

Cutting through the noise

We have updated our PGM company estimates following the recent results and 3Q close. Our views on the PGM market are largely unchanged – we remain bullish on the PGM market and believe the equities are due for a further correction following the sell-down in recent months. In this report, we also look at the electric-vehicle (EV) outlook and provide a battery metal summary. Our preferred stock picks remain Amplats, Northam, Impala and Sibanye.

One swallow does not an EV summer make

There has been a big spike in EV sales this year due to policy support and incentives. At the same time, internal combustion engine (ICE) vehicle sales have lagged due to COVID-19-related market distortions. As a result, EV market share penetration rates have spiked, with many taking this as a signal that the EV vs ICE sales split will shift materially in favour of EVs over the next five years. However, we caution against extrapolating these short-term trends caused by temporary market distortions. We expect ICE sales to rebound when market conditions normalise. The impact of EVs on PGM demand is still not clear cut, and we continue to see EVs as more of a longer-term threat than as a short-term one. We, thus, continue to see PGM autocatalyst demand growth over the next five years.

Where have all the chips gone?

The ongoing global semiconductor chip shortage is impeding vehicle production and has started to weigh on vehicle sales. This has negatively impacted PGM demand and could continue to do so in the near term. However, many of the factors that led to these shortages are short-term in nature, and we believe that some of these shortages and bottlenecks should ease over the next 6-12 months. This could lead to a sharp rebound in vehicle production and sales, which should see PGM autocatalyst demand pick up again.

Battery materials shaping up for a bright future

Copper, nickel and manganese stand to benefit from the global electrification drive, as their use in EVs and other battery applications should add new demand avenues for these metals. However, these metals could also benefit from traditional infrastructure development, which could accelerate on the back of increased global fiscal spending. These metals, thus, give investors exposure to both new and old demand drivers. Lithium, cobalt and graphite, on the other hand, are closely associated with batteries and EVs and their fortunes are, therefore, closely aligned to the anticipated electrification of the global economy. However, there are lots of moving parts in the outlook for these metals given the uncertainty about the pace of the global decarbonisation/renewables drive, and there are no clear winners yet, in our view. However, prospects for these metals look good given the global shift to EVs and renewables expected over the next decade.

PGM basket bounce is not done

We remain bullish on the PGM sector, sticking to our metal price call. We expect a rebound in prices as short-term anomalies ease. However, we do not expect the basket price to exceed the peak levels reached earlier in the year. Instead, we expect it to correct to more normalised levels and to remain robust for the next two to three years before correcting to more normalised long-term levels.

Equities pricing in sharp basket price downside

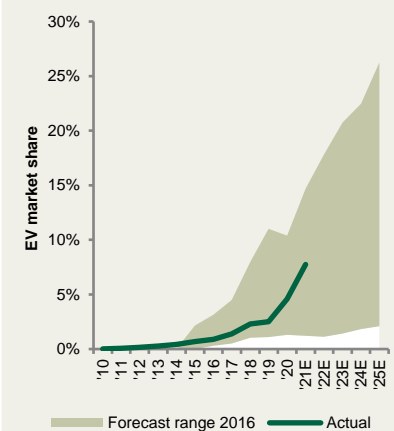
The market is still pricing in a sharp drop in the basket price, and we expect PGM stocks to rebound further following the pullback in August and September. We remain bullish on the longer-term outlook for the equities on the back of what is still a decent PGM basket price outlook. The companies should continue to generate decent cashflow even at these lower basket price levels, which should support higher valuation multiples. Our preferred stock picks are Amplats, Northam, Impala and Sibanye. Tharisa is also rated Overweight. We have downgraded RBPlat to Neutral.

Overweight

KEY CHANGES

RBPlat	Neutral from Overweight
--------	-------------------------

TOO OPTIMISTIC...EV MARKET SHARE PROJECTIONS IN 2016 VS ACTUAL PENETRATION TO DATE



ANALYST DETAILS

Arnold Van Graan

ArnoldVa@Nedbank.co.za

+27112959361

Contents

Electric-vehicle (EV) outlook	4
EV sales are booming despite the pandemic	4
Policy support incentive schemes boost EV sales	4
EV growth expected to accelerate	6
EV dominance is not a given	6
Extrapolation contagion	7
EV forecasts are overly optimistic	7
EVs still face technical and economic headwinds	8
Near-term EV impact not clear, but remains a longer-term headwind	8
Battery material cheat sheet	10
Sharp increase in demand	10
Battery technology	10
Battery formulations are evolving – no clear winners yet	12
Copper, nickel and manganese – the best of both worlds	13
Copper	13
Nickel	14
Manganese	15
New kids on the block – lithium, cobalt and graphite	17
Lithium	17
Cobalt	18
Graphite	19
PGM price outlook – short-term noise, market remains tight	21
Temporary market distortions	21
PGM basket price is still decent despite correction	21
Supply-demand balances	22
Supply challenges	23
Demand recovery expected	24
Global semiconductor shortage expected to be temporary	24
Autocatalyst demand expected to grow despite headwinds	25
Higher loadings could trump impact of thrifting	25
Industrial demand expected to recover	25
ETF demand could be a swing factor	25
Economic headwinds a risk to our investment case	26
PGM equity outlook	26
Results recap	26
Valuation and fair values	29
Anglo American Platinum – Overweight	30
Impala Platinum – Overweight	30
Ivanhoe Mines – Neutral	30
Northam Platinum – Overweight	30
Platinum Group Metals (PTM) – Neutral	30
Royal Bafokeng Platinum (RBPlat) – Neutral from Overweight	31

Sibanye-Stillwater – Overweight	31
Tharisa – Overweight.....	31
Wesizwe – Underweight	31
Comp tables	32
Key risks.....	35
Anglo American Platinum	35
Impala Platinum.....	35
Ivanhoe Mines	35
Northam Platinum	35
Platinum Group Metals	35
Royal Bafokeng Platinum	35
Sibanye-Stillwater.....	35
Tharisa.....	35
Wesizwe	35

Electric-vehicle (EV) outlook

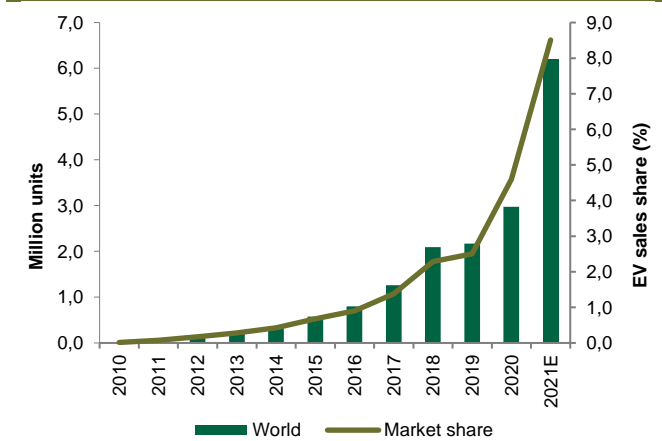
EV sales have been particularly strong in key markets around the world over the past year, pushing up EV penetration rates sharply. Many market commentators expect this trend to continue given the role of EVs in global climate change initiatives, and see the rapid rise in EV market share leading to the demise of the internal combustion engine (ICE) vehicle over the next 5-10 years as a foregone conclusion. We caution against this view. Although we also expect to see strong EV market share growth over the next decade, we caution against extrapolating recent EV sales trends into the future. Doing so sketches an overly optimistic EV outlook, especially over the next five years. We expect global vehicle sales to rebound strongly over the next two years, with steady growth beyond that. This growing base should see continued ICE vehicle growth despite an increase in EV market share. We, therefore, expect growing PGM autocatalyst demand over the next five years, despite increasing EV penetration.

EV sales are booming despite the pandemic

EV sales continued their upward momentum despite the pandemic. EV sales growth outpaced the broader auto industry in 2020, with new EV registrations increasing about +40% yoy (c.3m electric cars), while global vehicle sales dropped 16% yoy. This resulted in a sharp increase in EV market share, to 4,6% in 2020, from 2,5% in 2019. Although EV sales were somewhat impacted by pandemic-related headwinds in 1H20, EV sales showed significant growth from 2H20, with China and Europe accounted for most of the sales.

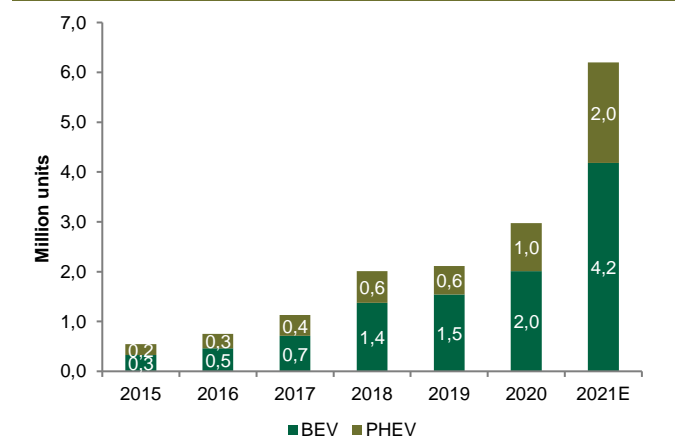
Full-year EV sales are expected to be around 6,2m units in 2021, pushing up EV market share to about 8,5%, according to S&P Global Market Intelligence. Pure battery electric vehicle (BEV) sales have been particularly strong, but plug-in hybrid electric vehicle (PHEV) sales are also expected to be strong. PHEVs are important from a PGM market perspective, as these hybrids contain PGMs and, thus, contribute to PGM demand. We, therefore, believe the headlines around EVs and PGM demand are often more dire than reality.

Exhibit 1: Global EV sales and market share have risen sharply despite the pandemic



Source: International Energy Agency (IEA), McKinsey, S&P Global Market Intelligence

Exhibit 2: Battery electric vehicles (BEVs) vs plug-in hybrid electric vehicles (PHEVs)



Source: International Energy Agency (IEA), S&P Global Market Intelligence

Policy support incentive schemes boost EV sales

Policy favouring EVs is increasing across the globe, contributing to the sharp rise in EV sales in recent years. Several jurisdictions and regions have formulated policies encouraging EV uptake, while ICE vehicles have attracted higher taxes and penalties.

The COVID-19-related economic response has further benefited EVs, with governments launching vehicle incentive schemes aimed at EVs, which we believe have contributed significantly to the surge in EV demand.

The EU's and China's policies have been favouring EV for a long time. US policy under the previous administration was not that supportive of EVs; only under President Biden has US policy become more favourable to EVs. These policies have ambitious EV market share targets, as Exhibit 3 shows. These targets should materially impact the future vehicle sales mix, in our view.

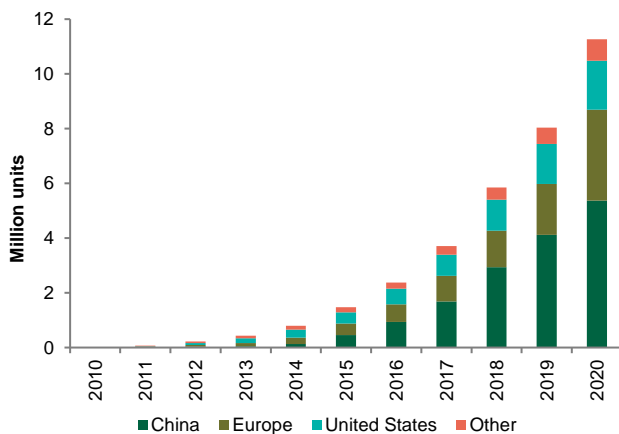
Exhibit 3: Regional EV targets

Region	Target
Europe	The "Fit for 55" package aims to align existing EU laws and targets with a deepened 55% net emissions reduction by 2030 and net-zero emissions by 2050. This includes an effective ban on the sale of new petrol-driven cars from 2035.
US	President Biden has outlined a target of a 50% EV sales share in 2030.
China	China aims for new energy vehicle (NEV) sales to account for 20% of the country's total vehicle sales in 2025. However, current rapid growth in the market will likely help it achieve this target in the next two years.

Source: Nedbank CIB Markets Research

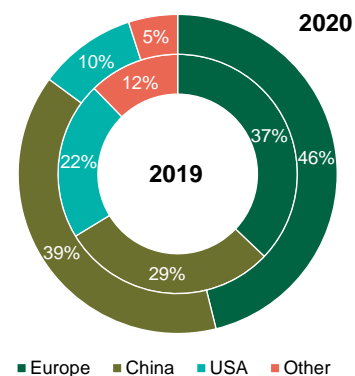
These policies have seen a big divergence in EV market trends in different regions, with the EU and China leading the charge while the US has lagged. Although China has the largest EV fleet (c.48% of total EV stock), significant sales growth in 2020 was largely driven by Europe, where EV sales more than doubled in 2020.

Exhibit 4: Global EV stock by region, 2010-2020



Source: International Energy Agency (IEA)

Exhibit 5: EV sales market share, 2019 vs 2020



Source: International Energy Agency (IEA)

Many other factors have also contributed to the increase in EV penetration:

- Climate-focused regulations.** Several countries have pledged to phase out the sale of ICEs. According to the IEA, more than 20 countries have announced the full phase-out of ICEs over the next 10-30 years. Governments globally are increasingly pushing legislation to force a reduction in CO² emissions. As a result, global vehicle emissions standards are being tightened with more stringent emissions standards being implemented across many jurisdictions over the next couple of years. As a result, there is mounting pressure on auto manufacturers to reduce CO² emissions by changing their fleet offerings by including lower-emission vehicles (smaller vehicles) and more EVs, while reducing their (often more lucrative) SUV and truck ranges.
- Improvement in battery technology.** Battery technology is evolving at a faster pace, with new chemistries and formulations being introduced to the market. According to Bloomberg New Energy Finance (BNEF), average battery density is rising at 7% per annum, while the price of lithium-ion batteries has fallen more than 89% from 2010. This has resulted in significant improvements in the EV range, performance and economics (cost).
- Automakers favouring EV adoption.** Several automakers have announced their intention to increase the number of EV models while some have announced plans to phase out ICE sales completely over time. General Motors (GM) is one such example; it plans to end sales of new US gasoline-powered light-duty vehicles by 2035, and it is focused on full EVs rather than PHEVs. Ford plans for at least 40-50% of its global vehicle volume to be all-electric by 2030. Volkswagen expects half of its sales to be BEVs by 2030 and almost 100% of its new vehicles in major markets to be zero-emission vehicles by 2040. We believe this is starting to impact consumer trends.
- Attractive EV incentive schemes.** Many governments are offering incentive schemes to bring down the cost of EVs. Germany has announced it will be extending its existing EV subsidies through to 2025, originally expected to end in

2021. France is also offering subsidies of up to EUR6 000 for certain EV models. In Spain, private buyers would be entitled to subsidies of up to EUR7 000 per EV. New Zealand has announced a clean-vehicle package, which provides rebates for EVs and PHEVs, with up to USD8 625 for new vehicles and USD3 450 for a used vehicle. These incentives reduce the purchase price of EVs and boost demand, in our view. We caution, therefore, that if these incentives run out or are withdrawn, it could negatively impact EV penetration rates.

- Improved EV infrastructure.** The number of available charging stations has also increased sharply in recent years, with the aid of government funding. The number of publicly available EV charging points globally surpassed 1m in 2020. This is more than double the number three years ago. Most of this steep increase was in China, where the number of EV charging stations increased to 800 000 at the end of 2020, from 516 000 in 2019.

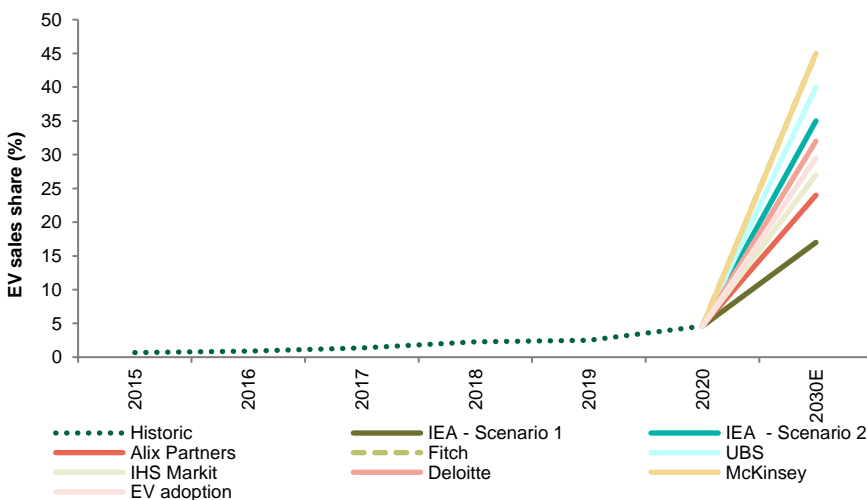
EV growth expected to accelerate

Many things have fallen into place for the EV market in recent years, with indications that the EV sector would continue to find support from governments, auto manufacturers and consumers in the coming years.

Although there is a big divergence of opinion on how fast EV market share will grow over the next few years, the general view is that it would increase substantially over the next decade, as Exhibit 6 shows. Based on the forecasts of various global auto-sector commentators, EV penetration rates are expected at 17-45% by 2030. These forecasts are at the extreme ends of the spectrum, with a clustering of forecasts at 20-30%.

It is important to note the large divergence in the various EV forecasts, which we believe reflects the complexity of this issue. Although the consensus is for a sharp increase in EV penetration rates, the outcome is certainly not clear cut based on these estimates. The estimates above are essentially calling for a 270-800% increase in EV market share over the next decade. This is significant and would dwarf the number of EVs being sold currently.

Exhibit 6: Global EV market share penetration rate forecasts – EV uptake rate is not clear cut



Source: Various contributors, as listed in the chart, Nedbank CIB Markets Research

EV dominance is not a given

However, we take these EV market share forecasts with a large pinch of salt. We believe most of these forecasts are overly optimistic and back-end loaded, with a sharp increase in EV sales expected from 2025. We also believe many of the vehicles included in the EV forecasts are hybrid vehicles, which contain PGM loadings. Therefore, not all EVs reflected in the charts displace PGMs.

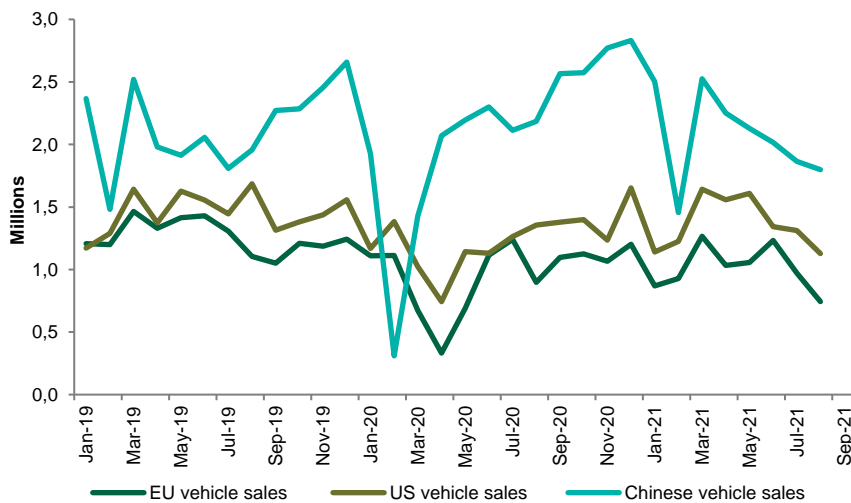
Still, the strong EV forecasts seen above, combined with the sharp increase in EV sales over the past year, have rekindled the belief in the market that EVs would materially displace ICEs over the next few years. It is not that clear cut, though, and there are still several factors that could materially impact these forecasts. We caution that this substantial increase in EV market share reflected above is not a foregone conclusion.

Extrapolation contagion

Vehicle sales have been particularly weak in recent months, as Exhibit 7 shows. This was due to concerns about slowing global growth and the negative impact of semiconductor (chip) shortages. ICE sales have been disproportionately hit, given the strong EV sales noted earlier. As a result, EV penetration rates have increased sharply, as they are measured off a very low ICE base.

As a result of the recent slowdown in sales, many commentators have trimmed their vehicle sales forecasts, making investors turn very negative on the global ICE vehicle sales outlook and PGM demand outlook.

Exhibit 7: Global vehicle sales have slowed in recent months, raising concern about the PGM market



Source: Bloomberg, Statista, ACEA and IEIC

However, we caution against extrapolating some of these shorter-term trends. We believe that the fallout from the pandemic, which includes the chip shortages, has created significant market distortions. However, we expect these aberrations to ease over the next 6-12 months as supply chains and other logistics flows start to normalise.

Yet, despite the short-term nature of some of these trends, investors now seem to base their forecasts off these numbers. This is something we see quite often and which leads to investors either becoming too optimistic or too pessimistic on certain market trends.

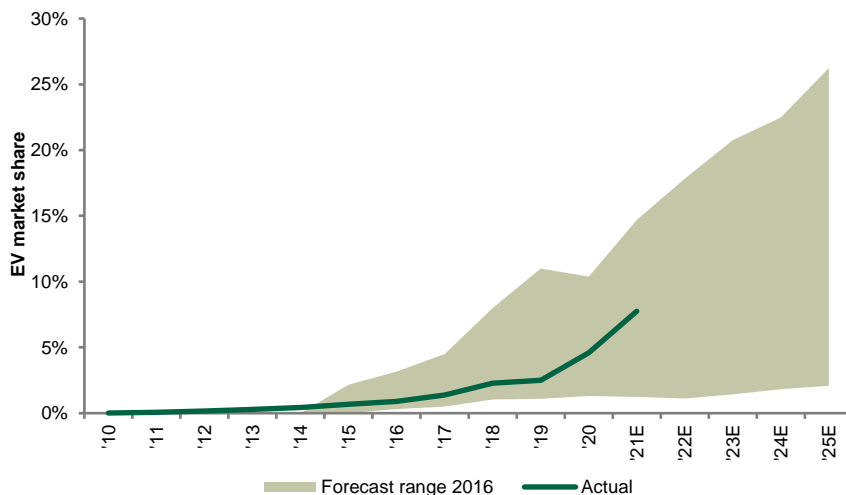
We would, therefore, not take it as a foregone conclusion that EV market penetration seen over the past year will continue to grow to the extent it has, given the base effect caused by low ICE vehicle sales. We also expect a rebound in ICE vehicle sales when conditions normalise. The near-term outlook for ICE vehicles may, therefore, not be as dire as some of the longer-term forecasts suggest.

EV forecasts are overly optimistic

The global decarbonisation drive is fuelling the move away from fossil fuels to renewable energy sources. This continues to dominate headlines and has accelerated the push towards EVs, in our view. Although we see EVs as playing a central role in the decarbonisation of the transportation sector, the transition to EVs could take longer than most expect, due to the economic and technical constraints associated with this move.

As a result, we believe many of the EV market share forecasts in the market remain overly optimistic, as has been the case for some time. Exhibit 8 shows the range of EV forecasts in the market in 2015 and how they compare to the actual EV market penetration rate to date. It is clear that the upper-end forecasts at the time turned out to be overly optimistic. Many of those forecasts were also back-end loaded, with a typical hockey stick-type exponential increase in the latter part of the forecast term. We believe the same is true for many of the current EV forecasts seen in the market. We, therefore, believe the headlines showing 30% EV market share by 2030 misconstrues the impact of the transition on the global vehicle sales.

Exhibit 8: Too optimistic... EV market share projections in 2016 vs actual EV penetration to date



Source: Bloomberg

EVs still face technical and economic headwinds

However, many of the impediments that have hampered EV uptake in recent years are far from being resolved, in our view. The cost of EVs is still high, and ongoing incentives and government subsidies are needed to make EVs viable for global mass-market uptake, in our view. Improved battery technology has improved the range of many EV models, but range issues persist, especially in lower-cost models.

Range anxiety, thus, remains an issue in many applications in many jurisdictions (not everyone in the world lives in a city). And despite a sharp increase in charging points globally, these have been concentrated in urban or built-up areas.

The economics and efficiency of ICE vehicles, therefore, continue to trump those of EVs in many applications and jurisdictions. As a result, we do not believe it is a foregone conclusion that EVs would materially displace ICEs over the next 5-10 years.

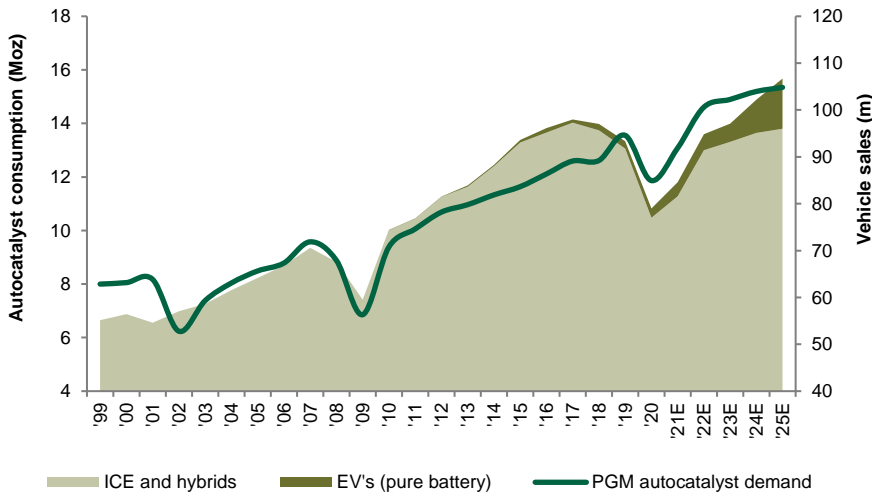
Near-term EV impact not clear, but remains a longer-term headwind

The transition to EVs is fraught with nuances and complexities, and there is no clear-cut outcome. The transition to EVs carries a large financial burden for auto manufacturers, consumers and governments, with no one really willing and able to pick up the tab. In other words, someone has to pay for this, but everyone tries to shift the burden onto the other. The economic and social impact of the pandemic could add to this complexity, which could influence the pace of EV adoption.

What is clear, though, is that EV penetration is picking up pace and could continue to do so. However, we maintain the opinion that the view on EV uptake is too optimistic, and see continued growth in ICE and hybrid vehicles.

The impact of EVs on PGM demand is also not clear cut. Our view is that the near-term impact could be less than what most investors expect, as we continue to see EVs as more of a longer-term threat than a short-term one. We also expect a sharp rebound in vehicle sales, including ICE vehicles, over the next couple of years on the back of a rebound in demand disrupted by the pandemic and chip shortages, further boosted by ongoing global stimulus measures. As a result, we continue to see PGM autocatalyst demand growth over the next three to five years, as Exhibit 9 shows. This is based on a 10% BEV penetration rate by 2025. This is towards the bottom end of the range of market forecasts, but given our views about the overoptimism in some of these estimates, we consciously take a more conservative view on EV growth rates.

Exhibit 9: Global ICE vs EV outlook – ICE expected to continue to dominate demand over the next few years



Source: Bloomberg, company reports, Nedbank CIB Markets Research

However, the narrative around growing EV penetration could continue to weigh on PGM market sentiment. The risk of growing EV sales could, thus, have a bigger impact than the actual supply-demand impact on the PGM investment case at the end of the day, in our view. This, we believe, could create a short-term opportunity for those willing to look through the noise.

Against this, the hydrogen fuel cell electric vehicle (FCEV) story is gaining traction. There have been significant advances in the hydrogen and fuel cell market in recent years, and this potential PGM demand angle is getting more airtime on the back of the global decarbonisation drive. According to WPIC, about 10 000 hydrogen FCEVs could be built by 2030. Although we expect a limited impact from FCEVs on PGM demand in the short term, the FCEV market offers strong upside for platinum demand growth in the longer term. However, positive sentiment and news flow around FCEVs could offset some of the negative demand sentiment associated with BEVs, in our view. We, therefore, believe news flow around FCEVs could have a much bigger impact than the actual demand impact, but that it could have a positive impact on PGM prices, platinum in particular, over the next few years as the FCEV story gains traction.

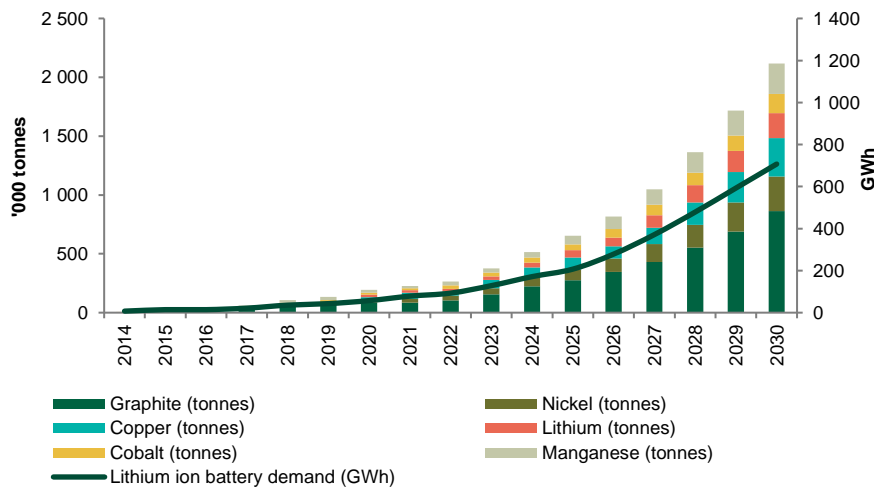
Battery material cheat sheet

There has been a large volume of research on battery materials in recent years. We do not have the resources to match this research and we also do not want to reinvent the wheel. However, we provide a summary of the outlook for certain key battery materials and our take on the prospects for selected metals.

Sharp increase in demand

The move to renewable energy, battery storage and EVs is expected to lead to a sharp increase in key battery materials over the next decade. Demand for many of these metals is expected to increase 2-9x by 2030. This sharp anticipated increase in demand in a constrained supply environment is leading to producers' and investors' interest in these metals.

Exhibit 10: Global lithium-ion and materials demand forecast from EV sales, 2015-2030 (thousands of tonnes, GWh)



Source: Bloomberg New Energy Finance

Battery technology

The estimates above are, however, very dependent on the evolution of the decarbonisation process and technology. As a result, some of these battery materials could be bigger winners than others, in our view. A major factor would be the evolution of battery technology and formulations.

Lithium-ion batteries are the technology widely used by automakers for EVs and are categorised by the chemistry of their cathodes. The usage of different minerals varies considerably, depending on the cathode and anode chemistries. We summarise the different battery technologies and their key features below.

Exhibit 11: Types of battery technologies

Battery technology	Features	Drawbacks
Lithium cobalt oxide (LCO)	LCO has the greatest energy density. Its high specific energy (150-190 Wh/kg) and technological maturity make it a popular choice for portable electronics.	The main drawback of the LCO battery is its thermal instability and its relatively short cycle life (500-1 000 full cycles). Coupled with safety concerns, LCO batteries are not favoured for application in EVs.
Lithium manganese oxide (LMO)	The LMO battery has a high specific power, a longer cycle life (1 000-1 500 cycles) and much better thermal stability than LCO. Being cobalt-free is often considered to be a key advantage of this chemistry.	It has a notably lower energy density, in the range of 100-140 Wh/kg. At present, it finds use in the production of electric bikes and some commercial vehicles.
Lithium iron phosphate (LFP)	The LFP battery offers thermal stability even at high temperatures, low cost and high durability (up to 2 000 full cycles while maintaining its performance).	Its relatively low specific energy (90-140 Wh/kg) is a limitation for use in long-range EVs compared with other chemistries. Nevertheless, LFP batteries could be particularly favoured in stationary energy storage applications and heavy-duty vehicles

Battery technology	Features	Drawbacks
Lithium nickel cobalt aluminium oxide (NCA)	The NCA battery has the highest specific energy range (200-250 Wh/kg) in the current class of technologies as well as high specific power, combined with a lifetime of 1 000 to 1 500 full cycles. It has immense potential for use in power systems in backup and load-shifting applications.	They are more expensive than other chemistries.
Lithium nickel manganese cobalt oxide (NMC)	NMC batteries have longer cycle life (1 000-2 000 cycles) compared to NCA, but a lower energy density (140-200 Wh/kg). It has dominated the BEV and PHEV markets since its commercialisation in the early 2000s. While NCA batteries have higher specific energy to their name, NMC batteries possess longer lifetimes, which makes them the favoured choice for PHEVs.	The rise in the cost of cobalt will also increase the price of NMC cells compared to LFP cells, as they contain cobalt.

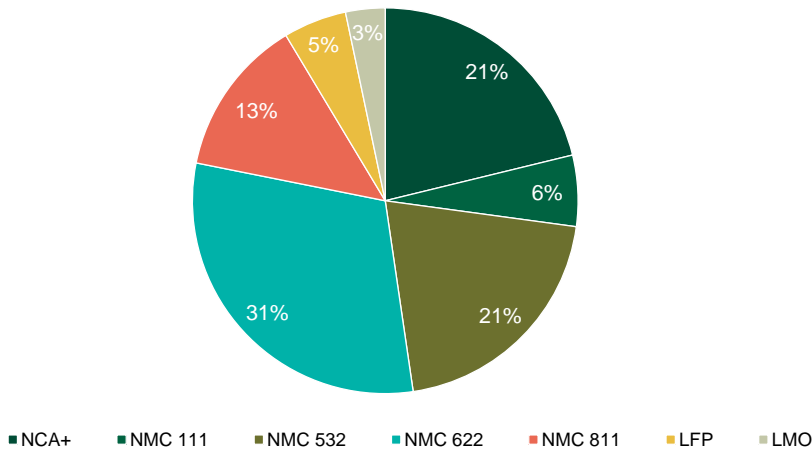
Source: International Energy Agency (IEA)

Battery technologies are evolving fast, and new and improved chemistries are hitting the market as producers look for the most efficient and cost-effective formulations. Auto producers and battery manufacturers have invested significantly in R&D in recent years, resulting in significant improvements in battery efficacies and capacity.

Commonly used cathode chemistries in light-duty EVs are lithium nickel cobalt manganese oxide (NCM), lithium nickel cobalt aluminium oxide (NCA) or lithium iron phosphate (LFP). Most heavy-duty vehicles rely on LFP batteries.

EV producers have been working to reduce the amount of cobalt in batteries in recent years due to higher cost and concerns surrounding ethical mining practices in the DRC. Tesla has also indicated its plans to completely move away from cobalt.

Exhibit 12: EV cathode chemistry market share in light-duty vehicles (LDVs)



The naming convention for battery chemistries is based on the first letter of the key materials included in the cathode, along with their proportions. For example, the cathode of NMC622 batteries is made of nickel, manganese and cobalt in the proportions 6-2-2 (ie three times more nickel than manganese or cobalt). The NMC811 cathode is made up of 8 parts of nickel, 1 of cobalt and 1 of manganese; the NMC532 cathode is made up of 5 parts of nickel, 3 of manganese and 2 of cobalt; the NMC111 cathode is one-third nickel, one-third manganese and one-third cobalt

Source: international Energy Agency (IEA)

The table below is a snapshot of the materials used in various battery formulations. Lithium, nickel and manganese feature prominently in most formulations.

Exhibit 13: Metal usage in different EV chemistries

	LFP	NMC111	NMC532	NMC811	NCA
Cathode (+)	Lithium 17% Other 83%	Lithium 15% Nickel 29% Manganese 29% Cobalt 27%	Lithium 16% Nickel 43% Manganese 24% Cobalt 17%	Lithium 16% Nickel 68% Manganese 8% Cobalt 8%	Lithium 11% Nickel 73% Cobalt 14%
Anode (+)	Graphite >95% Silicon/other <5%	Graphite >95% Silicon/other <5%	Graphite >95% Silicon/other <5%	Graphite >95% Silicon/other <5%	Graphite >95% Silicon/other <5%

* represents the proportions of cathode and anode in each battery, respectively. NCA batteries contain 2% aluminium (not shown)
Source: Pallinghurst-Traxys battery analysis.

Battery formulations are evolving – no clear winners yet

There is a sharp increase in demand expected for battery materials. This creates concerns for EV and battery makers over securing adequate supply and ESG aspects around sourcing the metals. There is also a strong push to improve the efficiency of the batteries – by improving the cost relative to the weight and size of the units. All of this happens against the backdrop of economics as companies strive to develop the most efficient and cost-effective batteries.

As a result, manufacturers are exploring different technologies and battery formulations, resulting in shifts in the type and quantum of materials used in their manufacture. This process is still a work in progress, and we expect further evolution in battery technology and metals used. This could have a material impact on the type and quantum of future battery metal demand.

We have already seen numerous examples of this in practice. Battery manufacturers have been working to reduce the amount of cobalt used in their applications for some time due to the price spikes and concerns over ethical mining practices. In practice, this has seen increased use of nickel in battery formulations. For example, nickel cobalt aluminium oxide (NCA) batteries transitioned to NCA+, a nickel-rich variant of NCA. Another alternative is the inclusion of manganese in battery formulations. The trend of moving away from cobalt could have major implications for future cobalt and nickel demand in battery application, in our view.

There are also efforts to reduce the use of nickel in battery formulations. One approach is to reduce the use of nickel by capitalising on the technical potential of manganese, which is ample in supply relative to nickel. SVOLT Energy Technology introduced battery cells that use less nickel and no cobalt by increasing the amount of manganese in the formulations, according to Kane, 2021. [Kane, M. (2021), *InsideEVs*, <https://insideevs.com>]

A manganese-rich cathode is expected to be less expensive and safer than nickel-rich chemistries. However, it decreases the cathode’s stability, which can impact performance over the longer term, according to Nunez, 2020. [Nunez, C. (2020), *Researchers eye manganese as key to safer, cheaper lithium-ion batteries*, *Argonne National Laboratory*, <https://www.anl.gov>]

Chinese automakers are showing renewed interest in using lithium iron phosphate (LFP) technology for manufacturing EVs, as it is cheaper, safer, simpler to package and does not require the use of cobalt or nickel.

LFP cells tend to be cheaper and contain no nickel or cobalt, but their energy density is lower. Conventional wisdom is that this trade-off makes LFP less suitable for high-end EVs, which need to deliver performance and range, but a good choice for lower-priced models.

LFP-based batteries have been the norm in China’s EV industry for years, and Tesla began using LFP batteries at the Shanghai Gigafactory in 2020, with Chinese manufactured Model 3s with LFP cells being exported to Europe.

Tesla has reportedly been offering potential Model 3 customers in the US the option of choosing LFP battery cells instead of the usual nickel cobalt aluminium oxide (NCA) cells. Volkswagen recently announced plans to use LFP batteries in its entry-level models, according to S&P Global Platts.

In China, the price of LFP cathode active material (CAM) from CATL is 43% less expensive (per kWh) than the NMC811 material. However, while there is an upside on

cost, the significant downside for LFP is energy density, which is only 65-70% that of MNC811 (depending on the packaging). This is a cheaper option but limits range. The use of LFP over nickel manganese cobalt (NMC) makes sense from a purely cost perspective, according to market commentators.

It is, thus, clear that there is a big trade-off between availability of ethically sourced battery materials, their efficiency and ultimately the cost implications on the battery. We believe the mix in battery materials could change as battery technology and battery material markets (supply and demand) change over time. We, therefore, believe it is still early days and it remains unclear which metals will be the winners and which the losers in the race to produce the most efficient and cheapest batteries.

Copper, nickel and manganese – the best of both worlds

The use of copper, nickel and manganese in battery metals or other decarbonisation initiatives is a fairly new demand avenue for these metals, which have traditionally been used in industrial applications. The use of these metals in EV battery storage and the general move to electrification of the global economy would increase demand in already tight markets. This should support the prices of these metals.

However, the pace of the global decarbonisation drive and the uptake of EVs remain uncertain. It could, therefore, be that EV and battery demand forecasts for these metals are overly optimistic.

However, given the use of these metals in traditional industrial applications, they should continue to benefit from global economic growth, whether related to decarbonisation or conventional applications.

Given our view that the major economies would continue to see stimulus measures and fiscal spending, we believe these metals are well positioned for the future. In essence, these metals provide investors with exposure to both traditional economic growth and the potential upside from the global move to renewables and EVs.

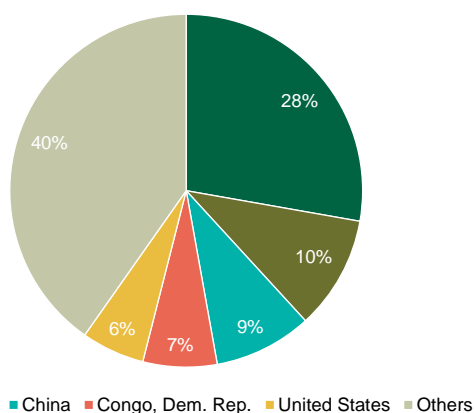
Copper

Copper has a vital role to play in modern economies and will continue to have one as the world moves to renewable energy. The metal is widely used in a broad range of electronic, industrial and domestic applications such as electrical wiring and appliances. Copper’s superior thermal and electrical conductivity attributes make it harder to substitute with other metals.

According to the Department of Industry, Science, Energy and Resources Australia, 31% of copper is used in equipment, 30% in building construction, 15% in infrastructure, 12% in transport and 12% in industrial applications.

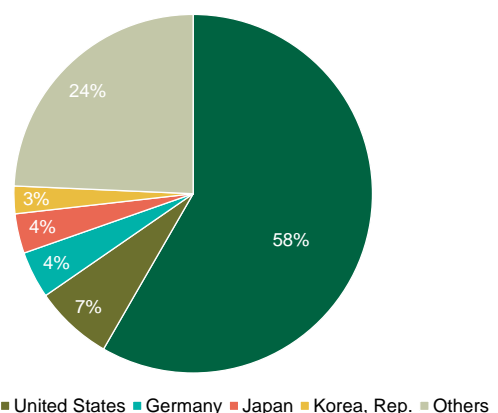
Chile and Peru are the largest producers of mined copper, responsible for about 40% of global output. China, the DRC, the US and Australia are the other major producing countries. China accounts for more than half of global consumption, followed by the US for 7%.

Exhibit 14: Top 5 countries by global copper production



Source: World Bank Group

Exhibit 15: Top 5 countries by global copper usage



Source: World Bank Group

Demand for copper has remained strong over the past decade amid growing income levels, increased access to electricity and rapidly advancing technology. According to Commodity Insights, world copper consumption has, on average, doubled about every

25-30 years. The move to renewable energy and EVs is expected to lead to a further sharp increase in copper demand over the next decade.

We believe copper has a strong demand outlook, aided by a global economic recovery, a pickup in industrial production and increased spending on consumer electronics and global infrastructure.

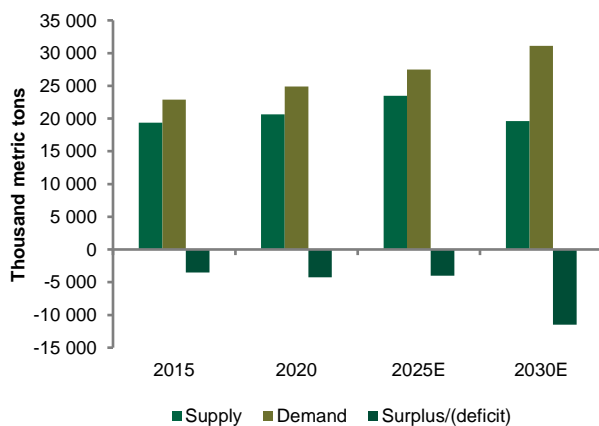
In the longer term, copper should benefit from the global energy transition and decarbonisation drive, and clean-energy technologies are one of the fastest-growing segments for copper demand. Copper is a major component of EVs, which should drive up demand. According to Commodity Insights, battery EVs contain around 60 kg of copper, more than four times that of a conventional car, which has 8-22 kg.

JP Morgan estimates that the energy transition will increase copper demand threefold by 2030, reaching 15% of total demand. Commodity Insights forecasts that global demand for refined copper will rise steadily to reach 31,1 Mt in 2030. Meanwhile, the IEA forecasts that committed mine production of copper will grow to a peak of 23,5 Mt from 2021 to 2025, and then drop below 20 Mt by 2030, while primary demand will continue to increase to top 25 Mt by 2030.

There are several copper projects in the pipeline, such as the Kamo-a-Kaula in the DRC, the Quellaveco copper project in Peru and the Udokan copper mine project in Russia. Although these projects could boost supply, if completed on schedule, demand growth is expected to far outweigh projected supply growth. The copper market is, therefore, expected to be in deficit over the next decade, based on most forecasts.

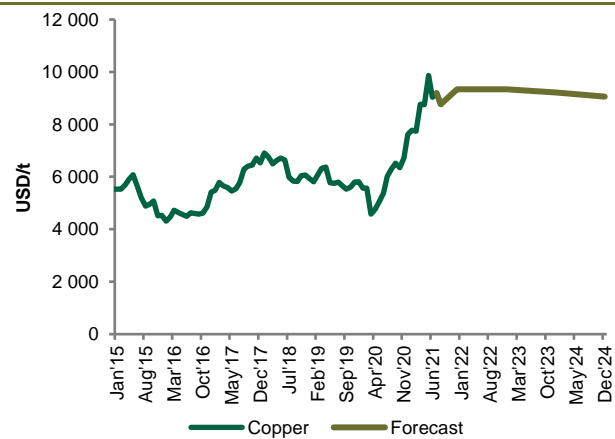
Key challenges facing the industry include grade decline, resource depletion and increased input costs. BHP estimates that declining grades will remove around 2m tons of global copper mine supply a year by 2030, with resource depletion potentially removing an additional 1,5-2,25m tons per year.

Exhibit 16: Copper market outlook



Source: International Energy Agency (IEA), World Bank Group, Minerals Council of Australia, Commodity Insights

Exhibit 17: Copper price history and outlook



Source: Bloomberg

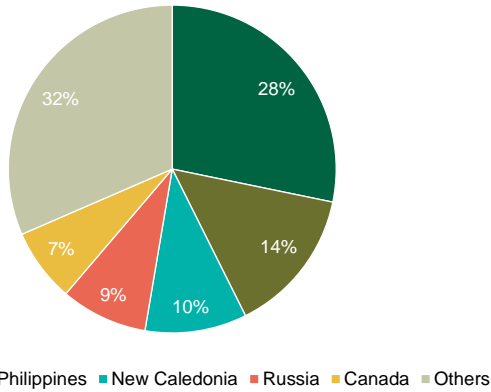
Nickel

Nickel has historically been used primarily in the production of stainless steel, which accounts for roughly two-thirds of total consumption. Nickel is also used as an alloying agent and in electroplating to provide resistance to corrosion and wear. According to Statista, about 73% of nickel was used in stainless steel and specialist steels, 9% in batteries and 5% in electroplating in 2020. High-purity Class 1 nickel is used in battery cathodes and Class 2 nickel in stainless steel production.

World nickel demand has already more than doubled since 2001. The steel market for nickel has been very strong, due to the stainless steel sector and growth in China. China accounts for more than half (55%) of the world's nickel consumption. The price of nickel has been volatile historically due to the uncertainties surrounding the timing and extent of nickel demand and supply growth.

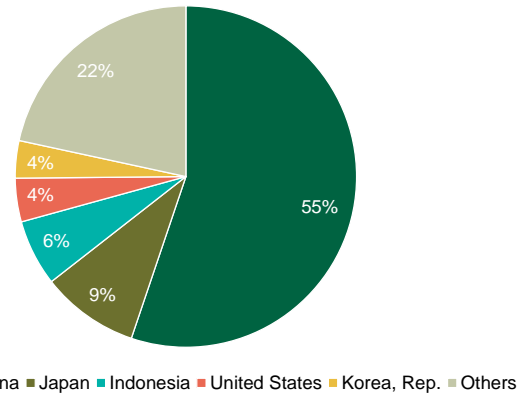
Indonesia accounts for most (28%) of the world's nickel production, followed by the Philippines and New Caledonia accounting for 14% and 10%, respectively.

Exhibit 18: Top 5 countries by global nickel production



Source: World Bank Group

Exhibit 19: Top 5 countries by global nickel usage



Source: World Bank Group

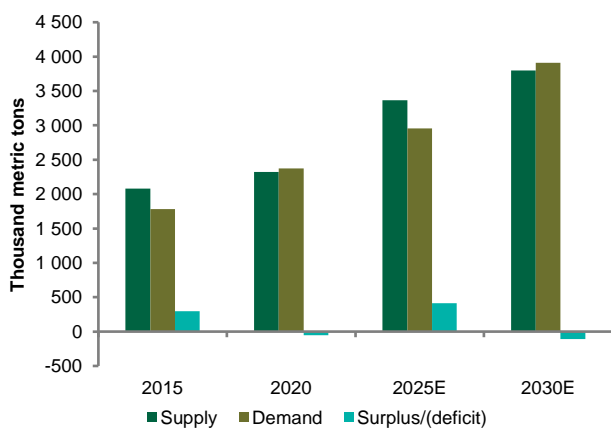
We expect the outlook for nickel to remain robust amid strong growth from major end-use markets for stainless steel, construction, automotives, industrial applications and consumer appliances. Nickel is also likely to experience significant growth stemming from rising demand for battery-grade nickel, which is a key component in the cathodes of EV and grid batteries.

Commodity Insights expects the battery industry to account for 26% of total consumption by 2030, amounting to more than 1 Mt of nickel per year. This would underpin nickel demand growing from 2,4 Mt in 2019 to 3,9 Mt in 2030.

The World Economic Forum expects demand from batteries for high-purity Class 1 nickel to increase by a factor of 24 in 2030 compared to 2018 levels. The mix between Class 1 and Class 2 nickel will also have to be adjusted to ensure that a shortage of Class 1 nickel does not become a constraint for the EV industry.

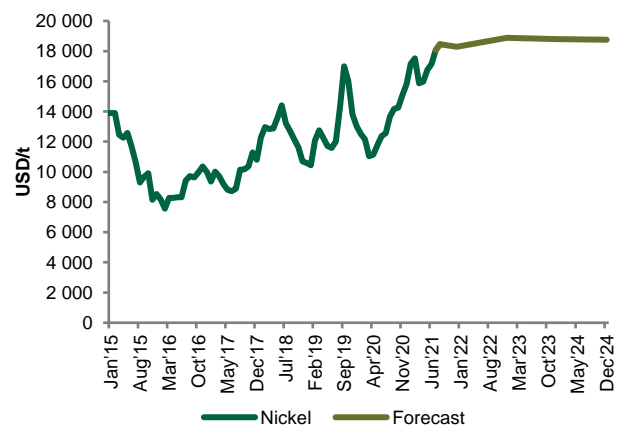
Roskill expects mine supply to grow at a CAGR of 4,7% from 2020 to 2030, with most of this growth coming from Indonesia, which is likely to see a growth rate of 6,7% per year to 2030. There are several greenfield and brownfield nickel projects under development in Australia and Canada that could boost supply. Despite these and other potential projects in the pipeline, nickel is expected to move into a deficit over the next decade as nickel used in batteries pushes up demand.

Exhibit 20: Nickel market outlook



Source: International Energy Agency (IEA), World Bank Group, Minerals Council of Australia, Commodity Insights, Roskill

Exhibit 21: Nickel price history and outlook



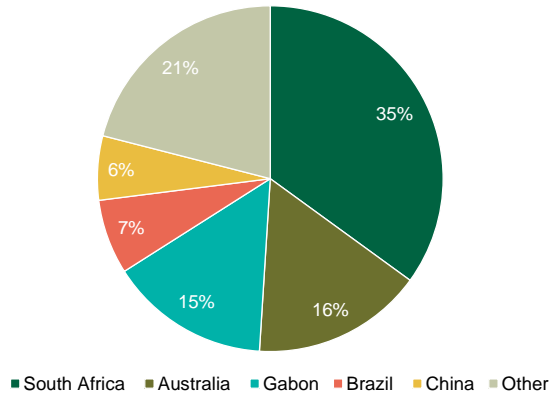
Source: Bloomberg

Manganese

Globally, 90% of manganese is used for steel production, making it a key mineral for industry. Manganese is primarily used for refining iron ore and as an alloy to convert iron into steel. It is a vital component in the steel-making process and currently, there are no viable processes for making steel without manganese. Six to nine kilograms of manganese are required to produce a tonne of steel.

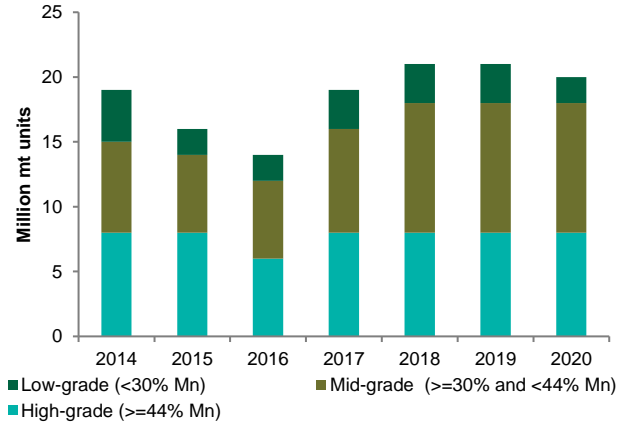
Most of the world's manganese ore is produced by a few countries, including South Africa, Australia, China and Gabon. South Africa, the world's largest producer of manganese, accounts for 35% of global production, followed by Australia (16%) and Gabon (15%). China is the largest manganese ore importing country and the producer of manganese metal, accounting for 96% of global output of manganese metal.

Exhibit 22: Top 5 countries by global manganese ore production



Source: International Manganese Institute

Exhibit 23: Global manganese ore production (2014-2020)



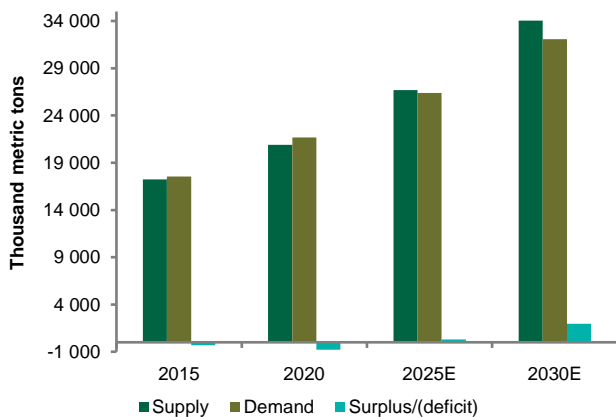
Source: International Manganese Institute

Manganese is also a key mineral for producing disposable and rechargeable batteries. Two of the most popular types of batteries, lithium-ion nickel manganese cobalt oxide battery (NMC or NCM) and lithium-ion manganese oxide battery (LMO), use manganese. Although the steel industry will continue to dominate manganese demand, consumption of manganese in batteries is expected to grow rapidly over the next decade.

Manganese appears to be a suitable alternative as new battery technologies are being developed to reduce EV industry reliance on cobalt. According to Roskill, manganese sulphate demand from lithium-ion batteries is expected to double over the next decade with an increase in EV market penetration.

The World Economic Forum expects demand for manganese to increase by a factor of 1,2 by 2030 from levels in 2018. The IEA expects demand for manganese from clean-energy technologies to increase by 3x to as much as 8x in 2040, relative to 2020 levels, depending on different global decarbonisation scenarios. Although manganese supply was slightly impacted by the pandemic in 2020, global manganese ore production is expected to increase over the next couple of years, reflecting a post-pandemic recovery and additional supply from new projects in Australia, South Africa and Brazil.

Exhibit 24: Manganese market outlook



Source: International Manganese Institute, Mordor Intelligence, Businesswire

Exhibit 25: Manganese price history and outlook



Source: Bloomberg

New kids on the block – lithium, cobalt and graphite

Below, we give a summary of the metals closely associated with batteries and EVs. Although these metals also have other non-battery uses, the fortunes of these metals are closely aligned to the development and rollout of battery and related technologies. Companies and investors that buy into these metals are essentially buying exposure to the battery market of the future and the transition to renewable energy and related technologies.

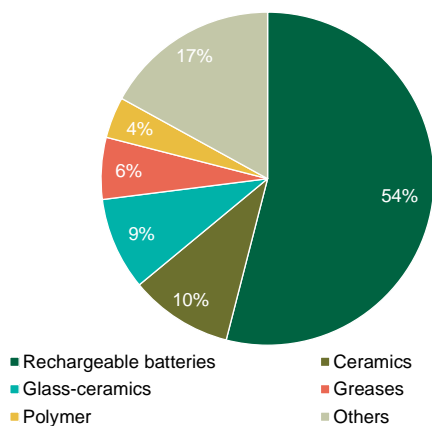
Lithium

Lithium is one of the most-sought-after commodities in the modern world given its use in batteries. The metal is primarily used in rechargeable batteries for mobile phones, laptops, digital cameras and EVs. Lithium is also used in non-rechargeable batteries such as those for pacemakers, toys and clocks. According to Roskill, more than 50% of demand for lithium comes from rechargeable batteries.

Lithium is likely to remain a core component of batteries due to attributes such as being the lightest metal and having the highest energy density by weight and high conductivity and its ability to store electrons.

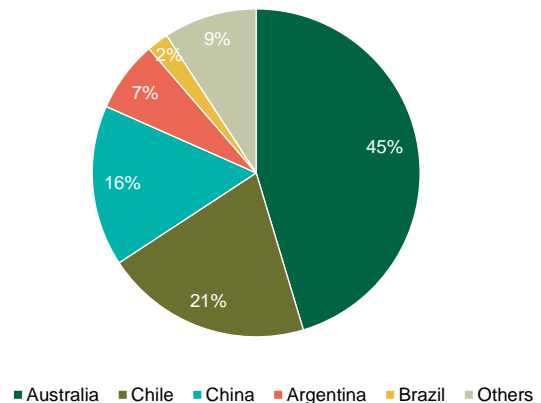
Lithium is mainly sourced from either spodumene or brine. Australia is home to most of the hard rock (spodumene) mines, while brine production is concentrated in South America, mainly in Chile and Argentina. According to US Geological Survey, Mineral Commodity Summaries, five mineral operations in Australia, two brine operations each in Argentina and Chile, and two brine and one mineral operation in China account for the bulk of the world’s lithium production.

Exhibit 26: Lithium demand by application, 2019



Source: Roskill

Exhibit 27: Top 5 lithium-producing countries

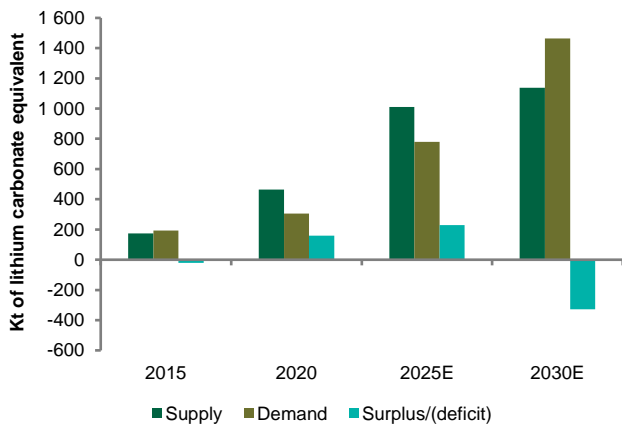


Source: US Geological Survey, Mineral Commodity Summaries

Demand for lithium has grown sharply over the past decade, and EVs should continue to drive long-term demand growth, as major economies accelerate their EV adoption to reduce emissions from the transport sector. Commodity Insights forecasts that lithium demand will rise rapidly from 313 kt of lithium carbonate equivalent (LCE) in 2019 to 1 465 kt LCE by 2030, an almost 5x increase. This is in line with the views of the World Economic Forum, which expects demand for lithium to increase by a factor of 6 compared to levels in 2018.

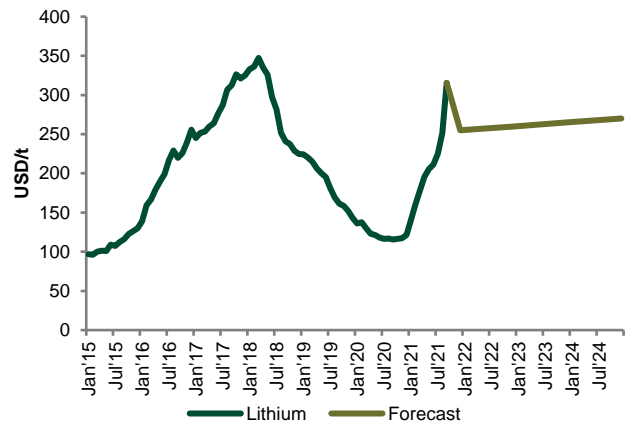
There are several lithium projects in the pipeline. Key projects include the planned expansion by Chilean miner SQM of its lithium carbonate production to 180 000 tpa and lithium hydroxide production to 30 000 tpa by 2022. Albemarle Corporation’s expansions at La Negra III and IV in Chile could also add supply in 2021 and 2022. Several lithium projects that were halted or delayed due to the pandemic are also expected to come online during the next couple of years. Although supplies from current and planned projects are expected to boost near-term supply, the market is expected to be tight in the long term.

Exhibit 28: Lithium market outlook



Source: International Energy Agency (IEA), Minerals Council of Australia, Commodity Insights, Roskill, Statista

Exhibit 29: Lithium price history and outlook



Source: Bloomberg

Cobalt

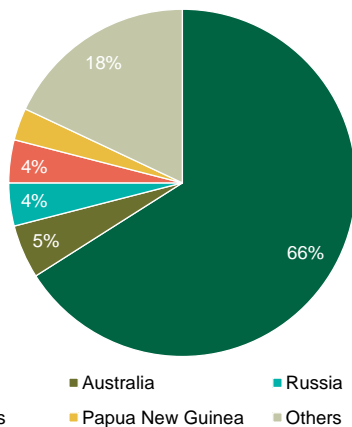
Cobalt is mainly a by-product of copper and nickel mining, primarily used in lithium-ion batteries. About 57% of cobalt is used for batteries in EVs, tablets and smartphones, while 13% is used in nickel-based alloys and 8% in tool materials.

The DRC is the largest source of cobalt, accounting for roughly two-thirds of global production in 2020. Countries such as Australia, Russia and the Philippines each contributed about 4-5% of global production.

The DRC, the largest producer, has significant social risk, primarily in its artisanal and small-scale mining industry due to its unregulated and informal nature, including hazardous conditions for workers and the presence of child labour. Artisanal and small-scale mining is an important source of the DRC's supply, accounting for 9% of its mine production. Ethical and sustainable sourcing of cobalt is a major challenge for battery and EV manufacturers.

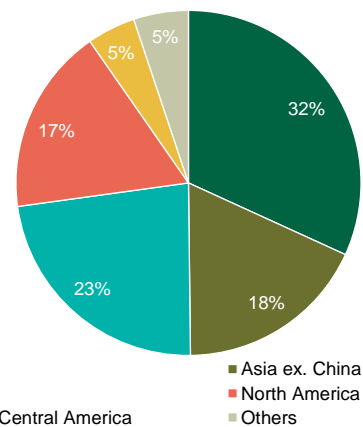
Global consumption of cobalt has increased significantly in recent years amid strong demand growth from lithium-ion batteries. Although demand for cobalt was somewhat impacted the pandemic in 2020, demand from the battery market remained strong, driven by strong demand for EV batteries. Asia is the largest cobalt-consuming region (c.50%), with China alone accounting for 32% of global consumption, reflecting the high concentration of battery metal production in the region.

Exhibit 30: Top 5 cobalt-producing countries



Source: Roskill, Cobalt Institute

Exhibit 31: Top 5 countries by cobalt usage



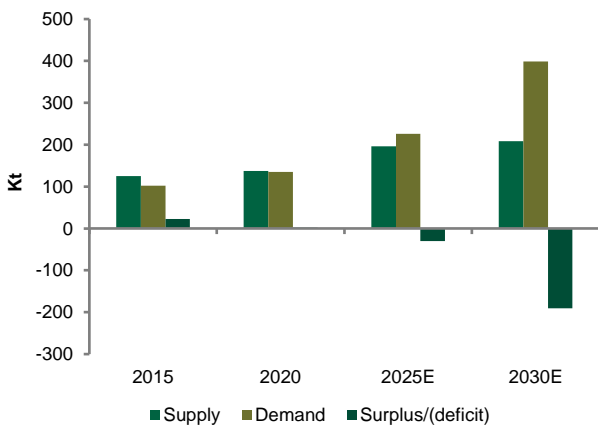
Source: Roskill, Cobalt Institute

Several EV manufacturers are transitioning away from using cobalt in lithium-ion batteries due to concerns about its high cost and the use of child labour in artisanal mining in the DRC. Tesla recently announced it was stopping the use of cobalt in its new 4680 lithium-ion batteries, substituting it with a manganese and nickel-based cathode. However, strong uptake by EVs should support overall growth in demand for cobalt over the next decade, based on market reports.

According to the IEA, there could be a significant shift in cobalt demand, with roughly 40% of future cobalt demand being used in clean-energy technologies by 2040, from only about 15% of total demand currently. This is expected to drive up cobalt demand, and the WEF expects cobalt demand for use in batteries to increase by a factor of 4 in 2030 from 2018 levels, almost doubling demand for cobalt by 2030.

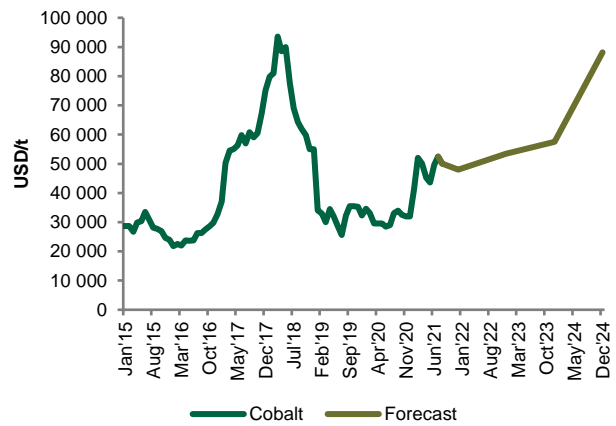
On the supply side, additional cobalt supply is largely dependent on the development of new nickel and copper capacity (as most of the cobalt is produced as a by-product). The latest expansion projects include China Molybdenum’s (CMOC’s) expansion at the Tenke Fungurume Mine (TFM) in the DRC. The project is expected to start production in 2023, increasing the TFM’s capacity by 200 000 tpa of copper and 17 000 tpa of cobalt. Glencore has also announced plans to restart operations at Mutanda, the world’s biggest cobalt mine in the DRC, in 2022. However, the overall cobalt market is likely to be in deficit by 2025, with the deficit expected to widen substantially by 2030, based on market reports.

Exhibit 32: Cobalt market outlook



Source: International Energy Agency (IEA), Roskill, Cobalt Institute, Cobalt Blue Holdings

Exhibit 33: Cobalt price history and outlook



Source: Bloomberg

Graphite

Graphite is a form of pure carbon and is used in various applications such as EVs, refractories, foundry, lubricating agents and construction applications. There are two main forms of graphite: natural graphite, which is sourced directly from mines, and synthetic graphite, which is made from petroleum coke.

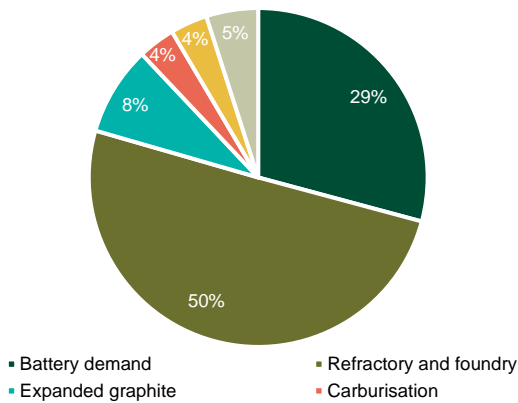
Characteristics of graphite include high resistance to high temperatures and chemicals, excellent thermal and electrical conductivity and resistance to friction and wear.

The global graphite supply chain is highly concentrated in China, the world’s leading graphite producer that supplies about 62% of total world output. China is also the largest player globally in terms of consumption and production capacity for graphite and accounts for an estimated 61% of synthetic graphite and 100% of chemical processing capacity.

Although the bulk of graphite demand is currently from steelmaking and refractory applications, incremental growth is expected to be driven primarily by the uptake in the EV industry. Graphite is a fundamental part of all lithium-ion batteries and remains the dominant active anode material used in the batteries.

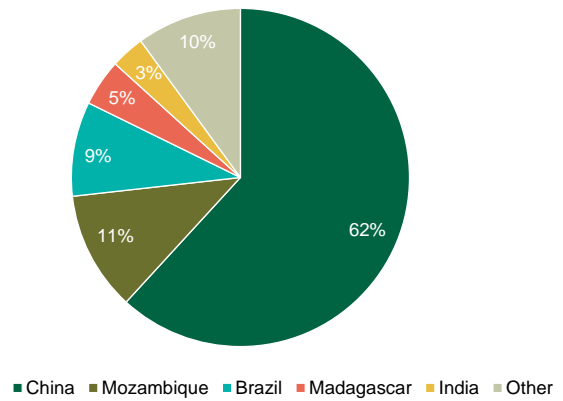
According to a study by Transport & Environment (T&E), the graphite anode makes up about 32% of the weight of a battery cell. Therefore, graphite is a critical commodity in terms of batteries and EVs, in our view.

Exhibit 34: Natural graphite use by application



Source: NMG.com, Benchmark Mineral Intelligence

Exhibit 35: Top 5 natural graphite-producing countries



Source: US Geological Survey, Mineral Commodity Summaries

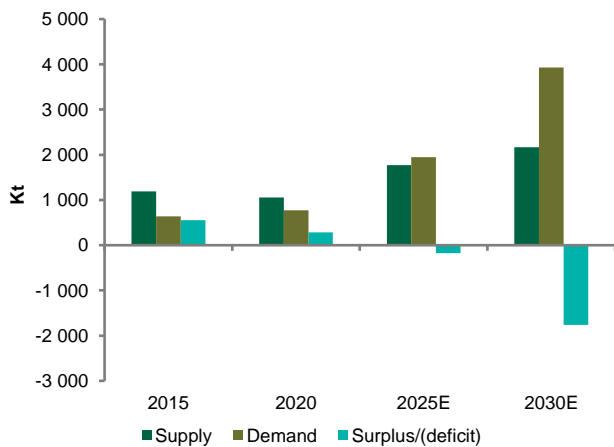
According to Benchmark Intelligence, demand for natural flake graphite is expected to grow from 771 kt in 2020 to approximately 1 948 kt in 2025 and approximately 3 932 kt in 2030, 153% and 410% growth, respectively. The World Bank forecasts that low-carbon energy technologies, primarily lithium-ion batteries, will require 4,5m tonnes of graphite per year by 2050, a 500% increase over 2018 levels and a 318% increase over total graphite produced in 2019.

Although efforts are underway to replace graphite with silicon and lithium-based alternatives in lithium-ion batteries, graphite is expected to remain a dominant element in EV batteries in the near to medium term.

According to the IEA, demand for graphite from clean-energy technologies is expected to increase by 8 times to as much as 25 times in 2040, relative to 2020 levels, depending on different global decarbonisation roadmaps. Roskill predicts that graphite demand from battery makers will grow by 23-27% each year through to 2028.

Growth in the global graphite market is reflected in the several projects being developed. Examples include Nouveau Monde Graphite’s Matawine graphite project, which is expected to reach commercial production of carbon-neutral battery-grade graphite by 2023, making it the largest producer in North America. Large-flake Lindi Jumbo graphite mine in Tanzania is on track for first production in the second or third quarter of 2022, building to output of 40 000 t/year of graphite concentrate over 24 years. However, despite this near-term new supply, the market is set to face a deficit due to exponential growth stemming from the EV sector.

Exhibit 36: Natural graphite market outlook



Source: NMG.com, Benchmark Mineral Intelligence, US Geological Survey, Mineral Commodity Summaries

PGM price outlook – short-term noise, market remains tight

Despite the recent headwinds, we remain bullish on the PGM sector. We continue to see the sharp correction over the past quarter as a buying opportunity and expect PGM prices and the equities to rebound further. However, we do not expect the PGM basket price to exceed peak levels reached earlier in the year. Instead, we expect the basket price to correct to more normalised levels and to remain robust for the next two to three years before correcting to more normalised long-term levels.

Our bullish view over the next few years is underpinned by the expectation of a strong demand recovery on the back of stimulus-led global economic growth and infrastructure programmes. We also expect higher loadings in heavy and off-road vehicles to offset the impact of thrifting in light-duty vehicles.

Supply remains constrained, and there are no quick ounces to fill the growing PGM shortages.

We continue to expect significant price volatility as temporary production- and supply chain-related disruptions caused short-term disjuncture. We still expect the PGM basket price to correct to more normalised levels over the next two to three years as supply-demand becomes more balanced. We expect the equities to continue to outperform the metals on the back of improved balance sheets, increased cashflow and the prospects of higher dividends.

Temporary market distortions

We recently updated our PGM price deck, and despite the sharp moves in PGM prices since then, we are sticking to our guns, and our forecasts remain unchanged.

PGM prices have been stronger than we had expected in 1H, reflecting a tight market, caused by pandemic-related supply disruptions, and delayed supply growth, caused by pandemic-related distortions.

At the start of 2H, the pendulum seems to have swung to the other direction, with fears of oversupply and weak demand resulting in a weakening of the PGM basket price. We see these as temporary market distortions, caused by an increase in metal supply as producers continue to destock and minimise stock levels ahead of their June reporting period. At the same time, the chip shortage started to have a negative impact on vehicle production and, thus, PGM demand. This created a perfect storm, which we believe triggered the correction, with the issues around China's Evergrande adding fuel to the fire.

We believe these temporary market anomalies will normalise over the next 6-12 months and that overall, PGM supply-demand fundamentals will remain robust, with growing deficits across most metals over the next three years. This should continue to underpin strong PGM prices, but we do believe the basket could correct to more normalised levels, as shown in Exhibit 37.

Exhibit 37: Nedbank PGM price forecasts

Forecasts			Ytd	Spot	2020a	2021e	2022e	2023e	2024e	LT
Platinum	USD/oz	New	1,117	1,050	886	1,150	1,150	1,100	1,100	1,100
Palladium	USD/oz	New	2,528	2,070	2,202	2,650	2,000	1,300	1,200	1,200
Rhodium	USD/oz	New	21,789	14,200	11,198	22,000	15,000	12,000	9,000	8,500
ZAR/USD		New	14.59	14.70	16.46	14.80	15.00	15.00	15.00	15.00
PGM basket	R/oz	New	45,229	33,915	34,688	47,067	36,638	29,085	25,365	24,840
	USD/oz	New	3,100	2,310	2,108	3,180	2,443	1,939	1,691	1,656

Source: Bloomberg, Nedbank CIB Markets Research

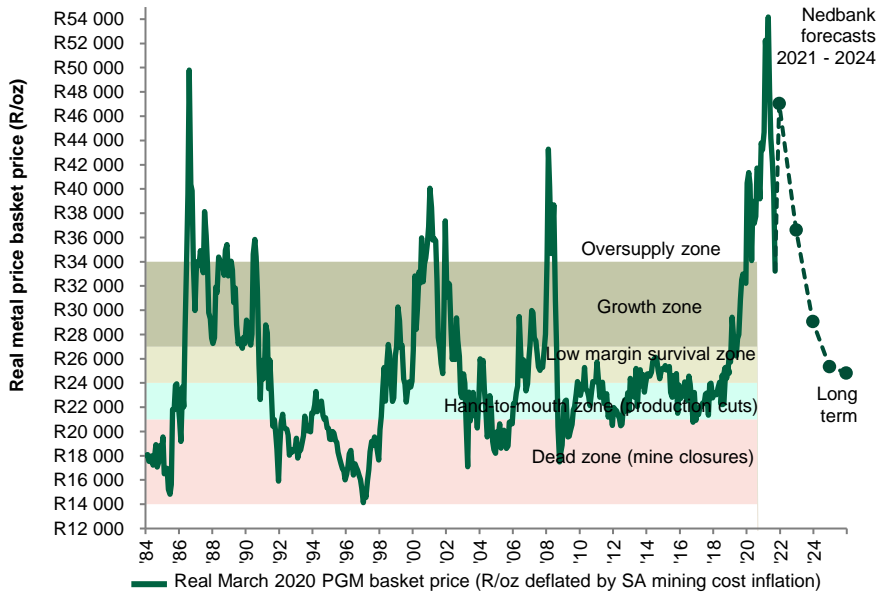
PGM basket price is still decent despite correction

We reiterate our view that the PGM basket price continues to trade at high levels relative to the real long-term trend (adjusted for mining cost inflation), despite the recent correction, as Exhibit 38 shows. The correction was, thus, overdue, in our opinion.

We believe the basket price could remain at elevated levels for a fairly long period of time (at least two to three years) given ongoing supply constraints and a lack of large-scale growth projects. However, we continue to expect a correction from what we see as peak-level pricing to a more normalised long-term level over the next two or three years.

Again, we do not expect the basket to surpass the level seen earlier in the year. However, unlike in previous cycles, we do not see it falling in a heap shortly given tight supply-demand balances and producers taking a much more reserved and measured approach to growth than during previous bull markets.

Exhibit 38: Real PGM basket price is still high relative to mid-range long-term levels



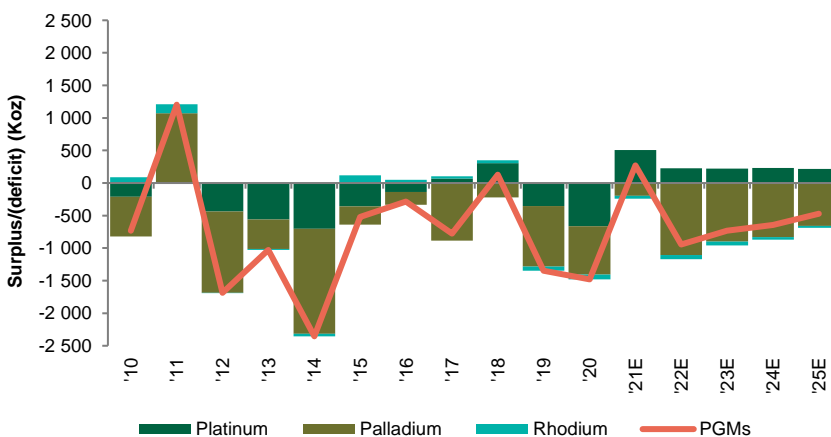
Source: Johnson Matthey, Nedbank CIB Markets Research

Supply-demand balances

We expect the PGM market, especially palladium and rhodium, to remain in deficit for the next two to three years. The platinum market is expected to move into balance over the next year, from where we see it moving into a deficit as well, as Exhibit 39 shows.

Platinum remains at risk of being oversupplied over the next few years. However, stronger-than-expected investment demand could move platinum into a deficit sooner. A sharp increase in substitution could also see the platinum surplus waning quicker than anticipated. Substitution volumes are still fairly low, but we expect this to increase sharply over the next few years, which should boost platinum demand, while easing some of the palladium and rhodium shortages.

Exhibit 39: PGM surplus/(deficit) shows growing deficits



Source: Johnson Matthey, Nedbank CIB Markets Research

Supply challenges

The pandemic and other supply disruptions such as the issues at Anglo American Platinum’s ACP facility and the issues at Norilsk materially knocked 2020 PGM production and resulted in market distortions. The effects of this, including additional supply from destocking, could linger into 2H and 2022.

We do not expect a significant surge in secondary supply, and there is not enough recycling supply capacity to fill the potential metal shortages. Several other operational challenges could continue to hamper PGM supply, most notably electricity shortages, labour and community unrest, and technical challenges at mining operations and processing facilities.

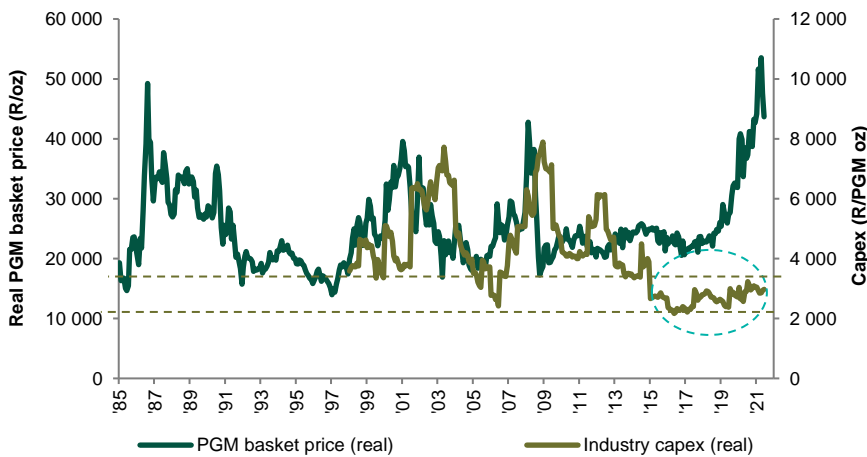
Many investors believe the sharp increase in PGM prices could see additional supply coming online quite quickly, as there are several projects in the pipeline that could materially boost future output. We believe supply could be slower to come online than most expect.

We believe the PGM industry was capital-starved over the past decade, with a sharp decline in real capex since 2012, as Exhibit 40 shows. As a result, many of the ore bodies are undercapitalised and some of the older shafts are nearing depletion. A material increase in output would, thus, require a sharp increase in capex, which has not yet been seen to the extent required to materially boost output in the near term.

Although there has been an increase in capital being allocated to projects and growth initiatives, we do not expect to see a sharp increase in output over the next year, as the lead time on most projects is at least 12-18 months. Many of these projects should also turn out to be replacement, rather than growth, due to the lack of capital over the past decade, in our opinion.

The largest projects such as Mogalakwena, Platreef and Waterberg, which have the ability to materially increase demand, have even longer lead times. So, although we do see a supply-side response on the back of the PGM bull market since 2018, we expect the market to remain tight over the next few years, which should be supportive of PGM prices.

Exhibit 40: Real capex levels are very low – ore bodies need to be recapitalised to boost supply



Source: Company reports, Bloomberg, Nedbank CIB Markets Research

We have also not seen the typical supply-side response as seen during previous bull markets, where management teams rush to bring on growth, due to more product capital allocation practices.

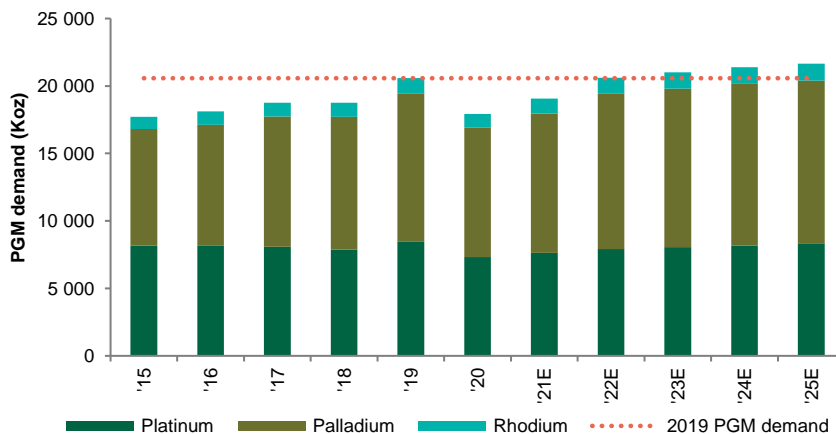
In short, the miners are not talking about building large new mines, as they did during previous cycles. This, we believe, could keep a lid on supply for some time, while demand could surprise on the upside, given that many investors are factoring in very strong EV pentation rates over the next five years.

We, therefore, do not expect a sudden rush of new projects to the market; instead, we see a slow build-up over the next five years. We, therefore, believe new supply could take longer to come online than most expect. We expect SA PGM supply to continue to fall over the next 5-10 years in the absence of a material increase in growth capex.

Demand recovery expected

The impact of the pandemic has severely distorted PGM demand, and the impact lingers, as noted above. Overall, though, we expect a strong recovery in autocatalyst demand, while industrial demand should also improve on the back of a normalising in the global economy following severe pandemic-related disruptions. Jewellery demand, which had been in decline for many years before the pandemic, may have reached a bottom and should see some demand support in 2021 and over the next couple of years. Overall, though, we expect PGM demand growth over the next few years, as Exhibit 41 shows.

Exhibit 41: PGM demand – We expect continued demand growth over the next few years, despite EV and other demand headwinds



Source: Bloomberg, company reports, Nedbank CIB Markets Research

Global semiconductor shortage expected to be temporary

One of the biggest fallouts from the pandemic is the ongoing global semiconductor chip shortage, which is impeding vehicle production and weighing on vehicle sales, as shown earlier.

The global semiconductor shortage has been dominating the headlines in recent months and is estimated to last well beyond 2022. This has negatively impacted vehicle sales and PGM demand and could continue to do so in the near term.

We do not see the chip shortage as a long-term issue. We expect it to weigh on vehicle sales over the next 6-12 months, but expect a strong rebound in sales due to pent-up demand.

The semiconductor chip shortage started early last year, when the pandemic resulted in temporary closure of vehicle assembly plants. The prolonged shortage has resulted in leading carmakers temporarily closing plants and announcing production cuts. According to IHS Markit, automakers cut production by nearly 1m vehicles in the first quarter due to the shortage. The semiconductor chip shortage is now expected to cost the global automotive industry USD110bn in revenue in 2021, according to consulting firm AlixPartners.

Multiple factors led to the shortage, and we summarise these below:

- Industry bottlenecks.** Global chip production is highly concentrated in Asia, with two of the largest Asian chipmakers responsible for manufacturing the bulk of the world's most advanced silicon. Any capacity constraint faced by the largest players would impact the global market. Building new capacity could take about more than 2,5 years; therefore, current expansions would not increase available capacity until 2023.
- Pandemic-induced new demand.** When the pandemic resulted in plant closures, automakers cancelled their orders for chips, anticipating a market slowdown. This resulted in chipmakers reassigning their spare production capacity for making smartphones, laptops and gaming devices, which were experiencing a surge in demand during the lockdowns. However, the auto sector rebounded stronger and sooner than expected, and chipmakers could not cater to the sudden surge in demand. Global demand for chips is also boosted by growth of new technologies including cloud services, 5G networks and artificial intelligence services.

- **Temporary factory closures.** The pandemic initially put pressure on supplies as plants were shut down. Subsequently, several recent setbacks including a power outage at TSMC, a production pause at Samsung, a fire at Japanese auto chipmaker Renesas and a storm that briefly halted production at several plants in Texas impacted global supply.
- **Tech wars.** The US banned foreign companies whose chips use American technology from selling to Chinese tech giant Huawei. This resulted in Huawei stockpiling semiconductors ahead of the sanctions coming into effect, and other companies followed its lead, further constraining supplies.

Many of the factors that led to these shortages are short-term in nature, and the issues should be overcome in the near term. We believe the global auto sector is actively taking steps to address these shortages, and we do not see it as a long-term issue. We believe some of these shortages should ease over the next 6-12 months, which could lead to a sharp rebound in vehicle production. We also believe vehicle production and sales lost due to the chip shortage is creating pent-up demand and, thus, expect a strong rebound in vehicle sales when the shortage eases.

Autocatalyst demand expected to grow despite headwinds

We focused on the impact of EVs on PGM demand earlier in this report and conclude that although EVs are a smaller short-term threat than most expect, they could have a material impact on PGM demand in the longer term.

We, therefore, remain bullish on auto-sector demand in the short term, as we expect a rebound in vehicle sales, as noted above. Beyond that, we expect a continued stimulus-led recovery in vehicle sales from 2022 as governments develop projects for ports, roads, bridges and other capital goods, ultimately involving the use of light- and heavy-duty vehicles, as seen in China. We expect similar trends in other economies, including the US. We also expect vehicle penetration rates to continue increasing in China and other developing markets, which should see continued vehicle sales growth over the next few years.

Higher loadings could trump impact of thrifting

We expect emissions standards to be tightened further over the next couple of years, including more stringent emissions standards for heavy and off-road vehicles in China and India, which should offset the impact of thrifting in light-duty vehicles. We, therefore, expect the step change in loadings in recent years to be a structural shift that would not be reversed.

Industrial demand expected to recover

The pandemic has disrupted economic activity and supply chains globally. This has created logistical constraints and bottlenecks that have upset the normal flow of goods and materials, including PGMs used in industrial applications.

Although the impact remains in some regions, we expect it to ease over time. We, therefore, expect PGM demand in industrial applications to grow in 2021, boosted by the overall improvement in economic activity and easing of logistical constraints. Industrial demand for platinum will likely be strong in 2021, with major applications in the chemicals, glassmaking and electronics sectors continuing to enjoy strong demand. Industrial demand for palladium would be boosted by strong investment by Chinese hydrogen peroxide producers.

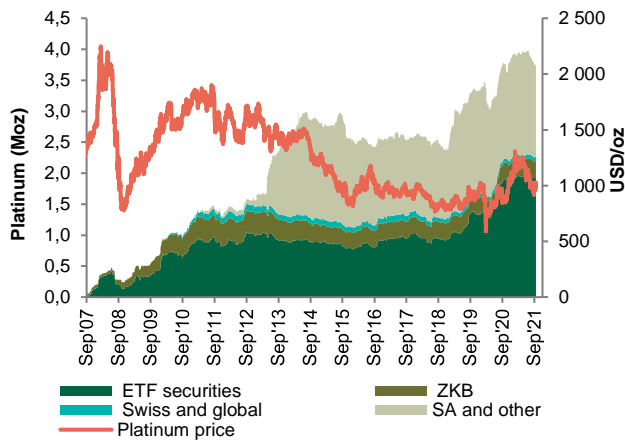
Jewellery demand was weak before the pandemic, which only served to make matters worse. However, a rapid recovery in China following its lockdown and the release of pent-up demand in key markets could see a recovery in jewellery demand in China. The US market has also seen a rebound in jewellery sales. Japan's jewellery demand remains weak, due to the impact of the pandemic. Overall, we expect jewellery demand to grow from 2020 levels, and a continued global recovery to support a further stabilisation in platinum jewellery demand from 2022.

ETF demand could be a swing factor

Platinum ETF demand was exceptionally strong in 2020, pushing the platinum market into a deficit. ETF growth has slowed somewhat during 2021, and there have been liquidations in SA ETF holdings recently as investors have switched out of the ETFs and into the PGM equities that are now paying dividends. However, international holdings continue to hold up, as Exhibit 42 shows. ETFs remain a major swing factor, and strong investment demand could move the platinum market closer to balance. Large liquidations in SA ETFs could, however, add to the surplus. We expect investors to start rotating back into ETFs on the recent rebound in PGM prices and given the operational and cost headwinds faced by the producers. This could be supportive of

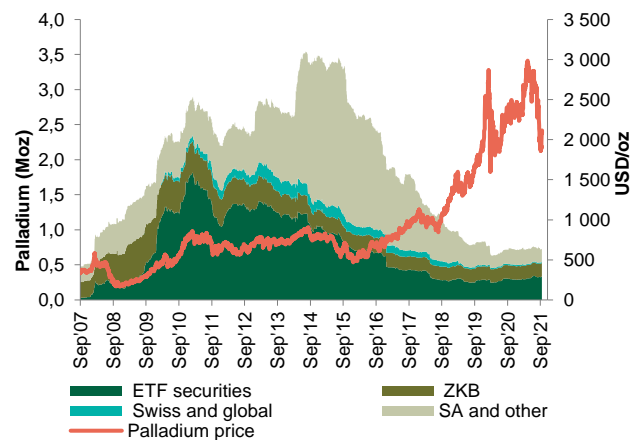
the platinum price, in our view. Palladium demand has also grown somewhat in 2021, which we believe should also be supportive of the palladium price.

Exhibit 42: Platinum ETF positions continue to grow



Source: Bloomberg

Exhibit 43: Palladium ETFs have also increased recently



Source: Bloomberg

Economic headwinds a risk to our investment case

We believe the biggest risk to PGM demand and price is not the EV market share, penetration rate or short-term chip shortages, but rather the overall trajectory of vehicle sales. This is a much bigger needle that could materially impact PGM demand. As such, we see the health of the global economy - the Chinese economy in particular - as a much bigger factor for the PGM investment case than EV growth.

Recent negative news flow around China's Evergrande and talk of the Fed starting to taper has raised fears of a global economic slowdown, materially knocking PGM and other commodity prices. As a result, many investors have started calling time on the PGM bull market.

We have a different view and remain bullish on the sector, as we see these as short-term headwinds. Although these events could cause short-term disruptions and see investors become risk-averse, which would knock resource stocks, we do not expect these events to lead to a material and prolonged economic slowdown, as we believe the authorities would step in with stimulus to arrest the decline as they have done so many times before.

We are not underplaying the risk posed by a potential fallout from Evergrande or the recent energy shortages in China, which are some of the biggest risks to our bullish PGM case. However, we are of the view that governments globally are keen to keep the post-pandemic economic recovery going and that they would use all means necessary to achieve this, which could imply further stimulus. With the nature of stimulus measures changing and involving more fiscal spending, infrastructure development programmes and resources, PGMs in particular could be a beneficiary of these initiatives. As such, we remain bullish on the broader commodity sector and PGMs.

PGM equity outlook

We expect the PGM stocks to rebound further following the pullback in August and September. We remain bullish on the longer-term outlook for the equities on the back of what is still a decent PGM basket price outlook. Despite our forecasts being below the peak levels seen earlier in the year, the companies should continue to generate decent cashflow even at these lower basket price levels, which should support higher valuation multiples.

Results recap

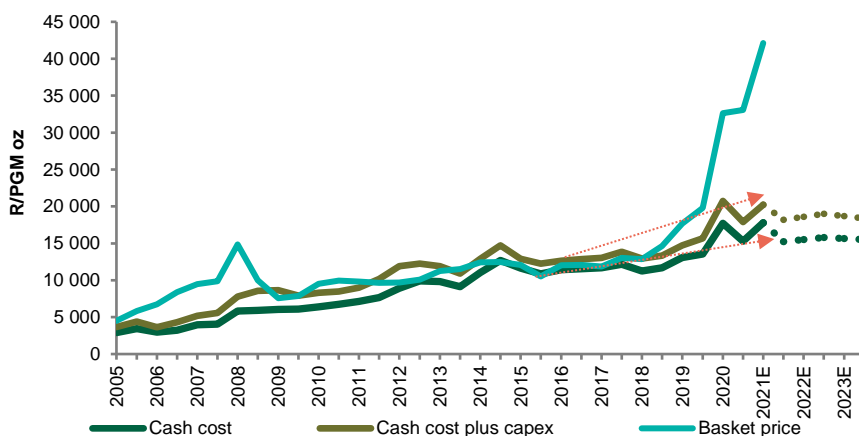
All the PGM companies reported sharp increases in 1H CY20 earnings and cashflow recently. The increased gains can be attributed to the sharp yoy rise in the PGM basket price and increased output (following lockdowns in 2020). This more than offset the impact of COVID-19-related production losses and higher costs.

Most of the companies delivered in-line or better-than-expected operational performances despite the challenges associated with the pandemic, with the third wave having been particularly impactful at many operations.

The other major operational challenge during the period was load shedding, which negatively impacted output and hampered some of the destocking efforts at Impala.

A key theme across the sector was sharp cost increases over the past year, building on the rising cost trend seen since 2018, as Exhibit 44 shows. Most companies, except Northam, delivered sharp period-on-period cost increases, despite coming off a higher pandemic-impacted base in 2020. Although many companies expect to deliver lower costs in 2H21, most are warning of above-inflationary cost increases in many key input cost items, and we expect costs to rise further over the next couple of years, as shown in the chart below. We have long been warning about the risk of higher costs, and this seems to have manifested itself across the industry. We expect continued cost pressure as higher electricity tariffs, increased wages and above-inflationary transport and material costs start to filter through the system. The cost estimates below, which are based on current company estimates, may be too conservative, in our view.

Exhibit 44: Costs starting to rise on the back of the higher PGM basket price (semi-annual costs)



Source: Company reports, Nedbank CIB Markets Research

Most companies have started to increase their capex forecasts as they embark on growth and replacement initiatives on the back of the higher PGM basket price. As a result, most producers are guiding for higher capex and cost numbers over the next couple of years. Beyond that, they are guiding for lower capex. We are of the opinion that capex is unlikely to come down in a couple of years and could remain at these levels for as long as the PGM price remains at high levels, as companies are likely to pursue further growth and replacement initiatives while margins are high. We also believe the industry remains undercapitalised and that a couple of years of higher capex would not be enough to offset the underinvestment over the past decade (see Exhibit 40 on page 23). As a result, we could see the cash cost plus capex increases at higher levels than the current estimates above.

Capital allocation remains very prudent, with returns to investors in the form of dividends and buybacks still taking preference over growth initiatives. We, therefore, see the potential for strong dividends when the companies report in early 2022, given strong balance sheets, the prospect of continued high free cashflow and a prudent approach to capex. Beyond that, we believe the narrative around capital allocation could start to change, with more funds being allocated to growth capex; hence our view that capex forecasts are unlikely to decline in 2023.

The biggest challenges facing the sector are electricity shortages and rising power tariffs. We also believe that cost pressure will remain high and that the cost of imported goods will be heavily impacted by rising freight and logistics costs and supply shortages. Rising fuel costs on the back of the recent spike in oil prices could add further cost pressure.

We, therefore, expect margins to start narrowing from the exceptional levels in 1H CY21. However, we expect the industry to continue reporting decent cashflow over the next year or two, at current PGM prices. This supports our bullish view on the equities.

We have adjusted our models following the recent results and made other minor adjustments to our estimates. The table below reflects these changes.

Exhibit 45: Revised Nedbank financial and operational forecasts

Company	Share Code	Year End	Closing Price	Valuation Metric	Multiple	Rating	Fair Value	NAV	EPS Estimate			CFPS Estimate			Production (Koz PGMs Cash Cost (US\$/PGMoz))						
									'20A	'21E	'22E	'20A	'21E	'22E	'20A	'21E	'22E	'20A	'21E	'22E	
Anglo Platinum	AMS	Dec	R 1,541.71	Latest Est.	P/CF	10	Overweight	R 2,800	R 934	R 115.52	R 275.45	R 211.74	R 167.94	R 309.56	R 244.28	3,217	4,287	4,505	\$718	\$835	\$848
			Previous Est.	10		Overweight	R 2,900	R 1,039	R 115.52	R 295.21	R 219.86	R 167.94	R 331.24	R 252.54	3,217	4,492	4,466	\$718	\$758	\$759	
Impala Platinum	IMP	June	R 212.45	Latest Est.	P/CF	8	Overweight	R 400.00	R 213.54	R20.75	R46.35	R35.88	R32.93	R52.53	R49.55	2,849	3,292	3,376	\$840	\$958	\$1,066
			Previous Est.	8		Overweight	R 440.00	R 212.67	R20.75	R50.32	R 40.45	R32.93	R66.08	R 54.67	2,849	3,218	3,212	\$840	\$1,010	\$973	
Ivanhoe Mines	IVN	Dec	CAD9.12	Latest Est.	P/NAV	1.0	Neutral	C\$11.00	\$4.88	(\$0.02)	\$0.07	\$0.13	(\$0.03)	\$0.11	\$0.20	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
			Previous Est.	1.0		Neutral	C\$11.00	\$4.88	(\$0.02)	\$0.02	\$0.12	(\$0.03)	\$0.05	\$0.18	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
Northam Platinum	NHM	June	R 227.27	Latest Est.	P/CF	10	Overweight	R 430.00	R 160.77	R6.20	R26.82	R37.36	R14.37	R38.10	R43.24	523	702	761	\$1,141	\$1,149	\$1,152
			Previous Est.	10		Overweight	R 440.00	R 156.53	R6.20	R37.06	R17.99	R14.37	R40.16	R22.22	523	685	774	\$1,141	\$1,109	\$1,063	
Platinum Group Metals	PTM	Aug	CAD2.95	Latest Est.	P/NAV	0.5	Neutral	C\$5.20	\$2.03	(\$0.08)	(\$0.05)	(\$0.04)	(\$0.08)	(\$0.05)	(\$0.04)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
			Previous Est.	0.5		Neutral	C\$7.40	\$2.03	(\$0.08)	(\$0.06)	(\$0.05)	(\$0.08)	(\$0.06)	(\$0.05)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
RBPlat	RBP	Dec	R 91.18	Latest Est.	P/CF	7	Neutral	R 150.00	R 130.93	R 13.54	R18.41	R14.27	R 31.50	R23.97	R20.21	419	481	530	\$952	\$1,078	\$1,082
			Previous Est.	7		Overweight	R 170.00	R 146.12	R13.54	R20.49	R 15.29	R31.50	R26.39	R 21.29	419	507	530	\$952	\$1,018	\$1,021	
Tharisa	THA	Sept	R 26.50	Latest Est.	P/CF	5	Overweight	R 50.00	\$1.80	\$0.16	\$0.46	\$0.34	\$0.42	\$0.80	\$0.68	142	158	167	\$895	\$1,171	\$1,021
			Previous Est.	5		Overweight	R 48.00	\$1.80	\$0.16	\$0.49	\$0.38	\$0.42	\$0.87	\$0.75	142	156	167	\$895	\$1,156	\$1,021	
Wesizwe Platinum	WEZ	Dec	R 0.72	Latest Est.	P/NAV	0.5	Underweight	R 0.60	R 0.84	R0.03	(R0.42)	(R0.32)	R0.02	(R0.42)	(R0.16)	n.a.	n.a.	27	n.a.	n.a.	n.a.
			Previous Est.	0.5		Underweight	R 0.70	R 0.69	R0.03	(R0.42)	(R0.18)	R0.02	(R0.42)	(R0.11)	n.a.	n.a.	40	n.a.	n.a.	n.a.	
Sibanye-Stillwater	SGL	Dec	R 54.87	Latest Est.	P/CF	6	Overweight	R 110.00	R 64.83	R10.68	R14.35	R9.84	R13.42	R19.55	R15.41	2,180	2,433	2,440	\$1,009	\$963	\$959
			Previous Est.	7		Overweight	R 150.00	R 54.76	R10.68	R16.20	R8.87	R13.42	R21.67	R14.22	2,180	2,473	2,461	\$1,009	\$974	\$833	

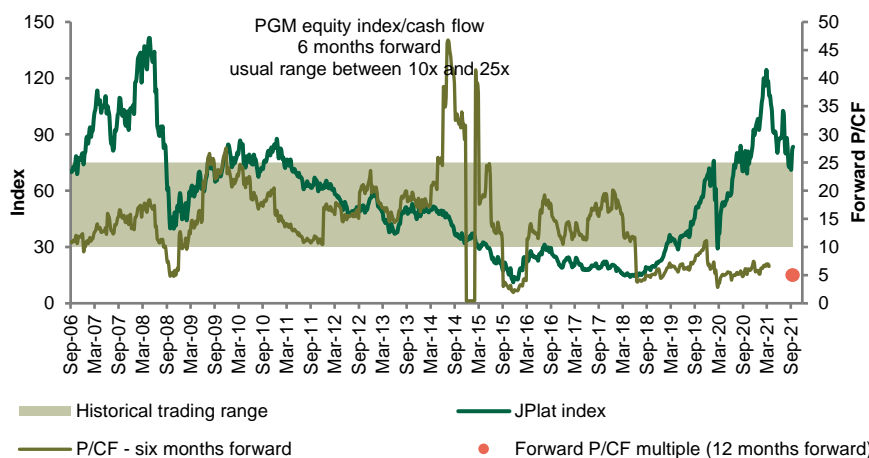
Source: Bloomberg, company reports, Nedbank CIB Markets Research

Valuation and fair values

PGM company P/CF valuation multiples have pulled back sharply in recent months, and this offers a good rerating opportunity. Average sector multiples are currently around 5x, well below the bottom of the long-term trading range of 10-25x, as Exhibit 46 shows. We expect most of the sector to trade around 10x, which implies a decent rerating from current levels. The market is, thus, clearly pricing in a sharp decline in the PGM basket price. If the PGM basket price continues to improve, the prospects of sustained strong free cashflow should drive a rerating.

However, we need to see some confidence return to the market, with the prospects of global economic growth improving for this rerating to materialise. A rerating of this magnitude should deliver good upside from current levels. We, thus, maintain our Overweight view on the PGM stocks. Our tops picks are Amplats, Northam, Impala and Sibanye-Stillwater. We continue to rate Tharisa Overweight. RBPlats has been downgraded to Neutral.

Exhibit 46: Forward P/CF multiples – valuations still undemanding



Source: Bloomberg, Nedbank CIB Markets Research

Exhibit 47 shows our implied fair values based on our official Nedbank metal price and currency forecasts as well as at spot prices.

Exhibit 47: Forward P/CF multiples – valuations still undemanding

Company	Share Code	Gold Price Scenario	Valuation Method	Valuation Multiple	Implied Value (Rand/ CAD)	Implied Value (USD)	Close	Implied Return	Rating
Anglo Platinum	AMS	Base	P/CF	10	R2,800.00	USD189.63	R1,626.30	72%	Overweight
		Spot			R2,295.53	USD157.20		41%	
Impala Platinum	IMP	Base	P/CF	8	R400.00	USD27.15	R221.45	81%	Overweight
		Spot			R409.00	USD28.01		85%	
Ivanhoe Mines	IVN	Base	P/NAV	1	CAD11.00	USD4.88	CAD9.87	11%	Neutral
		Spot			CAD10.08	USD8.15		2%	
Northam Platinum	NHM	Base	P/CF	10	R430.00	USD29.61	R227.00	89%	Overweight
		Spot			R405.99	USD27.80		79%	
Platinum Group Metals	PTM	Base	P/NAV	0.5	CAD5.20	USD1.02	CAD3.04	71%	Neutral
		Spot			CAD4.69	USD3.79		54%	
RBPlat	RBP	Base	P/CF	7	R150.00	USD10.59	R95.30	57%	Neutral
		Spot			R154.60	USD10.59		62%	
Tharisa	THA	Base	P/CF	5	R50.00	USD3.57	R25.60	95%	Overweight
		Spot			R48.33	USD3.31		89%	
Wesizwe Platinum	WEZ	Base	P/NAV	0.5	R0.60	USD0.03	R0.84	-29%	Underweight
		Spot			R0.74	USD0.05		-12%	
Sibanye-Stillwater	SGL	Base	P/CF	6	R110.00	USD7.18	R56.40	95%	Overweight
		Spot			R106.27	USD7.28		88%	

Base Case long term metal price forecasts: Pt USD1,100/oz; Pd USD1,200/oz; Rh USD8,500/oz; R/USD15.00
 Current spot metal prices: Pt USD1,050/oz; Pd USD2,070/oz; Rh USD14,200/oz; R/USD14.70

Source: Bloomberg, Nedbank CIB Markets Research

We provide a brief synopsis of our views and valuation on each stock below.

Anglo American Platinum – Overweight

Anglo American Platinum (Amplats) remains the safest play in our coverage universe, given its strong balance sheet and diverse asset portfolio. The Mogalakwena open pit mine, which is large and offers operational diversification away from underground mining, sets Amplats apart from its peers. The issues around its processing facilities have been resolved, and the company has managed to destock quicker than anticipated. The risk profile has, thus, normalised, and we expect investors to move into Amplats as they start to position for the safer, less levered PGM investments.

We continue to value the stock at a 10x multiple. This takes into account the company's strong balance sheet, its operational scale and its diversified suite of assets. We believe the risk of further volume constraints due to processing issues has diminished significantly following the successful recommissioning of the ACP A unit. Our fair value is R2 800/share, from R2 900/share before. We believe the stock again offers upside and continue to rate it Overweight.

Impala Platinum – Overweight

Impala remains one of the more operationally levered PGM plays, and the rise in PGM prices has significantly boosted Impala's fortunes. The rise in PGM prices since 2018 has seen the company's fortunes turn around sharply, and it is generating strong cashflow at the current PGM basket price, which has translated into strong dividend payments, following the deleveraging of the balance sheet. We expect this trend to continue at current PGM prices. The stock is also well positioned to benefit from a rebound in PGM prices following the recent pullback.

We value the stock at an 8x forward P/CF. The discount to Amplats is to account for the operational risk and leverage to a lower-PGM-price environment. Our fair value is R400/share, from R440/share before. The stock still offers good upside, and we rate it Overweight.

Ivanhoe Mines – Neutral

Ivanhoe has an exceptional mineral resource endowment, in our view. It has world-class assets, measured in terms of grade, quality and size. The company has made significant progress in developing Phase 1 of Kamoa-Kakula, which is running ahead of name-plate capacity, and Phase 2 of the project is also running ahead of schedule. This should bring the company closer to generating positive cashflow. However, Platreef development costs still need to be funded and could weigh on the valuation, in our opinion. The company's projects are in high-risk jurisdictions (the DRC and SA), which could also weigh on its valuation.

We now apply a 1.0x P/NAV multiple to our spot NAV estimate. Our fair value is CAD11/share. We continue to rate the stock Neutral.

Northam Platinum – Overweight

Northam remains our preferred PGM stock given its growth potential, positioning at the lower end of the cost curve and solid delivery track record. Over the next year, production should ramp up further. This positions the company well to benefit from elevated PGM prices and should see a sharp turnaround in the company's free cashflow and balance sheet leverage. The new simplified ownership structure should also see the company attracting a higher valuation multiple. With the Zambezi deal having been concluded, the company can now focus on its next phase of delivering value to its shareholders, including the resumption of dividend payments. We believe this will aid a further rerating of the stock.

We value Northam at a 10x forward P/CF. This is at a premium to Impala given the quality of Northam's asset base and expected production growth. Our revised fair value is R430/share, from R440/share before. We rate the stock Overweight.

Platinum Group Metals (PTM) – Neutral

We believe the Waterberg project has good long-term potential given its mechanised mining potential. However, the project has a very large capex bill (about USD800m) and significant execution risk. PTM currently has a weak balance sheet and no operating assets, and would need to raise additional funding to cover its operating expenses over the next few years as it develops Waterberg. These fund raisings and the Waterberg equity funding requirements could be highly dilutive, in our view. This funding uncertainty and potential dilution could remain an overhang on the valuation, in our opinion.

To account for the funding and execution risk associated with the development of Waterberg, we apply a 0,5x P/NAV multiple to our spot NAV estimate. Our fair value is

CAD5,20/share, from CAD7,40/share before. This change is due to higher dilution associated with the decline in the share price in recent months (we assume 50% of Waterberg's funding is raised by issuing equity, which increases the shares in issue). We rate the stock Neutral.

Royal Bafokeng Platinum (RBPlat) – Neutral from Overweight

Although Styldrift's ramp-up is picking up momentum and is adding much needed replacement and growth to the RBPlat portfolio, the ramp-up has not always been smooth, as there have been material setbacks along the way. Still, we expect Styldrift to make a meaningful contribution to RBPlat's cashflow over the next year, especially at current metal prices. However, we believe the operational risk at Styldrift remains higher and this is deterring investors.

We continue to value the stock at a P/CF multiple of 7x, a discount to its peers to account for the operational risk. Our fair value is R150/share, from R170/share before. We now rate the stock Neutral from Overweight.

Sibanye-Stillwater – Overweight

Sibanye has delivered a solid operational turnaround at its gold operations over the past year while its PGM operations have performed well over the past couple of years. The US PGM operations have disappointed from an operational perspective, but higher palladium prices carried the day. This, coupled with higher metal prices, materially transformed the fortunes of the company – evident in the resumption of dividend payments.

Sibanye continues to offer solid metal-price leverage, which could further boost dividend payments. However, the company has embarked on a battery metals strategy that we believe has not been well received by all investors. There is still uncertainty about the full cost of this strategy and what the potential returns could be on these investments.

We also believe that precious metals investors – the company's existing investor base – do not have a full understanding of the battery metals market and its potential and that this could see the market attributing a discounted value to these battery material assets. We, therefore, believe this strategy could outweigh the prospects of solid future dividend payments from the existing precious metals asset base. In short, we believe the uncertainty around this strategy will weigh on the valuation in the short term.

We previously expected the stock to re-rate sharply following the degearing of the balance sheet and the resumption of dividend payments. However, we believe these positive rerating catalysts are being outweighed by the perceived risk investors associate with the battery metals strategy. We also believe it will take time for investors to fully wrap their minds around this strategy and before they start to give the company credit for this. We believe the market will wait for delivery and a clear line of sight on the cashflow associated with this strategy before it starts factoring any upside into the valuations.

Many investors also still perceive many of Sibanye's assets as high-cost marginal mines that could struggle if there is a sharp drop in metal prices. The recent downturn in commodity prices has, thus, seen investors start to grow cautious about the company's cashflow and dividend prospects in a lower pricing environment. This has started to weigh on the valuation and could continue to do so while there is uncertainty about the global economy and the risk of lower commodity prices.

We, therefore, believe the anticipated rerating of Sibanye's stock could take longer to materialise than we had expected previously. As such, we now value the stock on a 6x P/CF multiple, from 7x before. Our fair value is now R110/share, from R150/share before. The stock still offers significant upside, and we continue to rate it Overweight.

Tharisa – Overweight

Tharisa is unique given its co-extraction model, which has served it well in recent years. The higher PGM basket price should, therefore, continue to boost the share price performance, while a recovery in chrome prices should add a further boost to the company's fortunes.

We continue to value the stock at a P/CF multiple of 5x. We believe Tharisa will continue to trade at a discount to its PGM peers given its leverage to metal prices and small size vs its larger PGM peers. Our fair value is R50/share, from R48/share before. We believe the stock is again offering value at current levels, and we continue to rate the stock Overweight.

Wesizwe – Underweight

Wesizwe is developing the Bakubung mine adjacent to RBPlat's Styldrift project and bordering on Platinum Group Metals' (PTM's) Maseve mine. We believe the company's

structure (with the minorities essentially in a free carry to full production) is casting doubt on how the outstanding funding will be delivered. Given the level of uncertainty associated with the funding structure and the long lead time to production, we believe the risk remains too high.

We value Wesizwe as a development project at a P/NAV multiple, using spot metal prices, as opposed to our official metal-price forecasts previously. This is in line with what we do for PTM and Ivanhoe. Given the significant risk, we apply a P/NAV multiple of 0,5x. Our fair value is now R0,60/share, from R0,70/share before. We continue to rate the stock Underweight.

Comp tables

The following table shows our key financial forecasts and valuation metrics based on different pricing scenarios.

Exhibit 48: P/E, P/CF and P/NAV comparisons – Nedbank price scenario vs spot and Bloomberg consensus

P/E										
Company	Share Price	Fair Value	Rating	12 Month Forward EPS Forecast			12 Month Forward P/E			Average P/E
				Consensus	Base Case	Spot	Consensus	Base	Spot	
Anglo Platinum	R 1,626.30	R 2,800.00	Overweight	R256.58	R243.59	R198.17	6	7	8	7
Impala Platinum	R 221.45	R 400.00	Overweight	R45.19	R35.88	R37.21	5	6	6	6
Ivanhoe Mines	C\$9.87	C\$11.00	Neutral	\$0.24	\$0.13	\$0.27	34	n.a.	29	32
Northam Platinum	R 227.00	R 430.00	Overweight	R37.13	R37.36	R34.71	6	6	7	6
PTM	C\$3.04	C\$5.20	Neutral	(\$0.19)	(\$0.05)	(\$0.05)	n.a.	n.a.	n.a.	n.a.
RBPlat	R 95.30	R 150.00	Neutral	R23.22	R16.34	R16.34	4	6	6	5
Tharisa	R 25.60	R 50.00	Overweight	R0.50	R0.37	R0.34	4	5	5	5
Wesizwe	R 0.84	R 0.60	Underweight	n.a.	(R0.32)	(R0.34)	n.a.	n.a.	n.a.	n.a.
Weighted Average (Market Cap) P/E							9	6	10	10
Sibanye	R 56.40	R 110.00	Overweight	R 13.09	R 12.09	R 9.76	4	5	6	5

P/CF										
Company	Share Price	Fair Value	Rating	12 Month Forward CFPS Forecast			12 Month Forward P/CF			Average P/CF
				Consensus	Base Case	Spot	Consensus	Base	Spot	
Anglo Platinum	R 1,626.30	R 2,800.00	Overweight	R286.12	R276.92	R229.55	6	6	7	6
Impala Platinum	R 221.45	R 400.00	Overweight	R39.70	R49.55	R51.12	6	4	4	5
Ivanhoe Mines	C\$9.87	C\$11.00	Neutral	\$0.19	\$0.20	\$0.36	n.a.	n.a.	n.a.	n.a.
Northam Platinum	R 227.00	R 430.00	Overweight	R51.96	R43.24	R40.60	4	5	6	5
PTM	C\$3.04	C\$5.20	Neutral	(\$0.08)	(\$0.05)	(\$0.05)	n.a.	n.a.	n.a.	n.a.
RBPlat	R 95.30	R 150.00	Neutral	R24.91	R22.09	R22.09	4	4	4	4
Tharisa	R 25.60	R 50.00	Overweight	R0.70	R0.71	R0.66	3	2	3	3
Wesizwe	R 0.84	R 0.60	Underweight	n.a.	(R0.16)	(R0.18)	n.a.	n.a.	n.a.	n.a.
Weighted Average (Market Cap) P/CF							5	5	5	5
Sibanye	R 56.40	R 110.00	Overweight	R 14.99	R 17.48	R 14.89	4	3	4	4

P/NAV										
Company	Share Price	Fair Value	Rating	NAV			P/NAV			Average P/NAV
				Consensus	Base Case	Spot	Consensus	Base	Spot	
Anglo Platinum	R 1,626.30	R 2,800.00	Overweight	R269.03	R934.46	R1,226.13	6.0	1.7	1.3	3.0
Impala Platinum	R 221.45	R 400.00	Overweight	R71.60	R213.64	R305.32	3.1	1.0	0.7	1.6
Ivanhoe Mines	C\$9.87	C\$11.00	Neutral	\$6.79	\$4.88	\$8.15	1.2	1.6	1.0	1.3
Northam Platinum	R 227.00	R 430.00	Overweight	R27.16	R160.77	R221.47	8.4	1.4	1.0	3.6
PTM	C\$3.04	C\$5.20	Neutral	n.a.	\$2.03	\$7.59	n.a.	1.5	0.3	0.9
RBPlat	R 95.30	R 150.00	Neutral	n.a.	R141.86	R141.86	n.a.	0.7	0.7	0.7
Tharisa	R 25.60	R 50.00	Overweight	\$1.89	\$1.80	\$2.84	0.9	1.0	0.6	0.8
Wesizwe	R 0.84	R 0.60	Underweight	n.a.	R0.96	R1.49	n.a.	0.9	0.6	0.7
Weighted Average (Market Cap) P/NAV							4.3	1.4	1.0	2.2
Sibanye	R 56.40	R 110.00	Overweight	R 23.02	R 64.83	R 82.16	2.4	0.9	0.7	1.3

Base Case long term metal price forecasts: Pt USD1,100/oz; Pd USD1,200/oz; Rh USD8,500/oz; R/USD15.00

Current spot metal prices: Pt USD1,050/oz; Pd USD2,070/oz; Rh USD14,200/oz; R/USD14.70

Source: Bloomberg, Nedbank CIB Markets Research

The following two tables show our key financial forecasts and valuation metrics based on our official metal-price forecasts and spot.

Exhibit 49: Key financial forecasts at Nedbank metal-price forecasts and spot

Company	Share Code	Year End	Rating	Market Cap (m)	Closing Price	Fair Value		EPS Estimate			P/E				CFPS Estimate			P/CF					
								NAV	P/NAV	'20A	'21E	'22E	'20A	'21E	'22E	1yr frd	'20A	'21E	'22E	'20A	'21E	'22E	1yr frd
Anglo Platinum	AMS	Dec	Overweight	R431,444 USD29,545	R 1,626.30	R2,800	Latest Est.	R1,226	1.3	R115.52	R187.38	R208.97	14	9	8	8	R167.94	R217.72	R241.38	10	7	7	7
							Spot	R1,226	1.3	R115.52	R187.38	R208.97	14	9	8	8	R167.94	R217.72	R241.38	10	7	7	7
Impala Platinum	IMP	June	Overweight	R180,984 USD12,394	R 221.45	R400	Latest Est.	R305.32	0.7	R20.75	R46.35	R37.21	11	5	6	6	R32.93	R52.53	R51.12	7	4	4	4
							Spot	R305.32	0.7	R20.75	R46.35	R37.21	11	5	6	6	R32.93	R52.53	R51.12	7	4	4	4
Ivanhoe Mines	IVN	Dec	Neutral	CAD11,933 USD9,652	CAD9.87	CAD11.00	Latest Est.	\$8.15	1.0	(\$0.02)	\$0.08	\$0.27	n.a.	95	29	29	(\$0.03)	\$0.13	\$0.36	n.a.	63	22	22
							Spot	\$8.15	1.0	(\$0.02)	\$0.08	\$0.27	n.a.	8	8	29	(\$0.03)	\$0.13	\$0.36	n.a.	63	22	22
Northam Platinum	NPH	June	Overweight	R82,223 USD5,631	R 227.00	R430	Latest Est.	R221.47	1.0	R6.20	R26.82	R34.71	37	8	7	7	R14.37	R38.10	R40.60	16	6	6	6
							Spot	R221.47	1.0	R6.20	R26.82	R34.71	37	8	7	7	R14.37	R38.10	R40.60	16	6	6	6
Platinum Group Metals	PTM	Aug	Neutral	CAD228 USD185	CAD3.04	CAD5.20	Latest Est.	\$7.59	0.4	(\$0.08)	(\$0.05)	(\$0.05)	n.a.	n.a.	n.a.	n.a.	(\$0.08)	(\$0.05)	(\$0.05)	n.a.	n.a.	n.a.	n.a.
							Spot	\$7.59	0.4	(\$0.08)	(\$0.05)	(\$0.05)	n.a.	n.a.	n.a.	n.a.	(\$0.08)	(\$0.05)	(\$0.05)	n.a.	n.a.	n.a.	n.a.
RBPlat	RBP	Dec	Neutral	R27,543 USD1,886	R 95.30	R150	Latest Est.	R141.86	0.7	R13.54	R18.41	R14.27	7	5	7	6	R31.50	R23.97	R20.21	3	4	5	4
							Spot	R141.86	0.7	R13.54	R18.41	R14.27	7	5	7	6	R31.50	R23.97	R20.21	3	4	5	4
Tharisa	THA	Sep	Overweight	R6,886 USD472	R 25.60	R50	Latest Est.	\$2.84	0.6	\$0.16	\$0.24	\$0.37	11	7	5	5	\$0.42	\$0.44	\$0.73	4	4	2	3
							Spot	\$2.84	0.6	\$0.16	\$0.24	\$0.37	11	7	5	5	\$0.42	\$0.44	\$0.73	4	4	2	3
Wesizwe Platinum	WEZ	Dec	Underweight	R1,367 USD94	R 0.84	R0.60	Latest Est.	R1.49	0.6	R0.03	(R0.41)	(R0.34)	2996	-230	-281	n.a.	R0.02	(R0.41)	(R0.18)	5654	-230	-544	n.a.
							Spot	R1.49	0.6	R0.03	(R0.41)	(R0.34)	26	n.a.	n.a.	n.a.	R0.02	(R0.41)	(R0.18)	50	n.a.	n.a.	n.a.
Sibanye-Stillwater*	SGL	Dec	Overweight	R158,389 USD10,846	R 56.40	R110	Latest Est.	R82.16	0.7	R10.68	R9.75	R9.78	5	6	6	6	R13.42	R14.45	R15.34	4	4	4	4
							Spot	R64.83	0.9	R10.68	R14.35	R9.84	5	4	6	5	R13.42	R19.55	R15.41	4	12	15	3

* Production and cash costs reflect only the PGM assets

Base Case long term metal price forecasts: Pt USD1,100/oz; Pd USD1,200/oz; Rh USD8,500/oz; R/USD15.00

Current spot metal prices: Pt USD1,050/oz; Pd USD2,070/oz; Rh USD14,200/oz; R/USD14.70

Source: Bloomberg, company reports, Nedbank CIB Markets Research

Exhibit 50: Revised Nedbank financial and operational forecasts

Company	Share Code	Year End	Rating	Market Cap (m)	Closing Price	Fair Value		Production (Koz PGMs)				Cash Cost (USD/PGMoz)				AISC (USD/PGMoz)			
								'19A	'20A	'21E	'22E	'19A	'20A	'21E	'22E	'19A	'20A	'21E	'22E
Anglo Platinum	AMS	Dec	Overweight	R431,444 USD29,545	R 1,626.30	R2,800	Latest Est.	5,152	3,217	4,287	4,505	\$703	\$718	\$841	\$863	\$807	\$828	\$958	\$989
							Spot	5,152	3,217	4,287	4,505	\$703	\$718	\$841	\$863	\$807	\$828	\$958	\$989
Impala Platinum	IMP	June	Overweight	R180,984 USD12,394	R 221.45	R400	Latest Est.	3,010	2,849	3,292	3,376	\$810	\$840	\$958	\$1,087	\$908	\$941	\$1,103	\$1,238
							Spot	3,010	2,849	3,292	3,376	\$810	\$840	\$958	\$1,087	\$908	\$941	\$1,103	\$1,238
Ivanhoe Mines	IVN	Dec	Neutral	CAD11,933 USD9,652	CAD9.87	CAD11.00	Latest Est.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
							Spot	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Northam Platinum	NPH	June	Overweight	R82,223 USD5,631	R 227.00	R430	Latest Est.	526	523	702	761	\$982	\$1,141	\$1,149	\$1,175	\$1,013	\$1,190	\$1,289	\$1,376
							Spot	526	523	702	761	\$982	\$1,141	\$1,149	\$1,175	\$1,013	\$1,190	\$1,289	\$1,376
Platinum Group Metals	PTM	Aug	Neutral	CAD228 USD185	CAD3.04	CAD5.20	Latest Est.	0	0	0	0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
							Spot	0	0	0	0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
RBPlat	RBP	Dec	Neutral	R27,543 USD1,886	R 95.30	R150	Latest Est.	401	419	481	530	\$972	\$952	\$1,078	\$1,082	\$1,076	\$1,051	\$1,214	\$1,218
							Spot	401	419	481	530	\$972	\$952	\$1,078	\$1,082	\$1,076	\$1,051	\$1,214	\$1,218
Tharisa	THA	Sep	Overweight	R6,886 USD472	R 25.60	R50	Latest Est.	140	142	158	167	\$623	\$895	\$1,072	\$1,064	\$808	\$1,262	\$1,451	\$1,406
							Spot	140	142	158	167	\$623	\$895	\$1,072	\$1,064	\$808	\$1,262	\$1,451	\$1,406
Wesizwe Platinum	WEZ	Dec	Underweight	R1,367 USD94	R 0.84	R0.60	Latest Est.	n.a.	n.a.	0	27	n.a.	n.a.	\$0	\$765	n.a.	n.a.	\$0	\$0
							Spot	n.a.	n.a.	0	27	n.a.	n.a.	\$0	\$765	n.a.	n.a.	\$0	\$0
Sibanye-Stillwater*	SGL	Dec	Overweight	R158,389 USD10,846	R 56.40	R110	Latest Est.	2,203	2,180	2,433	2,440	\$923	\$1,009	\$966	\$968	\$958	\$1,157	\$1,117	\$1,155
							Spot	2,203	2,180	2,433	2,440	\$923	\$1,009	\$963	\$959	\$958	\$1,157	\$1,110	\$1,146

* Production and cash costs reflect only the PGM assets

Base Case long term metal price forecasts: Pt USD1,100/oz; Pd USD1,200/oz; Rh USD8,500/oz; R/USD15.00

Current spot metal prices: Pt USD1,050/oz; Pd USD2,070/oz; Rh USD14,200/oz; R/USD14.70

Source: Bloomberg, company reports, Nedbank CIB Markets Research

Key risks

The biggest risk for the companies is a significant change in commodity prices.

Anglo American Platinum

Material operational setbacks, especially at Mogalakwena, which accounts for the bulk of the company's free cashflow, could have a material impact on our valuation. Disruptions to the processing facilities, especially the newly commissioned ACP plant, could also have a material impact on our valuation.

Impala Platinum

If the expected increases in volume from 20 Shaft and 16 Shaft do not materialise, Impala Rustenburg could continue to underperform. The company has kept open several marginal shafts previously earmarked for closure. A sharp drop in PGM prices could result in these shafts having to be restructured or closed, which could weigh on the valuation, in our view.

Ivanhoe Mines

Delays in raising the required funding to build the company's mines could negatively impact our valuation. Dilution associated with these possible fund raisings could also materially impact our valuation.

Northam Platinum

Any material operational setback could negatively impact our valuation. Delays in destocking its metal inventory pipeline could negatively impact the financial performance.

Platinum Group Metals

Failure to raise equity and the pricing level at which it is raised could have a material impact on our valuation. Any development delays at Waterberg could negatively impact our valuation. Failure to secure funding to develop Waterberg could also impact the valuation. A much higher PGM basket price could see the stock price in further upside at Waterberg.

Royal Bafokeng Platinum

RBPlat's specific risk is associated with having to execute the remainder of the build-up at Styldrift. Any major setback or delay could materially impact our valuation.

Sibanye-Stillwater

Any material operational setback could negatively impact our valuation. We also caution that the company's growth ambitions remain a risk, as management may use the windfall from higher metal prices to pursue further offshore growth, which could impact its free cashflow and valuation.

Tharisa

Tharisa is highly levered to the chrome price, which is directly related to economic growth in China. Any material operational setback or a miss on the commissioning of the Vulcan project could knock the valuation, in our view.

Wesizwe

Wesizwe needs to address its funding shortfall, in our view. We believe any material operational setback or delay in its project timeline could further materially affect the valuation. A much higher PGM basket price could see the stock price in further upside at its Wesizwe mine project.

Disclaimer

Recommendation structure

We use a relative rating system using terms such as Buy, Hold, and Sell.

Buy: Over the next 12 to 18 months this stock's total return is expected to outperform the average total return of the stocks in the analyst's coverage universe

Hold: Over the next 12 to 18 months this stock's total return is expected to perform in line with the average total return of the stocks in the analyst's coverage universe

Sell: Over the next 12 to 18 months this stock's total return is expected to underperform the average total return of the stocks in the analyst's coverage universe

Not rated: We do not maintain an investment recommendation on this stock.

Restricted: We are restricted from rating this stock due to a potential conflict of interest, or for legal/policy/regulatory issues

Target Price (TP): The TP is the level the stock should currently trade at if the market were to accept the analyst's view of the stock and if the necessary catalysts were in place to effect this change in perception within the performance horizon. In this way, therefore, the TP abstracts from the need to take a view on the market or sector. If it is felt that the catalysts are not fully in place to effect a re-rating of the stock to its warranted TP, the fair value may be interpreted as a target price to be attained at some point in the future, namely in 12 to 18 months' time, unless a different time frame is specified.

Valuation and Target Price

Anglo Platinum	R 1,541.71	R 2,800.00	Overweight
Impala Platinum	R 212.45	R 400.00	Overweight
Ivanhoe Mines	C\$9.12	C\$11.00	Neutral
Northam Platinum	R 227.27	R 430.00	Overweight
PTM	C\$2.95	C\$5.20	Neutral
RBPlat	R 91.18	R 150.00	Neutral
Tharisa	R 26.50	R 50.00	Overweight
Wesizwe	R 0.72	R 0.60	Underweight

Weighted Average (Market Cap) P/E

Sibanye	R 54.87	R 110.00	Overweight
---------	---------	----------	------------

PGM company P/CF valuation multiples have pulled back sharply in recent months, and this offers a good rerating opportunity. Average sector multiples are currently around 5x, well below the bottom of the long-term trading range of 10-25x, as Exhibit 46 shows. We expect most of the sector to trade around 10x, which implies a decent rerating from current levels. The market is, thus, clearly pricing in a sharp decline in the PGM basket price. If the PGM basket price continues to improve, the prospects of sustained strong free cashflow should drive a rerating.

However, we need to see some confidence return to the market, with the prospects of global economic growth improving for this rerating to materialise. A rerating of this magnitude should deliver good upside from current levels. We, thus, maintain our Overweight view on the PGM stocks. Our tops picks are Amplats, Northam, Impala and Sibanye-Stillwater. We continue to rate Tharisa Overweight. RBPlats has been downgraded to Neutral.

Disclosures

Subject Company	Relevant Disclosure(s) if any
Sibanye-Stillwater	H
Anglo American Platinum	H
Impala Platinum Holdings Limited	G,H
Platinum Group Metals	
Ivanhoe Mines	H
Northam Platinum	G,H
Royal Bafokeng Platinum	G,H
Tharisa	G
Wesizwe	G,H

A - Nedbank holds 1% or more of the total issued share capital of the subject company

B - Nedbank holds 5% or more of the total issued share capital of the subject company

C - The analyst of this report (or a connected person) has a holding in the subject company

D - The analyst of this report (or a connected person) has traded in the securities of the subject company in the last 30 days

E - The analyst of this report (or a connected person) is a director or officer of the subject company

F - The subject company viewed a draft (with no fair value or recommendation included) version of this report to confirm factual accuracy only

G - Nedbank earned investment banking fees from the subject company in the last 12 months

H - Nedbank has an investment banking relationship with the subject company

I - Nedbank has managed or co-managed a primary share issue for the subject company in the past 12 months

J - Nedbank has managed or co-managed a secondary share issue for the subject company in the past 12 months

Nedbank may conduct investment banking business with the subject company in the next 6 months.

RATING DISTRIBUTION (as at 15 October 2021)

Recommendation	Count	% of NCIB total stocks covered
Overweight	23	56%
Neutral	13	33%
Underweight	3	8%
Restricted	1	3%
Total	39	100%

Please click here to view our [Nedbank CIB Disclaimer](#)

Recommendation History

Sibanye-Stillwater				
Report Date	Report name	Analysts	Recommendation	Target Price
05 10 2021	SA Q4 2021 - Sector views steady despite more growth	Arnold Van Graan	Overweight	R150.00
16 09 2021	Sibanye-Stillwater Limited: Adding more battery material exposure	Arnold Van Graan	Overweight	R150.00
27 08 2021	Sibanye-Stillwater Ltd: Strong 1H FY21 results – lining up for a green-energy future	Arnold Van Graan	Overweight	R150.00

Anglo American Platinum				
Report Date	Report name	Analysts	Recommendation	Target Price
05 10 2021	SA Q4 2021 - Sector views steady despite more growth	Arnold Van Graan	Overweight	R2900.00
24 08 2021	Precious Metals: The cost of going green	Arnold Van Graan	Overweight	R2900.00
12 08 2021	Fuel Cell & Hydrogen conference: Q&A feedback	Arnold Van Graan	Overweight	R2900.00

Impala Platinum Holdings Limited				
Report Date	Report name	Analysts	Recommendation	Target Price
05 10 2021	SA Q4 2021 - Sector views steady despite more growth	Arnold Van Graan	Overweight	R440.00
02 09 2021	Impala Platinum: Strong FY21 results	Arnold Van Graan	Overweight	R440.00
24 08 2021	Precious Metals: The cost of going green	Arnold Van Graan	Overweight	R440.00

Platinum Group Metals				
Report Date	Report name	Analysts	Recommendation	Target Price
05 10 2021	SA Q4 2021 - Sector views steady despite more growth	Arnold Van Graan	Neutral	C\$7.40
24 08 2021	Precious Metals: The cost of going green	Arnold Van Graan	Neutral	C\$7.40
12 08 2021	Fuel Cell & Hydrogen conference: Q&A feedback	Arnold Van Graan	Neutral	C\$7.40

Ivanhoe Mines				
Report Date	Report name	Analysts	Recommendation	Target Price
05 10 2021	SA Q4 2021 - Sector views steady despite more growth	Arnold Van Graan	Neutral	C\$11.00
01 10 2021	Ivanhoe Mines: Kamo-a-Kakula concentrator exceeds steady-state throughput	Arnold Van Graan	Neutral	C\$11.00
24 08 2021	Precious Metals: The cost of going green	Arnold Van Graan	Neutral	C\$11.00

Northam Platinum				
Report Date	Report name	Analysts	Recommendation	Target Price
05 10 2021	SA Q4 2021 - Sector views steady despite more growth	Arnold Van Graan	Overweight	R440.00
30 09 2021	Northam Platinum: Strong FY21 results – building blocks falling into place	Arnold Van Graan	Overweight	R440.00
24 08 2021	Precious Metals: The cost of going green	Arnold Van Graan	Overweight	R440.00

Royal Bafokeng Platinum Limited				
Report Date	Report name	Analysts	Recommendation	Target Price
05 10 2021	SA Q4 2021 - Sector views steady despite more growth	Arnold Van Graan	Overweight	R170.00
24 08 2021	Precious Metals: The cost of going green	Arnold Van Graan	Overweight	R170.00
12 08 2021	Fuel Cell & Hydrogen conference: Q&A feedback	Arnold Van Graan	Overweight	R170.00

* Validity time period of the target price or of the recommendation: 12-18 months....

Tharisa				
Report Date	Report name	Analysts	Recommendation	Target Price
12 10 2021	Tharisa: Strong 4Q FY21 production results – lining up further growth	Arnold Van Graan	Overweight	R48.00
05 10 2021	SA Q4 2021 - Sector views steady despite more growth	Arnold Van Graan	Overweight	R48.00
24 08 2021	Precious Metals: The cost of going green	Arnold Van Graan	Overweight	R48.00

Wesizwe Platinum				
Report Date	Report name	Analysts	Recommendation	Target Price
05 10 2021	SA Q4 2021 - Sector views steady despite more growth	Arnold Van Graan	Underweight	R0.70
24 08 2021	Precious Metals: The cost of going green	Arnold Van Graan	Underweight	R0.70
12 08 2021	Fuel Cell & Hydrogen conference: Q&A feedback	Arnold Van Graan	Underweight	R0.70

* Validity time period of the target price or of the recommendation: 12-18 months....