

FOREWORD

This edition of *Platinum Quarterly* presents platinum supply and demand developments for the second quarter of 2023, as well as an updated outlook for 2023. It also provides WPIC's views on issues and trends relevant to investors considering exposure to platinum as an investment asset, plus an update on how our product partnerships continue to meet investors' needs. The *Platinum Quarterly* data and commentary (starting on page 6) are prepared independently for WPIC by Metals Focus.

2023 forecast deficit increases to 1,005 koz, equivalent to 12% of projected annual demand

- Updating the outlook for 2023, the platinum deficit is now projected to total 1,005 koz, 2% higher than the deficit presented in the last *Platinum Quarterly*. The updated deficit equates to a material 12% of projected full-year demand in 2023, the highest percentage on record.
- Demand in 2023 is expected to total 8,230 koz (+27% year-on-year), with automotive demand up 381 koz (year-on-year), industrial demand up 336 koz (to a record level in our series), and investment demand improving from net-negative to positive 386 koz. The outlook for jewellery remains muted, with demand effectively flat year-on-year.
- Total supply is now forecast to be flat year-on-year at 7,224 koz, with conditions remaining challenging for both primary and secondary supply. Total supply is expected to be 7% below the average annual output since 2013. Recycling supply has been downgraded by 4% from last quarter, on a continued shortage of end-of-life vehicles.

Platinum supply and demand – Q2 results and the read-throughs for the updated outlook for 2023

Q2 2023 deficit of 348 koz on increasing automotive, industrial and investment demand

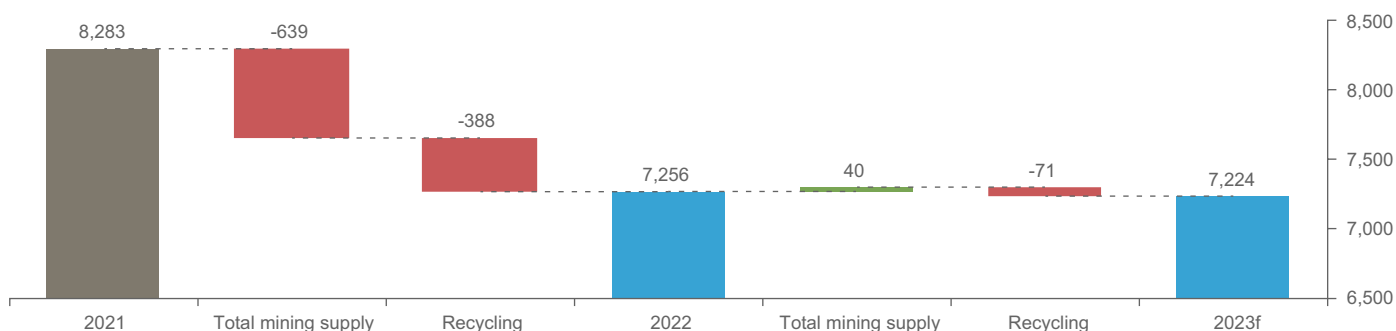
The second quarter of 2023 saw the strengthening of demand themes across platinum markets, and South African mine production continued the quarterly year-on-year downward trend which has been ongoing since the beginning of 2022.

Regarding supply, the enduring electricity shortage in South Africa continued to weigh on mine supply. South African mine supply decreased by 9% year-on-year in the second quarter despite being up strongly on the seasonally weaker first quarter. The stronger performance versus Q1 reflects smelting capacity ramping-up following planned maintenance work, although the ongoing electricity shortages, which eased somewhat during the quarter, still led to some delayed and lost production. Russian mine supply increased on the release of some work-in-progress inventory. The net impact was a 3% year-on-year decline in refined mine supply to 1,478 koz. Recycling supply also struggled and was down 12% year-on-year at 345 koz. Although new vehicle sales have increased so far in 2023, this has not translated to improved scrap supply. Lower end-of-life vehicle availability instead partly reflects the longer running of vehicles and reports of scrapyards holding out for higher PGM prices. Total supply in Q2'23 of 1,823 koz was down 5% year-on-year, but up 16% quarter-on-quarter.

Total demand was robust at 2,171 koz in Q2'23, up 31% year-on-year due to continued strength in demand from the automotive and industrial sectors (+212 koz year-on-year in aggregate) and a 317 koz improvement in quarterly investment demand year-on-year. Automotive demand in Q2'23 rose by 19% year-on-year on increasing platinum-for-palladium substitution, growing vehicle production and higher PGM loadings due to tighter emissions legislation, specifically in heavy duty and non-road vehicle segments. Industrial demand rose by 12% with a number of capacity additions in the chemicals industry, while jewellery demand fell 2% year-on-year mainly due to ongoing weakness in China. Bar and coin investment demand of 26 koz in Q2'23 decreased 46 koz year-on-year on moderating North American demand. This was comfortably offset by significant ETF inflows in Q2'23 (155 koz).

The net impact was a quarterly deficit of 348 koz in Q2'23, which represents the second consecutive substantial quarterly deficit.

Annual total supply and changes 2021 to 2023f (koz)



Source: Metals Focus

Updated 2023 outlook – platinum market deficit of 1,005 koz on stronger demand and weaker supply

The forecast deficit for 2023 has increased by 22 koz to 1,005 koz since the Q1'23 *Platinum Quarterly* in May 2023. Versus the 764 koz surplus in 2022, this reflects total supply being flat year-on-year and a 27% increase in demand.

Mine supply remains challenged and is expected to be at similarly depressed levels to 2022 as South African producers (0% year-on-year) manage operating risks, such as the electricity crisis. Notwithstanding the ongoing challenges facing mine supply, an expected drawdown of finished inventory (30 koz), improved smelter availability in South Africa, as well as better-than-expected Russian production in the first half of 2023 (although there are critical infrastructure maintenance risks in H2), flow through to a 94 koz increase in total mining supply versus our last *Platinum Quarterly*. Recycling supply-chain constraints experienced in 2022 continued into 2023, causing more disruption than originally anticipated. Recycling supply forecasts have therefore been reduced by 62 koz since the last *Platinum Quarterly*, to 1,620 koz (-4% year-on-year). Consequently, total supply for 2023 is forecast at 7,224 koz, flat versus 2022.

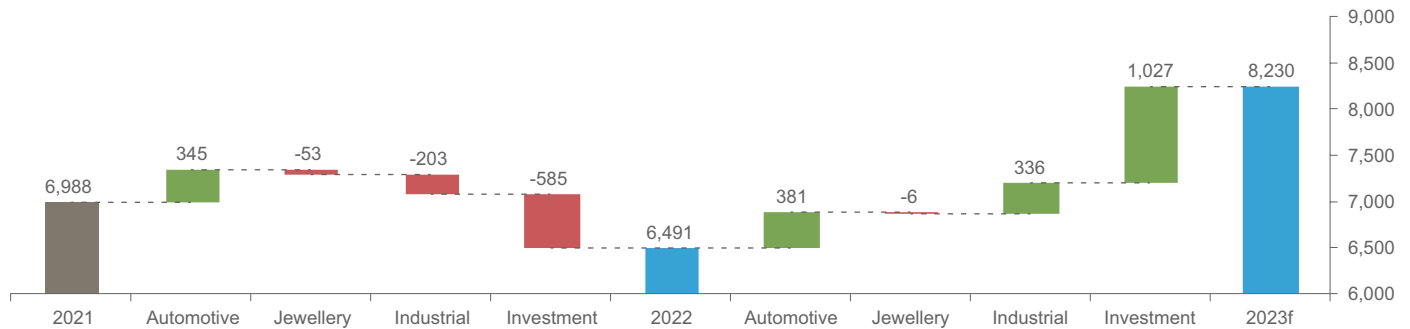
Automotive demand is expected to total 3,283 koz in 2023, up 13% on 2022. Automotive demand is up 28 koz versus previous estimates due to modestly higher-than-expected vehicle production, which accentuate the ongoing themes of substitution of platinum for palladium in gasoline vehicles, increased penetration of hybrid vehicles, and higher overall loadings in the heavy-duty and off-road vehicle categories. Jewellery demand has been revised higher in North America and Western Europe, although weak China demand is an offsetting factor that results in flat year-on-year expectations at 1,893 koz. Total industrial demand is forecast to be the strongest year on record at 2,667 koz, up 14% year-on-year and increased by 40 koz from last quarter's estimate. Glass capacity additions and, to a lesser extent, chemical capacity additions are the big drivers of the year-on-year growth in industrial demand, offsetting weaker petroleum and electrical demand.

Investment demand has been reduced versus the last *Platinum Quarterly* outlook. The challenging start to 2023 witnessed in bar and coin demand has persisted, although there is guarded optimism for improvement through the rest of the year. Bar and coin weakness is partially offset by a 30 koz improvement in the outlook for ETF inflows for the year, which are increased to 60 koz. Note that weaker-than-expected platinum bar and coin demand is not unique, with the gold and silver markets also seeing headwinds, particularly in Europe and Japan.

In aggregate, demand is expected to be 8,230 koz in 2023, up 53 koz from our last update and up 27% versus 2022.

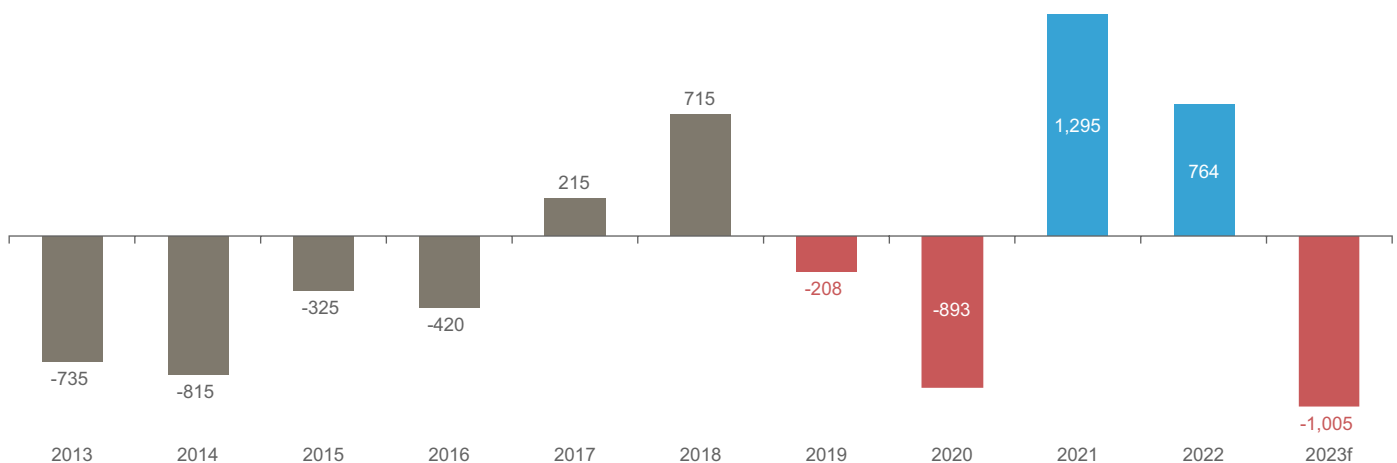
Combining the constrained supply outlook and strong demand projections results in the forecast 2023 deficit increasing from 983 koz (per the previous *Platinum Quarterly*) to a similarly significant deficit of 1,005 koz. This would be the deepest deficit in the current series going back to 2013.

Annual total demand and changes 2021 to 2023f (koz)



Source: Metals Focus

Annual platinum supply/demand balances (koz)



Source: SFA (Oxford) 2013-2018, Metals Focus 2019-2023f

The platinum investment case – supply challenges and strong demand underline risk of metal shortages

There have been some changes to the economic outlook since the last *Platinum Quarterly* in May. In general, market volatility remains somewhat elevated, but clarity regarding likely central bank interest rate decisions has improved. With inflationary pressures showing signs of moderating, policy rates appear to be at or near their peaks. However, the timing and extent of future interest rate cuts are less clear, with core CPI having proven to be more stubborn than headline CPI due to high employment levels and strong wage growth. Despite the uncertainties, recessionary risks, as estimated by a survey of economists, appear to be receding. Even so, we remain cautious that concerns around the health of the economy in China are becoming more pronounced, which may have a significant negative readthrough for commodity demand and price expectations, as well as risk broader contagion given the importance of the world's second largest economy.

Despite the economic challenges facing the world, we believe that the platinum demand outlook for 2023 remains well protected against downside risks. Automotive demand continues to be driven more by substitution and higher loadings in the heavy-duty and non-road segments than growth in vehicle production; with a 13% year-on-year increase in automotive demand for platinum, there is demand growth despite current or even a further erosion of consumer demand for new vehicles on economic grounds.

Similarly, confidence levels of Industrial demand growth are increasing. Since we are effectively three-quarters through the year, the risk of the commissioning of new plants being postponed is narrowing, with platinum demand effectively locked-in for 2023. If economic uncertainties and relatively high interest rates do impact new industrial capacity additions, it is more likely to be in 2024 and thereafter. However, it is important to note that most capacity additions which have benefitted record industrial platinum demand in 2023 have occurred in China where borrowing costs have changed relatively less than in Western markets and where significant potential remains for government stimulus to support further capacity additions over the next few years.

Another area of demand which is likely to be relatively well insulated from economic uncertainty is hydrogen-related demand for platinum, which straddles automotive demand (fuel cell electric vehicles) and industrial demand (electrolysers, stationary fuel cells and liquid organic hydrogen carriers). Whilst building off a small base, the need to pursue all avenues for global decarbonisation, almost at any cost, means that the hydrogen economy should remain a focus for government subsidies and support, even through uncertain times, with the US Inflation Reduction Act a prime example.

Demand segments that remain at risk from the uncertain outlook, are jewellery and investment demand. Jewellery demand is typically weaker during periods of declining real disposable income, but this comes at a time of a continued decline in demand from China, irrespective of the economic overlay. Offsetting China is some strength in demand from the better insulated high-end jewellery markets in Europe and North America, as well as general jewellery demand from India, which is seeing emergent growth. In terms of investment demand, bar and coin usually perform well during economically challenging periods, but have been struggling in 2023 across all precious metals. Meanwhile, ETF demand is benefiting from the earnings headwinds facing the miners in South Africa (encouraging investors to switch out of equities and into ETFs), despite being a non-yielding asset class in a rising interest rate environment.

The increasing certainty of the material forecast deficit in platinum through 2023 reflects both supply-side challenges and strongly growing demand, which combine to form an attractive investment case. Demand appears well insulated from significant downside risks, while supply continues to face multiple risks. The market will need to rely upon above ground stocks to meet the supply shortfalls, but as we have commented previously, it is not clear how freely available they are likely to be at current prices, particularly as a sizeable portion of above ground stocks appear to be held in China.

Regarding the platinum price reflecting fundamental value, our discussions with institutional investors suggest that the consensus view is positive on platinum, but that its rangebound trading pattern of ~US\$900-1,100/oz seems so entrenched that there is a collective fear regarding holding a long position beyond US\$1,100/oz. In combination with CTA and algorithmic trading, this becomes a self-reinforcing market dynamic. Clearly, above ground stocks are also contributing to this, being apparently available to clear the spot market at the upper end of that range. Indeed, we understand anecdotally, that automakers continued to take delivery of contractual commitments during the period when vehicle output was limited by the semiconductor shortage, which has resulted in their reduced procurement in the first half of this year. We don't have visibility of automaker inventories, but using average vehicle loadings and the volume of vehicles not produced suggests that automaker procurement rates should be back at normal levels during the second half of 2023.

We see some drivers that could break platinum free from its rangebound behaviour that is not aligned with its current compelling fundamentals. To the downside, the risks lie with the health of China's economy but this should pose more risk to palladium than platinum. To the upside, we can see several factors that may come into play: firstly, there is risk of further supply disruptions and ongoing work-in-progress inventory builds. Secondly, there is the potential for further drawdowns of stocks held by exchanges to levels below long run averages, which would be indicative of a shortage of metal in the prompt market. Finally, as the market draws down on above ground stocks, it is reasonable to assume that the remaining stocks are likely to need higher prices to incentivise those ounces into the market. Based upon the projected 2023 deficit of 1,005 oz, above ground stocks are expected to fall to only five months of demand by the end of the year. Given that excess imports into China mean that a substantial majority of above ground stocks are estimated to be concentrated in that country, it is not clear how much material will be available to offset supply/demand imbalances in the rest of the world, which could make for some very interesting market dynamics in the last quarter of the year. And finally, with no significant changes in supply/demand fundamentals likely in the near-term, it seems probable that deficits will persist into future years, further increasing the value proposition for investment.

WPIC initiatives highlights

We continue to grow the number and geographic coverage of our product partnerships which, in addition to increasing choices for investors, provides us with the ability to identify market developments and appropriate strategies to increase investment in platinum. This is particularly important in the context of the challenging market conditions prevalent in 2023. Although we are still expecting platinum bar and coin demand this year to be stronger than in 2022, overall demand has been softer than originally anticipated. Responding to this, we have worked with our partners to help them promote platinum bar and coin sales through salesforce education and special promotions.

Specifically in Europe and North America in Q2, we continued to work closely with our partners to strengthen their focus on platinum and ability to provide investors, potential investors and the trade with greater insight into the investment case for platinum. To this end we conducted a series of on-site training programmes with our North American partners. We also continue to support our various partners through the provision of marketing activities that promote platinum investment and enhance consumer awareness of platinum's strategic role in applications core to establishing the hydrogen economy and in global decarbonisation.

In China, in response to reduced investor purchasing of platinum as prices increased during the second quarter, we focused on supporting our partners to expand their product offerings and to improve designs; especially in the smaller-sized products oriented towards younger investors. Shanghai Platinum Week, co-sponsored by WPIC, successfully took place from June 26 to June 29, attracting more than 1,000 in-person delegates from over 400 organisations, as well as 180,000 online viewers. Looking ahead, Shanghai Platinum Week 2024 is scheduled to take place from July 8 to July 12.

In Japan, investors responded to higher prices by selling back platinum holdings when the yen price peaked in April, but bought back in June when the price dipped. Overall, our partners still reported net investment inflows for the first half of the year. In the second half of 2023, we expect to onboard new partners in Japan with help from the Japan Bullion Market Association (JBMA), adding to the strength and breadth of our partnerships in that market.

During the second quarter, we onboarded our first product partner in South Korea, the Korea Gold Exchange, a well-known bullion wholesaler and retailer, with the intention of exploring business opportunities in platinum products for local investors. We have also identified a potential partner in Singapore, which will further expand our footprint in the ASEAN market.

Trevor Raymond, CEO

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PLATINUM QUARTERLY Q2 2023

Table 1: Supply, demand and above ground stock summary

	2019	2020	2021	2022	2023f	2022/2021 Growth %	2023f/2022 Growth %	Q1 2023	Q2 2023
Platinum Supply-demand Balance (koz)									
SUPPLY									
Refined Production	6,075	4,989	6,297	5,522	5,575	-12%	1%	1,177	1,464
South Africa	4,374	3,298	4,678	3,915	3,919	-16%	0%	763	1,028
Zimbabwe	458	448	485	480	502	-1%	5%	116	126
North America	356	337	273	263	281	-4%	7%	71	74
Russia	716	704	652	663	667	2%	1%	180	190
Other	170	202	208	201	205	-3%	2%	48	47
Increase (-)/Decrease (+) in Producer Inventory	+2	-84	-93	+43	+30	N/A	-30%	+24	+14
Total Mining Supply	6,077	4,906	6,204	5,565	5,605	-10%	1%	1,201	1,478
Recycling	2,112	1,997	2,079	1,691	1,620	-19%	-4%	374	345
Autocatalyst	1,567	1,509	1,590	1,250	1,180	-21%	-6%	262	244
Jewellery	476	422	422	372	370	-12%	0%	95	84
Industrial	69	66	67	68	69	3%	2%	17	17
Total Supply	8,189	6,902	8,283	7,256	7,224	-12%	0%	1,575	1,823
DEMAND									
Automotive	2,810	2,324	2,557	2,902	3,283	13%	13%	850	840
Autocatalyst	2,810	2,324	2,557	2,902	3,283	13%	13%	850	840
Non-road	†	†	†	†	†	N/A	N/A	†	†
Jewellery	2,106	1,830	1,953	1,899	1,893	-3%	0%	462	480
Industrial	2,248	2,105	2,534	2,331	2,667	-8%	14%	622	697
Chemical	795	637	663	676	758	2%	12%	251	235
Petroleum	219	109	169	193	171	14%	-11%	42	42
Electrical	144	130	135	106	97	-21%	-8%	23	24
Glass	228	473	753	505	756	-33%	50%	89	170
Medical and Biomedical	277	256	269	278	287	3%	3%	71	71
Other	585	501	546	573	598	5%	4%	147	154
Investment	1,233	1,536	-56	-640	386	N/A	N/A	169	154
Change in Bars, Coins	263	571	324	225	326	-31%	45%	100	26
Change in ETF Holdings	991	507	-241	-558	60	N/A	N/A	40	155
Change in Stocks Held by Exchanges	-20	458	-139	-307	0	N/A	N/A	29	-27
Total Demand	8,397	7,796	6,988	6,491	8,230	-7%	27%	2,103	2,171
Balance	-208	-893	1,295	764	-1,005	-41%	N/A	-528	-348
Above Ground Stocks	3,442**	2,549	3,844	4,608	3,603	20%	-22%		

Source: Metals Focus 2019 - 2023.

Notes:

- **Above Ground Stocks 3,650 koz as of 31 December 2018 (Metals Focus).
- † Non-road automotive demand is included in autocatalyst demand.
- All estimates are based on the latest available information, but they are subject to revision in subsequent quarterly reports.
- The WPIC did not publish quarterly estimates for 2013 or the first two quarters of 2014. However, quarterly estimates from Q3 2014, to Q4 2017 are contained in previously published PQs which are freely available on the WPIC website.
- Quarterly estimates from Q2 2018 and half-yearly estimates from H1 2018 are included in Tables 3 and 4 respectively, on pages 19 and 20 (supply, demand and above ground stocks). Details of regional recycling supply in Table 6 on page 22 are only published from 2019.

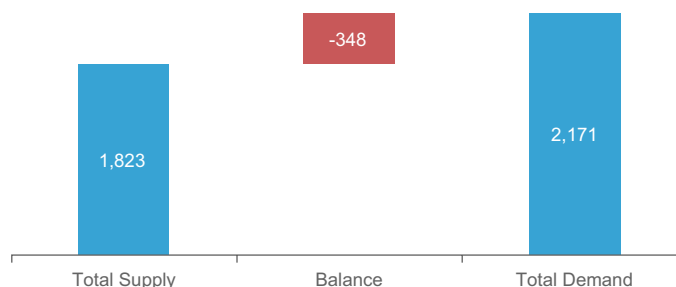
2023 SECOND QUARTER PLATINUM MARKET REVIEW

In many instances, the economic dataset that underpinned platinum demand during Q2'23 was better than expected. Europe has proved more resilient to the impact of Russia's invasion of Ukraine, with energy prices declining faster than anticipated. In addition, the threat of a widespread banking crisis following the failure of Silicon Valley Bank and Signature Bank in the US (as well as Credit Suisse in Switzerland) has subsided. However, despite expectations that core inflation will come down, it remains stubbornly high by historical terms, and as such, Western interest rate policies remain hawkish. An exception is the Chinese economy, which is no longer encumbered by COVID restrictions but where economic growth has struggled.

Amidst the varied economic data, platinum remained in deficit, with demand exceeding supply by 348 koz during Q2'23, marking platinum's first two consecutive quarterly deficits since the end of 2020. While the year-on-year performance is flattered by weakness in Q2'22, demand growth in the quarter was mainly attributable to net investment of 155 koz in platinum ETF holdings, reflecting both positive sentiment towards demand and negative sentiment towards supply. However, bar and coin investment declined by 64% (-46 koz) compared to Q2'22. Improved new vehicle production (especially in the heavy-duty segment), tighter emissions regulation and higher platinum ratios supported the automotive sector, up 19% year-on-year (+136 koz) to 840 koz. Industrial demand (excluding automotive) rose by 12% (+76 koz) year-on-year to 697 koz, resulting in a 31% (+519 koz) year-on-year increase in total demand to 2,171 koz during Q2'23, the highest level since Q3'20.

Refined mine production declined 4% (-65 koz) compared to Q2'22 due to a combination of loadshedding and asset maintenance. The supply chain continued to see low availability of spent autocatalysts, resulting in a 12% (-46 koz) year-on-year decline to 345 koz. Combined with mine supply total platinum supply declined by 5% (-95 koz) year-on-year to 1,823 koz in Q2'23.

Chart 1: Supply-demand balance, koz, Q2 2023



Source: Metals Focus

Supply

Refined platinum supply declined 4% (-65 koz) year-on-year, to 1,464 koz, as increases from North America and Russia were heavily outweighed by a decline from South Africa.

South African output exceeded 1 Moz for the first time in four quarters, reaching 1,028 koz, as processing constraints eased and certain smelters returned to service following rebuilds. However, production declined 9% (-101 koz) year-on-year in Q2'23, impacted by some continued processing asset maintenance and disruption due to Eskom load curtailment. The ongoing energy crisis in South Africa continues to impact both mined and refined output. Power generation from Eskom (the state utility provider) declined 9% year-on-year. However, a quarter-on-quarter improvement resulted in Eskom's power supply deficit reducing to 4.8 terawatt-hours, an 18% improvement versus Q1'23. This marked the first quarter the energy crisis has not deepened since the beginning of 2022. Nevertheless, Q2'23 still represented the second greatest shortfall in energy supply on record, only exceeded by the prior quarter. The negative impact of Eskom's power supply issues on refined platinum supply for the quarter was estimated to be around 50 koz, roughly double the prior quarter, due to power constraints delaying the restart of Implats' Number 4 Furnace following a rebuild.

Zimbabwe supply edged 2% higher (+2 koz) year-on-year to 126 koz, its highest since Q4'21. This was the result of higher output from Zimplats as additional milled ore volumes from the commissioning of a concentrator were realised. The operation also benefited from a Zambian power import agreement, mitigating the impact of national loadshedding that effected other producers in the country.

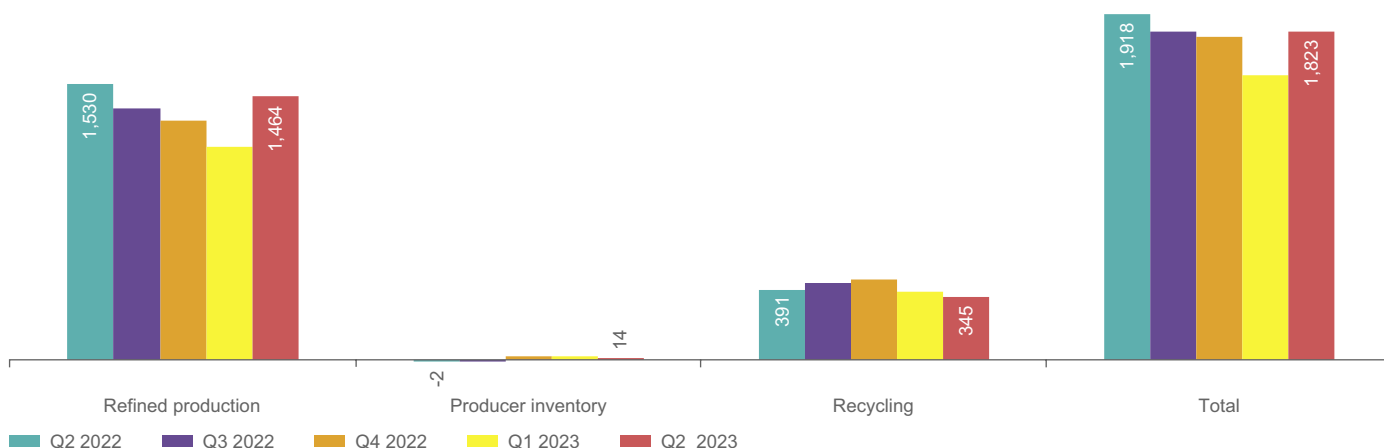
Russian production increased 18% (+29 koz) year-on-year to 190 koz, reaching a three-year high as the country's major producer, Norrnickel, continued to process semi-finished inventory. North American supply grew 14% (+9 koz) year-on-year to 74 koz, on higher volumes from Vale's Canadian operations which recovered from last year's smelter maintenance. Production from the other mines in the region remained constrained, due to the delayed repercussions of a strike affecting Glencore's operations and damage to a shaft at Sibanye-Stillwater's Stillwater West mine.

Recycling

Global recycling of platinum declined 12% (-46 koz) year-on-year to 345 koz. Supply from spent autocatalysts was down 13% (-37 koz), with lower-than-expected end-of-life vehicle supply persisting. As seen in Q1'23, lower mileage due to work-from-home trends and vehicle sales remaining below pre-pandemic levels are weighing on the sector. Significantly lower palladium and rhodium prices further disincentivised the flow of supply as some market participants held spent autocatalyst inventory back, hoping for higher prices to avoid having to crystallise losses in inventory bought earlier at higher prices.

Despite high platinum prices in Q2'23, Chinese platinum jewellery scrap dropped by 8% (-4 koz), mainly driven by lacklustre demand for new jewellery, which led to less exchanging of old, heavier products for newer, lighter ones. Furthermore, trade melt of unsold stock slowed, as inventory levels were already low.

Chart 2: Platinum supply, koz

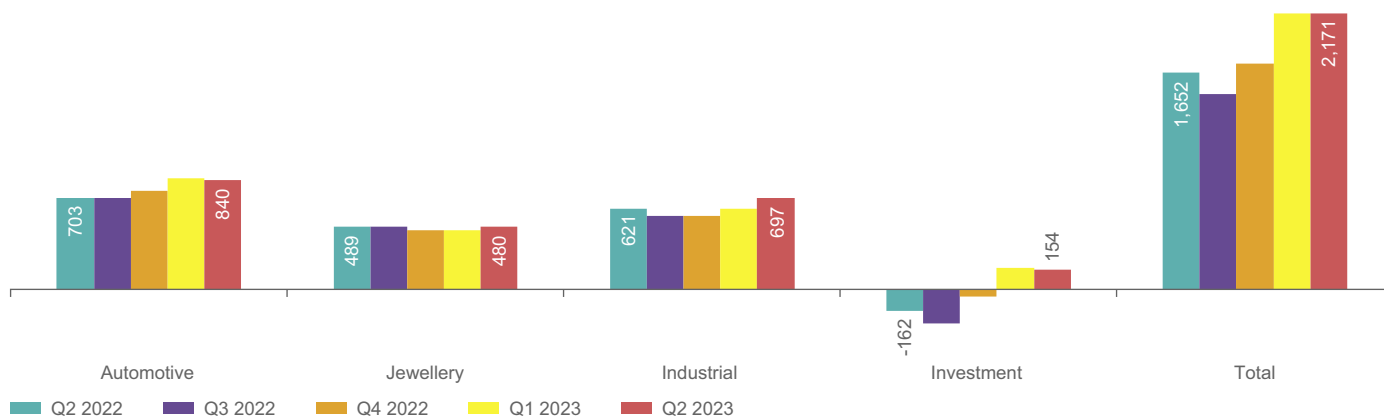


Source: Metals Focus

Demand

Global platinum demand improved 31% (+519 koz) year-on-year to 2,171 koz during Q2'23. Growth in ETF holdings was responsible for most of the gain for the quarter. The inflow into ETF holdings was 155 koz, compared to the 112 koz outflow in Q2'22. That said, both automotive and industrial demand also increased versus Q2'22. As the impact of the chip shortage and other supply chain challenges seen in Q2'22 have eased considerably, automotive production has improved, contributing to the 19% (+136 koz) year-on-year increase in platinum demand. Meanwhile, growth in the chemical sector (+109 koz), mainly due to capacity expansions, offset contractions in other areas of industrial demand. The petroleum market declined by 12% (-6 koz) compared to Q2'22, which was buoyed by catalyst changeouts in gas-to-liquid plants. The electronics sector, down 10% (-3 koz), was affected by cuts in capital expenditure at data centres in response to prevailing economic uncertainties, while glass demand fell by 16% (-32 koz), primarily due to delays in LCD capacity expansions.

Chart 3: Platinum demand, koz



Source: Metals Focus

Automotive demand

As the semiconductor shortage continued to ease in Q2'23, global light-duty vehicle (LDV) production saw a healthy increase of 14% year-on-year, while heavy-duty vehicle (HDV) production improved by 18%. Despite challenging macroeconomic conditions, demand for new vehicles still exceeded supply, which supported higher production rates. As a result, platinum demand rose by 19% (+136 koz) to 840 koz.

In North America, vehicle production improved by 15% year-on-year. Within the powertrain categories, battery electric vehicle production jumped by 89%, gasoline vehicle production improved by 12%, while diesel output declined by 12%. Despite lower diesel volumes, platinum demand in the region improved due to a combination of a greater share of hybrid vehicles and higher platinum loadings – both the consequence of increased substitution of platinum for palladium and higher overall loadings to meet tighter emissions limits.

In Europe, light vehicle demand has also improved, despite the challenging economic backdrop, resulting in passenger car production increasing 11% year-on-year during the quarter. Looking at production by fuel type, diesel and petrol vehicle output rose, and we saw a marked year-on-year increase in fuel cell vehicle production (albeit off an exceptionally small base). Platinum demand from the region increased by 11% in the quarter.

While the 17% recovery in light vehicle production in China supported platinum demand growth, it was the recovery in the heavy-duty vehicle sector (with output recovering by 64%), which was most noteworthy. In addition, the full implementation of China VIb, which came into force on 1 July 2023, will see China ban the production, import and sales of trucks and buses that fail to meet this new standard, despite some attempts to delay the implementation to 2024. A third factor that boosted Chinese platinum demand was the increased substitution of platinum for palladium in exhaust treatment systems. For the quarter, demand for platinum in China therefore surged by 60%.

Following a severe chip-impaired Q2'22, Japan's light-duty production of petrol and diesel cars increased by 20% year-on-year, while heavy-duty rose by a more moderate 6%. There was also a marked recovery in fuel cell vehicle production compared to Q2'22, albeit from an exceptionally low base. Higher production supported a 29% year-on-year increase in Japan's platinum demand.

In the "Rest of the World", production also improved by 11% year-on-year, resulting in a further lift in platinum demand.

Jewellery demand

The global platinum jewellery market slipped 2% (-10 koz year-on-year) to 480 koz in Q2'23, as the growth in Japan, India, and Europe could not offset weaker demand in China and North America.

European demand grew by 4% year-on-year in Q2'23, but the market was divided; mainstream bridal jewellery suffered double-digit losses due to cost-of-living issues and fewer weddings (as the wave of COVID-postponed events passed), but the high-end jewellery market continued to enjoy double-digit gains through still robust global sales.

North American offtake slipped by 5% year-on-year in Q2'23 due to wedding numbers normalising, the ongoing expenditure shift to services, and retailers' cautious inventory restocking. Notably, this was less than gold's 8% decline, due to still wide price differentials combined with a shift towards platinum within the bridal sector, and despite a fashion shift to the yellow look.

In China, platinum jewellery demand fell by another 16% from last year's low base. In addition to impaired consumer sentiment, competition from gold jewellery (where fabrication enjoyed a decent 28% rise) continued to weigh on local platinum jewellery demand. A few more manufacturers and showrooms removed their platinum lines and switched to gold jewellery production.

In Japan demand rose by 10% year-on-year. The post-COVID recovery continued, both in terms of local consumption and exports. Not all was rosy in the country, however. Bridal demand continues to struggle, due to the ongoing decline in the number of weddings on the back of demographic trends.

Another market that recorded an improvement in the quarter is India. In contrast to gold, Indian platinum jewellery fabrication rose by 15% year-on-year to 42 koz; it is the highest second-quarter figure on record. This improvement is a result of new store openings, and the addition of platinum displays in more existing stores. Further supporting fabrication is the growing acceptance of platinum jewellery by medium-sized jewellers seeking to increase their profitability by offering high-margin products.

Industrial demand

Industrial platinum demand totalled 697 koz in Q2'23, its highest level since Q3'21 and representing a 12% increase on Q2'22. The 87% (+109 koz) year-on-year increase in chemical offtake, brought about by paraxylene (PX) expansions in China, made up for the weakness in other sectors. Glass offtake declined 16% (-32 koz), as delays in expansion plans and decommissioning of costly assets in favour of lower-cost facilities impacted the quarter. In the petroleum industry, demand fell 12% (-6 koz) due to fewer catalyst changeouts compared to the comparable period. The uncertain economic conditions that prevailed during Q2'23 also led to electronics demand contracting by 10% (-3 koz), as capital expenditure cuts impacted data centre expansions. Both medical and other industrial demand increased during the quarter, the former due to patient numbers rising post-COVID and the latter due to electrolyser capacity continuing to expand.

Chemical

Platinum chemical demand rose by 87% (+109 koz) year-on-year to 235 koz in Q2'23. As in the previous quarter, growth was dominated by higher demand for platinum-bearing catalysts from the PX industry. In China, the construction of three large-scale PX plants was completed, with combined new capacity equivalent to 7% of the end-2022 total. Nitric acid offtake was also slightly higher, though this comes off a low base in 2022 when the industry faced elevated energy costs and supply disruption following Russia's invasion of Ukraine. By contrast, slowing economic growth affected the use of silicone across various sectors, such as construction and consumer electronics, which in turn weighed on platinum offtake.

Petroleum

Platinum petroleum demand eased by 12% (-6 koz) year-on-year in Q2'23. Continuing the trend from Q1'23, this decline was almost entirely due to gas-to-liquid catalyst changeouts in 2022 that have so far not been repeated this year. By contrast, demand related to reforming and isomerisation activity edged higher both quarter-on-quarter and year-on-year. This, in turn, reflected higher crude throughput at refineries and start-ups of new plants, as oil demand continued to improve in Q2. Despite growing macroeconomic headwinds, world oil demand hit a record high of 103 mb/d in June according to the International Energy Agency.

Medical

Platinum medical demand rose by 4% (+2 koz), year-on-year, to 71 koz in Q2'23, partly owing to a post-COVID improvement from the rest of the world along with a return to more normal, pre-pandemic medical industry growth.

Glass

A delayed start-up of LCD tanks in China in Q2'23 resulted in a 16% year-on-year decline to 170 koz in platinum demand from the glass industry. High power costs prompted the decommissioning of some Japanese LCD tanks which would have led to lower Japanese platinum glass offtake had it not been offset by the ramp-up of single feeder tanks.

Electrical

In Q2'23, demand from the electrical segment dropped by 10% (-3 koz) year-on-year. Shipments of high-capacity hard disc drives (HDDs), commonly used in nearline storage and data centres, were significantly impacted by reduced enterprise budgets and delayed data centre construction due to economic uncertainty. The rising adoption of solid-state drives (SSDs) continues, driven by lower NAND flash prices to address excess inventories. Semiconductor factory capacity utilisation rates remained low despite growth in artificial intelligence (AI) applications (heavily dependent on high-performance processors, memory chips, and other electronic components for its functioning), which could not bridge the gap caused by the weakness in consumer electronics.

Other

Global demand from other industrial sectors rose by 3% (+5 koz) to 154 koz during Q2'23. Among the various sub-categories, the most significant growth occurred in electrolysis, boosted by the growth in production of Proton Exchange Membrane Electrolysers (PEM). There was also an increase in the deployment of stationary fuel cells, despite certain key producers reporting a decline in demand in Q2'23, notably from Europe. The growth of vehicle production also benefited the manufacturing of spark plugs and sensors. Concurrently, there was a notable surge in aerospace requirements as the burgeoning commercial space industry gained traction.

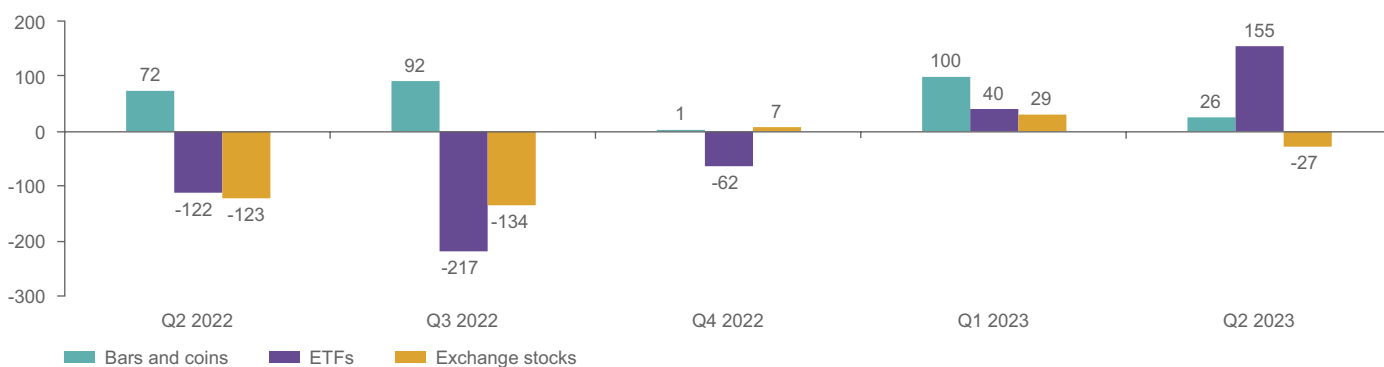
Investment demand

Global bar and coin investment demand in Q2'23 fell by 64% (-46 koz) year-on-year to 26 koz, led by a slump in North America, which fell to its lowest since Q2'20. It is worth bearing in mind that North America had already suffered a 66% year-on-year drop in Q1, generating an H1'23 decline of 63% (-103 koz) versus H1'22.

Staying with North America, the weakness initially reflected the strength of gold and silver demand, both of which responded positively to the US regional banking crisis. As such, those supplying investment products devoted finite production capacity to these two metals. However, from late May, safe-haven buying turned lower, to the detriment of all three precious metals. In Europe, a return to positive interest rates on savings, growing acclimation to the Ukraine war, inflation and the cost-of-living crisis all undermined interest in physical precious metals across the board among retail investors. Japan shifted to disinvestment, due to heavy selling in April when the local platinum price spiked up. Our field research also suggests that platinum was not helped by the gold price breaking through all-time records in yen-terms during the quarter, attracting media attention and, as a result, the interest of local retail investors.

In contrast to weak bar and coin demand, platinum ETF holdings grew by 155 koz (+5%) in Q2'23, their largest quarter-on-quarter increase since Q3'20. European funds saw their seventh consecutive quarter of liquidations, while North American funds experienced a slight increase, halting their four-quarter downtrend. The key driver, however, has been South African funds, adding 147 koz. As South Africa's winter months (June-August) approached, many investors moved from mining stocks to platinum over concerns that the local energy crisis would limit mine supply, lifting the platinum price and investor interest. NYMEX and TOCOM warehouse stocks fell by a combined 27 koz in the quarter, as strong physical platinum requirements incentivised a slight drawdown of exchange inventories.

Chart 4: Platinum Investment, koz

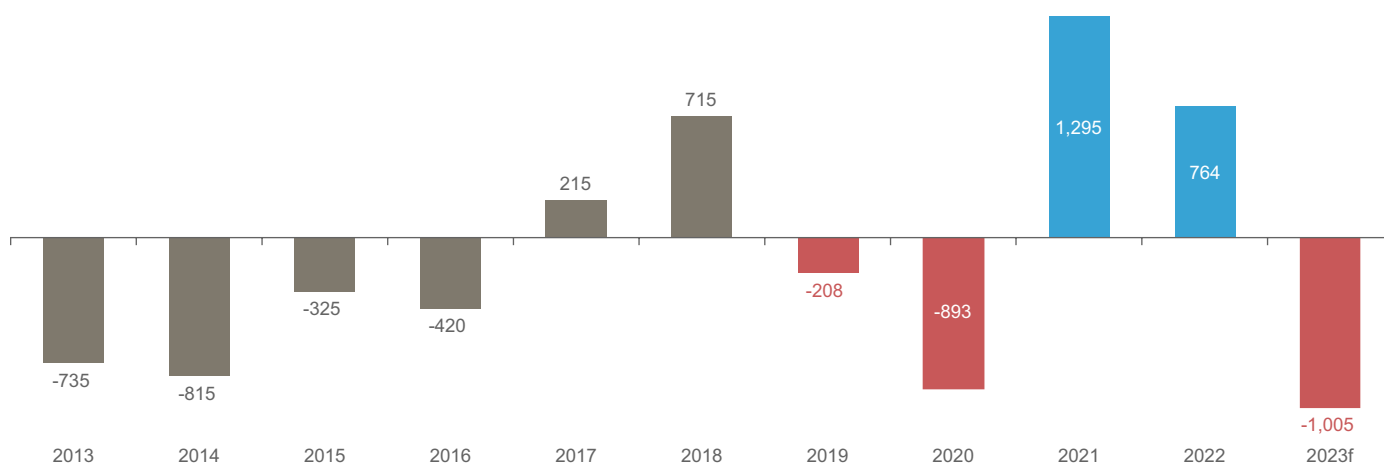


Source: Metals Focus

2023 OUTLOOK

At its press briefing in July, the IMF announced an upward revision to its global growth projections for 2023 from 2.8% to 3.0%. This will still mark a slowdown from the 3.5% seen in 2022. Moreover, high inflation and correspondingly higher interest rates are expected to prevail. Notwithstanding this slowdown in the world economy, we maintain our view of a deep deficit in the platinum market. We expect supply to remain flat on 2022 at 7,224 koz while demand is forecast to strengthen by 27% to 8,230 koz in 2023. Following a steady automotive market recovery and expansion within industrial demand for platinum, this year will see platinum demand in these sectors increase by 381 koz and 336 koz, respectively. In addition, a return to positive investment demand is expected this year, after substantial net outflows in 2022. As South African ETF holdings increase and bar and coin demand improves by 45% year-on-year, net investment is expected to rise to 386 koz (a +1,027 koz swing compared to 2022). Overall, we forecast the platinum market to return to a deficit for the first time in three years and in doing so breach the 1Moz deficit marker for the first time since at least 2010 (the start of Metals Focus' data series), reaching a 1,005 koz deficit this year.

Chart 5: Supply-demand balance, koz, 2013-2023f



Source: Metals Focus 2019-2023, SFA (Oxford) 2014-2018

Supply

The outlook for platinum mine supply remains uncertain, primarily due to persistent power insecurity and concerns about Eskom's future performance. The programme of smelter rebuilds in 2022 and H1'23 have constrained processing capacity, leading to a substantial build-up of semi-finished inventory as mining rates outpaced processing volumes. Following the restart of the Polokwane smelter, Anglo American Platinum began reducing its semi-finished inventory in Q2'23. However, that reduction was offset by an increase at Implats due to power constraints delaying the restart of Number 4 furnace. Reports indicate the level of semi-finished inventory continued to rise in Q2'23, reaching a level not seen since the period following the ACP shutdown in 2020. Metals Focus estimate there to be more than 250 koz of excess semi-finished inventory.

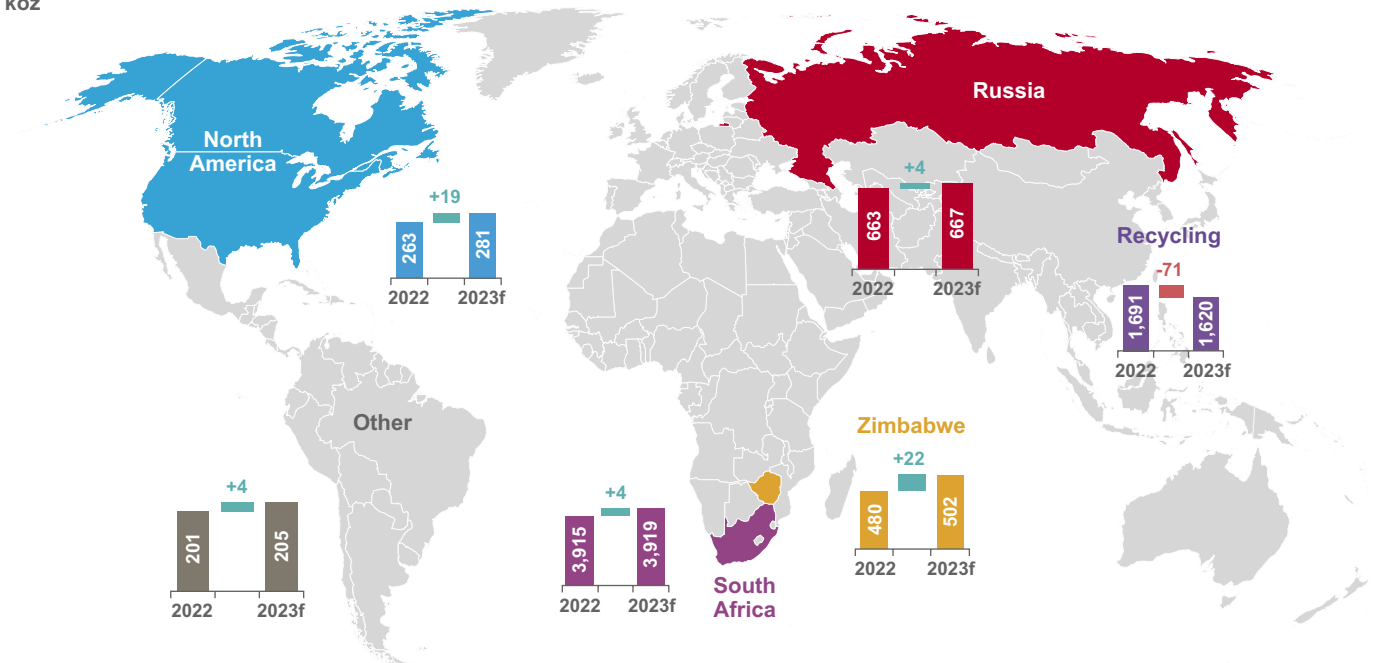
With smelters returned to service following rebuilds, under favourable conditions, producers will be able to process the inventory thereby boosting refined volumes. However, the ability of producers to address the backlog and increase refined production is impeded by the ongoing electricity shortage. The final balance of 2023 mine supply will be dictated by the speed of the drawdown. Aided by the reduction in semi-finished inventories, Metals Focus anticipate an increase in South African H2'23 refined production compared to the prior year. This increase is projected to fully offset the -216 koz year-on-year loss on H1'22. As a result, total South Africa mine supply for 2023 is forecast to remain virtually flat (+4 koz) year-on-year, amounting to 3,919 koz.

Elsewhere, the outlook for Russia also presents uncertainty. Nornickel's efforts to mitigate the procurement and logistical obstacles stemming from the geopolitical complexities caused by Russia's invasion of Ukraine appear to have prevented substantial disruptions for 2023. Even so, based on company forecasts, there is an anticipated drop in PGM production due to processing infrastructure maintenance. Despite the projected and significant fall in H2'23, the robust first half performance suggests that PGM output might exceed expectations, introducing upside risk to our 657 koz estimate of Russian supply.

Despite the headwinds of loadshedding across the Zimbabwean national grid, mine production is expected to hit an all-time high of 502 koz in 2023, a 5% (+22 koz) year-on-year increase. This growth reflects the expansion of capacity at Zimplats. However, it is important to note that since Zimbabwean-mined platinum undergoes downstream processing in South Africa, the overall outcome is contingent upon the performance of that country.

North American production is expected to remain well below pre-COVID levels. However, with the normalisation following the disruption of the past three years in Canada and the stabilization of Sibanye-Stillwater's US operations, growth of 7% (+19 koz) year-on-year is projected for the region. The net effect is that global platinum mine supply in 2023 is expected to remain virtually unchanged year-on-year at 5,605 koz.

Chart 6: Changes in supply, 2022 vs. 2023f
koz



Source: Metals Focus

Recycling

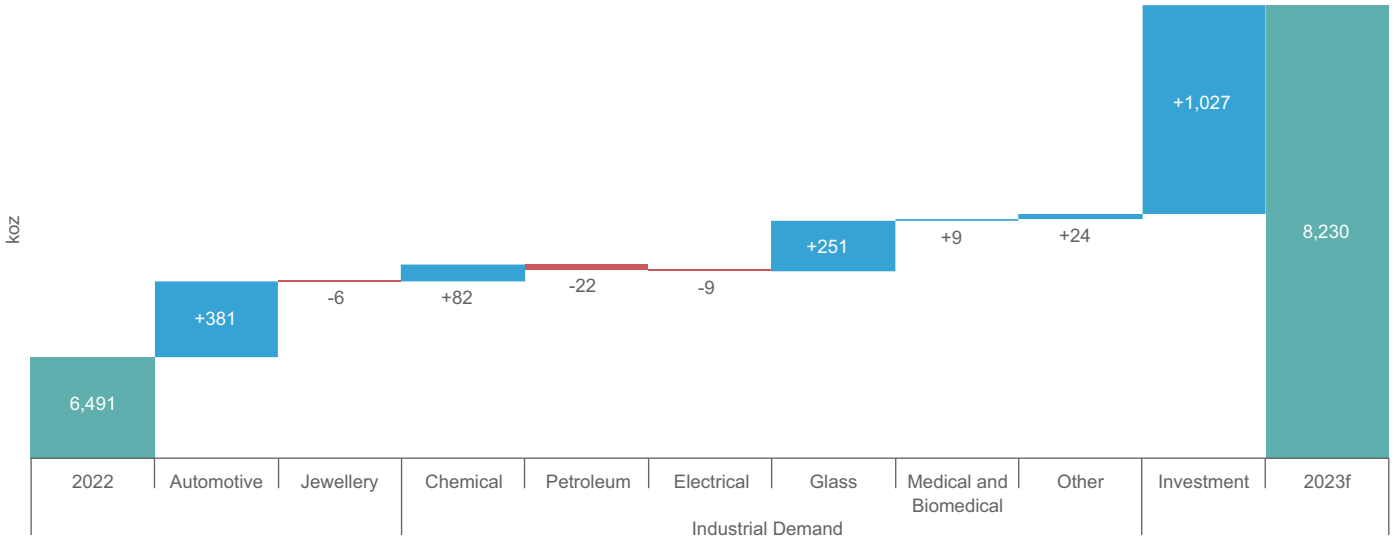
Global recycling markets have faced headwinds this year, with supply projected to be 4% lower than 2022 at 1,620 koz. While new vehicle sales growth suggests a potential uptick in the spent autocatalyst market, several challenges dampen the outlook. Scrap yards' current robust profitability from second-hand parts sales provides flexibility for the retention of spent autocatalyst materials, awaiting higher precious metals prices (although we do not expect this behaviour to persist in H2'23). Additionally, entrenched behaviours, such as remote working and online shopping, are leading to reduced vehicle usage, prolonging vehicle ownership and affecting end-of-life vehicle availability for recycling. In North America, evolving regulatory measures to counter autocatalyst theft may also be slowing the flow of material in general. Taking these issues into account, we forecast a 6% (-70 koz) reduction in supply from spent catalysts to reach 1,180 koz.

In contrast, jewellery recycling will be flat as Chinese jewellery scrap is poised for a modest 1% growth, driven by the easing of COVID-related disruptions which constrained consumer movement and resulted in global jewellery recycling decline of 12% in 2022.

Demand

Platinum demand is expected to grow by 27% (+1,738koz) year-on-year to 8,230 koz in 2023. After two years of outflows in global ETF holdings, we forecast a modest 60 koz inflow during 2023. Bar and coin demand is expected to be 45% up on 2022. Improved automotive production, tighter emissions legislation, and substitution will raise automotive demand by 13% (+381 koz) to 3,283 koz. Platinum demand in the industrial sector benefits from paraxylene and glass capacity expansions lifting demand by 14% (+336 koz).

Chart 7: Changes in demand by category, 2022 vs. 2023f



Source: Metals Focus

Automotive demand

Global automotive demand is expected to increase by 13% year-on-year in 2023 to 3,283 koz (+381 koz). Growth in vehicle numbers will be the key driver, with LDV and HDV production forecast to rise by 6% and 7%, respectively, in 2023. Despite growing concerns about economic weakness in China, production is set to improve. Another factor supporting platinum demand is the tighter Chinese emissions standards for HDV and non-road vehicles (NRVs). China’s V1b emissions regulations, applicable to all powertrain types from 1st July 2023, will require all HDVs to be fitted with a compliant aftertreatment system. NRV emission legislation will also support platinum demand as vehicles without aftertreatment systems will decline from 63% in 2022 to 47% this year as China IV (the NRV emissions regulation applicable to China), and particularly the fitment of particulate filter systems for all engines above 37kW, is phased in.

Despite only modest growth in vehicle production being expected in North America for the full year (as the high lease cost environment puts downward pressure on demand), we expect an improvement in platinum requirements due to the growth in hybrid production and platinum substitution. In Europe, despite economic uncertainty, the recovery should see an increase in platinum demand just short of 10%. Demand in other regions will also rise on the back of higher vehicle output, resulting in a 5% increase.

In addition the growing substitution of palladium with platinum in gasoline tri-metal catalyst aftertreatment systems globally, could see platinum account for 615 koz of what would otherwise have been palladium demand in 2023.

Jewellery demand

Global jewellery demand will remain largely flat year-on-year, reaching 1,893 koz in 2023.

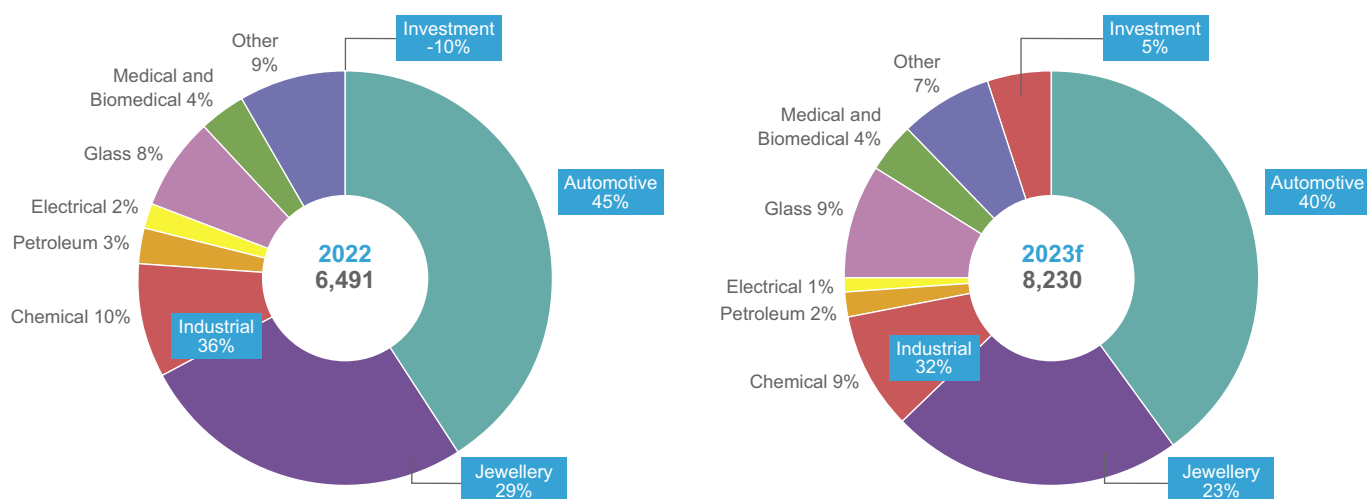
We have raised our European estimate from the previous quarter from -7% to +4% as the high-end continues to surpass expectations. This stems from booming sales to consumers insulated from the cost-of-living crisis and heavy investment and promotion by the brands. In contrast, sales within the mass market and bridal segments remain subdued.

Offtake in North America is forecast to fall, largely due to fewer postponed weddings following the build-up caused by the pandemic. However, our Q1’23 outlook of -10% has been lifted to -4% as the trade’s enthusiasm for platinum (largely due to price differentials) has exceeded expectations and through the fading threat to the economy of a hard landing.

For China, we have adjusted our 2023 forecast, revising the expected decline from 1% to a more pronounced 7%, resulting in demand of 450 koz (-34 koz). This reflects the Q2'23 performance that fell below expectations. Meanwhile, lingering concerns surrounding economic uncertainty and a lack of consumer confidence are poised to exert further pressure on Chinese consumer expenditure for non-essential goods over the short-to-medium term. Consequently, consumer preference for quasi-investment and value-preservation product collections is expected to persist, presenting platinum jewellery with formidable competition from the allure of gold. On a positive note, menswear and sales via online live-streaming platforms are flourishing and may mitigate some losses throughout the current year.

In India, aligned with our research findings over the last few quarters, we expect the strength in demand to continue as platinum continues to gain acceptance across the country, especially in smaller cities and towns.

Chart 8 & 9: Demand end-use shares, 2022 vs. 2023f



Source: Metals Focus

Industrial demand

Industrial demand in 2023 is forecast to improve by 14% year-on-year (+336 koz) to 2,667 koz. Capacity expansions in the glass and chemical industry will offset lower offtake from the electrical and petroleum markets.

Petroleum

Petroleum demand is forecast to drop by 11% (-22 koz) year-on-year to 171 koz in 2023. The decline is entirely due to fewer catalyst changeouts at gas-to-liquid plants in the Rest of the World. Higher offtake from reforming and isomerisation plants will mitigate some of these losses. Based on the International Energy Agency's data, global oil demand remains on track to hit a new high in 2023, thanks to solid air travel, increased oil use in power generation and surging Chinese petrochemical activity. This, coupled with low oil inventories, will continue to drive oil production. Even with voluntary OPEC cuts, this has been mitigated by higher non-OPEC supplies. North America, for instance, is expected to post higher platinum offtake on rising output.

Chemical

Platinum chemical demand is projected to rise by 12% (+82 koz) to 758 koz in 2023, marking the third consecutive year of growth. All major demand areas are expected to record higher platinum offtake, with the petrochemical industry again contributing the largest share of gains. Sizeable capacity expansions in paraxylene (PX) and propane dehydrogenation (PDH) meant that platinum offtake in H1'23 almost matched the full-year total for 2022. The current project pipeline suggests a much quieter H2'23. Compared to the last two years, when China almost entirely led growth, new units are also expected elsewhere. Following a challenging year in 2022 (when the war resulted in significant supply chain disruptions and surging energy prices), a recovery in fertilizer demand will also help lift platinum offtake in 2023. Likewise, the silicone industry is expected to improve later this year, albeit by a limited amount.

Glass

Platinum demand in the glass industry is expected to rise by 50% (+251 koz) to 756 koz in 2023, a 26 koz increase from our previous forecast. The change in projection reflects some newly identified capacity that we expect will be added in Japan. This would make 2023 the strongest year on record for this market. Most growth year-on-year will come from capacity expansions and new investment anticipated in China. Platinum demand from the installation of LCD tanks in the country is expected to double in 2023. This aligns with past industry growth cycles, where capacity expansions tend to be concentrated to take advantage of economies of scale. Additionally, the construction of new fibreglass plants from China's project pipeline will continue. The shift to a higher platinum ratio in platinum-rhodium alloys used in bushings, reflected in sizeable rhodium sales by Chinese glass-makers Jushi and Shandong Fiberglass Group, will continue to benefit platinum demand ahead of rhodium.

Medical

Platinum medical demand is forecast to grow 3% (+9 koz) year-on-year in 2023 to 287 koz. In addition to the lingering effects of COVID in 2022, drivers such as improved healthcare access and a growing, ageing global population will take the lead in lifting market growth.

Electrical

The consumer electronics market's inventory has normalised after consecutive downward adjustments over the past two years. While a second-half improvement is expected given an improvement seen in the July electronic component sales trends index, subdued consumer sentiment might hinder the recovery. The oversupply of NAND memory is expected to extend to 2024 and the continued lowering of SSD prices is likely to reduce HDD market share, impacting precious metal usage. Although semiconductor utilisation is rising with demand, reassessed investment plans have led to a slight downward revision of this year's forecast. As a result, electrical demand for platinum is projected to decline by 8% (-9 koz) to 97 koz this year.

Other

Platinum demand from the other industrial segment is forecast to grow by 4% year-on-year (+24 koz) to 598 koz in 2023. A further improvement in vehicle production will lift demand for spark plugs and sensors, but the downturn in the economic climate could pose challenges for the aftermarket business. Demand from stationary fuel cell applications will grow by 22%. Electrolyser capacity growth will also accelerate, however, the pace of growth is less than previously expected. We also see increased demand in the aerospace segment as the commercial space industry expands.

Investment demand

Platinum investment demand is expected to return to net positive investment of 386 koz in 2023, following two years of net divestment.

This year, global bar and coin investment is forecast to jump by 45% (+102 koz) to 326 koz, its first increase in three years. This will almost entirely be due to a return to positive net platinum investment in Japan, also for the first time since 2020. This contrasts with the forecast of a four-year low for North American demand.

After healthy net purchases in the first quarter being partially offset by liquidations in the second, we expect Japan will see modest net buying over the rest of the year. This is based on the assumption that the yen will stabilise and potentially even strengthen somewhat, limiting the upside for local prices.

In North America, following a particularly weak start to the year, we forecast a somewhat healthier second half as some coin and bar suppliers are able to devote more capacity to platinum, itself the result of a weaker tone to gold and silver retail demand (which Metals Focus forecasts for H2'23). Even so, a marked double-digit decline is still predicted for the full-year total.

Platinum exchange-traded fund (ETF) holdings climbed 6% in H1'23 to 3.28 Moz at end-June driven by a significant increase in South African ETF holdings which climbed 66% over the same period. We expect to see a further decline in European and North American ETF holdings for the remainder of the year, as higher interest rates continue to raise the opportunity cost for holding non-yielding assets, and price spikes present profit-taking opportunities for investors. As winter ends in South Africa, we expect investor concerns about the energy crisis affecting mine supply to moderate. This would lead to some divestment from South African funds from their elevated levels, a trend which is already taking place from peak holdings in mid-May. As such, we expect global

ETF holdings to increase by 60 koz throughout the whole of 2023, resulting in a decrease over the second half of 2023 from their end-June level (which had been up 196 koz since the start of the year).

As imports into China and Hong Kong have slowed from the exceptional inflows of 2021–2022, EFP rates have equally become less volatile, stabilising closer to flat and resulting in less intense fluctuations of warehouse inventories. As such, we expect exchanges stocks to remain flat for the full year.

ABOVE GROUND STOCKS

Due to a projected deficit of 1,005 koz in 2023, above-ground stocks are expected to decline to 3,603 koz by year-end, with demand cover of just over five months.

The WPIC definition of above-ground stocks is the year-end estimate of the cumulative platinum holdings not associated with exchange-traded funds, metal held by exchanges or working inventories of mining producers, refiners, fabricators, or end-users.

PLATINUM QUARTERLY Q2 2023

Table 2: Supply, demand and above ground stock summary – annual comparison

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023f	2022/2021 Growth %	2023f/2022 Growth %
Platinum Supply-demand Balance (koz)												
SUPPLY												
Refined Production	4,875	6,160	6,045	6,130	6,125	6,075	4,989	6,297	5,522	5,575	-12%	1%
South Africa	3,135	4,480	4,265	4,385	4,470	4,374	3,298	4,678	3,915	3,919	-16%	0%
Zimbabwe	405	405	490	480	465	458	448	485	480	502	-1%	5%
North America	395	365	390	360	345	356	337	273	263	281	-4%	7%
Russia	740	710	715	720	665	716	704	652	663	667	2%	1%
Other	200	200	185	185	180	170	202	208	201	205	-3%	2%
Increase (-)/Decrease (+) in Producer Inventory	+350	+30	+30	+30	+10	+2	-84	-93	+43	+30	N/A	-30%
Total Mining Supply	5,225	6,190	6,075	6,160	6,135	6,077	4,906	6,204	5,565	5,605	-10%	1%
Recycling	2,055	1,720	1,860	1,915	1,955	2,112	1,997	2,079	1,691	1,620	-19%	-4%
Autocatalyst	1,255	1,185	1,210	1,325	1,420	1,567	1,509	1,590	1,250	1,180	-21%	-6%
Jewellery	775	515	625	560	505	476	422	422	372	370	-12%	0%
Industrial	25	20	25	30	30	69	66	67	68	69	3%	2%
Total Supply	7,280	7,910	7,935	8,075	8,090	8,189	6,902	8,283	7,256	7,224	-12%	0%
DEMAND												
Automotive	3,245	3,245	3,360	3,300	3,100	2,810	2,324	2,557	2,902	3,283	13%	13%
Autocatalyst	3,095	3,105	3,225	3,160	2,955	2,810	2,324	2,557	2,902	3,283	13%	13%
Non-road	150	140	135	140	145	†	†	†	†	†	N/A	N/A
Jewellery	3,000	2,840	2,505	2,460	2,245	2,106	1,830	1,953	1,899	1,893	-3%	0%
Industrial	1,700	1,845	1,955	1,825	2,015	2,248	2,105	2,534	2,331	2,667	-8%	14%
Chemical	540	515	560	570	565	795	637	663	676	758	2%	12%
Petroleum	60	205	220	100	235	219	109	169	193	171	14%	-11%
Electrical	215	205	195	210	205	144	130	135	106	97	-21%	-8%
Glass	205	235	255	205	250	228	473	753	505	756	-33%	50%
Medical and Biomedical	225	240	235	235	235	277	256	269	278	287	3%	3%
Other	455	445	490	505	525	585	501	546	573	598	5%	4%
Investment	150	305	535	275	15	1,233	1,536	-56	-640	386	N/A	N/A
Change in Bars, Coins	50	525	460	215	280	263	571	324	225	326	-31%	45%
Change in ETF Holdings	215	-240	-10	105	-245	991	507	-241	-558	60	N/A	N/A
Change in Stocks Held by Exchanges	-115	20	85	-45	-20	-20	458	-139	-307	0	N/A	N/A
Total Demand	8,095	8,235	8,355	7,860	7,375	8,397	7,796	6,988	6,491	8,230	-7%	27%
Balance	-815	-325	-420	215	715	-208	-893	1,295	764	-1,005	-41%	N/A
Above Ground Stocks	2,590*	2,265	1,845	2,060	2,775	3,442**	2,549	3,844	4,608	3,603	20%	-22%

Source: Metals Focus 2019 - 2023, SFA (Oxford) 2014 - 2018.

Notes:

1. Above Ground Stocks: *4,140 koz as of 31st December 2012 (SFA (Oxford)). **3,650 koz as of 31 December 2018 (Metals Focus).
2. † Non-road automotive demand is included in autocatalyst demand.
3. Data from Metals Focus and SFA (Oxford) may not have been prepared on the same or directly comparable basis.
4. Prior to 2019 SFA data is independently rounded to the nearest 5 koz.

PLATINUM QUARTERLY Q2 2023

Table 3: Supply and demand summary – quarterly comparison

	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q2'23/Q2'22 Growth %	Q2'23/Q1'23 Growth %
Platinum Supply-demand Balance (koz)											
SUPPLY											
Refined Production	1,566	1,571	1,695	1,273	1,530	1,390	1,329	1,177	1,464	-4%	24%
South Africa	1,175	1,201	1,274	878	1,129	977	931	763	1,028	-9%	35%
Zimbabwe	125	116	127	117	124	116	123	116	126	2%	9%
North America	75	51	64	66	64	67	65	71	74	14%	4%
Russia	137	153	178	163	161	179	160	180	190	18%	6%
Other	53	51	52	49	52	52	49	48	47	-9%	-3%
Increase (-)/Decrease (+) in Producer Inventory	+18	-43	-39	+24	-2	-2	+23	+24	+14	N/A	-42%
Total Mining Supply	1,584	1,529	1,656	1,298	1,528	1,388	1,352	1,201	1,478	-3%	23%
Recycling	473	534	545	424	391	430	443	374	345	-12%	-8%
Autocatalyst	359	413	426	308	281	324	335	262	244	-13%	-7%
Jewellery	98	104	102	98	92	90	92	95	84	-9%	-12%
Industrial	16	17	17	17	17	17	17	17	17	2%	1%
Total Supply	2,057	2,063	2,201	1,721	1,918	1,818	1,795	1,575	1,823	-5%	16%
DEMAND											
Automotive	637	558	660	738	703	702	759	850	840	19%	-1%
Autocatalyst	637	558	660	738	703	702	759	850	840	19%	-1%
Non-road	†	†	†	†	†	†	†	†	†	N/A	N/A
Jewellery	470	485	511	472	489	480	457	462	480	-2%	4%
Industrial	789	715	543	574	621	566	570	622	697	12%	12%
Chemical	146	305	103	133	126	131	287	251	235	87%	-6%
Petroleum	38	38	56	44	48	49	52	42	42	-12%	0%
Electrical	35	35	32	30	27	26	24	23	24	-10%	8%
Glass	373	138	140	150	202	151	2	89	170	-16%	91%
Medical and Biomedical	67	69	67	72	69	69	68	71	71	4%	1%
Other	130	130	145	145	149	141	138	147	154	3%	5%
Investment	187	-278	-118	-165	-162	-260	-54	169	154	N/A	-9%
Change in Bars, Coins	104	109	92	59	72	92	1	100	26	-64%	-74%
Change in ETF Holdings	34	-213	-162	-166	-112	-217	-62	40	155	N/A	285%
Change in Stocks Held by Exchanges	49	-173	-48	-58	-123	-134	7	29	-27	N/A	N/A
Total Demand	2,084	1,480	1,595	1,619	1,652	1,488	1,732	2,103	2,171	31%	3%
Balance	-27	583	606	102	267	330	63	-528	-348	N/A	N/A

Source: Metals Focus 2021 - 2023.

Notes:

1. † Non-road automotive demand is included in autocatalyst demand.

PLATINUM QUARTERLY Q2 2023

Table 4: Supply and demand summary – half-yearly comparison

	H1 2021	H2 2021	H1 2022	H2 2022	H1 2023	H1'23/H1'22 Growth %	H1'23/H2'22 Growth %
Platinum Supply-demand Balance (koz)							
SUPPLY							
Refined Production	3,030	3,266	2,803	2,719	2,641	-6%	-3%
South Africa	2,203	2,475	2,007	1,908	1,790	-11%	-6%
Zimbabwe	243	242	241	239	242	0%	1%
North America	159	115	131	132	144	10%	9%
Russia	321	331	324	339	370	14%	9%
Other	105	103	101	101	95	-6%	-5%
Increase (-)/Decrease (+) in Producer Inventory	-11	-82	22	21	37	68%	82%
Total Mining Supply	3,019	3,184	2,825	2,740	2,679	-5%	-2%
Recycling	1,000	1,079	814	874	719	-12%	-18%
Autocatalyst	751	839	590	658	506	-14%	-23%
Jewellery	215	206	191	181	179	-6%	-1%
Industrial	33	34	34	34	34	0%	0%
Total Supply	4,019	4,264	3,640	3,613	3,398	-7%	-6%
DEMAND							
Automotive	1,339	1,218	1,441	1,461	1,690	17%	16%
Autocatalyst	1,339	1,218	1,441	1,461	1,690	17%	16%
Non-road	†	†	†	†	†	N/A	N/A
Jewellery	957	995	962	937	942	-2%	0%
Industrial	1,276	1,258	1,195	1,136	1,319	10%	16%
Chemical	255	407	258	417	486	88%	16%
Petroleum	74	95	92	101	84	-8%	-16%
Electrical	68	67	57	49	47	-17%	-5%
Glass	475	278	353	153	259	-26%	70%
Medical and Biomedical	132	136	141	137	142	1%	4%
Other	271	275	294	279	301	2%	8%
Investment	340	-396	-327	-313	323	N/A	N/A
Change in Bars, Coins	123	201	132	93	126	-5%	35%
Change in ETF Holdings	134	-375	-278	-280	196	N/A	N/A
Change in Stocks Held by Exchanges	82	-221	-181	-127	2	N/A	N/A
Total Demand	3,912	3,075	3,271	3,220	4,274	31%	33%
Balance	106	1,189	369	393	-876	N/A	N/A

Source: Metals Focus 2019 - 2023.

Notes:

1. † Non-road automotive demand is included in autocatalyst demand.

PLATINUM QUARTERLY Q2 2023

Table 5: Regional demand – annual and quarterly comparison

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023f	2022/2021 Growth %	2023f/2022 Growth %	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	
Platinum gross demand (koz)																		
Automotive	3,240	3,250	3,350	3,290	3,090	2,810	2,324	2,557	2,902	3,283	13%	13%	703	702	759	850	840	
North America	465	480	410	390	390	328	281	360	434									
Western Europe	1,395	1,450	1,630	1,545	1,325	1,430	1,060	963	1,004									
Japan	585	510	450	435	425	295	232	258	255									
China	125	145	195	230	220	183	279	380	492									
India	170	180	170	175	195	††	††	††	††									
Rest of the World	500	485	495	515	535	575	471	596	717									
Jewellery	3,000	2,840	2,505	2,460	2,245	2,106	1,830	1,953	1,899	1,893	-3%	0%	489	480	457	462	480	
North America	230	250	265	280	280	341	277	409	448									
Western Europe	220	235	240	250	255	237	196	260	301									
Japan	335	340	335	340	345	372	316	298	333									
China	1,975	1,765	1,450	1,340	1,095	871	832	703	484									
India	175	180	145	175	195	109	59	123	171									
Rest of the World	65	70	70	75	75	176	151	159	163									
Chemical	540	515	560	570	565	795	637	663	676	758	2%	12%	126	131	287	251	235	
North America	55	55	50	50	50	96	102	110	112									
Western Europe	105	75	110	115	105	120	111	118	113									
Japan	10	10	15	15	15	66	62	65	66									
China	215	230	225	220	215	310	214	222	207									
Rest of the World	155	145	160	170	180	204	147	148	179									
Petroleum	60	205	220	100	235	219	109	169	193	171	14%	-11%	48	49	52	42	42	
North America	25	-25	90	55	55	30	5	32	44									
Western Europe	-20	70	10	5	20	14	11	18	30									
Japan	-35	5	0	-40	5	7	6	12	7									
China	-5	45	80	45	10	66	35	39	26									
Rest of the World	95	110	40	35	145	103	52	67	86									
Electrical	215	205	195	210	205	144	130	135	106	97	-21%	-8%	27	26	24	23	24	
North America	15	15	10	15	15	38	35	35	28									
Western Europe	10	10	10	10	10	27	23	25	20									
Japan	15	15	15	15	15	20	16	17	14									
China	70	70	80	90	85	28	31	31	23									
Rest of the World	105	95	80	80	80	31	25	26	22									
Glass	205	235	255	205	250	228	473	753	505	756	-33%	50%	202	151	2	89	170	
North America	10	0	20	5	5	-81	-24	17	27									
Western Europe	15	10	5	5	35	65	36	6	22									
Japan	-25	-5	-10	-10	0	-38	-63	7	-151									
China	115	130	150	110	80	176	385	758	524									
Rest of the World	90	100	90	95	130	107	139	-36	82									
Medical	225	240	235	235	235	277	256	269	278	287	3%	3%	69	69	68	71	71	
Other industrial	455	445	490	505	525	585	501	546	573	598	5%	4%	149	141	138	147	154	
Bar & Coin Investment	50	525	460	215	280	263	571	324	225	326	-31%	45%	72	92	1	100	26	
North America						155	234	256	258									
Western Europe						52	75	61	44									
Japan						46	240	-26	-114									
Rest of the World						9	21	33	36									
ETF Investment	215	-240	-10	105	-245	991	507	-241	-558	60	N/A	N/A	-112	-217	-62	40	155	
North America						125	524	-6	-102									
Western Europe						508	237	56	-313									
Japan						-13	58	-23	-28									
Rest of the World						370	-312	-268	-116									
Change in Stocks Held by																		
Exchanges	-115	20	85	-45	-20	-20	458	-139	-307	0	N/A	N/A	-123	-134	7	29	-27	
Investment	150	305	535	275	15	1,233	1,536	-56	-640	386	N/A	N/A	-162	-260	-54	169	154	
Total Demand	8,090	8,240	8,345	7,850	7,365	8,397	7,796	6,988	6,491	8,230	-7%	27%	1,652	1,488	1,732	2,103	2,171	

Source: Metals Focus 2019 - 2023, SFA (Oxford) 2013 - 2018.

Notes:

- † Non-road automotive demand is included in autocatalyst demand.
- †† India automotive demand is included in Rest of the World.
- Data from Metals Focus and SFA (Oxford) may not have been prepared on the same or directly comparable basis.
- Prior to 2019 SFA data is independently rounded to the nearest 5 koz.

PLATINUM QUARTERLY Q2 2023

Table 6: Regional recycling – annual and quarterly comparison

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023f	2022/2021 Growth %	2023f/2022 Growth %	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	
Platinum recycling supply (koz)																		
Automotive	1,255	1,185	1,210	1,325	1,420	1,567	1,509	1,590	1,250	1,180	-21%	-6%	281	324	335	262	244	
North America						520	458	504	368									
Western Europe						785	815	835	662									
Japan						116	110	117	110									
China						36	36	41	34									
Rest of the World						110	90	93	76									
Jewellery	775	515	625	560	505	476	422	422	372	370	-12%	0%	92	90	92	95	84	
North America						3	3	3	3									
Western Europe						4	4	3	4									
Japan						187	162	160	165									
China						276	248	250	195									
Rest of the World						5	5	5	6									
Industrial	25	20	25	30	30	69	66	67	68	69	3%	2%	17	17	17	17	17	
North America						15	12	12	13									
Western Europe						11	10	11	11									
Japan						34	34	34	34									
China						7	7	8	9									
Rest of the World						2	2	2	2									

Source: Metals Focus 2019 - 2023, SFA (Oxford) 2014 - 2018.

GLOSSARY OF TERMS

Above ground stocks

The year-end estimate of the cumulative platinum holdings not associated with exchange-traded funds; metal held by exchanges or working inventories of mining producers, refiners, fabricators, or end-users. Typically, unpublished vaulted metal holdings from which a supply-demand shortfall can be readily supplied or to which a supply-demand surplus can readily flow.

ADH

Alkane dehydrogenation: catalytic conversion of alkanes to alkenes. Broad term encompassing BDH and PDH.

BDH

Butane dehydrogenation; catalytic conversion of isobutane to isobutylene.

Bharat

The Government of India introduced Bharat emission standards (BSES) to reduce and regulate the output of air pollutants from internal combustion and spark-ignition engine equipment, including motor vehicles.

Bharat Stage V/VI standards (BS-V, BS-VI)

Early in 2016 the Indian government announced the intention to 'leapfrog' Bharat Stage V and move directly to Bharat Stage VI, equivalent to Euro 6, in 2020. This intention, despite lockdown, has not been altered.

China Vehicle Emission Standards

China's vehicle emission standards are set nationally by the Ministry of Environmental Protection and are regionally and locally enforced by Environmental Protection Bureaus.

A number of cities and provinces in China continue the historic practice of early introduction of new standards.

China 6

As of December 2016, China adopted China 6 standards that apply nationwide to light-duty passenger vehicles from July 2020 (China 6a) and July 2023 (China 6b). These standards incorporate elements of Euro 6 and U.S. Tier 2 regulations for tailpipe and evaporative emissions. China 6b includes mandatory on-road emissions testing modelled after the EU RDE regulation (also known as Euro 6d TEMP) with a few enhancements and modifications. A number of cities and provinces adopted China 6b in July 2019 and many automakers have proceeded to adopt China 6b early for all their production.

China VI

In June 2018, China finalized China VI standards that will apply to new heavy-duty diesel vehicles nationwide in two stages.

The first stage, China VI-a, originally targeted to have become applicable by July 2020 for new models but has been delayed by 6 months to January 2021, and all new HDVs targeted for compliance in July 2021. The second stage, China VI-b will apply to gas engines nationwide starting in January 2021 and all new HDVs in July 2023.

Compounds (Platinum based)

Platinum combines with other elements to form chemical mixtures that are used as catalysts in chemical processes as well as in plating, metal deposition and other industrial processes.

Diesel oxidation catalyst (DOC)

A DOC oxidises harmful carbon monoxide and unburnt hydrocarbons, produced by incomplete combustion of diesel fuel, to non-toxic carbon dioxide and water.

Diesel particulate filter (DPF) and catalysed diesel particulate filter (CDPF)

A DPF physically filters particulates (soot) from diesel exhaust. A CDPF adds a PGM catalyst coating to facilitate oxidation and removal of the soot. The terms are often used interchangeably.

Electrolysis of water

Water electrolyzers are electrochemical devices used to split water molecules into hydrogen and oxygen. An electrical current is applied to the electrolyser cell, and water is split into oxygen and hydrogen. The electrolysis system comprises of the system, the stack, and the cell.

Emissions Legislation

Regulations that necessitate the fitment of autocatalyst systems dealing with the treatment of vehicle tailpipe emissions such as carbon monoxide (CO), particulate matter, hydrocarbons, and oxides of nitrogen (NOx). There are a range of standards specific to various regions and countries with varying minimum emissions targets and deadlines for compliance.

EPA

Environmental Protection Agency regulating the US vehicle and engine emission standards for pollutants.

ETF

Exchange-traded fund. A security that tracks an index, commodity, or basket of assets. Platinum ETFs included in demand are backed by physical metal (LPPM good delivery bars stored in a secure vault approved by the listing exchange).

Euro V/VI emission standards

EU emission standards for heavy-duty vehicles. Euro V legislation was introduced in 2008-09 and Euro VI in 2013/2014; similar standards have later been adopted in some other countries.

Euro 5/6 emission standards

EU emission standards for light-duty vehicles. Euro 5 legislation was introduced in 2009-11 and Euro 6 in 2014/2015. The limits set in Euro 6 have remained unchanged, but the measuring methods have become more stringent progressively including Euro 6 a, b, c, d, and Euro 6d-Temp, now in place. For CO₂, the laboratory based WLTP and for NO_x RDE.

FCM

Fuel Consumption Monitoring describes the recording of actual consumption during the life of the vehicle. Applicable under Euro 6d to all new vehicles from 1/01/2020 and all new registrations from 1/01/2021.

Forward prices

The price of a commodity at a future point in time. Typically comprises of the spot price as well as the risk-free interest rate and cost of carry.

GTL

Gas-to-liquids is a process that converts natural gas to liquid hydrocarbons such as gasoline or diesel fuel.

HAMR

Heat-Assisted Magnetic Recording. A magnetic recording technology which involves spot-heating the drive platters with laser beam.

HDD

Hard disk drive. Data storage device that stores digital data by magnetic platters.

HDV

Heavy-duty vehicle.

Hydrogen Production Methods

In recent years, colours have been used to refer to different hydrogen production routes. There is no international agreement on the use of these terms as yet, nor have their meanings in this context been clearly defined but the following colour key provides a guideline of most widely use reference to the various production methods.

white – naturally occurring or produced as industrial by-product

black or brown – coal gasification

grey – steam methane reforming turquoise – methane pyrolysis

blue – steam methane reforming plus carbon capture

green – water electrolysis with renewable energy sources

pink – nuclear power

yellow – solar power or mix of multiple sources.

ICE

Internal combustion engine.

IoT

Internet of Things. Networking system that allows data to be sent to and received from objects and devices through internet.

ISC

In Service Conformity which requires vehicles to not only conform with exhaust emission standards when they are new but also while in use.

Jewellery alloys

The purity of platinum jewellery is invariably expressed in parts per 1,000. For example, the most common variant, pt950, is 95% fine platinum, with the rest of the jewellery alloy made up of other metals such as cobalt or copper. Different markets would typically prescribe the purity levels for qualification and hallmarking of the jewellery as platinum jewellery.

Jewellery demand

Captures the first transformation of unwrought platinum into a semi-finished or finished jewellery product.

Koz

Thousand ounces.

LCD

Liquid-crystal display used for video display.

LCV

Light commercial vehicle.

Lean NO_x traps (LNT)

Platinum/rhodium-based, catalyses the chemical reduction of NO_x in diesel engine exhaust to harmless nitrogen.

Lease rates

The lease rate is defined as the rate at which the owner of the commodity lends or sells it and buys it back from the borrower in the market. LPPM.

The London Platinum and Palladium Market (LPPM)

It is a trade association representing the interests of the platinum and palladium market. It provides guidance and benchmarks on the form and governance of platinum and palladium delivered to the market and publishes a list of the companies that comply with the guidelines and purity. This list is known as the Good Delivery List. As at May 2020 the Good Delivery Lists consists of 31 platinum refiners, 28 palladium refiners, 15 full members, 41 associate members, 45 affiliate members and 2 affiliated exchange members.

MAMR

Microwave-Assisted Magnetic Recording. A magnetic recording technology by writing in the drive platters with a microwave field.

Metal-in-concentrate

PGMs contained in the concentrate produced after the crushing, milling and froth flotation processes in the concentrator. It is a measure of a mine's output before the smelting and refining stages.

MLCC

Multi-layer ceramic capacitors. A number of individual thin film capacitors stacked as a whole.

Moz

Million ounces.

NAND flash Memory

NAND flash memory is a type of non-volatile storage technology that does not require power in order to retain data. It uses floating-gate transistors that are connected in a way that the resulting connection resembles a NAND gate, where several transistors are series connected and a bit line is pulled low only when all word lines are at a high state.

NEDC

New European Driving Cycle vehicle emissions test set out in United Nations Vehicle Regulation 101 maintained by the United Nations Economic Commission for Europe and updated and reviewed from time to time. The WLTP is aimed to significantly enhance and replace this regulation.

Net demand

A measure of the requirement for new metal, i.e., net of recycling.

Non-road engines

Non-road engines are diesel engines used, for example, in construction, agricultural and mining equipment, often using engine and emissions technology similar to on-road heavy-duty diesel vehicles.

Ounce conversion

One metric tonne = 1,000 kilogrammes (kg)
or 32,151 troy ounces.

oz

A unit of weight commonly used for precious metals.
1 troy oz = 31.103 grams.

PDH

Propane dehydrogenation, where propane is converted to propylene.

PEM Electrolyser Technology

One of four key water electrolyser technologies. The electrode on oxygen side (anode) contains iridium oxide while the electrode on hydrogen side (cathode) typically contains platinum. Transport layers are platinum-coated sintered porous titanium, and the bipolar plates would typically have platinum on with other metals.

PGMs

Platinum group metals.

PMR

Precious metals refinery.

Pricing benchmarks

A price for a commodity that is traded on a liquid market that is used as a reference for buyers and sellers. In the case of platinum, the most commonly referenced benchmark is the LBMA Platinum Price, which is administered and distributed by the London Metals Exchange. The LBMA Platinum Price is discovered through an auction process.

Producer inventory

As used in the supply-demand balance, the change in producer inventory is the difference between reported refined production and metal sales.

PX

Paraxylene is a chemical produced from petroleum naphtha extracted from crude oil using a platinum catalyst. This is used in the production of terephthalic acid which is used to manufacture polyester.

Refined production

Processed platinum output from refineries typically of a minimum 99.95% purity in the form of ingot, sponge, or grain.

RDE

The Real Driving Emissions (RDE) test measures the pollutants such as NO_x, emitted by cars while driven on the road. It is in addition to laboratory tests. RDE testing was implemented in September 2017 for new types of cars and has applied to all registrations from September 2019.

Secondary supply

Covers the recovery of platinum from fabricated products, including unused trade stocks. Excludes scrap generated during manufacturing (known as production or process scrap). Autocatalyst and jewellery recycling are shown in the country where the scrap is generated, which may differ from where it is refined.

Selective catalytic reduction (SCR)

Selective Catalytic Reduction (SCR) is an emissions control technology system that injects a liquid-reductant agent (urea) into the outlet stream of a diesel engine. The automotive-grade urea, known by the trade name AdBlue. The system typically requires a platinum bearing DOC ahead of the SCR unit.

SGE

Shanghai Gold Exchange.

SSD

Solid-state drive. Data storage device that uses memory chips to store data, typically using flash memory.

Stage 4 regulations

Non-road mobile machinery (NRMM) is regulated by increasingly stringent regulations set out in tiers from Stage 1 to 5. This was last reviewed in May 2018 with deadlines set for 2020 and 2021. A submission by industry bodies requesting a delay in implementation as yet to be ruled on.

Three-way catalyst

Used in gasoline cars to remove hydrocarbons, carbon monoxide and NO_x. Largely palladium-based now, they also include some rhodium.

US Vehicle Emission Standards

US vehicle and engine emission standards for pollutants, are established by the US Environmental Protection Agency (EPA) based on the Clean Air Act (CAA). The State of California has the right to introduce its own emission regulations. Engine and vehicle emission regulations are adopted by the California Air Resources Board (CARB), a regulatory body within the California EPA. Vehicles can in every year be certified in different emission classes, called "bins." The fleet average emissions over all "bins" are then regulated and reduced from year to year. To achieve the required fleet average, every year more vehicles have to be registered in the lower bins.

Tier 3

Emission regulation issued by EPA. The regulation defines common targets until 2025 in the USA.

Tier 4 stage

Non-road mobile machinery (NRMM) is regulated by increasingly stringent regulations set out in tiers from Stage 1 to 5. This was last reviewed in May 2018 with deadlines set for 2020 and 2021. A submission by industry bodies requesting a delay in implementation yet to be ruled on.

Washcoat

The layer that contains the active catalytic materials, such as PGMs, that is applied on the inactive, often ceramic, substrate within an autocatalyst block or component.

WIP

Work in progress.

WLTP

Worldwide Harmonised Light Vehicle Test Procedure is a laboratory test to measure pollutant emissions and fuel consumption. WLTP replaces the New European Driving Cycle (NEDC). It became applicable to new car types from September 2017 and new registrations from September 2018.

WPIC

The World Platinum Investment Council.

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