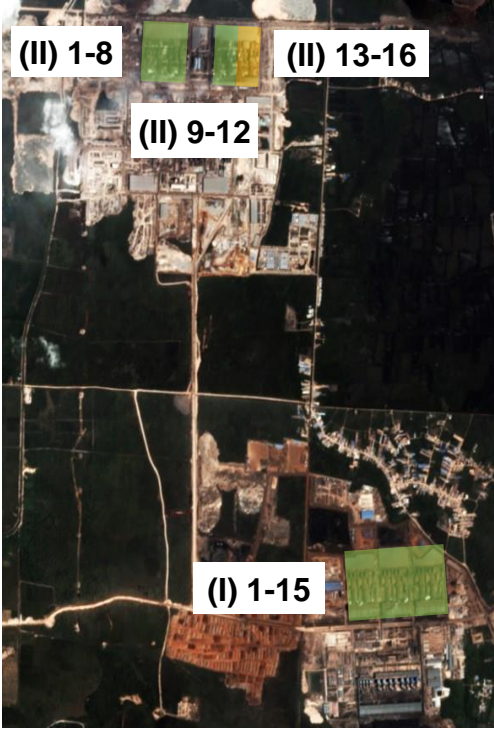
Project Name	Morowali Industrial Park	
Date	Dec 2019	Oct 2020
Satellite Image		
Lines under Construction	8 = 80 kt Ni (annual capacity)	0
Completed Lines	28+1BF = 286 kt Ni (annual capacity)	36+1BF = 366 kt Ni (annual capacity)

Sources: Planet Labs Inc, Mysteel, NN Analysis


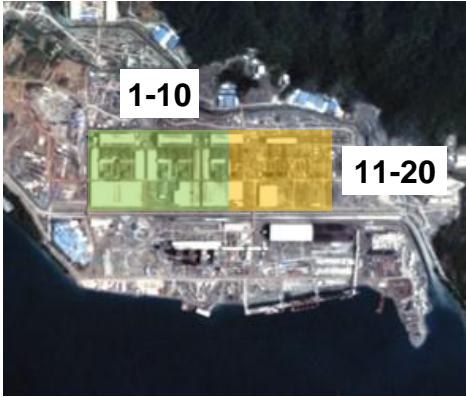
**Delong**

Delong has two projects in Indonesia: PT Virtue Dragon Nickel Industry (PT VDNI) and PT Obsidian Stainless Steel (PT OSS), which is developed in partnership with Xiamen Xiangyu. In early 2020, PT VDNI commissioned 14 RKEF with 33 KVA capacity. In June, the last 15th furnace was ramped up. The productivity of each 33KVA furnace is approximately 7 ktpa Ni.

Despite the challenging epidemiological situation, PT OSS had still managed to obtain entry permits for its 500 Chinese workers, which significantly accelerated the project's development. In May-Oct, 12 RKEF with 33 KVA capacity were put into operation within Phase II expansion. We expect a total of 15 RKEFs to be commissioned by the end of the year, which will result in 140 kt Ni supply. The producer announced another 10 RKEFs to be launched in 2021 which will boost annual production to 240 kt Ni, however we have failed to identify the construction of these lines so far on the satellite pictures.

Project Name	Delong (PT Obsidian and PT Virtue Dragon)	
Date	Jan 2020	Oct 2020
Satellite Image		
Lines under Construction	10 = 70 kt Ni (annual capacity)	4 = 28 kt Ni (annual capacity)
Completed Lines	14 = 98 kt Ni (annual capacity)	27 = 189 kt Ni (annual capacity)

Sources: Planet Labs Inc, Mysteel, NN Analysis

Project Name	Indonesia Weda Bay Industrial Park	
Date	Mar 2020	Oct 2020
Satellite Image		
Lines under Construction	11 = 99 kt Ni (annual capacity)	10 = 90 kt Ni (annual capacity)
Completed Lines	0	10 = 90 kt Ni (annual capacity)

Sources: Planet Labs Inc, Mysteel, NN Analysis

### Weda Bay (IWIP)

Indonesia Weda Bay Industrial Park (IWIP) is Tsingshan's second industrial park in Indonesia, where a number of NPI projects have been jointly developed in partnerships with other companies. In 2020, PT Weda Bay Nickel (a joint venture between Eramet, Tsingshan and PT Antam), PT Yashi Indonesia Investment (JV between Tsingshan and Zhenshi), PT Youshan Nickel Indonesia (JV between Chengtun, Huayou and Tsingshan) launched several production facilities.

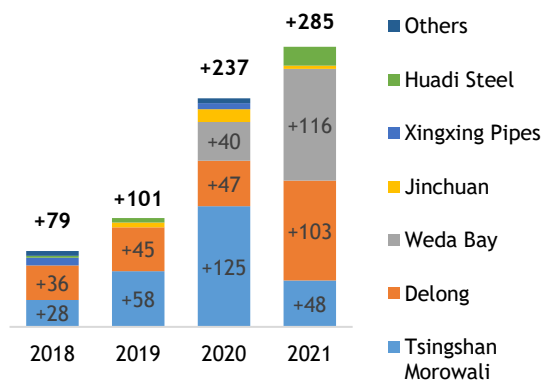
PT WBN commissioned 4 RKEFs from April to May, PT YII launched 4 RKEFs from June to October, PT YNI ramped up 2 RKEFs from September to October and plans to launch the remaining 2 RKEFs by the end of the year. The furnaces in IWIP are similar to the ones in Morowali, but their capacity is set at about 9 kpa Ni only due to the lower nickel content.

We estimate the production at IWIP to reach 40 kt Ni in 2020.

In 2021, the PT Angel Nickel Industry project (JV between Tsingshan and Nickel Mines Limited) is expected to be launched at IWIP. Nickel Mines Limited already has a stake in Hengjaya Nickel (HNI) and Ranger Nickel (RNI) projects in Morowali. In addition, Huayou and Tsingshan are planning to ramp up the PT LAN project. These two projects is expected to launch 8 RKEFs. We see 4 lines under construction while the area to build the remainder 4 lines is considered to be secured and cleared. We currently estimate the production at IWIP to be at 160 kt Ni in 2021 with 20 lines launched at Weda Bay in total.

In Jan-Oct 2020, NPI production in Indonesia amounted to 467 kt Ni, of which, according to the trade data, 311 kt Ni were exported (mainly to China). The rest was domestically consumed for the production of stainless steel (stainless consumption of primary nickel was 158 kt Ni in Jan-Oct 2020). We expect the total NPI production in Indonesia to reach 600 kt Ni in 2020 and increase to 885 kt Ni in 2021.

#### **Indonesian NPI Incremental Annual Output, kt Ni**



Sources: Mysteel, BGRIMM, NN Analysis

### **HPAL DEVELOPMENT**

In January, a week after the Indonesian nickel ore export ban had been introduced, PT Trimegah Bangun Persada (TBP) and PT Hua Pioneer Indonesia (HPI) presented their plans for using DSTP to the Coordinating Ministry for Maritime and Investment Affairs. TBP is a division of the Indonesian company Harita Group, which, together with the Chinese company Lygend, is launching the HPAL project on the Obi Island. HPI is responsible for the tailings disposal at PT QMB New Energy Materials and Huayue

Nickel and Cobalt projects, which are located in Morowali Industrial Park and are currently under construction.

However, it was reported in October that PT Hua Pioneer Indonesia had withdrawn its application for DSTP due to severe environmental obstacles that were difficult to assess.

The key reasons for the rejection of DSTP are severe environmental risks following the accident at the Ramu HPAL project in Papua New Guinea, with the spillover of slurry into the sea. Consequently, under public pressure, the demand for any product coming from sites using DSTP has effectively collapsed. Indonesian HPAL producers have since decided to implement alternative disposal methods to comply with the ESG standards and avoid any potential problems with product sales.

Experts identify several possible options for the mining waste disposal from HPAL projects: DSTP, tailings dams and dry stacking. Construction of tailings dams leads to additional CAPEX, there is a risk of dam failure as HPAL projects are located in a seismic zone and Indonesia is situated in the wet tropics. Dry stacking is considered to be the best option but it comes at cost while the stability of the stack and erosion issues are yet to be explored for a particular geography of Indonesia.

Out of three HPAL projects under construction in Indonesia, PT Halmahera Persada Lygend project in Obi Island is showing the most progress. The launch of this project was initially scheduled for 2H 2020, but there were some difficulties with the Chinese specialists' arrival due to the coronavirus outbreak, which delayed the commissioning. The launch of the first phase is now expected in March 2021 with a production capacity of 30-37 ktpa Ni. According to the currently available information, the project plans to use dry stacking for the mining waste.

Autoclave is the core equipment of an HPAL project. Huayue Nickel and Cobalt is going to utilise 4 autoclaves, each of them is 5.3 meters in diameter and 41 meters in total length. Two of them were shipped to Indonesia in October, the other two were delivered in the end of November. Currently, there is no information about any progress in construction of PT QMB New Energy Materials in Morowali. Two projects in Morowali are expected to come online by 2022 the earliest.

### **CONCLUSION**

Considering the challenges of the COVID-19 pandemic this year, the nickel market remains well-supplied in 2020. The pandemic's impact on the nickel production has been limited and fully offset by the Indonesian expansions resulting in the market surplus.

For 2021, we anticipate a smaller surplus which could further shrink on the back of faster than expected growth in Chinese stainless steel output and potential supply disruptions. However, as the global economic situation remains volatile and unpredictable, further potential revisions of the market balance might be required, both on the demand and supply sides.

As Indonesia is becoming a key nickel producer, given its scheduled ramp-up of NPI and HPAL projects, the future nickel market balance will be determined by the success of these launches and their compliance with the ESG standards.

The long term growth of the demand will come from the battery sector, driven by government legislation and incentives. Europe, which is currently building up its own battery eco-system, will become the new centre of growth based on high-nickel chemistries. Market players, who first secure the most reliable and responsibly sourced nickel supply in terms of quality stability (especially important for

NCM811+) and implement synergy integration, will have a competitive advantage and a platform for future growth along with the promising battery market.

We regard the ESG-compliant nickel as an essential metal to achieve the goals of a carbon-free and sustainable economy.

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## GLOSSARY OF TERMS

Abbreviation	Term
\$bn	Billion US dollars
\$m	Million US dollars
BEV	Battery electric vehicle (without ICE)
BF	Blast furnace
CAGR	Compound annual growth rate
CAM	Cathode active material
CAPEX	Capital expenditure
EF	Electric furnace
EMEA	Europe, Middle East, Africa
FCEV	Fuel cell vehicle
FeNi	Ferronickel
HEV	Hybrid electric vehicle
HPAL	High-pressure acid leaching
ICE	Internal combustion engine
IMIP	Indonesia Morowali Industrial Park
IWIP	Indonesia Weda Bay Industrial Park
JV(s)	Joint venture(s)
kt	A thousand tonnes
ktpa	A thousand tonnes per annum
LFP	Lithium iron phosphate battery
LME	London Metal Exchange
MHP	Mixed hydroxide precipitate
MLCC	Multilayer ceramic capacitors
MoM	Month-on-month
MSP	Mixed sulphide precipitate
Mt	Million tonnes
NCA	Nickel cobalt aluminium battery
NCM	Nickel cobalt manganese battery
NCMA	Nickel cobalt manganese aluminium battery
NEV	New energy vehicles (battery electric and plug-in)
Ni	Nickel
NiMH	Nickel metal hydride battery
NiSO <sub>4</sub>	Nickel sulphate
NPI	Nickel pig iron
PCAM	Precursor cathode active material
PHEV	Plug-in hybrid
RKEF	Rotary kiln furnace
SHFE	Shanghai Futures Exchange
STS	Stainless steel
xEV	BEV, PHEV & HEV
YoY	Year-on-year
YTD	Year-to-date

01 December 2020

# Macro Drivers and Financial Flows

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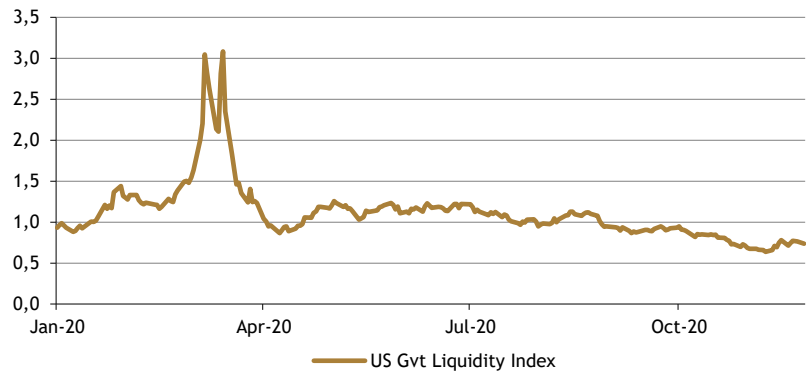
## Macro Drivers and Financial Flows

A year ago it would have been hard to imagine a global macro event that could overshadow Brexit, a US presidential election, and a US-China trade conflict. The Covid-19 pandemic has had profound effects on economics, trade, politics and of course public health. It has also of course had deep impacts on commodity supply chains, demand, investment flows and prices. Untangling the short-term effects from fundamental forces is difficult but the scale of the intervention by governments and central banks will continue to dominate for a time yet.

The immediate liquidity issues for financial markets posed by the rapidly expanding Covid-19 pandemic in the first half of the year were navigated well, considering the scale and nature of the problem. The importance of the quick provision of almost unlimited short-term liquidity to financial institutions was a lesson well learned by central banks from the financial crisis of 2007/08.

In many developed countries, the containment measures imposed in response to the health-care and human aspects of the crisis have necessitated unprecedented targeted and direct government support for specific sectors of the economy and for employment in general.

### USD liquidity at the sovereign and interbank level quickly reverted from the stressed peaks of March and April



Source: The Bloomberg™ Professional service

The merits or otherwise of those policies will become clear over the next decade. In the immediate future, the almost unfathomable increase in the supply of ultra-cheap money is having an inevitable uplifting effect on financial assets.

### US money supply has accelerated to unprecedented levels – how quickly it can be unwound under a new US administration is unclear

the almost unfathomable increase in the supply of ultra-cheap money is having an inevitable effect on financial assets

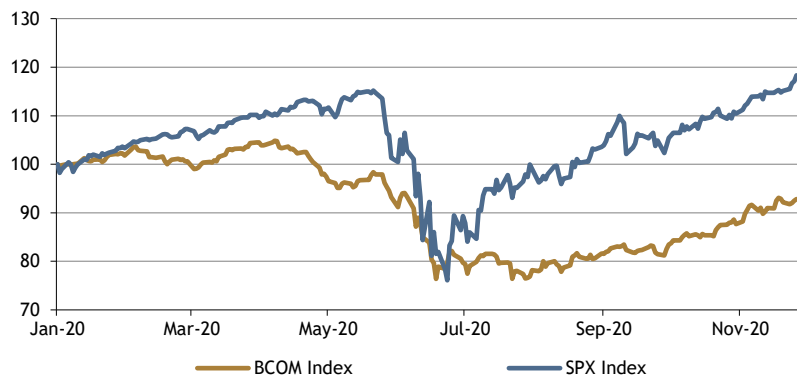


Source: The Bloomberg™ Professional service

Investors may be concerned about economic output gaps; debt-to-GDP ratios; disposable incomes and personal savings rates; commercial real estate valuations; P/E ratios; or any number of other macro-economic and financial market indicators – but when rates are negative and liquidity is excessive, financial assets are biased to go up.

There is clearly an element of capital flows lifting commodity prices at present. The influence of those was forgotten (or perhaps, heavily discounted, again) by ratings agencies and other commentators in Q1 when asset prices in general were collapsing. The letter V was missing from pretty much all the recovery scenarios but a V-shaped rebound is more or less what has been seen in copper, in zinc, and in nickel as well as in equities and fixed income.

**Capital flows surfing a wave of cheap money have lifted asset prices. Even broad commodity indices heavily weighted to energy are recovering well**

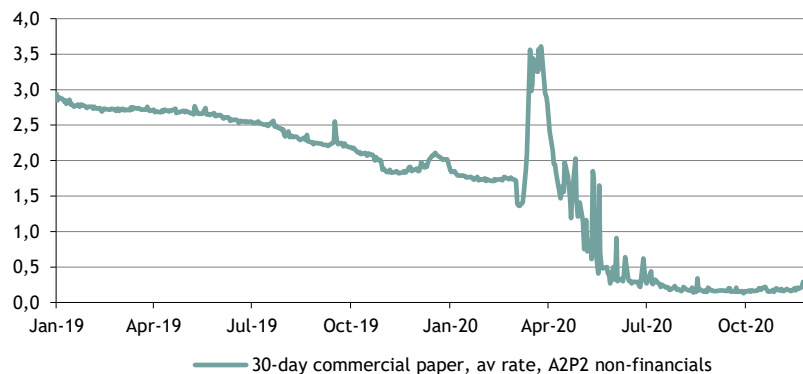


Source: The Bloomberg™ Professional service

Of course, our comments from May this year hold good: *"We are seeing 'v'-shaped recoveries in many asset prices but economic growth is much more likely to be an extended 'u'-shape... and it is likely to be two or three quarters for the bottom of that U to become apparent."*

Corporates that entered the pandemic with reasonable leverage ratios are, for the most part, now enjoying access to the cheapest funding rates in more than a generation. But once treasurers have refinanced existing debt, or paid special dividends, the challenge then becomes how to manage the balance sheet efficiently when forecasting future demand and the appropriate timing of capital investment remains exceptionally hard. By most measures economic growth turned around sharply in Q3 but it is the sustainability of the turnaround that is now a key question.

**Corporate funding rates are exceptionally low, as long as there is market appetite for the issuer**



Source: The Bloomberg™ Professional service

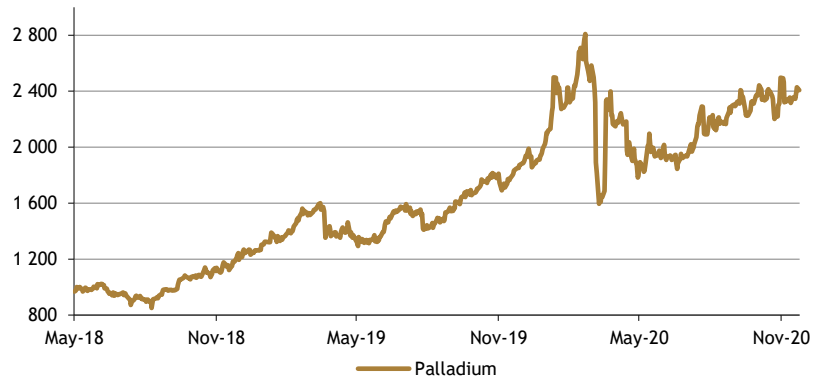


### Commodity fundamentals still matter

Even in the most unusual of circumstances the fundamentals of commodity supply, available inventories and demand still matter.

That is evident from a chart of the palladium price. For the past two years, palladium has been appreciating at annualised rate of around 47%. Running into the Cov-19 crisis the palladium price had accelerated above trend on material tightness in both the spot and forward markets that had (and has) little to do with short-term speculative flows.

**Palladium tightness in both spot and forward markets has been a reflection of a market that has increasingly depleted refined inventories of metal**



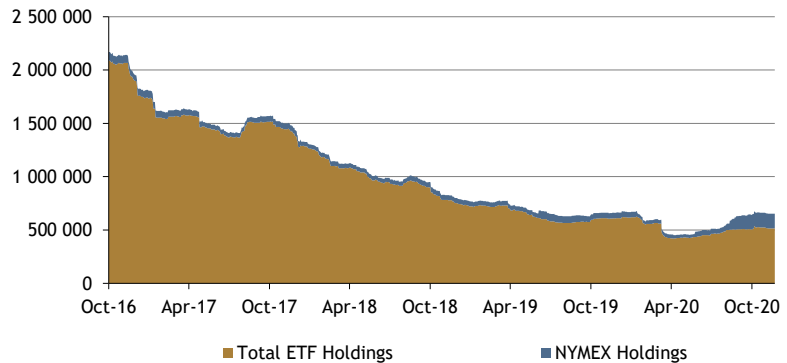
Source: The Bloomberg™ Professional service

As the pandemic unfolded and consumer demand collapsed, palladium did too. However, the reversal was short lived and by mid-year the market was turning upward again.

Regardless of the disruptions caused by the pandemic, the large accumulated deficit between supply and demand meant that refined inventories of physical metal continued to be drawn out of exchange traded investment products to fill the gap. Exchange traded fund holdings are a reasonable proxy for total near-market inventories and by the end of Q1 those ETF holdings had fallen below 0.5 million oz, equivalent to less than one month of global demand for the metal.

**The palladium stock cupboard is not completely empty but it is quite bare**

**ETF holdings of palladium now represent less than one month of global demand**



Source: The Bloomberg™ Professional service

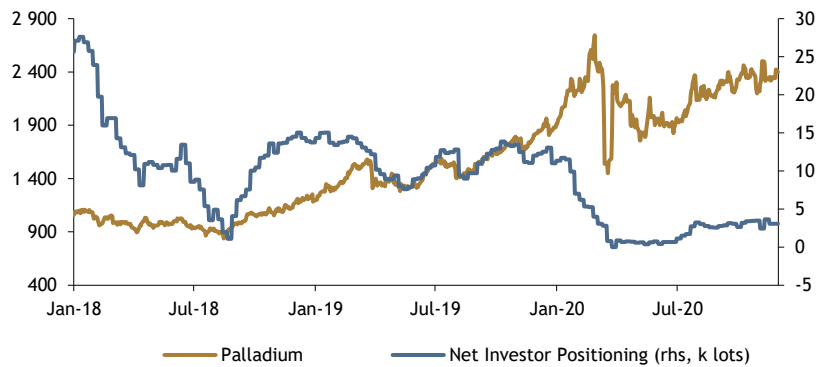
### Speculative funds rushed for the exit in palladium

Palladium was still very much a preferred commodity for investors to be long of at the start of this year. Coming in to the Covid-19 crisis there was still a net non-commercial long Nymex futures position of more than 1 million oz. However, as the pandemic's effect on first Chinese then global auto sales became apparent, those positions were rapidly unwound. Long Nymex futures and options positions dropped to the lowest level in almost 17 years.

From the beginning of April onwards there has been a moderate rebuilding of some non-commercial long positions (i.e. not related to hedging) but we think most of that is probably a result of an arbitrage against physical metal delivered in to exchange depositories rather than outright long exposure. In aggregate the speculative position remains very low.

It has been quite a ride but for now funds have largely stepped back from the palladium market

#### Palladium: outright and net speculative positions dropped to the lowest level for many years

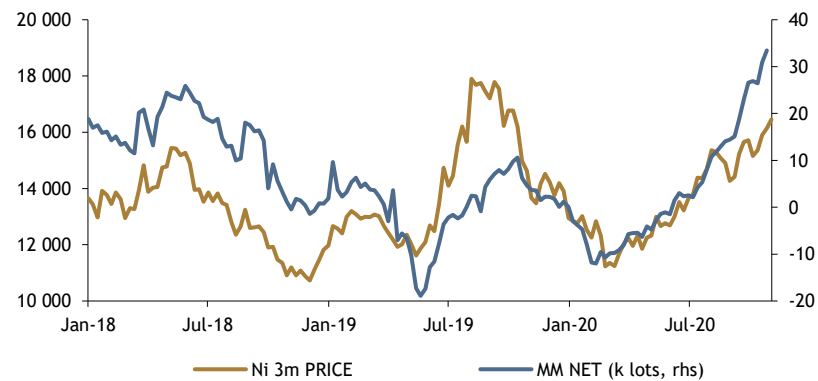


Source: The Bloomberg™ Professional service

### Nickel – focus of attention

The nickel market was far more balanced than palladium at the start of 2020, and market positions held by funds and others unrelated to hedging were at low levels. The ongoing trade tensions between the US and China, and a softening economic outlook had already weighed on sentiment and the price. Consequently, the initial spread of Cov-19 and its effects on economic activity had a relatively minor effect on the price of nickel.

#### LME fund positions in nickel have accumulated rapidly since Q1, helping to lift the price by 50% from the March low



Source: The Bloomberg™ Professional service

Since April, however, investment capital has been flowing back into nickel with a notable effect on the price, which has rebounded by >50% from the lows just below \$11,000/tonne in late March.

Shanghai Futures Exchange open interest tells a similar, though less pronounced story, with aggregate open interest slowly rebuilding from Q2 onwards.

**SHFE open interest also suggest moderate speculative length liquidated in Q1**

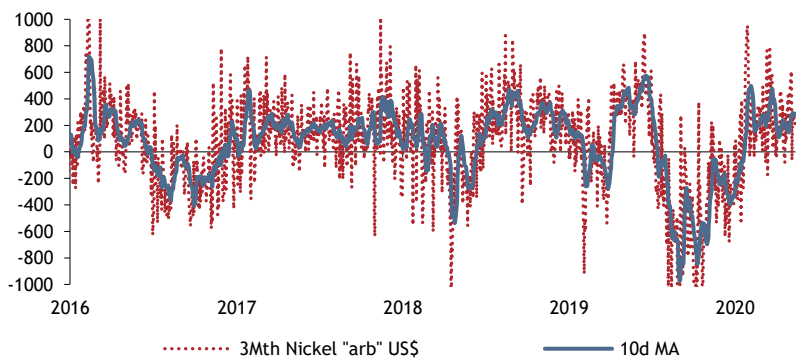


Source: The Bloomberg™ Professional service

With the renminbi appreciating quickly against the dollar during the second half of the year, some Chinese traders imported metal into bonded warehouses and financed it in-situ, waiting for a favourable arbitrage opportunity. To date, however, the windows when it has been profitable to import have been few and very short-lived.

the nickel supply/demand balance has been improving since the middle of the year

**SHFE / LME arbitrage – limited opportunities for importers so far despite CNY appreciation**

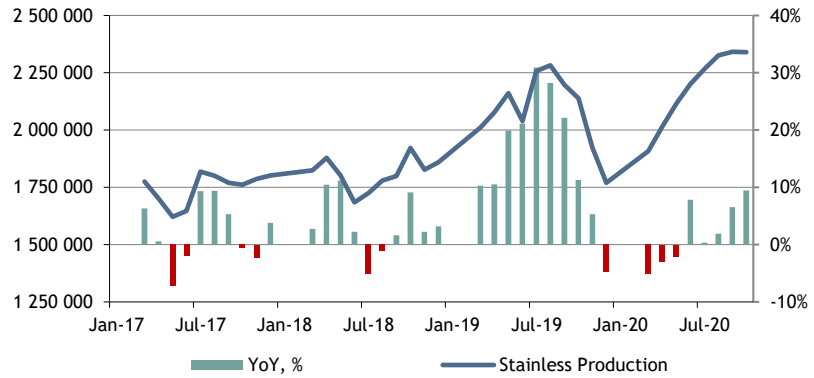


Source: The Bloomberg™ Professional service

The price rally, therefore, has not been purely driven by speculative flows or arbitrage trades, and of course those financial flows are influenced by the underlying supply/demand dynamic. For nickel, that supply/demand balance has certainly been improving since the middle of the year.

Chinese stainless steel output fell back sharply in Q1, having been running very strongly in 2019, but has rebounded relatively well through H2 2020 leading to a fall in domestic inventories of refined nickel. The question of course is whether stainless mills are over-producing relative to industrial demand – so far it seems that domestic stainless prices are holding up relatively well, suggesting that is not yet the case but sentiment is still quite fragile.

**Chinese stainless steel production recovered strongly through the second half of the year but sentiment amongst key demand segments is still fragile**



Source: The Bloomberg™ Professional service

**Outlook**

Back in May we erred on the side of caution with respect to the sustainability of the recovery that appeared to be emerging. The frictions of a US election cycle and strained US-China trade relations were concerns that predated the pandemic and had the potential to be exacerbated by it.

In the prior report we said, “*the risks for commodities seem skewed towards further disappointment*”. In hindsight, we underestimated the scale of the policy support for economic activity, and how quickly asset prices would reflect that and look past the immediate disruptions.

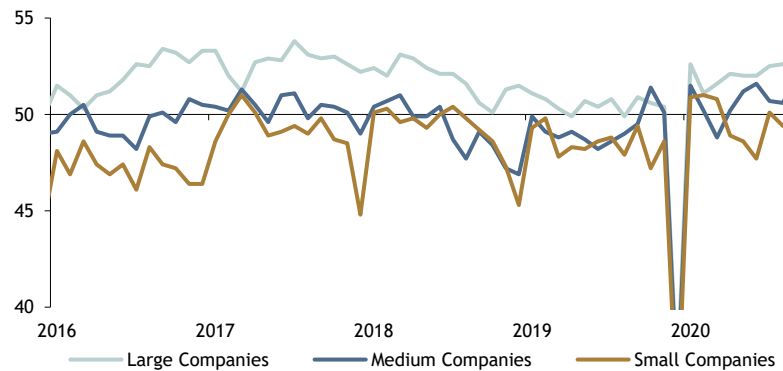
Of course there have been many variants of state intervention, whether from a public health perspective in attempting to control the spread of the virus, or from an economic perspective in the type and size of monetary and fiscal actions.

**policymakers have decided that a “buy now, pay later” approach is clearly preferable to another round of austerity**

But there is an overriding sense that policymakers have decided that a “buy now, pay later” approach is clearly preferable to another round of austerity, almost regardless of the long-term costs.

That is reflected not only in financial asset prices – the Dow Jones Industrial Average hitting new record highs, for example – but also in many measures of manufacturing sentiment, consumer confidence and spending.

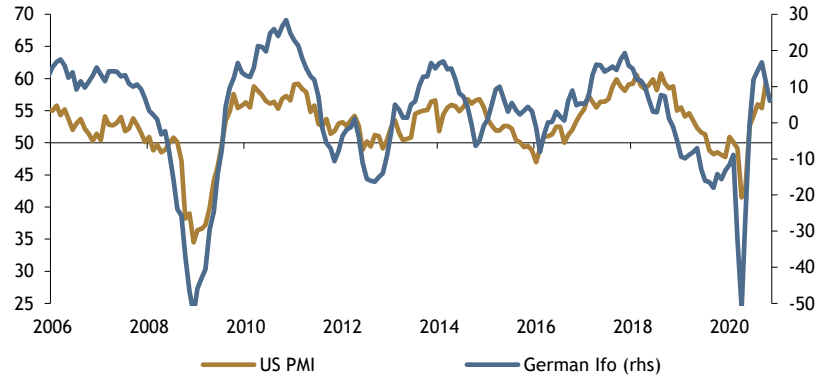
**Chinese manufacturing PMIs – the rebound has continued for larger companies**



Source: The Bloomberg™ Professional service

This is a truly global effort to avoid a deep recession, if not depression, albeit one that has not seen as much co-ordination between policymakers as previous banking crises.

**US and European manufacturing surveys have also snapped back**

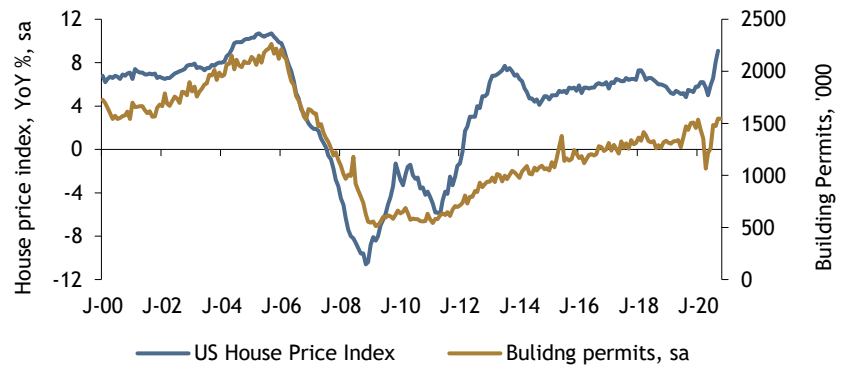


Source: The Bloomberg™ Professional service

Economic indicators from the US show a similar picture to those in Germany, even though the level of direct federal support for individuals is far less than in most EU states. The fact that US banks, businesses and consumers entered the pandemic with considerably less leverage than they had prior to the Global Financial Crisis has certainly helped. More of the cheap and abundant liquidity provided via the Federal Reserve can therefore flow into generating economic activity rather than paying back personal or commercial debt.

could 2021 really be a banner year for US construction activity?

**US building permits tend to be a reliable leading indicator, in which case 2021 should be a very strong year for US construction activity**



Source: The Bloomberg™ Professional service

We are aware that selective use of data can give a misleading impression and create unjustified optimism, particularly when the data have been so heavily influenced by centrally driven policy.

There are obvious concerns about the sustainability of the recoveries in consumer spending once some of the direct state support (furlough schemes, for example) start to expire in the New Year. There is also some frothy optimism about vaccines and how rapidly they can be rolled out; how effective they might be over the long term; and the rate of uptake.

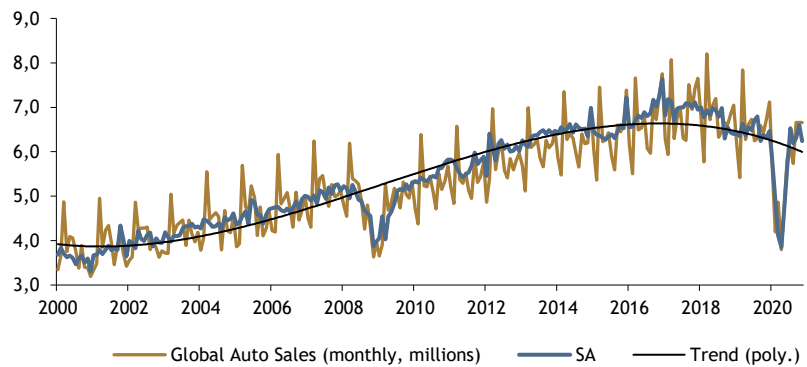
The questions of how much demand has been lost versus deferred, and how long that deferral will last, are not easily answered. Recovery in output to the trend that was in place prior to the pandemic will almost certainly be measured in years, not months.

But to return to the fundamentals of palladium and nickel, perhaps there are other influences at work that will be positive. Super-low to negative rates can help to stimulate a new period of infrastructure investment, though it will largely be via replacement of aging existing infrastructure rather than new additions to the capital stock in both the US and China. Low feedstock pricing will play into the petrochemicals industry, and pharmaceuticals are booming. That, superficially, is all good for stainless steel demand.

For palladium, auto production and sales are obviously critical, and the signs are cautiously encouraging. The global sales trend has taken a sizeable hit but a retracement from the elevated levels of 2018 was already underway and stabilisation around a 6.5 to 7.0 million units per month average globally would be a good outcome.

the signs from the global auto industry are cautiously encouraging

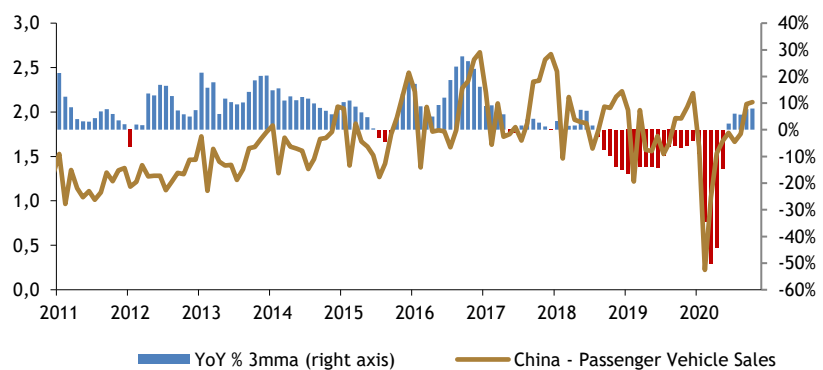
**Global auto sales have bounced back but heavy discounting has helped**



Source: The Bloomberg™ Professional service

In the world’s largest passenger vehicle market, China, growth has returned. If you are an optimist, that points to a strong 2021; if you are a pessimist then you might expect the sales rebound to fade early in the new year once aggressive discounting by dealers to move aged stock fades.

**Foundations for a robust 2021 or short-term blip driven by discounting?**



Source: The Bloomberg™ Professional service

We will continue to favour a cautious line for now. It does seem improbable that policymakers will be able to induce an above-trend period of economic recovery in 2021 when so many of the direct support measures will need to be withdrawn. Nevertheless, that caution does not necessarily mean a global recession is looming either. And both palladium and nickel demand are exposed to the right kind of demand trends: pollution remediation (catalysts for both conventional and hybrid vehicles), battery raw materials, and hydrogen purification.

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