PLATINUM ESSENTIALS

WPIC inaugural two- to five-year supply/demand outlook shows platinum market moving to deepening deficits

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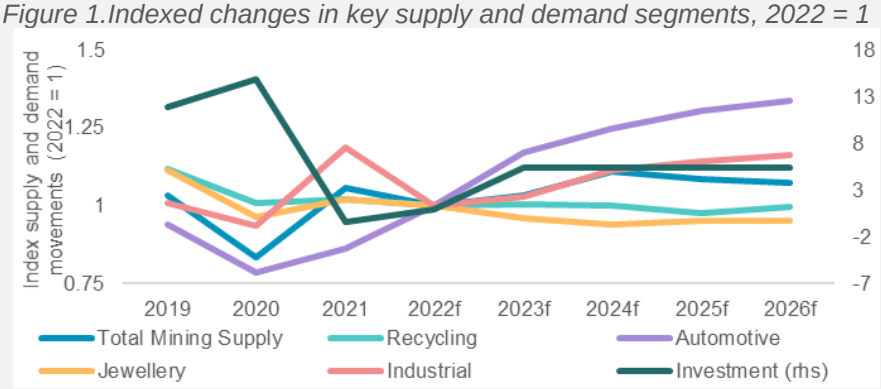
We present in this report our in-house projections for the years 2023-2026 which show the platinum market in deficit in 2023; these deficits deepen materially by 2026. This report complements, but is entirely separate from, the one year forward outlook we publish in our Platinum Quarterly (PQ), which is prepared independently for us by Metals Focus.

This report contains our outlook for platinum supply and demand for the years 2023-2026. It builds on our recently published drivetrain and fuel cell electric vehicle reports which forecast out to 2040. All estimates in this report are based upon publicly available information and WPIC in-house analysis*. Despite us having granular views of each demand segment, we have chosen, for this inaugural report, to use a simplified and conservative approach to our projections**. On this basis our outlook shows strong growth in automotive demand, driven primarily by platinum substitution for palladium in gasoline vehicles, and continued steady but unspectacular growth in industrial demand. Mine supply is projected to grow from current levels at the lower end of public published company guidance, with recycling supply forecast to remain broadly flat. Jewellery demand is expected to remain flat, albeit somewhat below historical levels as strong demand in North America and other markets is more than offset by continued weak demand in China. Our investment demand forecast is based on historic averages rather than more detailed modelling. **Our analysis shows modest platinum deficits in 2023 and 2024 with increasing and materially deeper deficits in 2025 and 2026.** It is noteworthy that our supply/demand data does not include China's platinum imports in excess of identified demand, which deepened the 2020 deficit and moved the market from major surplus into modest deficit in 2021.

Figure 1.Indexed changes in key supply and demand segments, 2022 = 1



Source: Metals Focus 2019-2022f, WPIC Research 2023f onwards

Figure 2. WPIC projects platinum deficits from 2023 deepening to 2026

Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023

**WPIC in-house supply research is based solely on published supply data, including forward looking guidance, with any adjustments noted. It does not represent the views of any WPIC members or those of Metals Focus which independently prepare our Platinum Quarterly reports. Demand data is based on public data but includes WPIC in-house analysis.*

***This provides us with our best current base case to allow scenario analysis while we increase modelling detail and publish more granular results in future reports.*

WPIC drivetrain report

WPIC FCEV report

WPIC's ***Platinum Essentials*** is a publication which explores topics affecting platinum as an asset class. This is different to ***Platinum Perspectives***, which is a concise monthly publication which looks at a specific topic affecting supply demand dynamics for platinum.

Contents

Figure 3. Supply/demand summary table

	PUBLISHED PLATINUM QUARTERLY ESTIMATES†				WPIC ESTIMATES‡			
	2019	2020	2021	2022f	2023f	2024f	2025f	2026f
PLATINUM SUPPLY								
Refined mine production								
- South Africa	4,374	3,298	4,678	4,258	4,459	4,868	4,713	4,628
- Zimbabwe	458	448	485	465	479	514	537	534
- North America	356	337	273	333	332	342	345	355
- Russia	716	704	652	611	607	607	607	607
- Other	170	202	208	205	182	183	184	185
- Producer inventory movement	2	-84	-93	0	0	0	0	0
Total mining supply	**6,077**	**4,906**	**6,204**	**5,872**	**6,059**	**6,514**	**6,385**	**6,310**
Total recycling	**2,136**	**1,930**	**1,953**	**1,909**	**1,917**	**1,908**	**1,864**	**1,902**
Total supply	**8,213**	**6,836**	**8,156**	**7,781**	**7,975**	**8,422**	**8,249**	**8,212**
PLATINUM DEMAND								
Automotive	**2,869**	**2,402**	**2,643**	**3,055**	**3,583**	**3,817**	**3,983**	**4,086**
Jewellery	**2,099**	**1,820**	**1,923**	**1,886**	**1,814**	**1,770**	**1,793**	**1,800**
Industrial	**2,127**	**1,978**	**2,508**	**2,109**	**2,170**	**2,349**	**2,411**	**2,454**
Total investment	**1,237**	**1,544**	**-45**	**104**	**560**	**560**	**560**	**560**
- Bar and coin	266	578	332	254	310	310	310	310
- ETF	991	507	-238	-50	250	250	250	250
- Stocks held by exchanges	-20	458	-139	-100	0	0	0	0
Total demand	**8,331**	**7,743**	**7,029**	**7,155**	**8,128**	**8,495**	**8,746**	**8,901**
Supply/demand balance	**-119**	**-908**	**1,128**	**627**	**-152**	**-74**	**-497**	**-689**

†The Platinum Quarterly report and data are prepared independently for the WPIC by Metals Focus

‡WPIC estimates and analysis are based upon publically available information

Source: Metals Focus from 2019 to 2022, WPIC Research from 2023

Introduction

The WPIC's platinum supply and demand projections are intended to complement the estimates and forecasts published in our *Platinum Quarterly*, but they look further into the future and allow for longer term scenario analysis. The *Platinum Quarterly* report and data are prepared independently for the WPIC by Metals Focus, with Metals Focus's estimates provided on a one year forward basis. For the avoidance of doubt, all estimates for 2023 to 2026 included in this report are WPIC forecasts, with the exception of mine supply which is based upon public published company guidance. Specifically, WPIC has made no use of any data or views included in Metals Focus's separate five-year forecast available to its customers, that provides an outlook for platinum, palladium and rhodium.

WPIC's base case published supply/demand projections for 2023 to 2026 provide the ability to run scenario analysis on different parts of the supply/demand landscape

The WPIC has not attempted to develop further in-country and in-industry relationships to obtain fresh/incremental data and the information and sources used to develop our supply/demand model are all in the public domain.

Please see the appendix for a complete description of the methodologies we have used to develop each model and section of this report.

Key projections

The summary of the key aspects related to our estimates and forecasts includes the results of our efforts to normalise the outlook against pre-COVID levels to appropriately manage the impact of the significant disturbances in 2020 and 2021. For this purpose, we consider the averages for the years 2016-2019 for each source of supply or demand, to assist in our forecasting over the period 2023-2026.

Our key projections for the period 2023-2026 are as follows:

Public company guidance suggests that total mine supply will reach almost record levels in 2025

Automotive demand for platinum expected to be 7% p.a. through 2026, supported by platinum for palladium substitution in gasoline vehicles

- **Total mining supply** averages 4% above pre-COVID levels, despite the increasingly challenging mining operating environment, and approaches but does not reach the record production levels of 2006.
- **Recycling supply** is expected to remain broadly flat on the forecast 2022 level.
- **Automotive demand** for platinum is expected to grow by 7% p.a. through to the end of 2026, supported by increased substitution for palladium in gasoline engines, as well as higher diesel loadings.
- **Jewellery demand** remains strong in the US and Europe. However, the continued erosion of demand in China is expected to depress jewellery demand for platinum in 2024 and 2025, with 2026 5% below the 2022f level, but down by 24% versus pre-COVID levels.
- **Industrial demand** for platinum is expected to grow by 6% p.a. through to the end of 2026 compared to pre-COVID levels.
- **Investment demand** for platinum is expected to stay flat at 560 koz p.a., in line with the average annual rate of investment demand since 2013

Conclusion – platinum market deficit from 2023

As shown below, the outcome of this analysis is that the platinum market will be in deficit in 2023, which eases slightly in 2024 before deepening significantly thereafter in 2025 and 2026.

Figure 4. Platinum is expected to be in modest deficits in 2023 and 2024, moving to deepening deficits in 2025 and 2026

Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023

Please see pages 11 and 12 for an examination of the impact of changes in mine supply, as well as a short discussion on China's excess imports in recent years.

The platinum market is expected to be in deficit from 2023 to 2026

Risks to forecasts

- Small changes in assumptions can have a significant impact on the supply/demand balance – for example a 5% change in total mine supply moves the supply/demand balance by an average of 330 koz p.a. over the years 2023-2026.
- Automotive demand projections include our current understanding of supply chain challenges and economic threats to demand, but these could worsen from current levels. However, we think the pent-up demand for new vehicles due to the supply chain challenges of recent years provides some level of protection from demand destruction.
- However, we have taken a conservative view on platinum for palladium substitution in gasoline engines, including only less than half the potential substitution levels projected by Sibanye-Stillwater.
- We have also taken a cautious view of jewellery demand, which could recover to historical levels sooner, possibly supported by higher platinum price levels. But growing economic uncertainties could depress jewellery buying across all metals.
- Growing economic uncertainties, including inflation and its impact, could slow or halt industrial capacity additions, reducing our forecast growth in industrial demand for platinum.
- We conservatively project investment demand for platinum to be flat compared to historical levels, which could be overly pessimistic if economic uncertainties continue to proliferate, growth in investor demand for hard, liquid assets could increase platinum investment demand. Equally, investors that see the potential for future deficits of platinum are likely to attempt to benefit from a resulting increase in the platinum price by purchasing physical platinum or ETFs.

We have taken a conservative view of the potential for platinum for palladium substitution in gasoline vehicles

Economic uncertainty could reduce automotive, jewellery and industrial demand for platinum, but this could be offset by greater investment demand

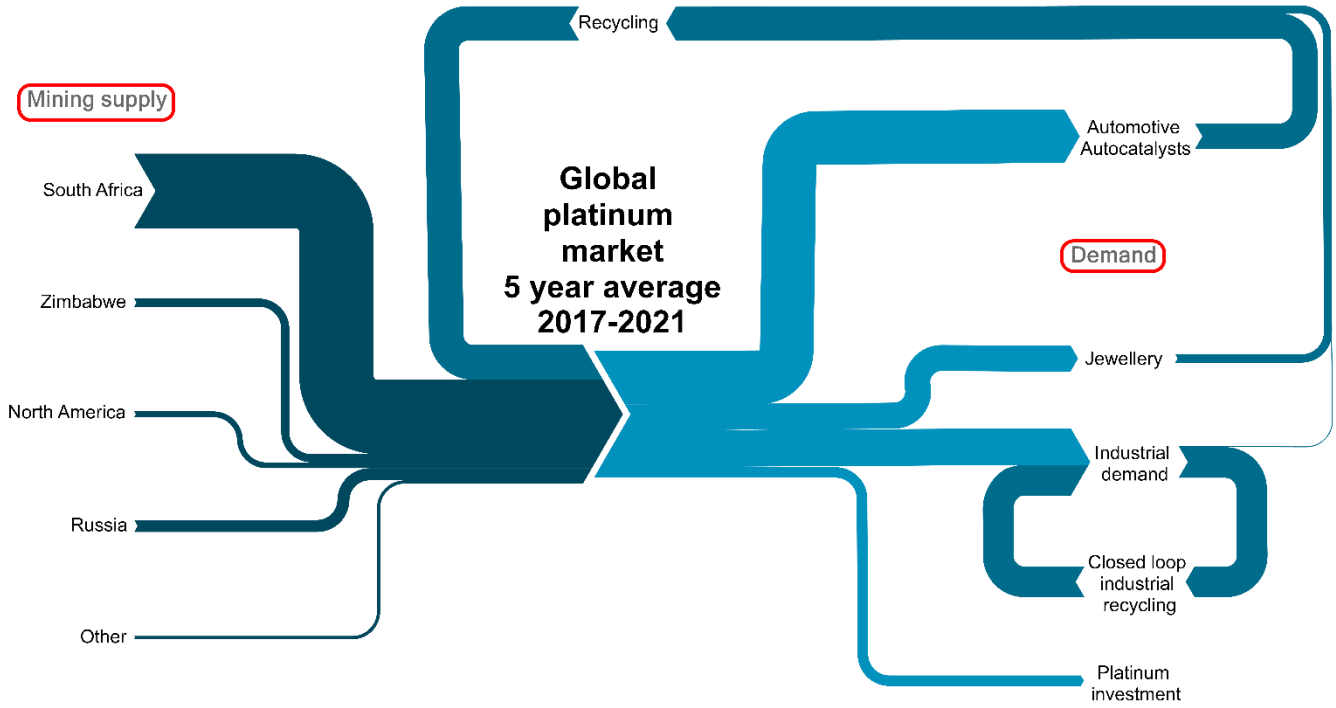
An overview of platinum market flows

Platinum metal is mined in four main geographies, South Africa, Russia, Zimbabwe and North America. South Africa dominates platinum mine supply, typically accounting for +/-75% of total mine supply aside from in years of exceptional production disruption. As such, small changes in output from South Africa have the greatest bearing on variations in total platinum supply.

The main end uses of platinum have historically been split roughly one third to catalytic converters for reducing tailpipe emissions in the automotive industry, a third in jewellery and a third split across industrial demand and investment. In recent years the relative importance of jewellery has faded and been replaced by increased industrial and investment demand.

Recycling plays a significant role in the platinum industry. In theory, almost all metal that has been used in automotive, jewellery or industrial purposes can be recovered and recycled. In practice, most of the industrial uses of platinum is closed loop with industrial users recycling platinum internally. Open loop automotive, jewellery and industrial recycling has typically accounted for around 30% of supply over the past twenty years. Inefficiencies in platinum recycling relate more to the collection of used materials than to material losses in the recycling process.

Figure 5. Sankey diagram illustrating material platinum flows



Source: Metals Focus, WPIC Research

Platinum mine supply outlook

Total mine supply is based upon published mining company public guidance

Reminder: please see the appendix for fuller descriptions of our methodologies.

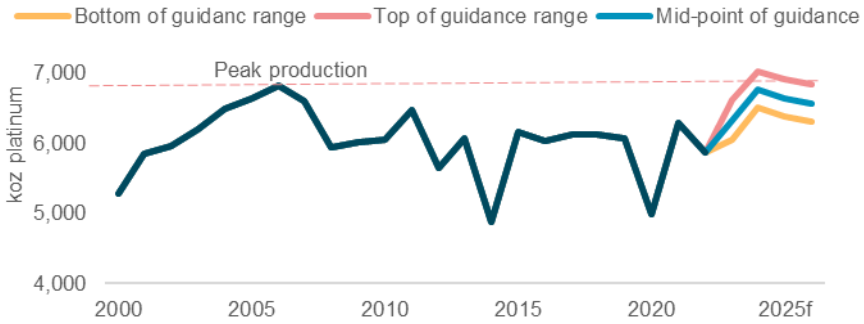
We have seen a number of Platinum Group Metals (PGM) mining companies make significant downgrades to public production guidance for 2022 due to ongoing challenges in South Africa. Equally, while Nornickel in Russia has kept guidance unchanged for the time being, it has flagged that sanctions are limiting its ability to import new mining equipment and spares, which could negatively impact its ability to sustain production rates in the future.

Companies typically only change longer-term guidance once a year, usually around year end, and so although we have seen guidance adjustments being made for 2022 the longer-term guidance ranges have not been adjusted. Given the operational challenges in both South Africa and Russia, we have elected to use the bottom end of the public production guidance ranges for our mining supply projections.

Using the bottom end of producer guidance, total mining supply peaks at 6,514 koz platinum in 2024. This is the highest production level since the peak during 2005-2007, which came in the wake of significant and sustained capital investment in production growth, and which represented record production output. We have not seen comparable levels of investment in recent years. After 2024, available company guidance suggests that production should gradually decline toward typical long-run levels.

Producer guidance suggests that platinum production will strengthen from current levels

Figure 6. Production is projected to increase according to the lower end of public company guidance. Achieving the upper end of this guidance would exceed record production levels despite comparably lower capital investment



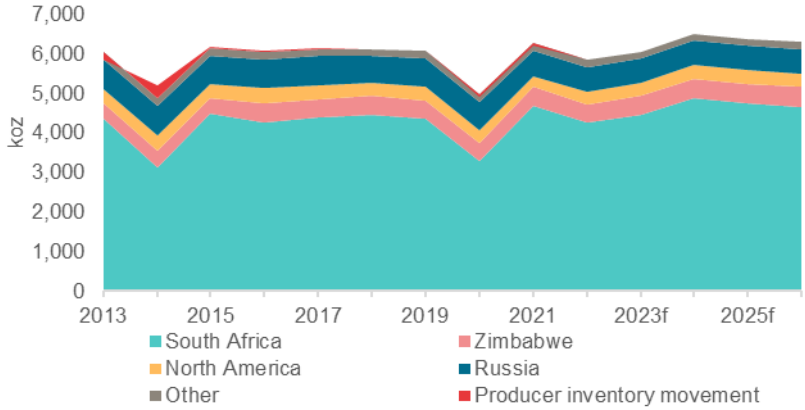
Source: Johnson Matthey from 2000 to 2012, SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023, Company reports

The middle and upper end of public production guidance suggests a return towards or through record production levels, despite lower relative capital investment rates

We have not allowed for any major disruptions, such as strike action or infrastructure failure, as these events are unpredictable by nature. We also note that recently announced multi-year employee wage agreements significantly reduce the chances of wage-related labour unrest in the timeframe we are examining.

Historically, significant variations in mine supply output are mostly due to changes in production in South Africa, with production in other geographies typically more stable on a year-to-year basis.

Figure 7. Public company guidance indicates that platinum mine supply is expected to strengthen materially from current levels with a step change from 2023



Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023, Company reports

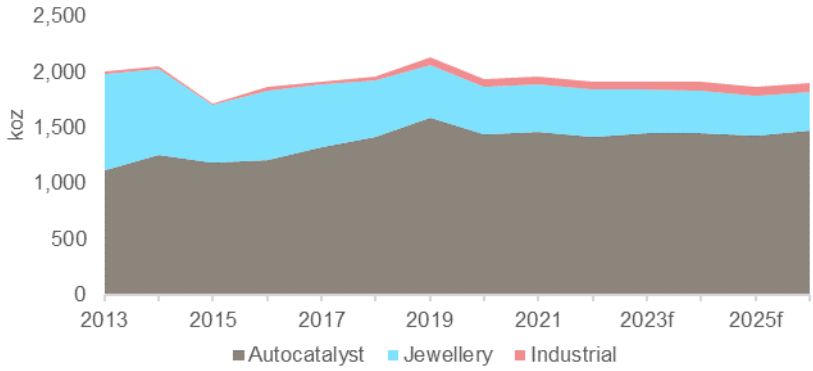
Platinum recycling supply outlook

Recycling outlook based upon historical recycling rates

We expect recycling to remain broadly flat going forwards. We expect modest growth in autocatalyst and industrial recycling rates, but this is offset by lower jewellery recycling. As described in the appendix, we have used a methodology of projecting based upon historical trends and we do not attempt to adjust for changes observed in recovery rates driven by massive moves in PGM prices. The downward trend in jewellery recycling reflects lower trade-ins of old jewellery for newer pieces where the latter is typically a function of new jewellery sales, i.e. recent lower sales has reduced trade-in volumes.

We forecast a flat outlook for recycling volumes

Figure 8. Recycling supply is expected to be broadly flat going forwards



Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023

Automotive demand for platinum

Strong demand growth on substitution and higher loadings, slowly supplemented by the growth of FCEVs

At around 40% of demand, the automotive outlook is key to the supply/demand fundamentals of platinum. It is also critical to investor sentiment towards platinum, given some perspectives predict that the demise of the internal combustion engine is imminent and therefore automotive platinum demand is likely to decline going forwards. In fact,

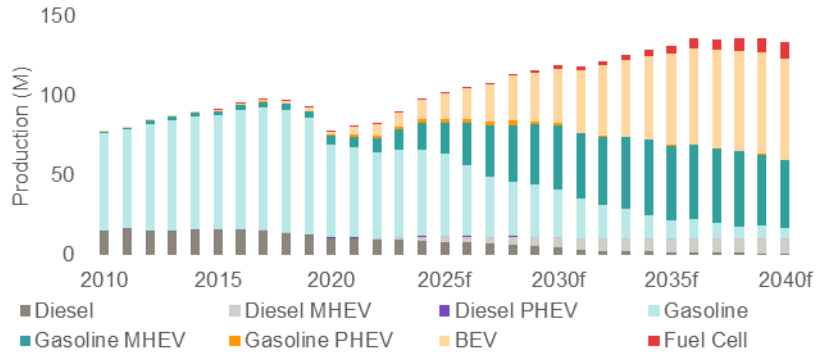
although we believe that 2017 will be the peak volume year for internal combustion engine (ICE) vehicles, our analysis strongly suggests the automotive platinum demand will continue to grow.

The outlook for automotive demand for platinum is covered in detail in our standalone drivetrain report, which is available here, and the outlook for fuel cell electric vehicles (FCEV) is the subject of its own standalone report, which is available here. Given the importance of the drivetrain outlook to that of overall platinum demand, our drivetrain estimates run to 2040, well beyond our supply/demand projections to 2026.

Electrification trend to continue but offset from a platinum perspective by rising vehicle production numbers and platinum for palladium substitution in gasoline vehicles

Summarising our drivetrain outlook, we expect the trend of electrifying the automotive industry to continue, but our view is that not all vehicle roles or geographies are suitable for battery electrification. Thus, we expect internal combustion engine vehicles to remain a core, albeit declining, part of the drivetrain outlook, with the ensuing impact on platinum automotive demand more than compensated for by the higher platinum loadings needed to achieve tighter emissions standards, including increased CO_2 efficiencies, underpinned by increasing hybridisation. It is possible that we could see a swing back towards diesel given diesel engines' 20% lower CO_2 emissions compared to an equivalent gasoline engine, and because NO_X emissions for new diesel vehicles have been addressed by modern catalytic converters combined with on-road tailpipe emissions testing.

Figure 9. Combined automotive drivetrain production outlook for light vehicles, light commercial vehicles and heavy-duty vehicles



Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023

Including the full potential for platinum for palladium substitution in gasoline vehicles would increase automotive demand by >750 koz in 2024 and more thereafter

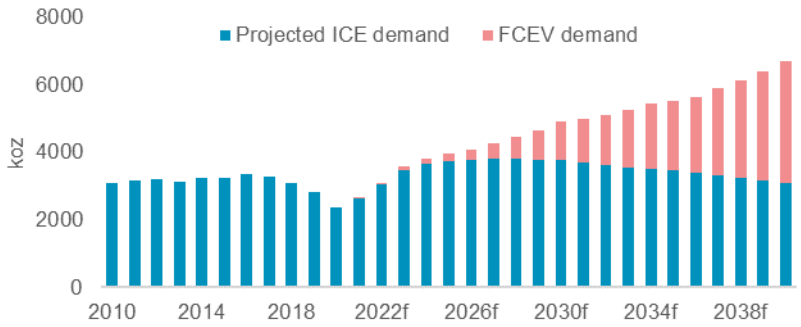
While ICE vehicle production is expected to decline from 2024 onwards, the outlook for automotive platinum demand is, surprising to many, one of positive growth. This is driven primarily by platinum substitution for palladium in the catalytic converters for gasoline vehicles as well as by higher loadings to meet tighter emission standards. We have been conservative on the volume of platinum for palladium substitution, and note that our estimate for 2024 is around half that of other industry participants (such as Sibanye-Stillwater). Matching their numbers would add 750 koz to our demand forecasts in that year. Please see our recent drivetrain report which presents more detail of our analysis.

In addition to the growth in demand from ICE catalytic converters, we also forecast increasing FCEV penetration into the vehicle roles that are hard to electrify with existing battery technologies. Our base case supply/demand projections for 2023 to 2026 use platinum demand growth from our policy driven scenario only, where Government incentives are the key enabler of FCEV uptake. The standalone FCEV report also considers

a more rapid broad-based commercial adoption scenario, where cheap hydrogen and production economies of scale result in FCEV cost competitiveness with alternative drivetrain technologies.

To conclude the automotive demand for platinum outlook, we forecast catalytic converter demand for platinum to peak at 3,819 koz in 2028, vs the 3,055 koz expected in 2022. When adding the platinum demand from the slowly growing FCEV volumes to this, we expect automotive demand for platinum to exceed 4,700 koz, in 2028, 60% higher than forecast automotive platinum demand in 2022.

Figure 10. Total ICE demand for platinum peaks in 2028 with FCEV demand driving growth thereafter



Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023

We expected FCEVs to be a key driver for increasing automotive demand

ICE demand for platinum peaks at 3,819 koz in 2028

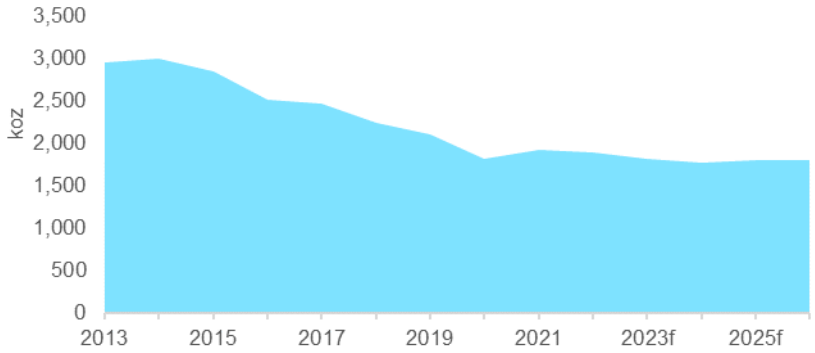
Jewellery demand for platinum

A gradual ebbing of jewellery demand to continue

Although we continue to see strong jewellery demand for platinum from North America and Europe, the trend in China has been consistently negative for a number of years. Demand from India, an important jewellery market, has been variable, but has been lower on average in recent years.

Combating competition for consumer attention for other precious metals and luxury goods is possible, but it takes time to change trends in the jewellery industry. As such, our forecasts in this sector are based upon historical trends, but assuming a floor to demand in some geographies. Thus, we expect a continued decline in platinum jewellery demand, albeit at a slower rate than in the recent COVID disrupted years.

Figure 11. We expect the gradual decline in jewellery demand for platinum to continue due to competition from other metals in jewellery and other luxury goods in general



Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023

Consumer demand for platinum jewellery has struggled in recent years, specifically in China, which is the largest market

Industrial demand for platinum

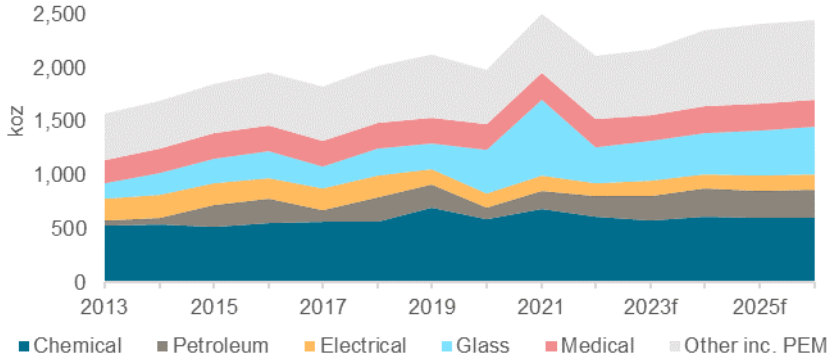
Continued growth in industrial demand expected

We expect platinum's unique catalytic and high temperature stability attributes to lead to an ongoing expansion in its industrial uses. That aside, our estimates for industrial demand are again trend based, using historical demand growth rates for the chemical, petroleum, electrical, medical and other segments. We have also used a trend-based methodology for glass but attempted to normalise for the exceptional increases in capacity additions in 2020 and 2021, which we do not expect to be repeated.

We have also added our estimate for the demand for platinum from the PEM electrolysers used to produce green hydrogen, which is something that has been a strong focus in Europe in particular as it aims to wean itself off Russian gas. Our estimates for PEM electrolysers are based upon the IEA's database of planned electrolyser projects globally and our estimates for platinum loading per MW of capacity as well as thrifting of loadings over time. Electrolyser demand for platinum is biased towards 2030 and afterwards, with demand only reaching 143 koz by 2026.

After including all factors, we are projecting total industrial demand to exhibit a CAGR of 3% through 2026, reaching 2,454 koz, remaining below the peak demand year of 2021.

Figure 12. Historical trends point to continued growth in industrial demand for platinum, underpinned by its catalytic properties



Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023

We expect industrial demand for platinum to continue to grow in-line with historical rates

Investment demand for platinum

Flat based on historic average

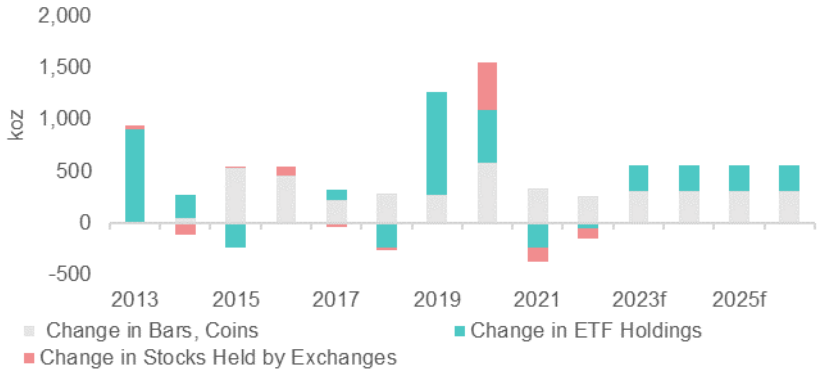
While we have granular insight into investment demand due to the views of our many product partners around the world and our regular interaction with investors, we have chosen to use a ten-year historic average of demand as the basis for our forecast. This is to reduce the dramatic positive impact of extremely strong global ETF demand in 2019 and 2020 and similarly strong bar and coin demand in 2020 and 2021. Furthermore, we have not included the likely impact on investment demand of any material changes in price.

We have purposefully taken a conservative view on the outlook for investment demand

Consequently, we include bar and coin investment demand of 310 koz p.a., and ETF demand of 250 koz p.a., for a total of 560 koz p.a. We have assumed a net change in stocks held by exchanges of zero each year over the forecast period as those flows are typically short-term in nature to

address atypical developments in the physical market and furthermore, primarily reflect the movement of metal between visible and non-visible inventories.

Figure 13. We have taken a conservative view on the outlook for investment demand versus historical investment demand.



Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023

Supply/demand balances for 2023-2026

Moving towards deepening deficits

Putting our supply and demand forecasts together results in a projection of the platinum market in a modest annual deficit of -152 koz in 2023, which reduces in 2024 and deepens thereafter, reaching -689 koz in 2026.

Figure 14. Platinum is expected to be deficit in 2023 and 2024, moving to deepening deficits in 2025 and 2026

Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023

Platinum is expected to be in deficit in 2023 and 2024 before moving to deepening deficits in 2025 and 2026

Examining the impact of changes to mine supply

Figure 6. includes a c.550 koz difference between the top and bottom of the published guidance ranges in each of the years 2023-2026. As shown in figure 15, achieving the upper end of mine production guidance in 2023 and 2024 would result in all-time record production volumes and would result in platinum market surpluses. However, even at the top end of guidance the market would be in a deficit in 2026, albeit modestly.

Figure 15. Even achieving the upper end of production guidance ranges would result in a material deficit in 2026

Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023

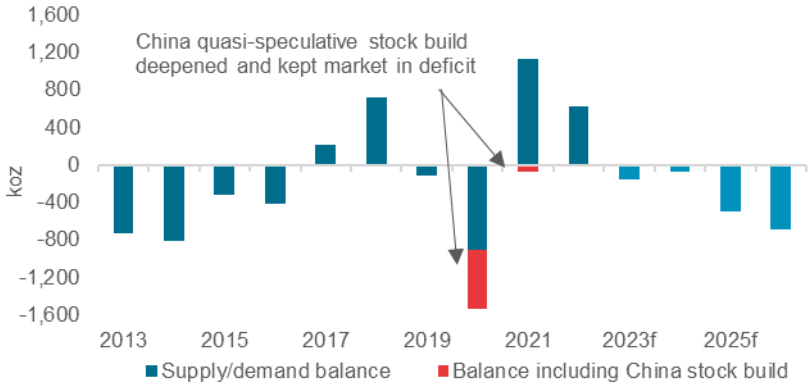
China's demand for platinum could exacerbate future deficits

Our base case published supply/demand estimates from 2023-2026, and those of Metals Focus for 2022 include only identified end use demand. On this basis we published a deficit of -909 koz in 2020, which swung to a surplus of +1,128 koz in 2021. However, not captured in our data were significant excess imports into China, well in excess of identified demand needs. Incorporating these excess imports into our published data deepens the 2020 deficit by -624 koz to -1,531 koz and swings the 2021 surplus by -1,200 koz to a deficit of -72 koz.

We think China's excess imports are for quasi-speculative purposes due to industry participant fears of future metal shortages. It is too early to say for certain that this behaviour will continue, but Q1'22 imports exceeded identified demand by 34%, and April '22 imports exceeded estimated monthly requirements by 187% (calculated by deducting Q1 actual demand from 2022f projected full year and dividing the residual by nine).

Should China continue to import above requirement platinum volumes it could materially deepen deficits from those shown. Of course, this inventory accumulation should be expected to be unwound at some point, but we think it is unlikely that this happens in the time period of our published projections without a significant increase in the platinum price.

Figure 16. Platinum's expected deficits from 2023 to 2026 could be significantly deepened by continued excess imports into China



Source: SFA (Oxford) from 2013 to 2018, Metals Focus from 2019 to 2022, WPIC Research from 2023

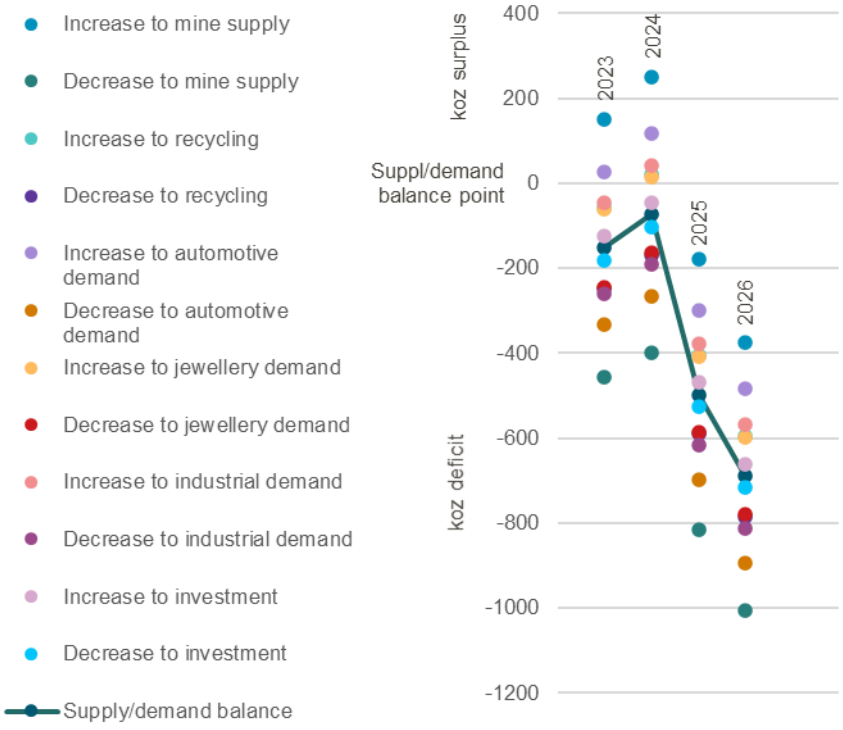
Sensitivity analysis

Mine supply is the biggest variable on a simple sensitivity analysis

The sensitivity of the supply/demand balance to its inputs is naturally a function of the size of the supply and demand segments. It is most sensitive to changes in mine supply, the largest segment, where a +/-5% move in supply moves the balance by a little over 300 koz, depending upon the year. Similarly, on the demand side, it is most sensitive to changes in automotive demand, where a +/-5% move in demand moves the supply/demand balance by around 200 koz.

In the future, we plan to publish more in-depth analysis of the sensitivity of supply and demand to specific factors or events, such as the potential for increased platinum substitution for palladium in gasoline vehicles.

Figure 17. The supply/demand balance for platinum is most sensitive to changes in mine supply followed by automotive demand (all inputs changed by +/-5%)



Source: WPIC Research

WPIC aims to increase investment in platinum

World Platinum Investment Council (WPIC) was established by the leading South African PGM miners in 2014 to increase investment ownership in platinum. This is done through both actionable insights and targeted development. We provide investors with the information to support informed decisions e.g. the *Platinum Quarterly* and monthly *Platinum Perspectives* and *Platinum Essentials*. We also analyse the platinum investment value chain by investor, product, channel and geography and work with partners to enhance market efficiency and increase the range of cost-effective products available to investors of all types.

Appendix – WPIC outlook methodologies

Preamble

The WPIC's platinum supply and demand model is intended to complement the one year out forecast published in our Platinum Quarterly, but to look further into the future to provide the basis for longer-term scenario analysis of particular aspects of supply and demand. The Platinum Quarterly report and data are prepared independently for the WPIC by Metals Focus.

The WPIC has not attempted to develop in-country and in-industry relationships to obtain data and the information and sources used to develop the underpinnings of WPIC's supply/demand model are all in the public domain.

Despite us having granular views of each demand segment, we have chosen, for this inaugural report, to use a simplified and conservative approach to forecasting. This provides us with our best current base case to allow scenario analysis while we increase modelling detail and publish more granular results in future reports.

Different methodologies in different segments

The WPIC's platinum supply/demand methodology is built up as follows for the years 2023-2026:

Refined mining supply: The WPIC was established by several PGM mining companies, and consequently we do not attempt to forecast future mined supply of platinum. To be able to present a supply/demand forecast to assist investors in making more informed investment decisions our refined mining supply outlook is strictly based on each company's public guidance for future production. This applies for WPIC members and non-members alike.

We have seen a number of PGM mining companies make significant downgrades to public production guidance for 2022 due to ongoing production challenges in South Africa. Equally, while Nornickel in Russia has kept guidance unchanged for the time being, it has flagged that sanctions are limiting its ability to import new mining equipment and spares, which could negatively impact its ability to sustain production rates in the future. Companies typically only change longer-term guidance once a year, usually around year end, so although we have seen guidance adjustments being made for 2022 the longer-term guidance ranges have not been adjusted. Given the operational challenges in both South Africa and Russia, we have elected to use the bottom end of the public production guidance ranges for our mining supply projections, which feed into our overall supply/demand forecasts.

The guidance published by the PGM mining companies is typically provided for the combination of PGMs contained in the ore bodies mined by the respective companies, and expressed on a six-, four-, or two-element basis (6E, 4E or 2E respectively) including either: platinum, palladium, rhodium, ruthenium, iridium and gold; platinum, palladium, rhodium and gold; or platinum and palladium. Where guidance excludes specific reference to platinum, we have calculated refined platinum

guidance by using the historical production ratios of these metals as published by the specific company. Where individual PGM mining companies do not provide refined mine supply guidance or where such guidance does not cover the period to 2026, we forecast that platinum mining supply remains at the level of the final year for which guidance, or production, is available. We have remained impartial to: the extent of mineral reserves and resources, the ability to extend mine lives, any potential smelter, precious or base metal refinery capacity constraints, the technical hurdles or timelines to complete capital projects, and the impact a change in PGM prices might have on mined supply.

Recycling supply: Automotive recycling can be determined by purchasing consecutive annual global vehicle registration data and determining detailed regional scrappage rates to apply to average vehicle platinum loadings, when manufactured, per region. We have not attempted to fund this high-cost exercise and have used a simplified approach using the published average vehicle life across all regions and determining the portion of annual platinum demand in the year of manufacture that reflects as recycled supply at the end of that average life. We use the average of this ratio over the past 20 years to calculate our forecast. Jewellery and industrial recycling rates are projections based upon historical ten-year trends.

Automotive demand: Automotive demand projections are a function of the WPIC's drivetrain outlook in combination with estimated autocatalyst platinum loadings and engine sizes for different vehicle categories in different geographies. Automotive production and the drivetrain estimates are based upon historical production numbers and trends as well as announced future regulations and WPIC's view of the pace of electrification and the phasing out of internal combustion engines. Future platinum loadings in autocatalysts are based upon historical loadings that are available in the public domain or can be calculated from published data, adjusted for WPIC's estimates of the impact of regulatory changes in different geographies, such as tightening emissions standards, as well as the rate of substitution of platinum for palladium in gasoline engines. FCEV demand for platinum has been added to the automotive demand outlook as a separate demand component.

Jewellery demand: The outlook for jewellery is predicated on recent historical trends by geography, projected into the future, with some allowance for a slowing of the trend away from platinum jewellery in China, and a return to modest growth in India.

Industrial demand: Industrial demand projections are based upon historical trends within each sub-category. This results in relatively steady trend projections, whereas in practice industrial demand is more volatile, depending upon the timing of capacity additions. Nonetheless, while industrial demand can be volatile, the multi-year trends have been very consistent and do provide a good guide to the future, added to which, in practice the annual volatility seen within each industrial sub-category tends to even each other out when totalled up. Platinum industrial demand is the demand segment most closely correlated to global economic growth over the long term. Despite the compound annual growth of platinum industrial demand over the past 30 years significantly exceeding global growth, our forecast, based on more recent historical trends, is closer to forecast global

growth. Projected stationary fuel cell and electrolyser demand have been included in the other industrial category.

Investment demand: While we have granular insight into investment demand due to the views of our many product partners around the world and our regular interaction with investors, we have chosen to use a ten-year historic average of investment demand as the basis for our forecasts. This is to reduce the dramatic positive impact of extremely strong global ETF demand in 2019 and 2020 and similarly strong bar and coin demand in 2020 and 2021. Furthermore, we have not included the likely impact on investment demand of any material changes in price. For example, if the market is seen with successive, and increasing deficits as we are projecting, then it is likely that investors might expect the platinum price to move higher to reflect the shortage of metal available to the market and consequently increase their exposure by purchasing platinum metal or ETFs. This would in turn accentuate future deficits. We do not attempt to capture this iterative process and rather choose to maintain future investment demand at a level based on a ten-year historic average. Consequently, we include bar and coin investment demand of 310 koz p.a., and ETF demand of 250 koz p.a. We have assumed a net change in stocks held by exchanges of zero each year over the forecast period as those flows are typically short-term in nature to address atypical developments in the physical market and furthermore, primarily reflect the movement of metal between visible and non-visible inventories.

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