

FOREWORD

This edition of *Platinum Quarterly* considers platinum supply and demand developments for the fourth quarter of 2020 and for all of 2020; it also presents an updated forecast for 2021. The *Platinum Quarterly* report and data (starting on page 8) is prepared independently for WPIC by Metals Focus. We also provide 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.

Platinum demand in the fourth quarter of 2020 continued to increase as it had done in the third quarter. However, quarter four supply reduced as the major South African converter plant outage in March was repeated in November. Overall, continued supply weakness, recovering automotive, jewellery and industrial demand, combined with robust investment demand drove a third consecutive quarterly platinum deficit in quarter four of -170 koz, and for the full 2020 year a record -932 koz deficit. In 2021 supply is expected to increase more than demand compared to 2020 yet will still produce a modest deficit of -60 koz. This will be the third consecutive annual deficit.

The negative economic effects of the COVID-19 pandemic eased further through the fourth quarter, as vaccine programmes were planned and commenced, and government stimulus measures continued to support increased economic activity. Indeed, the widespread provision of vaccinations globally in 2021 has significantly reduced potential economic concerns of the impact of future COVID-19 infection waves and new virus variants. This has enabled governments to plan the reduction of social and economic restrictions, boosting 2021 economic growth expectations. Additionally, and a positive development for long term platinum demand, government stimulus policies increasingly include decarbonisation of transport and heavy industry through growth in the production and use of green hydrogen.

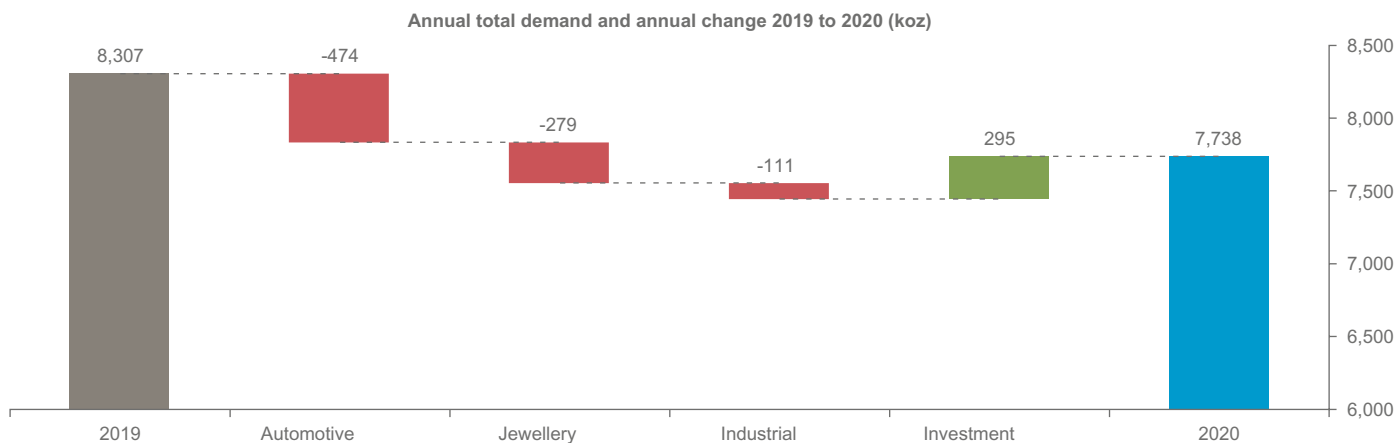
Platinum supply and demand – updating 2020 and 2021 forecasts

In 2020 the platinum market was in a deficit of -932 koz, the largest annual deficit on record albeit below the -1,202 koz deficit forecast in November 2020. This difference was due to Anglo American Platinum Converter Plant (ACP) Phase A being restarted in December 2020, three weeks earlier than expected. However, over the year, as a whole, lower supply due to COVID-19-related mine closures, ACP outages and reduced recycling far outweighed the pandemic-driven fall in demand from the automotive, jewellery and industrial sectors, which fall was partially offset by increased investment demand.

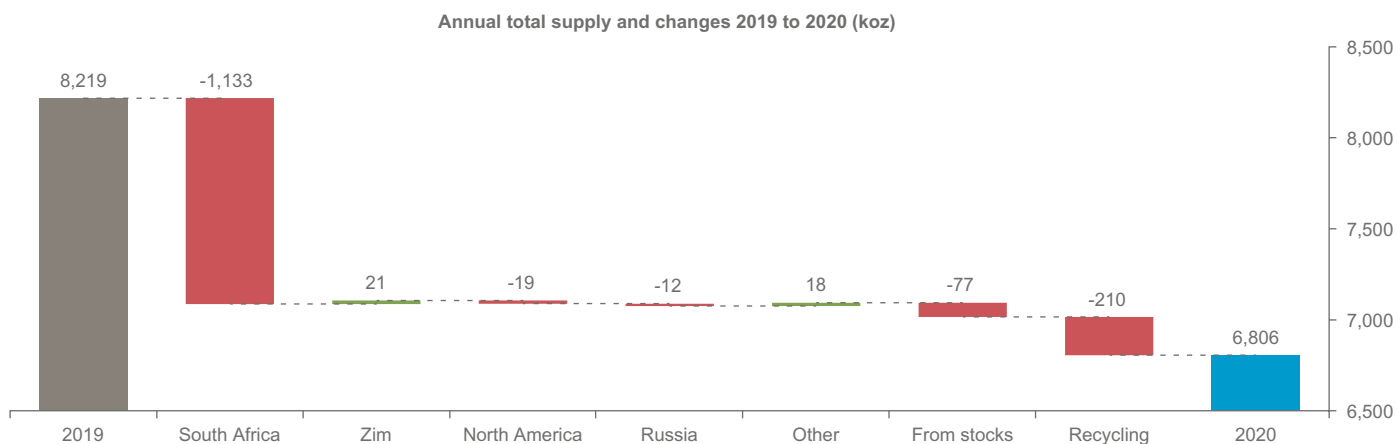
For 2021 the platinum market is forecast to remain in a deficit for the third consecutive year. The modest deficit of -60 koz results from a 17% increase in total supply and a 3% increase in total demand. Interestingly, total supply in 2021 will still be 3% lower than in 2019, with industrial, jewellery and automotive demand levels all above their respective levels in 2019.

Total platinum demand in 2020 was 7,738 koz, 7% (-569 koz) lower than in 2019. Automotive demand reduced by 17% (-474 koz) year-on-year, largely due to lower vehicle sales in the first half of the year, as measures to control the spread of COVID-19 resulted in vehicle factory and showroom closures. However, platinum automotive demand losses were cushioned by the impact of higher metal loadings on catalysts to meet tighter emissions regulations. Jewellery demand was similarly impacted in 2020, with volumes 13% (-279 koz) lower on a full-year basis despite quarter four demand returning to pre-pandemic levels. Industrial demand was 5% (-111 koz) lower, with strong glass sector demand largely compensating for weakness in all other industrial demand segments.

In 2020, weakness in automotive, jewellery and industrial demand was partly offset by strong investment demand, from bars and coins and ETFs, collectively up 24% (+295 koz) year-on-year. Heightened global risk drove investor demand for hard assets such as platinum during the first half of the year, further encouraged by the weak platinum price. Investment demand increased in line with the improving economic outlook in the second half of 2020 and was bolstered by NYMEX futures exchange physical metal stocks, that increased significantly to address the disconnect between the price of platinum futures and platinum. However, as the year progressed bar and coin demand moderated somewhat as the platinum price increased and stock shortages in North America were addressed. ETF holdings increased strongly over the year with growth in North America, Europe and Japan far exceeding declines in South Africa.

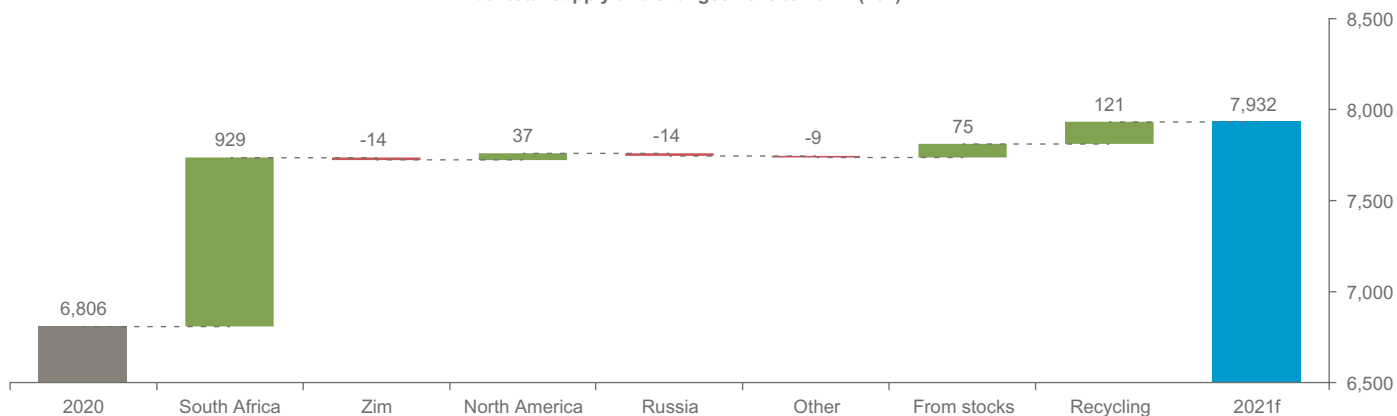


Total platinum supply in 2020 was 17% (-1,413 koz) lower at 6,806 koz due to a 18% (-1,126 koz) decline in refined production and a 10% (-210 koz) decline in recycling supply. South African refined supply was 26% (-1,133 koz) lower due to COVID-19-driven mine closures and the ACP outages in March and November.



For 2021 total platinum supply is now forecast to rise 17% above the 2020 level, to 7,932 koz, with refined production rising by 21% (+1,005 koz) and recycling supply by 6% (+121 koz). South Africa accounts for the majority of the forecast refined production recovery due to mines returning to full operation after 2020's COVID-19 driven closures, and the December 2020 recommissioning of the ACP Phase A unit. However, risks to South African supply do remain in the form of potential electricity supply disruption as power supplier Eskom undertakes major maintenance programs through the year. The relatively modest recycling supply recovery forecast is in part due to price-driven spent autocatalyst destocking by merchants in the second half of 2020 and longer lead times in processing for the growing supply of spent Euro 4-compliant catalysts.

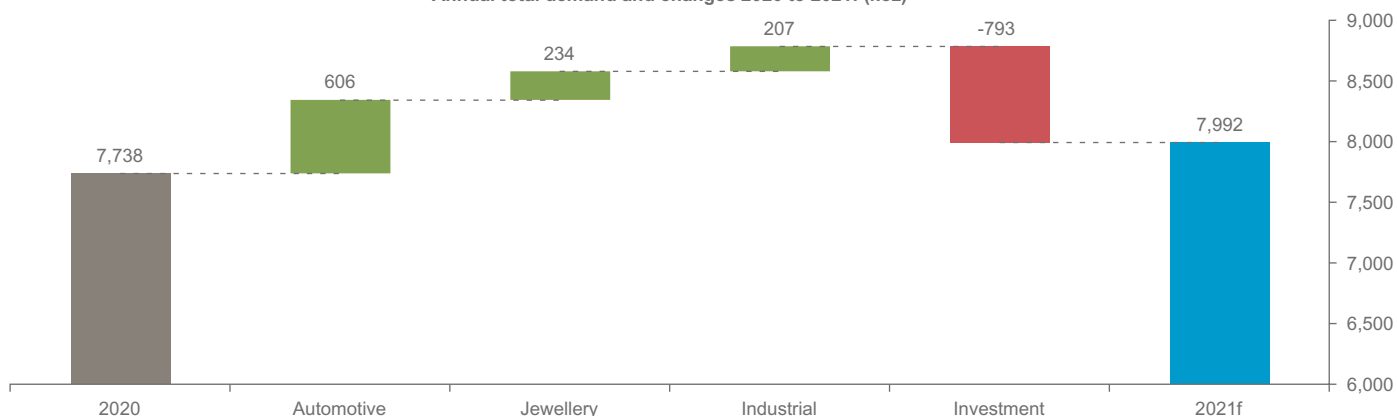
Annual total supply and changes 2020 to 2021f (koz)



Demand in 2021 is forecast to grow by 3% (+254 koz), as reduced, yet still strong, investor demand is more than offset by strong growth from automotive, jewellery and industrial end use sectors. Forecast investment demand in 2021 of 756 koz is lower than the record in 2020, mainly as no further growth in futures exchange stocks is expected. Yet it is still above the average level over the past 5 years as more investors are attracted by platinum’s use in the hydrogen economy and the growing substitution of platinum for palladium in autocatalysts.

Automotive demand in 2021 is expected to rebound by 25% (+606 koz) above the 2020 level. Key to this growth are the higher catalyst loading implications of the full implementation of light-duty vehicle Euro 6d and China 6b emissions regulations, and China VI for heavy-duty vehicles. In addition to rising catalyst loadings, additional demand is expected from some platinum for palladium substitution in the three major auto markets of China, North America and Europe. Indeed, it is the strength of automotive, jewellery, and industrial demand, countering the lower forecast investment demand, that is forecast to result in a third consecutive annual platinum market deficit of -60 koz.

Annual total demand and changes 2020 to 2021f (koz)



Q4 2020 deficit of -170 koz on weak supply and strong automotive and industrial demand

Total fourth quarter platinum supply fell 15% (-326 koz) year-on-year to 1,832 koz mainly due to the complete outage of the Anglo American Platinum ACP converter plant. The Phase B unit was taken offline in early November and refined production was only re-established in early December due to the earlier than expected re-commissioning of the ACP Phase A unit. South African mined production was 27% (-322 koz) lower year-on-year, and 18% (-189 koz) lower than the third quarter. The fourth quarter ACP outage also prompted some destocking of producer refined inventory to support sales, but this was outweighed by the rebuilding of refined inventory drawn down earlier in 2020. In contrast to mining supply, recycling supply grew by 8% (+45 koz), driven principally by PGM price-related spent catalyst destocking by merchants.

Demand in the fourth quarter surged by 18% (+299 koz) year-on-year to 2,002 koz, the highest fourth quarter volume since 2017, with continued recovery seen across the automotive, jewellery and industrial sectors. Industrial demand was notable in the fourth quarter, with levels up by 43% (+184 koz) to a record quarterly total of 613 koz, driven by strong demand from the glass sector. Investment demand, whilst still strong on a year-on-year basis, up 63% (+51 koz), could not maintain the record quarterly uptake volumes seen during the third quarter. ETF demand in the quarter rose 56% year-on-year (+26 koz), whilst bar and coin demand strength continued, rising 112% (+32 koz) year-on-year. The previous quarter's surge of metal into NYMEX approved warehouses in the US abated during quarter four, with minimal outflows of less than 1 koz reported.

The continued recovery of demand and renewed supply challenges in the fourth quarter of 2020, combined to sustain the market in a third consecutive quarterly deficit of -170 koz.

The platinum investment case – sustained quarterly deficits in 2020, a rising price and platinum's positive supply demand outlook support continued strong investment demand

The investment case for platinum became increasingly compelling through 2020, evolving from being strongly supported by macro-risk considerations in the first half of the year, as platinum's sustained discount yet strong correlation to gold attracted precious metal and hard asset investor interest, to being driven by platinum's own positive fundamental dynamics in the second half. The platinum market quarterly deficits increased substantially from the second quarter of 2020 onwards, reflecting the lowest annual mine supply from South Africa for over two decades, the rapid rebound in automotive, industrial and jewellery demand and sustained strong investment demand. Increased investment was also supported by the wider awareness of platinum's key role in the hydrogen economy, which increasingly attracted global support and funding during 2020, as well as increased recognition of the material platinum demand growth potential over the next three years in substituting for palladium in vehicle autocatalysts.

Despite the sustained quarterly platinum deficits in 2020 and strong investor interest, the platinum price increase from March lows was initially to between \$850/oz and \$950/oz, similar to the range seen in the second half of 2019. However, it was noticeable that during the fourth quarter the platinum price increased as the price of gold fell. This trend has continued into 2021 and from the end of October 2020 to the end of February 2021, gold is down by 15% and platinum is up by 33%. A sustained trend of this nature has not been seen since 2014 and appears similar to platinum's sustained outperformance of gold following the Global Financial Crisis (GFC) in late 2008. Over the two years from the price lows of the GFC, platinum's weekly returns outperformed gold's by between 30% and 65%.

The quarter four price increase also coincided with increased investor long positions in NYMEX platinum futures, up 63% in the fourth quarter – historically, changes in net investor positioning on NYMEX have been strongly correlated to short term changes in the platinum price. This increase followed a period of relatively flat long positioning in the second and third quarters that coincided with the large spread between the price of futures and the platinum price, at its worst of over \$70 per ounce in the second quarter. As this spread was resolved, following the increase in platinum stocks in NYMEX warehouses of over 450 koz, long positions continued to grow. Indeed, NYMEX money manager platinum futures net positions increased from -128 koz (short) in mid-October last year to 1.4 moz (long) in mid-February 2021. It is notable that this investor net long positioning remains well below levels seen in January 2020.

Many investors considering platinum as an investment for the first time, as well as some seasoned market participants and commentators, were surprised by the sudden and substantial increase in the platinum price. We believe that part of the reason for this surprise is that there is a deeply engrained bearish sentiment towards platinum. This developed over the past six years and has continued to mask the growing market deficits and their relevance to price discovery. Indeed, platinum deficits have been overlooked, by many, for several years, mainly because investment demand was widely excluded from supply demand analysis and the platinum market was consequently presented as being in surplus, with high and growing stock levels, thereby justifying the sustained low platinum price. We are seeing more investors consider the impact of strong and sustained investment demand when taking a platinum value view. They also realise that net negative investment has been an extremely infrequent event. This has highlighted platinum's constrained supply and strong demand growth potential as being more compelling than previously accepted; a change that is significantly increasing the prospect of sustained investment demand growth.

Constrained supply – short-term concern over South African processing outage and power supply stability, long-term issues over severely constrained mine supply growth

Total platinum mining supply reduced by 1,203 koz in 2020 year-on-year, the lowest level for 21 years, due to COVID-19-related mine closures and the major converter (ACP) outages. Although mining supply is forecast to recover by 18% in 2021 to 5,899 koz, it remains 3% (-198 koz) below the level in 2019 and is vulnerable to South African power supply disruption and the ACP plant operating without its usual, full volume back-up plant.

These short-term supply concerns are interesting to investors, but the recent wider recognition of the longer-term supply issues appears to be more compelling. South African refined mine supply over the past decade has averaged 4.2 million ounces, the same level forecast for 2021. This largely flat production level was accompanied by weak prices and declining margins which depressed available cashflow and mining capital expenditure. Despite the significant increase in the rand price received for the basket of metals produced by these PGM miners, there is no sizeable mining project that will deliver material platinum supply growth in the next 3-4 years. Major PGM miners, Sibanye Stillwater and Anglo American Platinum, both projected relatively flat PGM production profiles over the next 3-4 years, in their results presentations in February 2021. While there are several projects currently being evaluated, long project development lead times, typically in excess of three years even for brownfield expansions, suggest there is limited scope for supply responses to platinum's material demand growth potential and a higher platinum price environment. With recent price increases, platinum investors are increasingly aware that near-term supply growth is unlikely, further supporting the case for increased investment demand.

Demand growth potential – automotive, substitution, jewellery and hydrogen, boosted by investment

The recovery in automotive platinum demand over the second half of 2020 is expected to continue in 2021, maintaining strong momentum. Global light vehicle production is forecast to rise to 86.9 million units in 2021, over 16% up on 2020 levels, however, heavy-duty truck and bus production is expected to contract by 1% year-on-year as the impact of the China heavy-duty subsidy and sales incentive schemes implemented in 2020 ease. Automotive platinum demand is forecast to rise by 25% this year to 2,999 koz, well above pre-COVID 2019 levels. The key to this rapid demand recovery is the impact of tightening emissions legislation, most notably the full implementation of Euro 6d and China 6b light vehicle regulations, and China VI heavy-duty regulations, driving higher platinum and palladium loadings across light vehicle and heavy-duty applications.

Rapidly rising catalyst PGM loadings are having a direct impact on the issue of substitution. For palladium, a market that experienced a 9th consecutive deficit in 2020, rising light vehicle loadings are further adding to market deficits, exacerbating palladium price pressure, and accelerating platinum for palladium substitution in some gasoline autocatalysts and in diesel aftertreatment systems. Automakers and autocatalyst manufacturers published little detail of the extent to which platinum is currently being used to replace palladium. We believe that the amount of substitution is already greater than limited public information might suggest and presents a clear upside to 2021 automotive platinum demand expectations. It is notable that market expectations of such substitution have progressed rapidly, from hardly being quantified or seen as material in the near-term, to widespread anecdotal and published increased estimates. Indeed, some industry participants now project as much as 400 koz of additional annual platinum automotive demand from substitution in 2022 and as high as an additional 1.5 moz annually in 2025.

Diesel, and mild and plug-in hybrid diesel model variants, continue to represent a key component of automotive OEM plans to reduce their average European fleet CO₂ levels to meet EU prescribed 2020 levels. These levels will reduce further from the 2020 95g CO₂/km level, to c.81g/km by 2025 (-15% from 2020) and c.60 g/km by 2030 (-37.5% from 2020). Diesel vehicles, and in particular hybrid diesel vehicles, produce far less CO₂ than equivalent gasoline and hybrid gasoline models, and are vital to enabling OEMs to meet these tightening targets and avoid sizeable fines. Hybridised diesel passenger cars accounted for over 11% of diesel passenger cars sold in Europe in 2020. This share is expected to rise significantly in 2021 and beyond as new hybrid models are launched, thus supporting diesel's overall share of European passenger car sales. However, the nature of how hybrid vehicle sales are generally reported by national auto associations and some automotive data providers, while accurate at the detailed granular level, remains somewhat misleading at the headline level and as reported in the media. Hybrids are frequently classed as electric vehicles, with sales numbers being combined with those of battery electric vehicles (BEVs), leading to an apparent underreporting of diesel engine passenger car sales and over reporting of the growth of BEVs in the media. The automotive platinum demand we publish for 2021 includes the accurate diesel portion, but investors may not fully appreciate the material benefit of diesel vehicles to platinum demand in future years.

The strong platinum demand recovery from the Chinese jewellery sector in the third and fourth quarters of 2020 is also forecast to continue. Indeed, 2021 is set to continue this trend as platinum's discount to gold, plus the focus on new product development and marketing activities, support the Chinese markets continued recovery this year.

One outcome of the COVID-19 pandemic has been a hugely increased global focus on climate change and environmental policy that has accelerated the development of detailed and coordinated global decarbonisation plans. With the Biden election victory in November, the US re-joined the Paris Climate Agreement on greenhouse gas emissions, and committed to achieve carbon neutrality by 2050, meaning all major global economic blocs are now committed to carbon neutrality by 2050 to 2060. Indeed, the focus on decarbonisation and clean energy generation has been central to recent economic stimulus policies announced by the US, Europe, and China. The development of a competitive hydrogen economy, and production of green hydrogen in particular, is seen as key to achieving decarbonisation targets. Hydrogen is targeted to meet 25% of global energy needs by 2050, being used to generate electricity, drive heavy industry, fuel vehicles and heat homes. Platinum's role in the hydrogen economy is crucial, it is used in fuel cell electric vehicle (FCEV) stacks and in proton exchange membrane (PEM) electrolyzers using polymer electrolyte to produce green hydrogen. Current hydrogen capacity investment plans, for both PEM and alkaline capacity, will be key to reducing the price of hydrogen, in turn driving up FCEV penetration and thus demand for platinum.

The long-term demand potential for platinum now looks exceptionally strong, with the combination of platinum for palladium substitution in automotive uses, and development of hydrogen generation and FCEV applications, potentially creating over 1 moz of additional platinum demand by 2025, rising to over 2 moz by 2030. We believe that platinum's positive demand outlook should provide investors with a strong incentive to continue to build platinum exposure from current levels.

WPIC initiatives highlights

2020 was a record-breaking year for WPIC product partnerships in North America and Europe. The increased global risk brought on by the pandemic led to massive demand for platinum bars and coins, but occurred as global logistics almost ground to a halt. Sales in 2020 would have been higher without the product shortages and the associated spike in product premiums in some markets in the first half of the year. Our close relationships with our partners helped to ensure that physical platinum investment products were included in the gold-dominated production start-up efforts after the initial lockdowns eased. We worked closely with our partners to assist them in their efforts to overcome pandemic-related challenges. By providing our increased research output to our partners, their distribution assisted in attracting more investors to platinum, including many gold investors. While the increased platinum price naturally resulted in some profit taking, demand for platinum bars and coins remained strong.

WPIC also worked closely with ABC Bullion, Australasia's largest independent bullion dealer and the only independent bullion dealer in Australia to have full London Bullion Market Association membership, in launching a new range of platinum bullion bars – the first Australian platinum minted bar range. At 999.5 fine and produced using the latest in international minting technologies, the ABC Bullion Platinum Minted Bar Range is offered in six weights from 1 oz to 1 kg, providing investors, including those looking to diversify their superannuation portfolio, a flexible and accessible way of gaining exposure to platinum.

In China, partner ounces also reached record levels in 2020, however the suspension of platinum trading account business at Chinese banks has not yet been relaxed. Fortunately, the wider awareness of platinum, and of platinum as an investment, was further stimulated by the higher platinum price. Sales of physical platinum products by our local partners continued to increase and this momentum attracted new product suppliers. The WPIC China team also successfully hosted a PGMs Market Summit in December with a focus on platinum's role in fuel cell electric vehicles and the hydrogen industry which was well attended by platinum market participants as well as local investors and institutions. We have expanded our efforts in market development with local exchanges, aiming to improve the platinum market infrastructure and expand product availability in China. We continue to work closely with physical platinum product suppliers to expand their distribution network, especially through banks.

Our partners in Japan reported that sales of platinum bars and coins eased in the fourth quarter as a result of some profit taking. Despite this, net sales remained at elevated levels. Our work with the Japan Bullion Market Association (JBMA) continues to provide more in-depth knowledge on platinum to investors, especially regarding platinum's strong demand growth potential linked to the global hydrogen economy, where Japan is a leading participant. We also observe growing interest in platinum and in WPIC's insights shared through social and traditional media.

We have a strong pipeline of new partners, new programmes and effective products that will assist in enhancing awareness and distribution of platinum in 2021 and beyond.

As we re-emerge from the pandemic, we now must consider the role platinum has to play in global decarbonisation – one of the clearest global imperatives to emerge during the pandemic. Platinum is key in the production of green hydrogen and in fuel cells for electric vehicles, and this understanding among investors is rapidly increasing. As hydrogen availability rises and its production cost falls, due to accelerated global investment in decarbonisation, fuel cell vehicles are likely to require over a million more ounces of platinum per annum within 10 years. In addition, platinum’s rapidly accelerating substitution for palladium in autocatalysts will require over a million more ounces of platinum per annum within four years.

The combination of this substantive demand growth, combined with the market rally in recent months, could well drive increased investment demand, for investors with both short- and long-term investment horizons.

Paul Wilson, CEO

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PLATINUM QUARTERLY Q4 2020

Table 1: Supply, demand and above ground stocks summary

	2018	2019	2020	2021f	2020/2019 Growth %	2021f/2020 Growth %	Q3 2020	Q4 2020
Platinum Supply-demand Balance (koz)								
SUPPLY								
Refined Production	6,125	6,095	4,969	5,899	-18%	19%	1,491	1,299
South Africa	4,470	4,402	3,269	4,198	-26%	28%	1,056	867
Zimbabwe	465	455	476	463	5%	-3%	121	120
North America	345	356	337	374	-5%	11%	70	82
Russia	665	716	704	690	-2%	-2%	197	182
Other	180	165	183	174	11%	-5%	47	47
Increase (-)/Decrease (+) in Producer Inventory	+10	+2	-75	+0	N/A	N/A	-109	-43
Total Mining Supply	6,135	6,097	4,894	5,899	-20%	21%	1,381	1,256
Recycling	1,935	2,122	1,911	2,033	-10%	6%	482	576
Autocatalyst	1,420	1,587	1,433	1,517	-10%	6%	347	426
Jewellery	505	476	422	456	-11%	8%	121	134
Industrial	10	58	56	59	-3%	5%	14	15
Total Supply	8,070	8,219	6,806	7,932	-17%	17%	1,864	1,832
DEMAND								
Automotive	3,075	2,868	2,394	2,999	-17%	25%	639	726
Autocatalyst	2,930	2,868	2,394	2,999	-17%	25%	639	726
Non-road	145	†	†	†	†	†	†	†
Jewellery	2,245	2,099	1,820	2,054	-13%	13%	510	529
Industrial	1,940	2,086	1,976	2,183	-5%	10%	510	613
Chemical	575	702	594	605	-15%	2%	124	176
Petroleum	235	219	115	179	-47%	56%	23	38
Electrical	205	145	130	126	-10%	-3%	33	35
Glass	245	189	406	444	115%	9%	136	163
Medical and Biomedical	240	249	235	252	-5%	7%	59	59
Other	440	583	496	578	-15%	16%	135	142
Investment	15	1,253	1,549	756	24%	-51%	960	133
Change in Bars, Coins	280	283	586	496	107%	-15%	97	60
Change in ETF Holdings	-245	991	504	250	-49%	-50%	522	74
Change in Stocks Held by Exchanges	-20	-20	458	10	N/A	-98%	342	-1
Total Demand	7,275	8,307	7,738	7,992	-7%	3%	2,619	2,002
Balance	795	-88	-932	-60	N/A	N/A	-756	-170
Above Ground Stocks	3,365	3,562**	2,630	2,569	-26%	-2%		

Source: Metals Focus 2019 - 2021, SFA (Oxford) 2018.

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 25 and 26 (supply, demand and above ground stocks). Details of regional recycling supply in Table 6 on page 28 are only published from 2019.
- 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.

2020 FOURTH QUARTER PLATINUM MARKET REVIEW

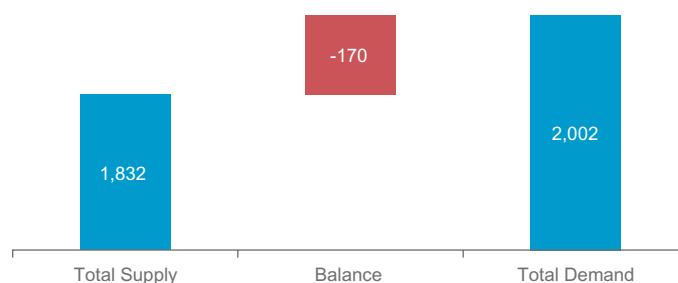
The positive momentum in global economic recovery seen in Q3'20 continued in Q4'20, supported by vaccination availability but hampered somewhat by renewed waves of infection and new variants of the virus. This had varied impacts on platinum's supply and demand segments and resulted in a platinum deficit for a third consecutive quarter.

Compared to Q4'19 platinum supply was 15% (-326 koz) lower as the 8% (+45 koz) higher recycling was unable to counter the 23% (-371 koz) decline in mining supply. Total platinum demand was 2,002 koz, 18% (+299 koz) higher than Q4'19. Automotive demand rose by 5% (+31 koz) year-on-year, while jewellery demand was up 7% (+32 koz). The 43% (+184 koz) rise in industrial demand during Q4'20 was mostly due to a swing in the glass sector from negative demand in Q4'19, to positive in Q4'20. In turn, this reflected furnace decommissioning in Q4'19 and capacity expansions in Q4'20. Although platinum demand in the remaining segments of industrial demand increased compared to Q3'20, it was lower than Q4'19 levels.

In Q4'20 investment demand was 63% (+51 koz) higher than Q4'19 despite being 86% (-827 koz) lower than the highest on record level in Q3'20. Bar and coin net purchases more than doubled year-on-year, growing 112% (+32 koz) while ETF holdings added 74 koz during the quarter, up 56% on last year. Platinum stocks held by exchanges declined by less than 1 koz in Q4'20 compared to the increase of 6 koz in Q4'19. This followed two exceptional quarters, Q2'20 and Q3'20, when NYMEX inventories increased by 138 koz and 342 koz respectively.

The platinum deficit in Q4'20 of -170 koz contrasts with the large surplus in Q4'19 (+455 koz) and the particularly large deficit in Q3'20 (-756 koz). These fluctuations reflect the significant impact of mainly pandemic-related changes in 2020 on mine supply and demand from industrial uses and investment.

Chart 1: Supply-demand balance, koz, Q4 2020



Source: Metals Focus

Supply

Global refined production fell 18% (-281 koz) year-on-year to 1,299 koz in the fourth quarter, primarily due to lower supply from South Africa caused by outages at the Anglo American Platinum Converter Plant (ACP).

South African refined mine supply declined in Q4'20 as a result of the second complete closure of the ACP in 2020, early in November and the result of water leaking in the Phase B unit, while the Phase A unit was still offline. The rebuild of the ACP Phase A unit was completed in early December, and refined output has returned to more normal levels.

After the mine closures in South Africa to reduce the spread of COVID-19 earlier in the year, the country's mining output returned to full capacity during Q4'20 as operators embedded COVID-19 protocols and labour returned to its full compliment. Nevertheless, some mining stoppages occurred during the quarter due to mining fatalities and unprotected strikes. The lower refined mine supply in Q4'20 was further compounded by a net 43 koz build in producer refined inventory as increased cash flow eased pressure on sales.

PLATINUM QUARTERLY Q4 2020

Production from Zimbabwe kept to levels similar to the previous few quarters. The 13% (+14 koz) year-on-year increase was due to the prior year period having been impacted by a furnace rebuild.

In North America, disruptions associated with a spike in COVID-19 infections at Sibanye Stillwater's Montana operation offset planned increases from an expansion at the mine. Output from Canadian nickel mining declined due to lower grades. The net effect was a 13% (-12 koz) year-on-year decline for the region.

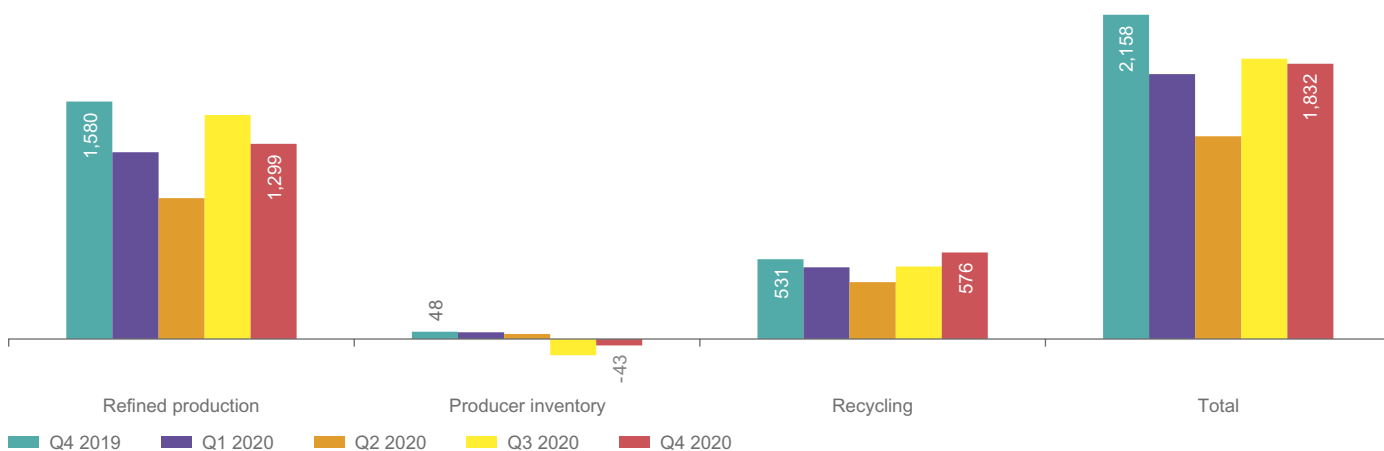
Russian output exceeded expectations, rising 22% (+33 koz) year-on-year to 182 koz as Nor Nickel progressed reconfiguring of its processing pipeline.

Recycling

Recycling in Q4'20 was 8% (+45 koz) higher than in Q4'19 with higher supply from both recycled autocatalysts and jewellery. Recycled autocatalyst platinum volumes were up 8% (+31 koz), despite inevitably lower vehicle scrappage numbers. The higher level was also due to some destocking amid record high platinum group metal prices and refineries continuing to process pipeline material accumulated in 2019.

Global jewellery recycling in Q4'20 was 11% (+13 koz) higher, mostly through gains in China. There, the higher platinum price allowed the retail chain to recycle unsold platinum jewellery inventory at a profit, and this freed up capital to acquire gold jewellery stocks in time for the traditional peak gold buying season in the lead up to Chinese New Year.

Chart 2: Platinum supply, koz

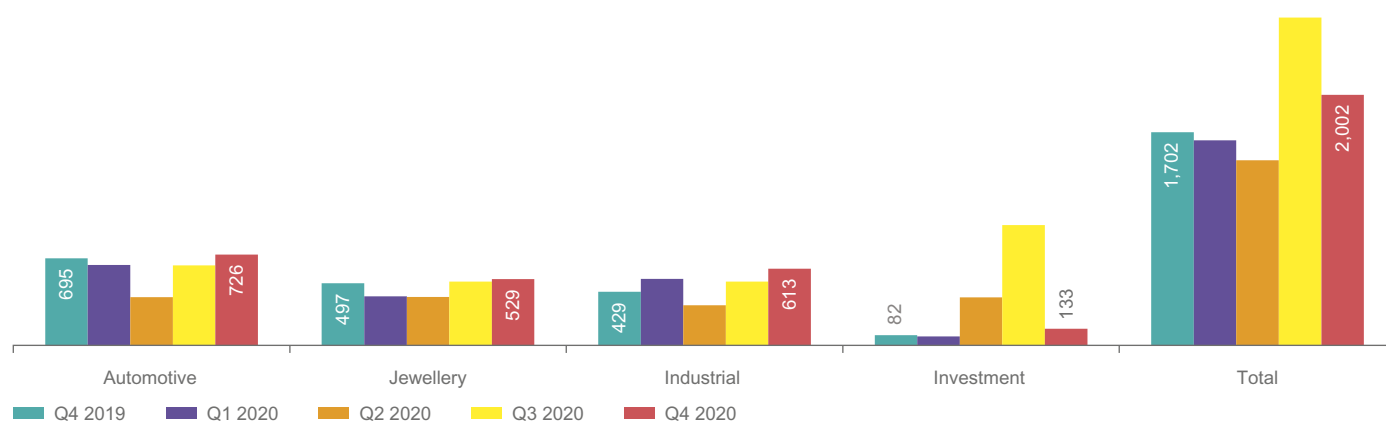


Source: Metals Focus

Demand

Demand in Q4'20, was 18% (+299 koz) higher than in Q4'19. Automotive and jewellery demand reflected the continued economic recovery in the quarter, while most of the remaining segments of demand remained below pre-pandemic levels. Platinum investment was up 63% (+51 koz) on Q4'19, however it was 86% (-827 koz) lower than in Q3'20, as ETF investments slowed, and the extensive exchange stock inflows of previous quarters halted.

Chart 3: Platinum demand, koz



Source: Metals Focus

Automotive demand

Automotive demand in Q4'20 grew 5% (+31 koz) due to a healthy recovery in both light-duty and heavy-duty vehicle production. While light-duty vehicle production was up 4% year-on-year, overall diesel light vehicle production was down by 2%. However, production trends varied substantially on a regional basis. A decline of 10% in diesel unit production in Europe resulted in an 8% (-26 koz) reduction in platinum demand, partially offsetting growth seen in other regions. In North America, despite a slight decline in regional production, platinum demand increased 17% (+13 koz). Though diesel light-duty vehicle production is only a small share of the overall US market, output increased 37% in Q4'20, helping to offset the declines in other regions.

As passenger car manufacturing in countries such as Brazil and Mexico also stabilised, growth in the production of diesel units outpaced other fuel types, contributing to the 10% (+14 koz) growth in platinum demand from other regions. Gains would have been higher, were it not for offsetting losses in some other markets, notably India which saw diesel vehicle production decline by 11%. Global production in heavy-duty vehicles increased by 7%, spearheaded by China increasing by 21%. With the target date for China VI (heavy-duty) compliance fast approaching, an estimated 20% share of production was fitted with the heavier PGM loaded catalysts, contributing, along with higher unit production, to the 51% (+29 koz) increase in platinum demand from this region.

Jewellery demand

North American fabrication demand in Q4'20 saw its first year-on-year increase for the year, of 4% (+4 koz). Pandemic-driven restrictions on travel and leisure activities resulted in some expenditure diversion towards jewellery. Moreover, the emotional impact of the pandemic resulted in consumers choosing platinum for special occasion gifting, particularly over the festive season. This also benefited from platinum's still historically favourable pricing compared to gold. Fabrication would have been even higher, had retailers not trimmed stock levels as they did.

European demand in Q4'20 continued its recovery from the Q2'20 trough, registering a modest improvement of 2% (+1 koz). This was mainly as high-end jewellery and watch brands benefitted from improving sales into East Asia, plus some re-stocking by retailers. Bridal jewellery sales in contrast remained sluggish.

China's platinum jewellery fabrication demand in Q4'20 was 15% (+31 koz) higher than Q4'19. Compared to the prior quarter however, we saw demand soften. While buying was still strong in October, it softened in November and December, as platinum prices increased, and seasonally driven gold interest started to overshadow interest in platinum jewellery. With Chinese New Year approaching, retailers directed marketing activities more towards gold than platinum.

In India, despite the onset of the wedding season, platinum jewellery fabrication fell by 25% (-7 koz), recording its fourth consecutive quarterly drop. Fabrication continued to underperform consumption as retailers remained cautious about building inventory. Importantly, unlike gold, which is the preferred choice for weddings, there has been only a limited recovery in platinum jewellery demand as consumer buying remains need-based. In addition, the impact of the pandemic on disposable income meant that purchases have been heavily curtailed.

Industrial demand

Industrial demand in Q4'20 was 43% (+184 koz) higher than in Q4'19 and 20% (+103 koz) above Q3'20. However, these increases result primarily due to very strong glass demand, which offset year-on-year declines in the balance of industrial end-uses, which, despite showing significant quarter-on-quarter improvement, still remain below pre-pandemic levels.

Petroleum

Platinum demand in Q4'20 was higher than the previous two quarters but was 31% (-17 koz) below pre-COVID-19 levels as widespread refinery closures in North America and other regions comfortably offset the return to more typical levels in China where significant capacity expansions continued in Q4'20. North America and other regions continued to suffer from the deep impact of their oil sectors' challenging year. In particular, the closure of several refining complexes in North America contributed to regional platinum demand being close to zero in Q4'20. Elsewhere, top-up catalyst demand in Europe showed a modest decline of 2% (-0.06 koz), while Japan increased by 6% (+0.1 koz).

Chemical

While still 9% (-18 koz) below Q4'19, platinum chemical offtake grew by 43% quarter-on-quarter to 176 koz in Q4'20. To a large extent, gains compared with Q3'20 were led by new paraxylene (PX) capacity expansion in China. China Sinochem Group commissioned a new crude processing unit and a petrochemical complex (including a new 800,000 tonnes/year PX facility) in Quanzhou in December, with trial operations already starting in early 2021. On the other hand, PX producers outside China continued to grapple with reduced operating volumes and ongoing margin pressures, amid rapid capacity expansion in China in recent years and weak downstream demand.

Platinum use in silicone also continued to recover in Q4'20. The worsening of COVID-19 infections saw increased use in medical, health and hygiene applications. Meanwhile, the ongoing recovery in economic activity, at least in the early part of Q4, also supported demand from other areas, such as construction and automotive. Finally, continuing the trend in the previous quarter, production of nitric acid suffered limited impact from the pandemic as most countries designated the agricultural sector (including fertiliser production) as essential and therefore exempt from business closures and restrictions on movement.

Medical

After a strong rebound in October, demand from the medical device sector reduced as the second COVID-19 infection wave resulted in a slowdown in elective procedures and postponements of non-urgent procedures in November and December. This, together with a similar reduction in cancer treatments, resulted in a 5% (-3 koz) decline in platinum demand. Europe and North America reduced the most, but all regions reported a decline.

Glass

Platinum demand from the LCD substrate and glass-fibre industry continued to recover in Q4'20, reaching 163 koz. This compares with a negative net figure (-65 koz) in Q4'19, the result of major decommissioning of LCD furnaces in Japan and for Q4'20 mainly because most planned new capacity expansions are going ahead despite COVID-19, albeit with some delays.

Electrical

The electronics segment declined modestly in Q4'20 by 3% (-1 koz) year-on-year to 35 koz, buoyed by the resumption of HDD shipments to key sectors. The extension of work-from-home and distance learning sustained strong use of hard drives in the consumer electronics market. However, the delays in data centre expansion caused by the pandemic weighed somewhat on orders from this segment. Demand from surveillance and enterprise recovered from their weak Q3'20 performance, but stayed low compared to prior year, as economic uncertainties brought about by the pandemic favoured increased cost conservation.

Other

Demand from the other industrial segment in Q4'20 was 5% higher on Q3'20 in line with increased automotive production and platinum used in non-autocatalyst vehicle applications. This was supported by growing deployment of platinum-based electrolyzers to produce green hydrogen from mainly wind and solar renewable power sources and use stationary fuel cell applications. However, despite the increased contribution from these applications to demand, overall offtake was still 3% (-5 koz) below pre-pandemic Q4'19 levels.

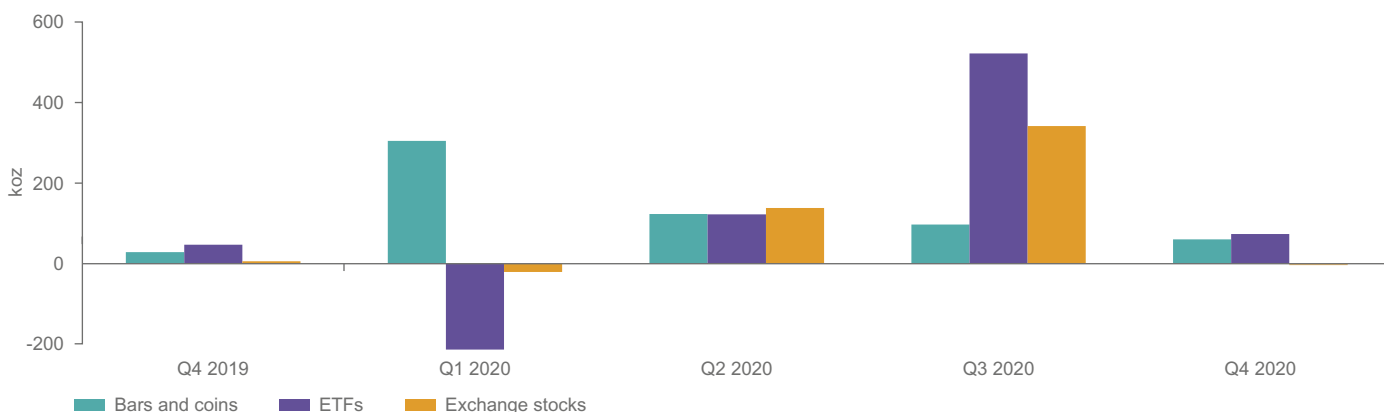
Investment demand

During Q4'20, global bar and coin demand more than doubled year-on-year to 60 koz. The strength reflected a much-improved demand in North America, while net sales in Japan and Europe were little changed compared with Q4'19. However, buying was sharply weaker quarter-on-quarter, falling by 38% as a result of Japan swinging from modest net investment during the July to September period to modest net selling in the fourth quarter.

In North America, the market has effectively recovered from the pandemic-induced shortages which affected Q2'20. In particular, the availability of 1 oz small bars has returned to more normal levels over the past 4-5 months, although retail premiums have often remained above pre-pandemic levels.

After two strong quarters ETF inflows slowed during October and November but recovered in December to post a net increase in holdings 56% (+26 koz) above Q4'19. At the end of December, ETF holdings were at an all-time high of 3,881 koz. Exchange stocks reduced by around 1 koz and ended the year at a historical high of 657 koz, due to the unusual and unprecedented increase in NYMEX approved warehouse stocks in 2020.

Chart 4: Platinum Investment, koz



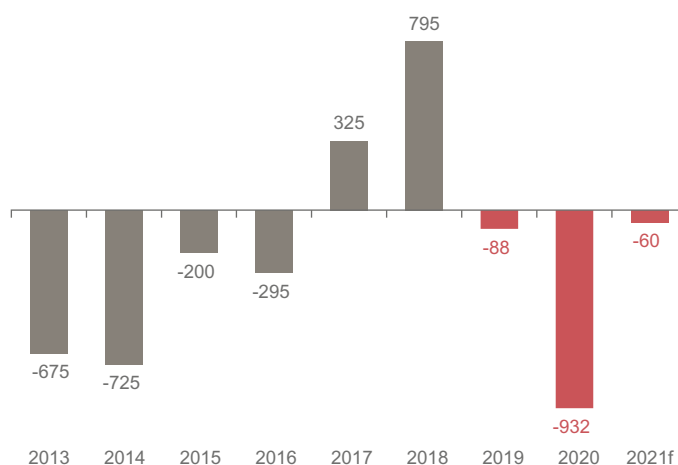
Source: Metals Focus

2020 REVIEW

The multi-faceted impacts of the COVID-19 pandemic saw the global economy contract by 3.5% in 2020. The associated fall in production and sale of products reduced total platinum demand by 7% (-569 koz) compared to 2019. In 2020 platinum automotive fabrication fell by 17% (-474 koz), jewellery by 13% (-279 koz) and industrial demand by 5% (-111 koz), compared to 2019. Investment enjoyed strong growth of 24% (+295 koz), as bar and coin purchases amounted to 586 koz, up 107% (+304 koz). ETF net inflows in 2020 were 49% (-487 koz), below 2019, but still accounted for over 500 koz of platinum demand. In addition, NYMEX-approved vaults recorded significant inflows, totalling 458 koz over the course of last year.

Given that the sharp decline in mine supply of 18% (-1,126 koz) and the contraction in recycling of 10% (-210 koz) in 2020 was greater than the 7% (-569 koz) decline in total platinum demand, the platinum market deficit in 2020 was -932 koz.

Chart 5: Supply-demand balance, koz, 2013-2021f



Source: Metals Focus 2019-2020, SFA (Oxford) 2013-2018

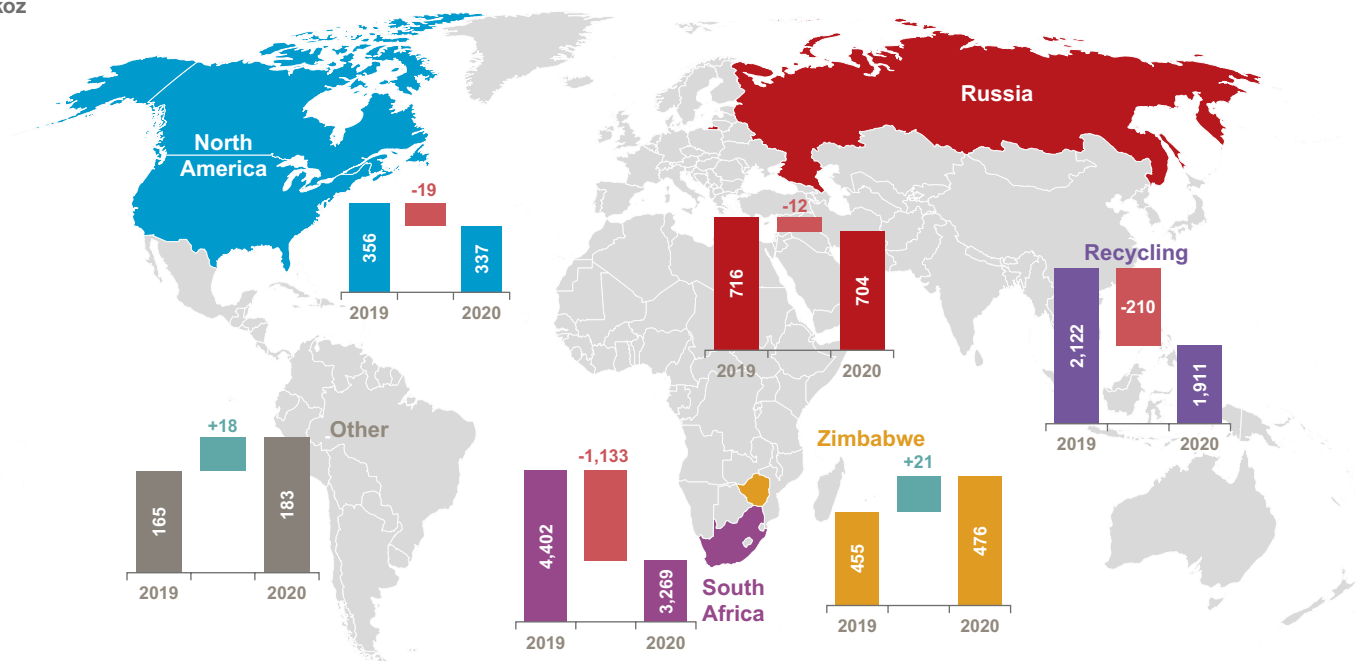
Supply

Global refined mine production declined sharply by 18% year-on-year (-1,126 koz) to 4,969 koz in 2020, a result of the dual impact of the ACP shutdown and COVID-19 pandemic-related mine production disruptions. With around 40% of global platinum mining supply processed through the ACP complex, the closure severely curtailed output, in isolation representing around 850 koz of foregone annual production in 2020. The South African government mandated shutdown of the mining industry in late March, in response to the pandemic, and continued restrictions through to the beginning of June reduced refined mine production. Mining production took a further three months to ramp-up as COVID-19 protocols and travel restrictions for migrant labour reduced workforce availability. However, in general the speed with which the industry returned to full capacity exceeded miners' expectations.

Outside South Africa, supply was less disrupted. North American output declined 5% year-on-year (-19 koz), primarily due to lower grades and maintenance impacting by-product platinum from nickel mining. Planned growth from an operation in Montana did not materialise as social distancing protocols reduced productivity and growth activities were deemed non-essential and were deferred.

Elsewhere, operations continued largely undisrupted achieving planned volumes. In Zimbabwe, miners were allowed to continue through the country’s lockdown, with only one mine impacted. Country output increased 5% year-on-year (+21 koz) to 476 koz, reflecting disruptions in 2019 from a furnace rebuild. Russian output continued unaffected by the pandemic, with Nornickel slightly exceeding planned output for the year. Volumes, however, fell 2% year-on-year (-12 koz) to 704 koz, as the company continues to reconfigure its processing pipeline, while there was no repeat of an inventory release at the precious metal refinery, which had buoyed 2019 output.

Chart 6: Changes in supply, 2019 vs. 2020
koz



Source: Metals Focus

Recycling

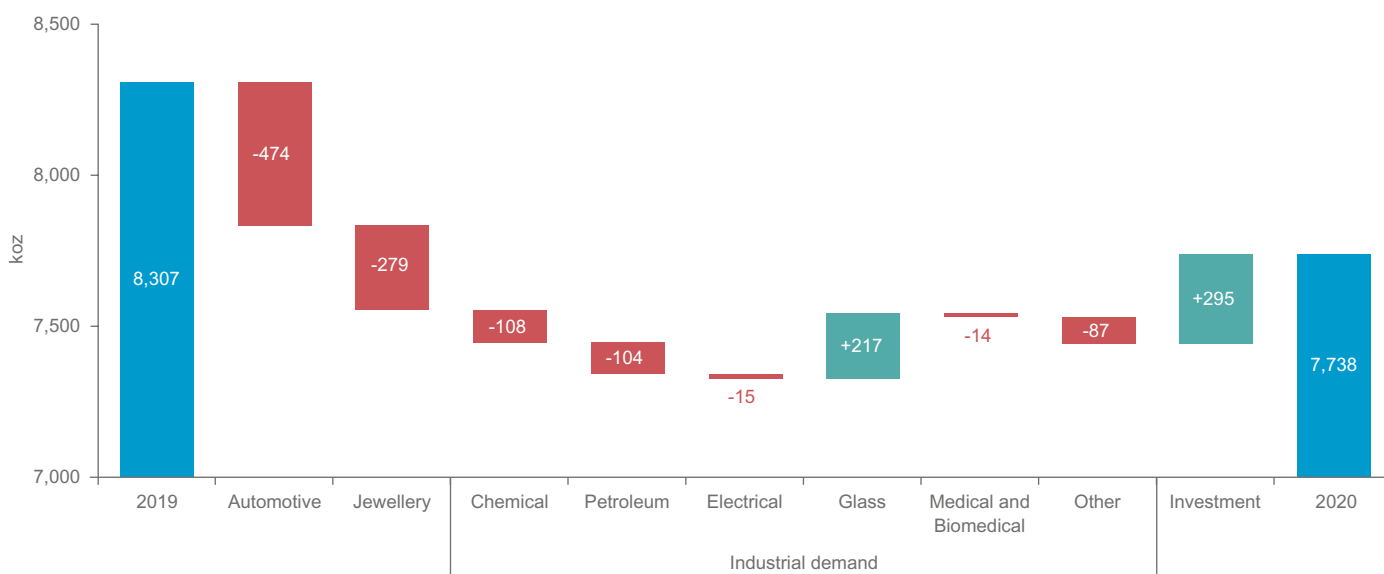
Autocatalyst recycling fell by an estimated 10% (-154 koz) last year to 1,433 koz. In spite of the overall decline, there were contrasting themes which affected recycling in 2020. Most important was the impact of the pandemic, which had two outcomes. Low new car and truck sales sharply reduced the supply of end-of-life vehicles. Furthermore, widespread restrictions and the need for operational social distancing measures at times disrupted the supply, and processing, of scrapped vehicles and spent autocatalysts. To a large extent, these issues were concentrated during mid to late-H1’20.

Consequently, the second half of 2020 saw a surge in scrapped vehicles, and the processing of their catalysts. This increase was enhanced by the high palladium and rhodium prices which encouraged some destocking by scrap yards. The extent of the sharp increase in platinum autocatalyst recycling in H2’20 was adversely affected by two factors. First, record palladium and rhodium prices meant that some scrap catalyst aggregators struggled to acquire and finance as much work-in progress material as they might have liked. Second, the market was again affected by a lack of refining capacity which increased processing times, which in turn placed additional pressure on balance sheets across parts of the supply chain.

Demand

Platinum demand in 2020 decreased by 7% (-569 koz) from 8,307 koz in 2019 to 7,738 koz. Platinum automotive demand reduced by 17% (-474 koz), jewellery demand by 13% (-279 koz), industrial demand by 5% (-111 koz), while investment increased by 24% (+295 koz).

Chart 7: Changes in demand by category, 2019 vs. 2020



Source: Metals Focus

Automotive demand

Despite the sharp recovery in H2'20, global light-duty and heavy-duty vehicle production for the full year reduced 16% and 6% respectively. In addition to this severe overall contraction, some of the pandemic recovery response schemes, introduced by governments, favoured electric vehicles ahead of diesel and gasoline cars, further reducing platinum automotive demand, which was down 17% (-474 koz). Western European production of light-duty vehicles dropped 25% and diesel's share of the total declined from 32% in 2019 to 28% in 2020, leading to a decline in platinum demand of 25% (-368 koz). As the European automotive industry adjusted its powertrain mix to attempt to meet the stringent average fleet CO₂ requirements and avoid severe penalties, the diesel powertrain has suffered more than other categories. In North America, light-duty vehicle production declined 20% and heavy-duty vehicle production contracted 25%. However, light-duty diesel production increased 5% softening the overall platinum demand decline, which was 13% (-44 koz) lower. In China, demand grew 48% (+96 koz), as both heavy-duty vehicle units and loadings increased to ensure compliance with China VI emissions requirements. In other regions such as India, where passenger car production dropped 23% and diesel production was down by as much as 44%, platinum automotive demand declined 17% (-95 koz).

Jewellery demand

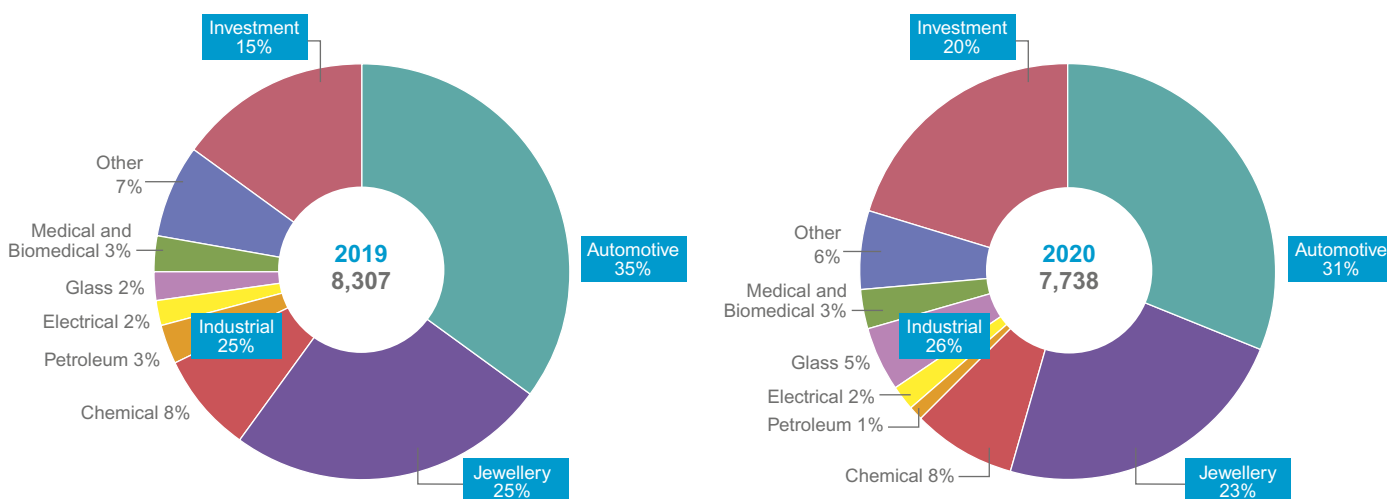
Platinum jewellery demand in 2020 declined 13% (-279 koz) to 1,820 koz. North American demand dropped by a steep 19% year-on-year, chiefly as a result of pandemic-related changes in consumers' sentiment and their willingness and ability to shop. Some mitigation came from a boom in online sales and by core bridal offtake being sustained through engagements still occurring, even if weddings were cancelled. Similarly, fabrication in Europe fell markedly last year due to COVID-19 but at a slightly less steep pace of 17%. This reflected the fact that, partly through improving exports to East Asia, the all-important top-end jewellery and watch sector recovered faster in the second half than mass market/bridal jewellery.

Chinese jewellery demand declined 5% (-39 koz) as the favourable price compared to gold and increased promotional effort, helped limit the impact of the pandemic on consumer buying behaviour. In India, demand for jewellery declined 53% (-54 koz) as a slow recovery in economic activity perpetuated a cautious stance among consumers. In India, demand for jewellery declined 53% (-54 koz) as the pandemic exacerbated the slowdown in the economy, undermined consumer sentiment and in turn, jewellery purchases.

Industrial demand

Total industrial demand in 2020 contracted to 1,976 koz, a 5% (-111 koz) year-on-year decline.

Chart 8: Demand end-use shares, 2019 vs. 2020



Source: Metals Focus

Chemical

Despite a 15% year-on-year decline in 2020, the total remained high by historical standards and was the second highest over the past six years. In keeping with many industrial sectors, volumes were affected by COVID-related disruptions and weak economic conditions. The decline should also be viewed in the context of an exceptionally high base in 2019. After record paraxylene (PX) capacities were added in China that year, growth moderated slightly during 2020. Moreover, rising PX production in China and lacklustre demand elsewhere resulted in lower operating rates (and hence lower platinum top-up and replacement demand) for other Asian plants that were previously focused on exports to China.

Petroleum

The global oil industry was hit hard by the COVID-19 pandemic, with refining throughput down by over 7% year-on-year. On top of a major contraction in oil consumption, elevated inventories and fears about storage capacity put sustained pressure on refining margins at the peak of the pandemic. Meanwhile, lockdown measures also disrupted, albeit temporarily, projects that were under construction. Against this backdrop, platinum demand is estimated to have fallen by 47% (-104 koz) in 2020 year-on-year to a seven-year low of 115 koz.

Electrical

Full year demand for 2020 is estimated to have fallen 10% (-15 koz) to 130 koz. This reflected downward pressure on platinum demand due to falling HDD market shares in several categories. However, in view of growing shipments of high-capacity drives for nearline and data central storage, the addition of platters per unit led to higher platinum loadings per unit which partially offset the above losses.

Medical

Given a year in which hospitals and medical services were central to the defence against the COVID-19 pandemic, demand for platinum in medical devices and cancer treatment protocols declined 5% (-14 koz). Implantation devices containing platinum typically form part of elective procedures which declined as much as 21% in some regions. Similarly, cisplatin, oxaliplatin and carboplatin, also referred to as platinum chemotherapy agents are generally administered in a controlled medical environment and, where possible, treatments were delayed or switched to alternative medication regimes.

Glass

Most plans to increase LCD furnace and glass fibre production lines remained in place in spite of the COVID-19 pandemic. Indeed, if anything the crisis has created supply shortages and in turn boosted prices of the related end-products, all of which encouraged manufacturers to add to capacity. Some delays did take place, particularly as it was extremely difficult to travel into China, for an extended period of time, where most of the capacity additions were concentrated. That coupled with an expected slow-down in glass fibre capacity growth, capped platinum demand volumes in 2020. Nevertheless, at 406 koz, demand was more than double the exceptionally low 2019 levels, indicating a return to normality after the significant LCD plant decommissioning in that year.

Other

The severe contraction in automotive production has seen demand for sensors and sparkplugs drop. Increased policy support for the production and consumption of green hydrogen through electrolysis and in the use of stationary fuel cells has started registering a small contribution to 2020 demand. Nevertheless, it could not offset the impact of declines in other areas, resulting in an overall decline of 15% (-87 koz) year-on-year in other industrial platinum demand.

Investment demand

Global retail investment in bars and coins more than doubled year-on-year in 2020 to an estimated 586 koz, the third highest total on record. Every key market posted healthy gains, although most significant was the performance in Japan, followed by North America. Both locations benefited from the price weakness in Q1'20 which led to a jump in bargain hunting. To put this into perspective, the Q1'20 total for Japan was more than three times the full year total recorded for 2019. Staying with Japan, while this buying carried over into Q2'20, it then weakened significantly. As a result, in spite of the early 2020 strength the 2020 total still compared poorly with the level of buying seen in 2015-16.

North America also benefited from an exceptionally strong Q1'20, which was then interrupted as COVID-19 restrictions severely reduced product availability. As these limitations eased, and against the backdrop of strong retail interest, a much healthier H2'20 followed. As a result full year total investment demand was a record high of 1,549 koz.

ETF holdings reached record levels in 2020 ending the year just short of 4,000 koz. Aside from Q1'20 both North American and European funds saw net inflows during the year, while South African funds reduced holdings during most quarters.

In Q4'20, we did not see the same uncharacteristically high inflow of platinum into NYMEX warehouses observed in Q2'20 and Q3'20. As the scope for arbitraging the NYMEX and London prices largely evaporated by the end of Q3'20, so did the flow of bars into NYMEX warehouses to back short positions in futures. Stocks held by exchanges, including NYMEX and TOCOM, remained at a new historical high level of 657 koz.

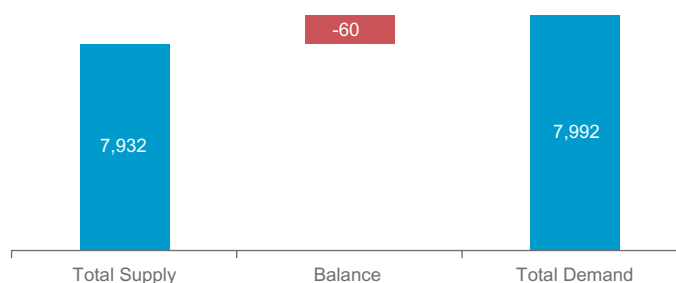
ABOVE GROUND STOCKS

With the market deficit of -932 koz in 2020 above-ground stocks fell to their lowest level since 2014, standing at 2,630 koz at the end of 2020.

2021 OUTLOOK

At the time of writing 269 million doses of COVID-19 vaccines have been administered and the IMF forecast global economic growth in 2021 of 5.5 percent. There are increasing expectations that the roll-out of vaccine programmes will see economies return to normal activity, while policy support will provide additional momentum. In this context, we forecast both platinum demand and supply to recover in 2021. Following its significant growth over the past two years we forecast that investment demand, despite remaining robust, will not rise at the same pace. Overall, we forecast demand will increase by 3% (+254 koz) to 7,992 koz, while supply will recover 17% (+1,126 koz) to 7,932 koz, resulting in a modest deficit of 60 koz in 2021.

Chart 9: Supply-demand balance, koz, 2021f



Supply

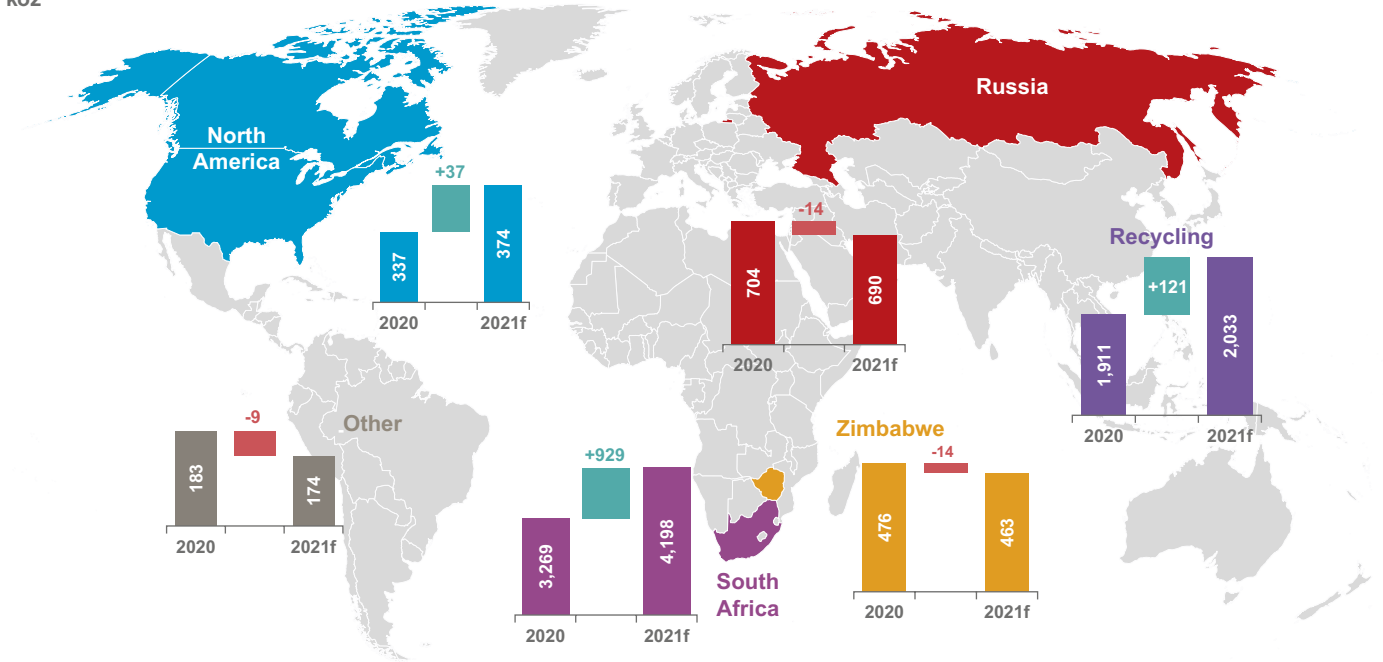
In 2021 mine supply is forecast to increase by 19% (+930 koz) year-on-year to 5,899 koz, following the extreme disruptions of 2020. South Africa will account for the bulk of this increase and is forecast to be 28% (+929 koz) higher at 4,198 koz, as output recovers following the processing infrastructure failure and pandemic-curtailed mining operations in 2020. Refined production will be supplemented in 2021 by the expected processing, refining and sale of 200 koz of semi-processed material inventory, accumulated as a result of the ACP shutdowns. This is possible despite only one of the ACP units being operational, as each unit can individually process slightly more than typical mining throughput.

Existing growth projects continue to bring modest additional volumes online, offsetting lost production from mine rationalisation and reserve exhaustion. However, with projects in Russia, North America and the Northern Limb in South Africa targeting palladium-rich ore bodies platinum supply's upside is more limited.

Material risk for South African mine production remains, as the country's electricity supply crisis has worsened and Eskom warns that the grid will be unreliable and supply unpredictable for the next year, until maintenance programmes are completed in December 2021. Producers, however, are thus far successfully handling the disruption with minimal impact.

Russian output is expected to remain little changed, declining 2% (-14 koz) year-on-year to 690 koz. North American output is forecast to reach 374 koz, up 11% (+38 koz), as by-product output from nickel mining stabilises and growth from a primary producer comes online. Output from Zimbabwe is expected to register a modest decline of 3% (-14 koz), as new mine development mostly offsets declines at two mines nearing their end-of-life.

Chart 10: Changes in supply, 2020 vs. 2021f
koz



Source: Metals Focus

Recycling

This year, the recovery of platinum from spent autocatalysts is forecast to recover most of the losses sustained in 2020, rising by 6% (+84 koz) year-on-year to 1,517 koz; this will still be the second highest total on record. The key factor underpinning this recovery will be the growing supply of scrapped vehicles that were fitted with rising levels of platinum loadings in aftertreatment systems, especially in Europe, as the emission catalyst components were designed to meet the more stringent Euro 4 regulations effective from 2006. This in turn will see an increasing volume of diesel particulate filters enter the supply chain. Often manufactured using silicon carbide these take longer to treat, resulting in extended processing times.

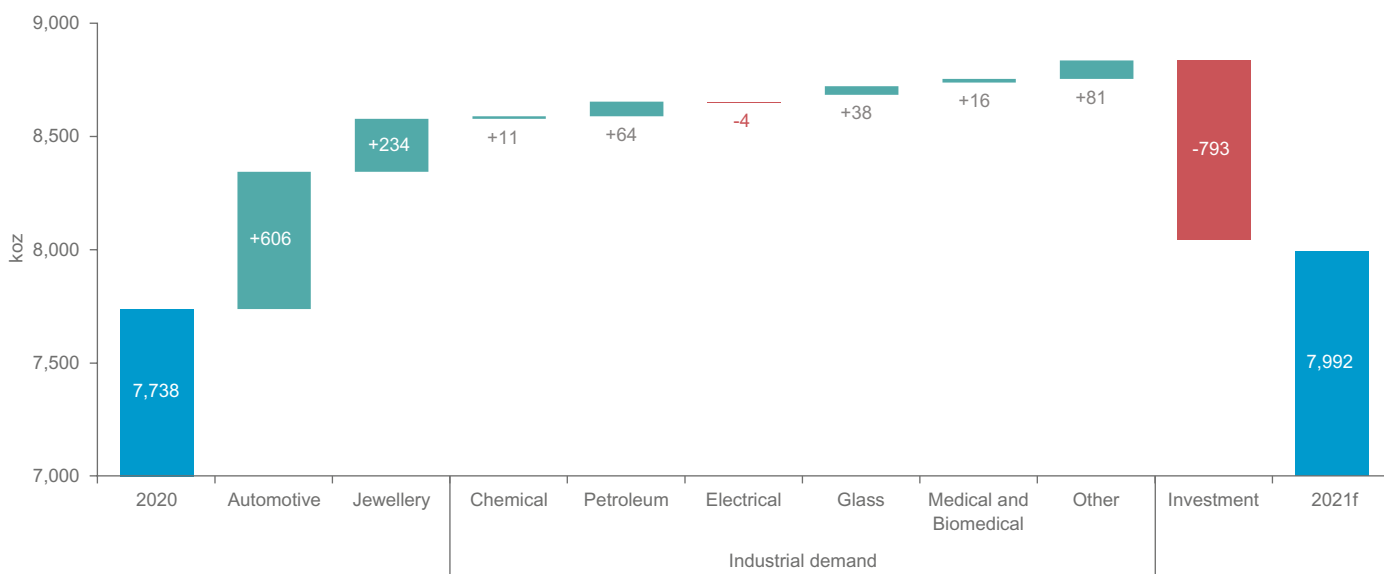
Elevated PGM prices will also continue to encourage some auto yards to de-stock spent autocatalysts. This will add to the pressure on refiners, which are again expected to operate at close to full capacity.

Jewellery recycling this year is forecast to rise by 8% (+34 koz) to 456 koz, as all regions are forecast to have higher recycle volumes as logistic limitations related to COVID-19 diminish.

Demand

We forecast demand in 2021 to grow by 3% (+254 koz) to 7,992 koz, driven by a recovery in automotive, jewellery and industrial demand. We forecast a drop of 51% (-793 koz) in investment as we do not forecast a similar growth in NYMEX approved stocks seen in 2020 and we expect a more moderate growth in net ETF holdings. We also forecast lower buying of platinum bars and coins this year.

Chart 11: Changes in demand by category, 2020 vs. 2021f



Source: Metals Focus

Automotive demand

Light-duty vehicle production is expected to increase to 87m units in 2021, approximately 1.1m units below pre-pandemic levels. Despite concerns that the shortage of semi-conductor chips could negatively impact vehicle production, this is a near-term challenge which should be resolved over the course of the year. Unlike passenger cars, the production of trucks and buses is expected to fall by 1% compared to the COVID-19 impacted lower 2020 levels. The decline is mainly due to China's truck production, which increased 35% in 2020, returning to more typical levels similar to 2019. The surge in sales in 2020 was driven by the government incentive and scrappage scheme which will see China III vehicles banned from entry into several provinces. Based on the expected increase in vehicle production, we forecast a 25% (+606 koz) increase in automotive demand. Even though light-duty production in 2021 is expected to be lower than in 2019, platinum demand is projected to increase to 2% above pre-pandemic levels, mainly due to higher vehicle production, increased platinum loadings due to tighter emissions limits and some substitution of platinum for palladium in aftertreatment systems. We expect a small number of new gasoline models with increased platinum ratios to be produced in 2021.

European platinum demand, regardless of strong growth this year, will still be below pre-pandemic levels. Despite government incentives continuing to favour the electric powertrain and diesel's share declining to 25% during this year, the overall recovery of car production loading increases due to tighter emissions regulations are expected to underpin demand growth.

North American platinum demand this year is expected to exceed pre-pandemic 2019 levels. In the context of global platinum automotive demand this remains a small market, but the 16% growth in diesel vehicles, along with some substitution of platinum for palladium in gasoline cars, will help support overall platinum demand growth.

In China, we forecast continued growth as China VI implementation by July 2021 for heavy-duty vehicles contributes to higher demand in the second half of the year. The growth will also be supported by some platinum for palladium substitution in this market. In other markets the recovery to pre-pandemic vehicle production levels will further support platinum demand growth.

Jewellery demand

In 2021, platinum jewellery will recover, growing 13% (+234 koz) above prior year. A recovery is forecast for North American offtake as economic activity returns on the premise that the worst of COVID-19 is believed to have passed. Furthermore, jewellery purchases will remain supported by access to surplus funds due to under-spending on travel in the first half of this year and then later on also by previously postponed weddings and other events finally taking place. Fabrication, however, may fall short of pre-COVID levels, due to structural changes that mean retail inventories can be lower than before.

European demand is expected to enjoy a robust increase this year, to almost to pre-COVID levels. Key to this will be a continuation of export-led growth for the top-end jewellery and watch brands. Sales within Europe, however, could remain soft, as long-haul tourism stays muted and as the region's economic recovery proves modest. This will also affect mass market/bridal sales, although this will be partly offset by the emergence of pent-up sales from events postponed in 2020.

China platinum jewellery demand is also forecast to increase this year. In contrast to Q1'20, which saw a 45% drop in demand, Q1'21 is expected to show a robust recovery. The rest of the year will also be stronger as supply chains continue to focus on new product development and marketing activities.

Finally, Indian jewellery fabrication is expected to improve this year, driven by a strong recovery in economic growth and the recent 2.5% cut in the import duty on platinum. A revival in the urban economy and higher spend on platinum jewellery advertising by retailers are also likely to benefit demand.

Industrial demand

Chemical

Demand is expected to remain elevated by historical standards, growing 2% (+11 koz) year-on-year to 605 koz, as two new petrochemical plants are expected to come on-stream this year. On the other hand, weak downstream demand and an increasing oversupply will continue to negatively affect utilisation rates for operations outside of China. Elsewhere, as the global economy continues to improve, so will demand for silicone. Finally, a modest increase is also expected for nitric acid production, which will further benefit platinum offtake.

Petroleum

Early 2021 has seen the recovery in global oil demand stall, due to new restrictive measures imposed to contain renewed COVID-19 infections. Furthermore, widespread vaccination efforts and an eventual recovery in economic activity should prompt stronger growth in the second half of 2021. Meanwhile, the ongoing expansion of capacity in China, along with new units elsewhere (that were affected by COVID-19), should also help platinum offtake. For the full year, platinum demand is expected to rise by 56% (+64 koz) year-on-year to 179 koz.

Electrical

Full year demand for 2021 is forecast to decline by 3% (-4 koz) to 126 koz as SSDs continue to replace HDDs as the primary storage in several categories. However, with the implementation of energy-assisted recording technologies, HHD is expected to maintain its \$/TB advantage versus SSDs in the secondary storage solution market. Moreover, the increasing adoption of high-capacity drive technology will see higher platinum loadings per unit due to the increasing number of platters in each drive. This will partially offset the downward pressure on platinum offtake due to falling HDD shipments.

Glass

Ongoing capacity expansions, primarily of LCD substrate furnaces, will underpin the 9% (+38 koz) increase in platinum demand from the glass industry in 2021, which is forecast to reach 444 koz. The postponement of some capacity expansions in 2020, due to COVID-19 disruptions, will also support this year's growth. In spite of current signs of tightness in the glass fibre composites market and the upward price pressure this will result in, we do not think an acceleration of capacity growth there is likely in 2021, as it will take time for any new investment plans to be implemented.

Medical

Medical demand is forecast to grow 7% (+16 koz) to 252 koz as the success of vaccination programmes will see pandemic related pressure on hospitals and healthcare systems reduce, making way for a return to more normal levels of elective procedures and oncology treatments.

Other

Despite the rapidly increasing share of pure battery electric vehicles that require fewer platinum-bearing sensors and no sparkplugs, the dominance of combustion technology and tightening emissions legislation should continue to drive usage of sensor components and environment-friendly spark plugs. In addition, higher vehicle numbers forecast for 2021 will see demand for spark plugs and automotive sensors grow to record levels, while a resumption of travel and a return to normal should see the aerospace segments recover close to pre-pandemic levels. That said, recent chip shortages and the potential for consumers to prefer smaller vehicles could dampen growth.

Elsewhere, the deployment of stationary fuel cells and the production of the first gigawatt scale water electrolysis plants to produce green hydrogen, using proton exchange membrane technology, will also see some platinum demand growth over the course of 2021. We therefore forecast a 16% (+81 koz) increase in demand from these industrial sectors.

Investment demand

This year, we expect platinum bar and coin demand to weaken by 15% (-90 koz) year-on-year, but still remain elevated. Every key region is forecast to see lower net demand compared with 2020. This reflects two key drivers. First, platinum prices are forecast to rise and, at times, remain volatile. This will see bargain hunting emerge as prices dip, but as prices strengthen, we also expect some profit taking to emerge. As a result, two-way buy/sell activity will remain heightened over much of this year. In other words, gross buying by investors will exceed the level of net retail demand shown in our figures.

The rate of ETF investment, with holdings currently standing at a record level of 3,981 koz, will moderate this year compared with 2020. As with bar and coin investment some profit taking will be evident but rising optimism in the potential for platinum use in the hydrogen economy and the growing views of substitution of platinum for palladium will attract investors, resulting in a net increase of 250 koz in global ETF holdings. Finally, we have allowed for a small increase of 10 koz in stocks held by exchanges.

ABOVE GROUND STOCKS

The market is expected to be in a deficit of -60 koz in 2021, which would result in above-ground stocks reducing to 2,569 koz.

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 Q4 2020

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

	2013	2014	2015	2016	2017	2018	2019	2020	2021f	2020/2019 Growth %	2021f/2020 Growth %
Platinum Supply-demand Balance (koz)											
SUPPLY											
Refined Production	6,060	4,865	6,155	6,030	6,125	6,125	6,095	4,969	5,899	-18%	19%
South Africa	4,345	3,125	4,475	4,250	4,380	4,470	4,402	3,269	4,198	-26%	28%
Zimbabwe	405	405	405	490	480	465	455	476	463	5%	-3%
North America	355	395	365	390	360	345	356	337	374	-5%	11%
Russia	740	740	710	715	720	665	716	704	690	-2%	-2%
Other	215	200	200	185	185	180	165	183	174	11%	-5%
Increase (-)/Decrease (+) in Producer Inventory	-215	+350	+30	+30	+30	+10	+2	-75	+0	N/A	N/A
Total Mining Supply	5,845	5,215	6,185	6,060	6,155	6,135	6,097	4,894	5,899	-20%	21%
Recycling	1,980	2,035	1,705	1,840	1,895	1,935	2,122	1,911	2,033	-10%	6%
Autocatalyst	1,120	1,255	1,185	1,210	1,325	1,420	1,587	1,433	1,517	-10%	6%
Jewellery	855	775	515	625	560	505	476	422	456	-11%	8%
Industrial	5	5	5	5	10	10	58	56	59	-3%	5%
Total Supply	7,825	7,250	7,890	7,900	8,050	8,070	8,219	6,806	7,932	-17%	17%
DEMAND											
Automotive	3,130	3,245	3,245	3,350	3,290	3,075	2,868	2,394	2,999	-17%	25%
Autocatalyst	2,990	3,095	3,105	3,215	3,150	2,930	2,868	2,394	2,999	-17%	25%
Non-road	140	150	140	135	140	145	†	†	†	†	†
Jewellery	2,945	3,000	2,840	2,505	2,460	2,245	2,099	1,820	2,054	-13%	13%
Industrial	1,490	1,580	1,700	1,805	1,700	1,940	2,086	1,976	2,183	-5%	10%
Chemical	535	540	505	560	565	575	702	594	605	-15%	2%
Petroleum	50	60	205	215	100	235	219	115	179	-47%	56%
Electrical	195	215	205	195	210	205	145	130	126	-10%	-3%
Glass	145	175	200	205	180	245	189	406	444	115%	9%
Medical and Biomedical	220	220	225	230	235	240	249	235	252	-5%	7%
Other	345	370	360	400	410	440	583	496	578	-15%	16%
Investment	935	150	305	535	275	15	1,253	1,549	756	24%	-51%
Change in Bars, Coins	-5	50	525	460	215	280	283	586	496	107%	-15%
Change in ETF Holdings	905	215	-240	-10	105	-245	991	504	250	-49%	-50%
Change in Stocks Held by Exchanges	35	-115	20	85	-45	-20	-20	458	10	N/A	-98%
Total Demand	8,500	7,975	8,090	8,195	7,725	7,275	8,307	7,738	7,992	-7%	3%
Balance	-675	-725	-200	-295	325	795	-88	-932	-60	N/A	N/A
Above Ground Stocks	3,465*	2,740	2,540	2,245	2,570	3,365	3,562**	2,630	2,569	-26%	-2%

Source: Metals Focus 2019 - 2021, SFA (Oxford) 2013 - 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 Q4 2020

Table 3: Supply and demand summary – quarterly comparison

	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q4'20/Q4'19 Growth %	Q4'20/Q3'20 Growth %
Platinum Supply-demand Balance (koz)											
SUPPLY											
Refined Production	1,565	1,320	1,665	1,531	1,580	1,243	937	1,491	1,299	-18%	-13%
South Africa	1,170	874	1,218	1,122	1,189	832	514	1,056	867	-27%	-18%
Zimbabwe	120	113	120	116	106	118	117	121	120	13%	-1%
North America	90	85	99	79	94	98	87	70	82	-13%	16%
Russia	145	204	189	174	149	150	175	197	182	22%	-7%
Other	40	44	40	40	41	45	44	47	47	15%	1%
Increase (-)/Decrease (+) in Producer Inventory	-20	+12	-28	-30	48	44	34	-109	-43	N/A	N/A
Total Mining Supply	1,545	1,332	1,637	1,501	1,627	1,286	971	1,381	1,256	-23%	-9%
Recycling	495	538	509	543	531	476	377	482	576	8%	19%
Autocatalyst	380	402	376	413	395	393	267	347	426	8%	23%
Jewellery	115	120	119	116	121	70	97	121	134	11%	10%
Industrial	0	15	14	14	15	14	13	14	15	-1%	5%
Total Supply	2,040	1,870	2,147	2,044	2,158	1,763	1,348	1,864	1,832	-15%	-2%
DEMAND											
Automotive	765	760	741	672	695	642	386	639	726	5%	14%
Autocatalyst	725	760	741	672	695	642	386	639	726	5%	14%
Non-road	40	†	†	†	†	†	†	†	†	†	†
Jewellery	560	539	535	529	497	393	388	510	529	7%	4%
Industrial	500	559	534	565	429	532	321	510	613	43%	20%
Chemical	140	140	203	164	195	181	113	124	176	-9%	43%
Petroleum	55	55	55	55	55	34	20	23	38	-31%	64%
Electrical	55	35	36	38	36	32	29	33	35	-3%	5%
Glass	65	120	32	102	-65	110	-3	136	163	N/A	20%
Medical and Biomedical	70	62	62	62	62	59	59	59	59	-5%	0%
Other	115	146	146	145	146	117	103	135	142	-3%	5%
Investment	-65	794	126	251	82	71	384	960	133	63%	-86%
Change in Bars, Coins	50	111	89	54	29	305	123	97	60	112%	-38%
Change in ETF Holdings	-115	687	50	207	47	-213	122	522	74	56%	-86%
Change in Stocks Held by Exchanges	0	-4	-13	-10	6	-20	138	342	-1	N/A	N/A
Total Demand	1,760	2,652	1,936	2,017	1,702	1,638	1,479	2,619	2,002	18%	-24%
Balance	280	-782	211	27	455	125	-132	-756	-170	N/A	N/A

Source: Metals Focus 2019 - 2021, SFA (Oxford) 2018.

Notes:

- † Non-road automotive demand is included in autocatalyst demand.
- 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 Q4 2020

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

	H1 2018	H2 2018	H1 2019	H2 2019	H1 2020	H2 2020	H2'20/H2'19 Growth %	H2'20/H1'20 Growth %
Platinum Supply-demand Balance (koz)								
SUPPLY								
Refined Production	2,905	3,230	2,985	3,110	2,180	2,789	-10%	28%
South Africa	2,075	2,400	2,091	2,311	1,346	1,923	-17%	43%
Zimbabwe	230	240	233	222	235	241	9%	3%
North America	175	180	184	173	184	152	-12%	-17%
Russia	340	325	393	324	325	379	17%	16%
Other	85	85	84	81	89	94	16%	5%
Increase (-)/Decrease (+) in Producer Inventory	+50	-40	-15	+18	+77	-152	N/A	N/A
Total Mining Supply	2,955	3,190	2,970	3,128	2,257	2,637	-16%	17%
Recycling	940	985	1,047	1,074	853	1,058	-1%	24%
Autocatalyst	675	745	779	808	660	773	-4%	17%
Jewellery	265	240	239	237	167	255	8%	53%
Industrial	0	0	29	29	27	30	2%	10%
Total Supply	3,895	4,175	4,017	4,202	3,111	3,695	-12%	19%
DEMAND								
Automotive	1,585	1,480	1,501	1,367	1,028	1,366	0%	33%
Autocatalyst	1,510	1,405	1,501	1,367	1,028	1,366	0%	33%
Non-road	75	75	†	†	†	†	N/A	N/A
Jewellery	1,150	1,110	1,074	1,026	780	1,039	1%	33%
Industrial	960	975	1,093	993	853	1,123	13%	32%
Chemical	280	295	343	358	294	300	-16%	2%
Petroleum	110	110	109	109	54	61	-45%	12%
Electrical	105	105	71	74	61	69	-7%	12%
Glass	120	130	152	36	107	299	>±300%	180%
Medical and Biomedical	125	115	124	124	118	118	-5%	0%
Other	220	220	292	291	219	277	-5%	26%
Investment	5	0	921	333	455	1,094	229%	140%
Change in Bars, Coins	155	120	200	82	428	158	92%	-63%
Change in ETF Holdings	-140	-110	737	254	-91	595	134%	N/A
Change in Stocks Held by Exchanges	-10	-10	-17	-4	118	341	N/A	189%
Total Demand	3,700	3,565	4,588	3,719	3,117	4,621	24%	48%
Balance	195	610	-571	483	-7	-926	N/A	N/A

Source: Metals Focus 2019 - 2021, SFA (Oxford) 2018.

Notes:

- † Non-road automotive demand is included in autocatalyst demand.
- 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 Q4 2020

Table 5: Regional demand – annual and quarterly comparison

	2013	2014	2015	2016	2017	2018	2019	2020	2021f	2020/2019 Growth %	2021f/2020 Growth %	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020
Platinum gross demand (koz)																
Automotive	3,135	3,240	3,250	3,345	3,280	3,065	2,868	2,394	2,999	-17%	25%	695	642	386	639	726
North America	425	465	480	410	375	355	338	295								
Western Europe	1,350	1,395	1,450	1,635	1,550	1,330	1,447	1,079								
Japan	585	585	510	450	435	430	322	260								
China	130	125	145	195	230	220	197	293								
India	165	170	180	170	175	195	††	††								
Rest of the World	480	500	485	485	515	535	562	467								
Jewellery	2,945	3,000	2,840	2,505	2,460	2,245	2,099	1,820	2,054	-13%	13%	497	393	388	510	529
North America	200	230	250	265	280	280	341	277								
Western Europe	220	220	235	240	250	255	237	196								
Japan	335	335	340	335	340	345	372	316								
China	1,990	1,975	1,765	1,450	1,340	1,095	871	832								
India	140	175	180	145	175	195	102	48								
Rest of the World	60	65	70	70	75	75	176	151								
Chemical	535	540	505	560	565	575	702	594	605	-15%	2%	195	181	113	124	176
North America	55	55	50	50	50	50	77	90								
Western Europe	110	105	75	110	115	110	125	113								
Japan	10	10	10	15	15	15	66	62								
China	195	215	230	225	215	215	223	193								
Rest of the World	165	155	140	160	170	185	211	136								
Petroleum	50	60	205	215	100	235	219	115	179	-47%	56%	55	34	20	23	38
North America	40	25	-25	90	55	55	30	8								
Western Europe	-45	-20	70	10	5	20	14	13								
Japan	10	-35	5	0	-40	5	7	6								
China	80	-5	45	80	45	10	66	39								
Rest of the World	-35	95	110	35	35	145	103	49								
Electrical	195	215	205	195	210	205	145	130	126	-10%	-3%	36	32	29	33	35
North America	10	15	15	10	15	15	38	34								
Western Europe	5	10	10	10	10	10	27	24								
Japan	15	15	15	15	15	15	20	18								
China	75	70	70	80	90	85	28	26								
Rest of the World	90	105	95	80	80	80	31	28								
Glass	145	175	200	205	180	245	189	406	444	115%	9%	-65	110	-3	136	163
North America	5	10	0	20	5	5	7	-20								
Western Europe	-10	15	10	5	5	35	59	25								
Japan	0	-25	-5	-10	-10	0	-87	-41								
China	90	85	95	100	85	75	180	344								
Rest of the World	60	90	100	90	95	130	30	97								
Medical	220	220	225	230	235	240	249	235	252	-5%	7%	62	59	59	59	59
Other industrial	345	370	360	400	410	440	583	496	578	-15%	16%	146	117	103	135	142
Bar & Coin Investment	-5	50	525	460	215	280	283	586	496	107%	-15%	29	305	123	97	60
North America							159	242								
Western Europe							52	75								
Japan							46	240								
Rest of the World							25	29								
ETF Investment	905	215	-240	-10	105	-245	991	504	250	-49%	-50%	47	-213	122	522	74
North America							125	526								
Western Europe							509	232								
Japan							-13	58								
Rest of the World							370	-312								
Change in Stocks Held by Exchanges	35	-115	20	85	-45	-20	-20	458	10	N/A	-98%	6	-20	138	342	-1
Investment	935	150	305	535	275	15	1,253	1,549	756	24%	-51%	82	71	384	960	133
Total Demand	8,505	7,970	8,095	8,190	7,715	7,265	8,307	7,738	7,992	-7%	3%	1,702	1,638	1,479	2,619	2,002

Source: Metals Focus 2019 - 2021, SFA (Oxford) 2013 - 2018.

Notes:

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

PLATINUM QUARTERLY Q4 2020

Table 6: Regional recycling – annual and quarterly comparison

	2013	2014	2015	2016	2017	2018	2019	2020	2021f	2020/2019 Growth %	2021f/2020 Growth %	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020
Platinum recycling supply (koz)																
Automotive	1,120	1,255	1,185	1,210	1,325	1,420	1,587	1,433	1,517	-10%	6%	395	393	267	347	426
North America							520	458								
Western Europe							805	743								
Japan							116	103								
China							36	33								
Rest of the World							110	96								
Jewellery	855	775	515	625	560	505	476	422	456	-11%	8%	121	70	97	121	134
North America							3	3								
Western Europe							4	4								
Japan							187	162								
China							276	248								
Rest of the World							5	5								
Industrial	5	5	5	5	10	10	58	56	59	-3%	5%	15	14	13	14	15
North America							3	3								
Western Europe							11	10								
Japan							34	34								
China							7	7								
Rest of the World							2	2								

Source: Metals Focus 2019 - 2021, SFA (Oxford) 2013 - 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 (NO_x). 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.

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) 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.

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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