PLATINUM QUARTERLY

Q3 2020

18th November 2020

World Platinum Investment Council

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FOREWORD

This edition of *Platinum Quarterly* considers platinum supply and demand developments for the third quarter of 2020 and provides an updated outlook for 2020, it also presents the first forecast for 2021. The *Platinum Quarterly* report and data (starting on page 7) 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 supply and demand both recovered significantly in the third quarter of 2020 when compared to the second quarter, but overall still weak supply and strong investment demand are behind the large deficits in quarter three and for the full 2020 year of over -700 koz and over -1.2 moz respectively. The forecast deficit in 2021 will be over -220 koz.

The negative COVID-19 pandemic effects continued through the third quarter, but widespread easing of restrictive pandemic control measures, combined with government stimulus measures, saw economic activity accelerate globally compared to activity levels in the second quarter. Platinum supply and demand picked up significantly through the quarter, with mines ramping back towards full capacity, refined processing capacity returning to more normal levels, and demand in the automotive and jewellery segments experiencing sharp V-shaped recoveries. However, forecasts of supply and demand not just for 2020, but also for 2021, are likely to continue to be subject to change due to the ongoing impacts of the pandemic. Parts of the Western world, notably in Europe, have been pitched back into strict lockdowns to combat a second wave of COVID-19 infections. This increases near-term uncertainty regarding levels of economic activity in Q4 and early 2021 and has heightened concerns over longer-term government debt levels as more support measures are introduced to combat the negative impact on economies.

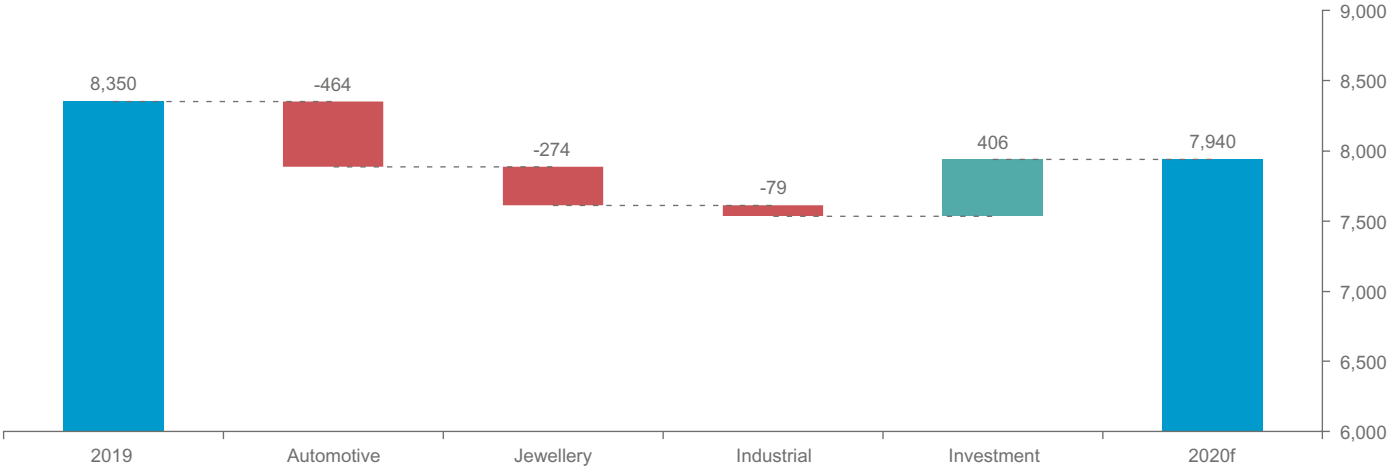
Platinum supply and demand – updating 2020 and introducing 2021 forecasts

The platinum market is now projected to be in a significant deficit this year, as the updated 2020 forecast now signals a record annual deficit of -1,202 koz compared to the prior estimate of a -336 koz deficit just two months ago. The combination of supply losses due to pandemic-driven mine closures, ongoing South African processing disruption, and strong investment demand more than offsets lower COVID-19-impacted automotive, jewellery and industrial demand.

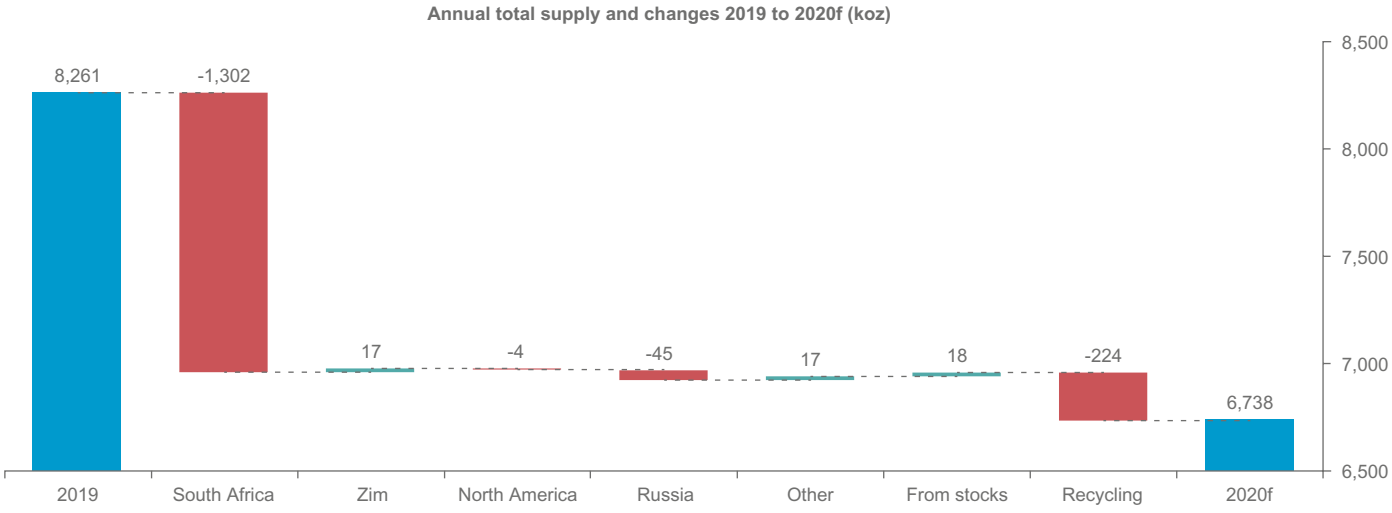
For 2021, the initial forecast shows the platinum market in deficit for a third consecutive year. The -224 koz deficit reflects a 17% pick-up in supply and a 2% increase in demand, with the latter largely due to lower, albeit still well above the historic trend, investment demand.

Total platinum demand in 2020 is forecast to be 7,940 koz, 5% (-410 koz) lower than in 2019 due to reduced demand in the automotive (-464 koz), jewellery (-274 koz), and industrial (-79 koz) segments. However, weakness in these demand segments is expected to be partially offset by continued strong investment demand, with investment volumes expected to be up 32% (+406 koz) to a record high of 1,659 koz. Heightened global risk is expected to continue to drive investor demand for hard assets, with 2020 bar and coin demand forecast to grow by 123% to 629 koz.

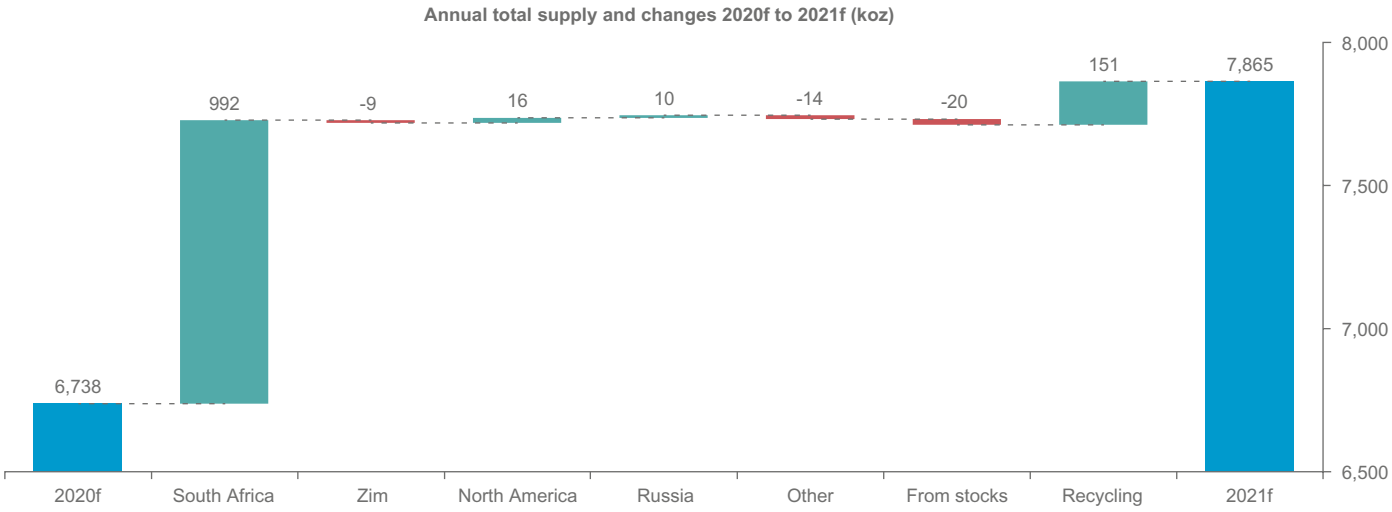
Annual total demand and annual change 2019 to 2020f (koz)



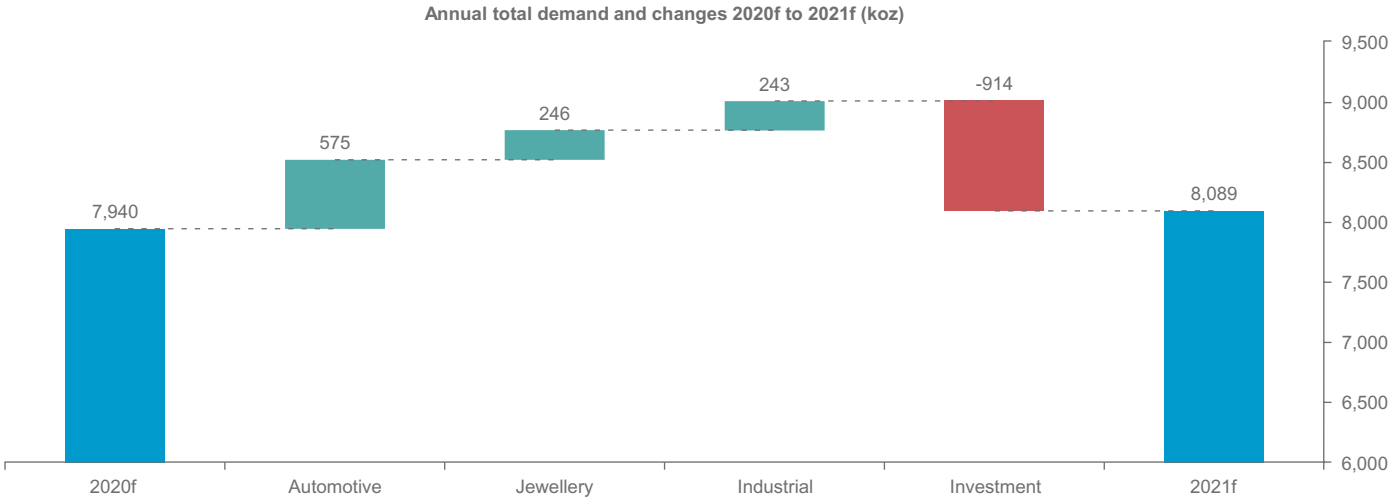
Total platinum supply in 2020 is now forecast to fall by 18% (-1,524 koz) to 6,738 koz and reflects a 22% (-1,318 koz) decline in refined production and a 10% (-224 koz) decline in recycling supply. Supply expectations for the year, already impacted during the first two quarters by COVID-related mine closures and the Anglo American Platinum converter plant (ACP) outage, have been further downgraded due to a similar, additional ACP closure until year-end, announced in early November.



For 2021, the initial forecast shows total platinum supply rising 17% above 2020 levels, to 7,865 koz. The recovery is driven by an expected 21% pick-up in refined production, and an 8% rebound in recycling. South Africa accounts for the bulk of this projected production recovery due to the expected recommissioning of the ACP converter plant in January and a return to near full capacity mine production after 2020's pandemic-related curtailments.



Demand in 2021 is expected to recover to 2% above 2020 pandemic-impacted levels. In particular, automotive demand is projected to recover strongly, by 24%, to 2,996 koz, taking demand to 4% above the level in 2019. The full implementation of Euro 6d and China 6b emissions regulations for light-duty vehicles, and importantly China VI for heavy duty vehicles, are key drivers of automotive demand. Indeed, demand from the automotive, jewellery, and industrial categories is forecast to rise by 17%, countering the lower forecast investment demand and resulting in a third consecutive annual deficit for the platinum market, of -224 koz.



Q3 2020 deficit of -709 koz on weak supply and strong investment demand

Total platinum supply in the third quarter of 2020 fell by 5% year-on-year (-101 koz) to 1,940 koz. The return to production of South Africa's mining operations from June, after COVID-19-driven lockdowns, plus the recommissioning of the Anglo American Platinum ACP Phase B unit, saw South African mined production rebound by 105% (+541 koz) compared to quarter two. However, volumes remained down by 6% (-66 koz) year-on-year, as mines took time to recover towards full capacity. In contrast to the first two quarters, quarter three saw South African miners rebuilding refined metal working inventories (+58 koz) to replace volumes depleted earlier in the year. The easing of COVID-19 related restrictions in many markets during the quarter, combined with the incentive from higher platinum group metal prices, saw recycling volumes recover to 505 koz, but levels remained 6% (-35 koz) down year-on-year.

Demand in the third quarter surged by 32% compared to the third quarter of 2019 (+642 koz) to 2,648 koz. The recovery seen across the automotive, jewellery and industrial sectors that started during the second quarter of 2020 gained momentum in the third quarter, as stimulus measures and the lifting of lockdowns provided demand support. However, the rate of recovery was not sufficient to push demand in the third quarter of 2020 into positive territory on a year-on-year basis, with automotive and jewellery both down by 3%, and industrial demand down by 10%. In contrast, investment demand surged by 291% (+730 koz) year-on-year in the third quarter. ETF demand in the quarter rose to 543 koz, while strong bar and coin demand continued, rising to 96 koz. Additionally, the growth in stocks held by exchanges rose to 342 koz, primarily due to the growth of good delivery metal in the form of 50 oz bars in NYMEX approved warehouses in the US.

Despite the strong recovery of supply and demand in the third quarter of 2020, when compared to the second quarter, overall weak supply and very strong investor demand were the main contributors to the -709 koz deficit in the quarter.

The platinum investment case – very strong investment demand set to continue

The investment case for platinum has become more compelling as 2020 has progressed, supporting strong gains in platinum investment, in particular growth in ETF holdings of over 600 koz since platinum's March and April price lows and bar and coin demand of 523 koz in the first three quarters. Investor interest and positioning increased further based on the positive developments in 2020. These included the stronger than expected V-shaped recoveries in automotive markets, sustained pandemic-related risk driving precious metal investment demand and severely reduced supply, that all contributed to the record -1,202 koz deficit forecast for 2020.

Platinum's sustained discount to gold and the increased relevance of hard assets has seen more gold investors considering and owning platinum, many for the first time. The wider awareness of platinum's key strategic role in the growth of the hydrogen economy, has also driven more investors to consider platinum investment. When these investors take a closer look at platinum, they see that platinum's constrained supply and strong demand growth potential are more compelling than expected and in turn greatly enhance the likelihood of sustained investment demand growth.

Heightened economic risk of lockdowns to combat a second wave of COVID-19 infections, albeit somewhat reduced by vaccination developments, and the associated impact on government debt levels appear likely to maintain interest in precious metals, including platinum, as an attractive alternative investment. This, combined with platinum's heightened demand growth potential and the -224 koz deficit forecast in 2021, suggests upside risk to current investment demand forecasts.

Constrained supply – extended processing outage, power supply concerns and low capital expenditure

Platinum supply expectations for 2020 have been significantly downgraded from previous projections. Total mine supply in 2020 is forecast to fall by 21% or -1,300 koz year-on-year, with c.-400 koz due to COVID-19-related mine shutdowns and c.-900 koz due to the impact of the converter plant outage in the first half, compounded by the recent announcement of a similar outage in the last two months of 2020. The latest outage will alone reduce supply by c.-350 koz this year.

Mine production is expected to return to close to full capacity in 2021 and the now fully offline ACP converter plant is expected to restart in January. However, forecast total mine supply in 2021 is still 6% below the average annual supply from 2015 to 2019. While producer margins improved markedly in 2019 and remained strong in 2020, due to sustained high palladium and rhodium prices, the uncertain outlook created by the COVID-19 pandemic has led to deferrals in capital spending. This has compounded the low level of capital expenditure over the past decade at a time when margins came increasingly under pressure. Additionally, long project development lead times, typically in excess of three years even for greenfield expansions, reduce the possibility of short-term price or deficit related supply responses.

Demand growth potential – Automotive, palladium, jewellery and hydrogen, boosted by investment

The strong V-shaped rebound in automotive markets that has occurred so far in 2020 is expected to continue into 2021, with global light-duty vehicle production forecast to rise by 15% next year to a total of 85 m vehicles and heavy-duty volumes projected up 5%. While vehicle production volume projections remain below 2019 levels, platinum automotive demand is expected to be above pre-pandemic levels. Indeed, compliance with tightening emissions regulations, Euro 6d, China 6b for light vehicles, and China VI for heavy-duty vehicles, will drive higher platinum loadings.

Risk to automotive platinum demand expectations for 2021 is we believe, skewed to the upside, as particularly in Europe, the need for OEMs to bring their European average fleet CO_2 levels to the EU prescribed level (pre-weight adjustment) of 95 g CO_2/km could raise platinum demand. For many OEMs, the route to achieve CO_2 emissions targets has been to launch new gasoline and diesel mild hybrid electric vehicles (MHEV) and plug-in hybrid electric vehicles (PHEV). These models have been increasingly launched throughout 2020 with the diesel variants still offering lower CO_2 emissions compared to gasoline ones and significantly lower CO_2 emissions compared to comparable conventional gasoline vehicles. This trend, as well as favouring the lower CO_2 diesel models, is likely to continue as fleet CO_2/km targets fall 15% by 2025, and 37.5% by 2030. Misleadingly, however, sales of gasoline and diesel engine hybrids are often publicly reported as 'EVs'. This has resulted in some commentators and policy makers referring to higher levels of battery vehicle adoption and lower levels of diesel vehicle sales than is occurring.

Upside risks to demand projections are also being driven by the sustained and significant premium of palladium prices over platinum, notably well above $1,000/oz since the third quarter. This wide premium continues to offer automakers the ability to reduce vehicle costs substantially by substituting platinum for palladium in both diesel and gasoline catalysts at metal ratios of 1:1. The importance of securing this saving, that flows directly to the OEM bottom line profit, has increased significantly in 2020 due to reduced sales and margins. The forecast automotive platinum demand in 2021 of 2,996 koz, includes some platinum being used in place of palladium in gasoline autocatalysts and some shift from palladium to platinum in diesel aftertreatment systems. Understandably, automakers and autocatalyst manufacturers have not published details of the extent to which platinum is currently being used to replace palladium – it is proprietary and confidential information and publication would risk increasing the platinum price. We believe that the amount of substitution is far greater than limited public information might suggest, and that substitution volumes are likely to increase rapidly in 2021 and beyond, as the successful replacement of palladium by platinum is applied to a higher portion of new gasoline and diesel models launched.

Low platinum prices prompted strong imports of platinum into China during the early months of the COVID-19 pandemic by industrial users and jewellery fabricators. Jewellery manufacturers in China recalled the benefit in 2009 of their metal purchases to increase their stocks when the platinum price collapsed. They again increased stock levels during the March 2020 pandemic-driven price fall. Producing, promoting and selling platinum jewellery locks in the value of that discount, offering better margins than gold to manufacturers and retailers. As China's government is expected to maintain their successful virus containment protocols, consumption is expected to continue to improve, with China's platinum jewellery demand expected to increase in 2021 by 13% (+107 koz). This is the first annual rise since 2013, increasing above the pandemic-reduced demand in 2020 but is also higher than demand in 2019.

Green hydrogen, produced by the electrolysis of water using renewable electricity as the power source, is key to decarbonisation across many industries, and is attracting significant policy interest. During 2020 more than 70 countries, plus the EU, pledged to achieve carbon neutrality by 2050. Importantly, China which previously focussed on environmental policy measures to improve air quality, has now pledged to be carbon neutral by 2060. Hydrogen is highly versatile with applications as a feedstock, a fuel, an energy carrier and for storage of renewable energy. Platinum's role in the hydrogen economy is crucial. It is used in fuel cells and in electrolysers to produce green hydrogen, where it is used in conjunction with iridium. A recently announced breakthrough by Heraeus cuts iridium requirements by up to 90%, unlocking more widespread adoption and increased demand for platinum.

The response of the platinum price to address its discount to gold and palladium has been slower than many expected this year. We believe that the hiatus that happened in the platinum futures market, initially caused by pandemic-related transport restrictions, has contributed to this numbed response. The flow of metal into CME approved vaults in the US was, we believe, initially driven during the second quarter by the impact of the COVID-19 pandemic prompting logistics constraints, which in turn diminished market maker participation and overall platinum futures trading activity. The continued flow of metal into CME vaults since the start of the third quarter, we believe represents moves to rebuild market making capacity and provide confidence to investors to trade in platinum futures, a clear positive for the platinum price.

WPIC initiatives highlights

The COVID-19 pandemic continued to negatively impact our product partners in the third quarter of 2020, but to a lesser extent than in the second quarter of the year. Platinum product manufacturing at mints and refineries increased slowly during the quarter as platinum products were added to the efforts to meet the significant investor demand for precious metals that had, in the second quarter, focussed strongly on gold. Despite the higher platinum price in quarter three, demand for bars and coins remained strong, with the flow of products meeting pent up demand. Demand for precious metals remains strong as global events maintain high risk levels.

Our focus remains on increasing the number and impact of product partnerships in three of our key target markets, China, North America and Japan.

Platinum investment encountered headwinds in China this quarter. The Chinese bank regulator required banks to put platinum and palladium trading products on temporary suspension in the third quarter of 2020 until further notice. This pause seemed to be a response from the regulator to the increasing volatility in the international commodity and precious metal markets as well as an attempt to curb the use of risky products by domestic retail investors who do not have an appropriate risk appetite.

As a result, the platinum investment demand via Chinese banks' trading account offerings is very slow, while the retail platinum sales at other partners kept their momentum. We are still working closely with our physical investment platinum partners to expand their distribution network, especially through banks.

The sales of platinum bars and coins by our Japanese partners in the third quarter of 2020 in Japan continued to record exciting growth, though the rate slowed slightly compared to those in the second quarter. Our work with Japan Bullion Market Association (JBMA) to explain platinum investment using social media has started very successfully in quarter three with the number of views growing rapidly. We are also delighted to see that more Japanese firms started using WPIC platinum market content for their investor development.

We continued to work closely with our partners in North America and Europe to help reduce the market constraints arising from COVID-19, especially with regard to the supply of coins. We have implemented initiatives to support specific marketing and promotion activities of our partners starting in quarter four, that will assist our partners ability to sell platinum investment products during these volatile times.

We have a strong pipeline of new partners, new programs and effective products that will assist in enhancing awareness and distribution of platinum in 2020 and beyond.

As the negative effects of the COVID-19 pandemic begin to dissipate, platinum's demand growth potential is likely to strengthen due to its increasingly important role in combating climate change, addressing the imbalance between the platinum and palladium markets and because of its increased attractiveness as a physical, industrial and precious metal investment.

Paul Wilson, CEO

Contents

Table 1: Supply, demand and above ground stocks summary

	2018	2019	2020f	2021f	2020f/2019 Growth %	2021f/2020f Growth %	Q2 2020	Q3 2020
Platinum Supply-demand Balance (koz)								
SUPPLY								
Refined Production	**6,125**	**6,094**	**4,777**	**5,772**	**-22%**	**21%**	**938**	**1,493**
South Africa	4,470	4,402	3,100	4,092	-30%	32%	514	1,056
Zimbabwe	465	455	472	463	4%	-2%	117	121
North America	345	356	352	369	-1%	5%	87	70
Russia	665	716	672	682	-6%	2%	176	200
Other	180	164	181	167	10%	-8%	44	46
Increase (-)/Decrease (+) in Producer Inventory	+10	+2	+20	+0	>±300%	-100%	+34	-58
Total Mining Supply	**6,135**	**6,097**	**4,797**	**5,772**	**-21%**	**20%**	**972**	**1,435**
Recycling	**1,935**	**2,165**	**1,941**	**2,093**	**-10%**	**8%**	**419**	**505**
Autocatalyst	1,420	1,630	1,486	1,573	-9%	6%	309	378
Jewellery	505	477	398	462	-16%	16%	97	113
Industrial	10	58	57	57	-3%	1%	13	14
Total Supply	**8,070**	**8,261**	**6,738**	**7,865**	**-18%**	**17%**	**1,391**	**1,940**
DEMAND								
Automotive	**3,075**	**2,885**	**2,421**	**2,996**	**-16%**	**24%**	**389**	**660**
Autocatalyst	2,930	2,885	2,421	2,996	-16%	24%	389	660
Non-road	145	†	†	†	†	†	†	†
Jewellery	**2,245**	**2,100**	**1,826**	**2,072**	**-13%**	**13%**	**393**	**498**
Industrial	**1,940**	**2,112**	**2,033**	**2,276**	**-4%**	**12%**	**352**	**509**
Chemical	575	698	587	678	-16%	15%	114	124
Petroleum	235	219	115	158	-47%	37%	20	23
Electrical	205	145	136	135	-6%	-1%	29	37
Glass	245	224	478	497	113%	4%	26	138
Medical and Biomedical	240	249	235	254	-6%	8%	59	59
Other	440	577	483	556	-16%	15%	104	129
Investment	**15**	**1,253**	**1,659**	**745**	**32%**	**-55%**	**381**	**981**
Change in Bars, Coins	280	283	629	485	123%	-23%	120	96
Change in ETF Holdings	-245	991	530	250	-47%	-53%	122	543
Change in Stocks Held by Exchanges	-20	-20	500	10	N/A	-98%	138	342
Total Demand	**7,275**	**8,350**	**7,940**	**8,089**	**-5%**	**2%**	**1,515**	**2,648**
Balance	**795**	**-89**	**-1,202**	**-224**	**N/A**	**N/A**	**-124**	**-709**
Above Ground Stocks	**3,165**	**3,561****	**2,360**	**2,135**	**-34%**	**-10%**		

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

Notes:

1. **Above Ground Stocks 3,650 koz as of 31 December 2018 (Metals Focus).
2. † Non-road automotive demand is included in autocatalyst demand.
3. All estimates are based on the latest available information, but they are subject to revision in subsequent quarterly reports.
4. 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 22 and 23 (supply, demand and above ground stocks). Details of regional recycling supply in Table 6 on page 25 are only published from 2019.
5. Data from Metals Focus and SFA (Oxford) may not have been prepared on the same or directly comparable basis.
6. Prior to 2019 SFA data is independently rounded to the nearest 5 koz.

2020 THIRD QUARTER PLATINUM MARKET REVIEW

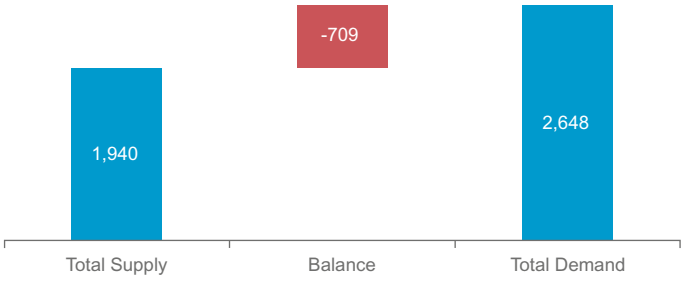
During Q3'20, global economic conditions improved markedly compared to the first half of 2020. Increasingly, larger sections of global activity were nearing pre-COVID-19 levels, which lifted both supply and consumption of platinum. Total platinum supply in Q3'20 was down year-on-year by 5% (-101 koz) compared to a 22% decline in H1'20. Mining shed 4% (-66 koz), as South African operations in particular ramped up to near full capacity over the quarter. Meanwhile, supply from recycling posted a 6% decline (-35 koz), despite elevated levels of material flow directly after borders were re-opened.

Driven by strong investment inflows, total platinum demand was 2,648 koz, 32% (+642 koz) higher than Q3'19. Despite the boost in production rates in Q3'20 and the marked improvement compared to Q2'20, automotive demand was down on the prior year by 3% (-17 koz). Industrial demand decreased 10% (-54 koz) as the petroleum and chemical industries were hard hit by COVID-19. In contrast, jewellery demand showed stronger signs of recovery, posting a 3% (-16 koz) decline for the quarter.

Investment demand strengthened considerably in Q3'20, up year-on-year by 291% (+730 koz). ETF demand rose by 336 koz year-on-year to 543 koz in Q3'20, while bar and coin demand increased by 42 koz to 96 koz. The change in stocks held by exchanges, dominated by increases in holdings in NYMEX approved warehouses, rose to 342 koz.

Following the strong increase in investment demand the platinum market saw a swing from the surplus of Q3'19, and a material deepening of the deficit from Q2'20, to -709 koz in Q3'20.

Chart 1: Supply-demand balance, koz, Q3 2020



Source: Metals Focus

Supply

Global refined production fell 2% (-37 koz) year-on-year to 1,493 koz in the third quarter as declines in South Africa and North America offset growth from Russia, Zimbabwe and other regions. Losses from South Africa were the result of ongoing processing plant challenges at the Anglo American Platinum Converter Plant (ACP). Maintenance and risk control measures at the ACP resulted in 20 days lost output for the quarter. Elsewhere, other producer volumes benefited from improved smelter availability due to maintenance in the prior comparable period. COVID-19 protocols continue to impact mine output as a small number of labour intensive non-mechanised operations build up towards full capacity. Operations with a high international component of their workforce were impacted by travel restrictions and quarantine procedures. A loss of life incident and associated safety stoppage at an Eastern Limb operation reduced production. The net effect was South African refined output declining 6% (-66 koz) year-on-year to 1,056 koz.

Russian production rose 15% (+26 koz) year-on-year to 200 koz as new refining capacities at Kola were completed. Zimbabwean output was not disrupted by the COVID-19 pandemic and rose 4% year-on-year in the quarter, with improved mill performance at two operations offsetting reduced smelter throughput.

In North America, COVID-19 continued to have a modest impact on output as hygiene protocols and maintenance, the latter delayed from earlier in the year, impacted some operations. Production for the quarter fell 10% (-8 koz) year-on-year to 70 koz. In the US, productivity suffered due to COVID-19 protocols, but output remained flat as an expansion project increased output and falling grades elsewhere were offset by increased throughput. Canadian production, primarily sourced from nickel mining, declined due to lower grades.

The 58 koz global build-up in producer inventory was primarily due to a South African producer rebuilding refined metal stockpiles that were drawn down earlier in the year.

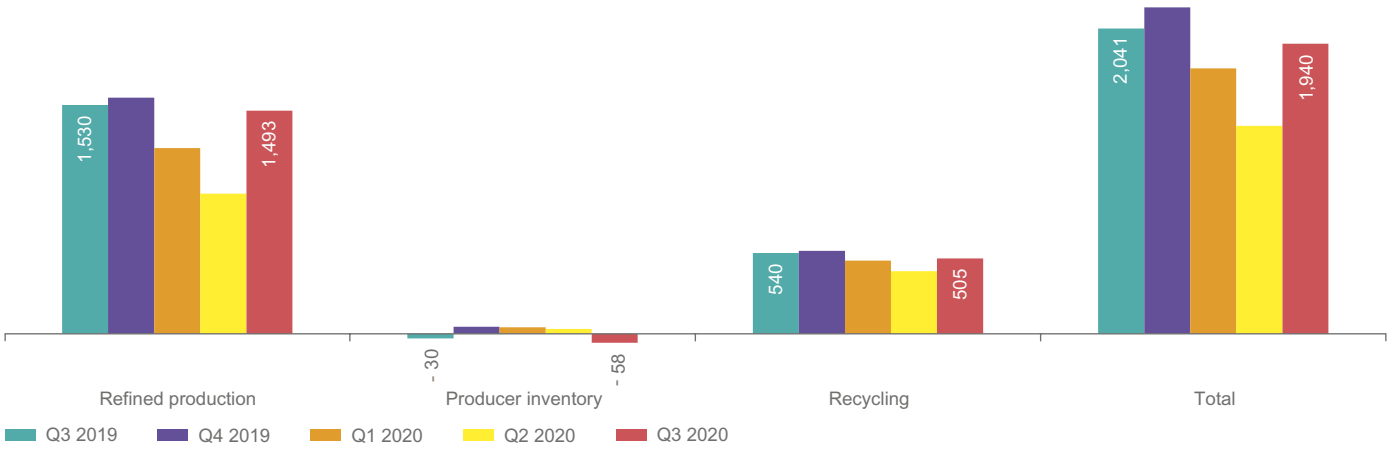
Recycling

Total recycling was down 6% (-35 koz) in Q3'20 after the dramatic 19% drop in Q2. The re-opening of borders promoted ease of movement by collectors and aggregators of spent autocatalysts, while higher platinum prices aided jewellery recycling.

During Q3'20, the recovery of platinum from spent autocatalysts fell by an estimated 8% (-32 koz) year-on-year to 378 koz. This reflected the ongoing impact of lockdown restrictions, especially in the US and Europe. A reduction in the volume of cars that were being scrapped also played a part, as demand for second-hand vehicles rose as some sought to avoid using public transport due to COVID-19 risks. However, there was a partial offset as smelters and refiners continued to work through material that had been accumulated, both during 2019 and early 2020.

As economic activity improved in Q3'20, as COVID-19 restrictions eased further, global jewellery recycling declined by 3% (-4 koz). This was despite the boost in Chinese volumes from successful promotion of retailer product exchange schemes.

Chart 2: Platinum supply, koz

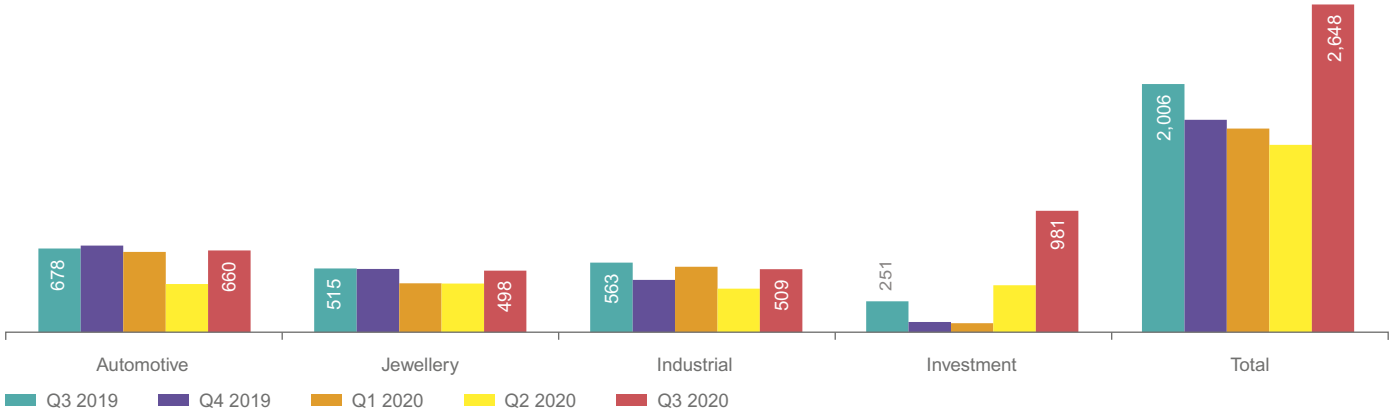


Source: Metals Focus

Demand

Despite the marked recovery in both manufacturing and consumer activity during Q3'20, demand in the automotive, jewellery and industrial markets in Q3'20 were lower year-on-year. However, total platinum demand was up 32% (+642 koz) during the quarter, as ETF investment increased and stocks held by exchanges, primarily in NYMEX approved warehouses reached unprecedented highs.

Chart 3: Platinum demand, koz



Source: Metals Focus

Automotive demand

Following the period of severe lockdown, LMC Automotive reported that light vehicle sales rebounded, with the global seasonally adjusted annualised rate recovering to pre-pandemic levels of around 89 m units in July and August. This rebound was assisted by pent-up vehicle demand and incentives in regions such as Europe which drove the need for inventory replenishment. As a result, global automotive production recovered to 2% below Q3'19, compared to the year-on-year decline of 43% seen in Q2'20. Despite the marked recovery in both sales and production, total automotive demand for platinum was down 3% (-17 koz) year-on-year.

The early adoption by some cities and provinces of China 6 legislation for light-duty vehicles and the ramp-up of heavy-duty vehicles' compliance to China VI, continued to benefit demand from this country. However, the growth of 68% (+30 koz) did not offset the decline in other regions. A further contraction in both vehicle units and diesel's market share in Europe, resulted in a decline of 7% (-22 koz), while the slow recovery in South America and India contributed to a decline of 11% (-15 koz) for the Rest of the World region. North America was flat on prior year recovering from the dramatic 56% drop of Q2'20.

Jewellery demand

Global platinum jewellery demand bounced back by 27% quarter-on-quarter as pandemic-related restrictions eased. However, the total remained 3% (-16 koz) below the prior year as heavy losses in North America and India outweighed a 14% (+29 koz) increase in China.

North American jewellery fabrication in Q3'20 saw a distinct improvement on Q2 (rising 36%), but it remained down by 22% (-18 koz) on Q3'19. This large fall may seem at odds with reported growth in jewellery and watch sales to consumers of 7.5% in July and 9.3% in August compared to the prior year. However, fabrication is measured at the point of production and unprecedented levels of retailer destocking has led to a disconnect with consumer sales of platinum jewellery, which looks to have risen.

European demand almost doubled quarter-on-quarter, attaining a level that was only 4% down on Q3'19, mainly due to a recovery in the sale of high-end watches and jewellery brands. This in turn is largely because a key destination for these pieces, East Asia, recovered from the pandemic more rapidly than other regions. The bridal segment of demand is also understood to have improved on Q2, but remained weak by comparison to Q3'19.

China's platinum jewellery fabrication was up 14% (+29 koz) on Q3'19. The gold-platinum price differential has spurred growing platinum jewellery interest, especially over a quarter where the gold price hit record highs. An increasing number of showrooms have re-introduced platinum jewellery lines with renewed market and product innovation efforts. Of note, one of the leading manufacturers has developed and introduced a 95% pure electroformed product known as 5D Hard Platinum. The hollow structures that can be achieved allow manufacturers to sell bigger and lighter pieces. The higher and volatile gold price has also triggered some substitution of gold pieces in favour of new platinum designs. Finally, the percentage gain was helped by the low base in Q3'19.

Japanese jewellery fabrication in Q3'20 was up by more than 60% on the previous quarter's trough, but 12% (-13 koz) lower year-on-year. There was a material improvement in retail sales as Japan lifted movement restrictions, but reticence to visit shops and ongoing concerns about the economy dampened the recovery. As in North America, consumer sales outpaced restocking, dampening manufacturing volumes. In terms of product ranges, "asset" jewellery, such as heavy kihei chains, continued to outperform and there was also a noticeable, albeit it seems short-lived, spike in bridal sales, as weddings that were postponed due to the pandemic were rescheduled. TV channel and, to a lesser extent, online sales were strong during the quarter.

Consumption in India fell by 40% (-8 koz) to 12 koz, a third consecutive quarterly drop as the spread of COVID-19 weighed heavily on the country's economy and consumer sentiment. Weak demand expectations and a pessimistic outlook for the economy have seen retailers delay inventory replenishment. As a result, we have seen an underperformance of fabrication versus consumption in the last two quarters. Despite this weakness, some positive signs are also emerging. Due to higher margins compared to gold jewellery, retailers have started to aggressively market platinum jewellery. In addition, consumers have taken a renewed interest in platinum, due to the attractive discount to gold at the retail level, seen in some cases at 25-30%.

Industrial demand

Despite rebounding 45% from the prior quarter, industrial demand continued to reflect the economically destructive impact of the pandemic. As a result, Q3'20 offtake contracted by 10% (-54 koz).

Petroleum

Following two consecutive quarters of declining demand, platinum use in the petroleum sector improved slightly in Q3'20, though overall volumes remained historically weak at 23 koz (-32 koz year-on-year). At the start of Q3'20, as national lockdowns eased in many countries, there were initially some improvements in oil consumption. The recovery, however, gradually lost momentum from September onwards, in the wake of renewed COVID-19 fears. More importantly for refineries, any benefit from improving demand was largely offset by high spare capacity and inventories, with refining margins staying depressed. As a result, in spite of a tentative recovery, refinery production run rates remained at historically low levels across most countries, which continued to weigh on platinum demand in Q3. Finally, continuing the trend seen in H1'20, a slower pace in petrochemical capacity expansion this year (which has tended to be integrated with upstream oil refining units in the last couple of years) also explains year-on-year losses in platinum offtake.

Chemical

Despite an 8% (+10 koz) rise from the previous quarter, platinum chemical offtake, at 124 koz in Q3'20, was still 24% (-40 koz) below the same period in 2019. This sharp year-on-year fall should be viewed in the context of record demand for platinum bearing catalysts from new PX and PDH plants in China in 2019, which has proven difficult to sustain this year. Meanwhile, the rapid capacity expansion in China, weak downstream consumption and continuous oversupply globally, continued to weigh on profit margins for many manufacturers in Asia, which in the past relied on exports to China. This in turn resulted in lower operating rates or plants being placed on care and maintenance.

Platinum use in silicone also improved during Q3'20 on the previous quarter. The recovery was uneven across key sectors. Use in medical, health, hygiene and consumer care applications remained robust. In contrast, the slow recovery in other areas, such as automotive, has restrained growth. Elsewhere, after initial COVID-19-related disruptions, the rebound in the production of nitric acid has been swift during Q3. This was largely attributed to most countries having designated the agricultural sector (including fertiliser production) as essential and therefore exempt from business closures and restrictions on movement. That said, with an economic downturn, 2020-to-date has seen a slower pace of new capacity additions, which has negatively affected demand for platinum bearing catalysts.

Medical

Despite the medical sector remaining mostly immune to the restrictive impact of the pandemic, demand for the quarter was down 6% (-4 koz). Overall, elective procedures in Q3'20 were lower than anticipated. In addition, Q3'20 saw a slight decline for in-hospital/clinic administered oncology treatments, as patients with compromised immune systems were advised (where possible) to avoid unnecessary exposure and delay treatments. That said, China and India continued to report increased production for platinum-based antineoplastic agents, especially for export markets.

Glass

Q3'20 saw a sizeable increase in glass demand compared to the previous quarter, with offtake also up by more than one-third compared to the previous year. This was largely due to some of the investments in capacity that were delayed earlier in the year, in the face of COVID-19, coming on-stream during the period. Demand continues to be supported by healthy margins across the whole LCD supply chain and a positive medium-term outlook for composite consumption remains intact.

Electrical

The decline of 1% (-0.3 koz) is reflective of the resumption of HDD shipments to key consumer markets following the lifting of lockdown measures. New work-from-home regimes and fears of a second wave of infections in many countries are sustaining robust demand for IT equipment and fuelling inventory replenishment. However, surveillance and enterprise segments did not fare as well, in the light of continued cost conservation amid prevailing economic uncertainty. In addition, SSDs continue to erode HDD demand due to increasing adoption of the former in laptops, game consoles and aerospace devices.

Other

Improved demand in spark plugs and sensors, due to the gradually recovering vehicle and automotive aftermarket, helped demand in Q3'20 bounce back to 129 koz, up 24% on the prior quarter. Despite staging a strong quarter-on-quarter recovery other industrial demand was still 10% (-15 koz) below the prior year.

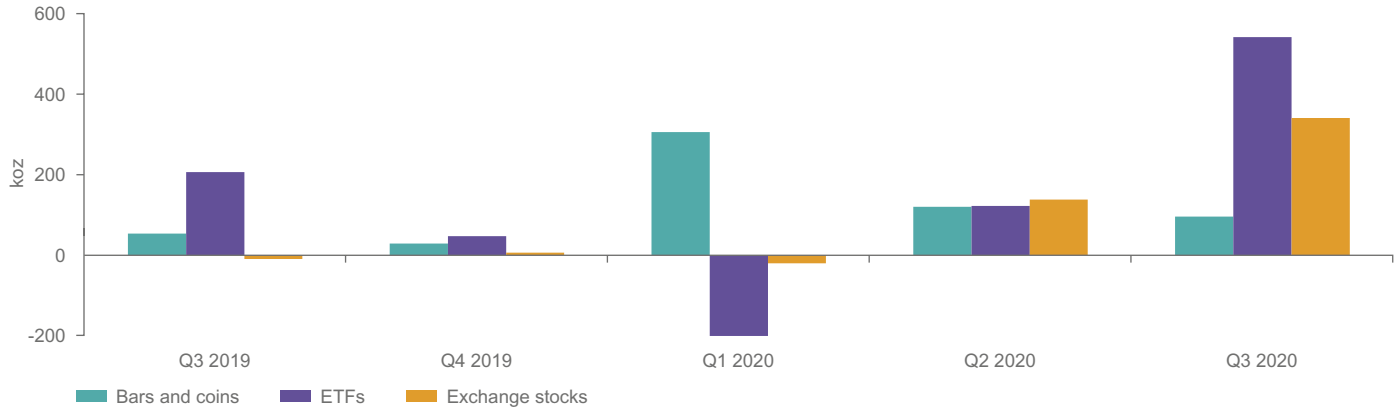
Investment demand

Global bar and coin demand rose by 78% (+42 koz) year-on-year during Q3'20 to 96 koz. This reflected gains in every key retail investment market, but most significant in volume terms were the increases in North America and Japan. Both markets benefited from bargain hunting in August and early September when the platinum price weakened. In the case of Japan, this helped offset price-related liquidations earlier in the quarter. Furthermore, some of the product shortages in North America, which hit demand in Q2'20, were not as acute during Q3, though they were not entirely addressed. Interestingly, retail activity in that market appeared largely one-way, with little sign of selling back either when prices jumped in July or then recovered towards the end of Q3.

European bar and coin investment edged higher in Q3'20 on the previous quarter and remained at an elevated level. In line with Q2'20, investor interest in platinum bars and coins was fuelled by the metal's attractive price levels, especially compared to gold. Sales also benefited from an easing of product shortages.

The strong investor interest in platinum ETFs seen in Q2'20 accelerated during Q3'20, with holdings growing by +543 koz to close September at an all-time high of 3.8 moz. Exchange of futures for physical (EFP) volatility and sponge discounts to ingot persisted during Q3'20, resulting in further inflows into CME approved vaults in the US and increasing stocks held by exchanges to 342 koz.

Chart 4: Platinum Investment, koz



Source: Metals Focus

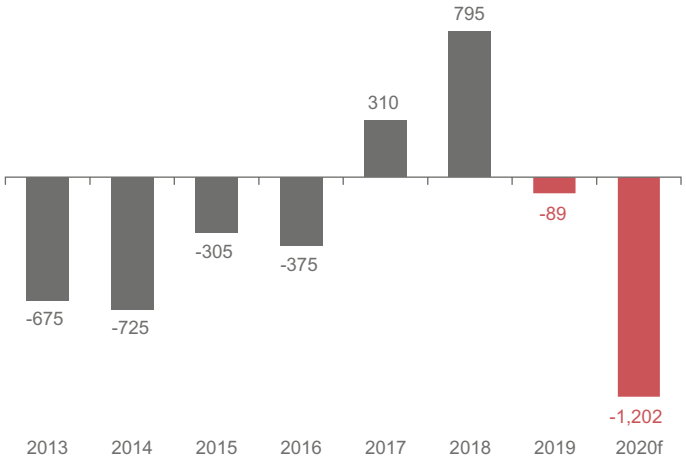
2020 FORECAST

In the context of the marked improvement in economic activity quarter-on-quarter, we expect the last three months of 2020 to see a further recovery, as governments and businesses continue to find ways to stimulate and promote increased consumption and production. Despite this, total supply for the full year is expected to be down 18% (-1,524 koz).

Compared to supply, the decline in demand is somewhat lower due to significant investment demand growth cushioning the drop. Total platinum demand for the year is forecast to be down by 5% (-410 koz), led by declines of 16% (-464 koz) in automotive demand, 13% (-274 koz) in jewellery demand and 4% (-79 koz) in industrial demand. Despite ETF demand being 47% (-461 koz) below the 2019 level, the healthy 123% (+347 koz) forecast increase in bar and coin demand and the unprecedented inflows of 520 koz into stocks held by exchanges (primarily CME approved warehouses) are expected to see investment demand grow by 32% (+406 koz).

As a result of the 18% decline in supply, due mainly to mine supply curtailment and the 5% decline in demand, as elevated investment demand offset declines elsewhere, the platinum market is expected to shift into a deficit of -1,202 koz in 2020.

Chart 5: Supply-demand balance, koz, 2013-2020f



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

Supply

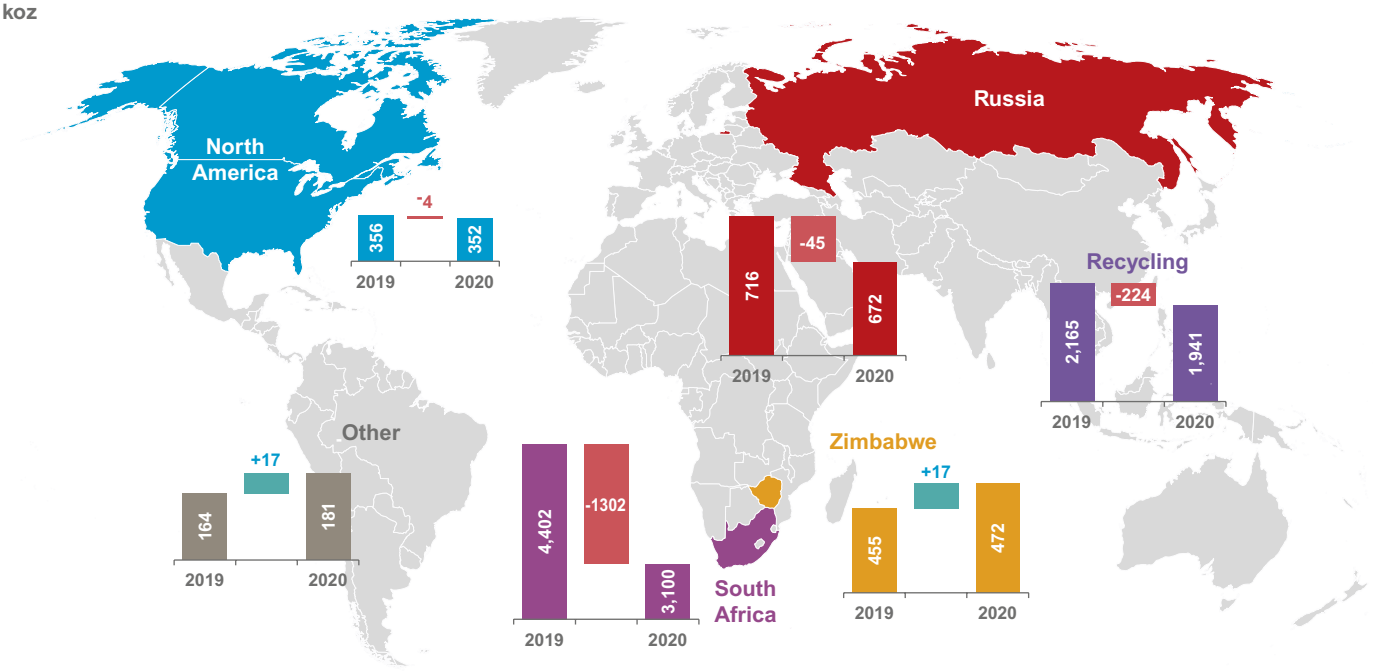
Global refined platinum production is forecast to fall 22% (-1,318 koz) year-on-year to 4,777 koz driven by losses from South Africa. The country's output is expected to decline 30% (-1,302 koz) as a result of a processing infrastructure failure and COVID-19 curtailed operations. With smelters and refineries permitted to return to full operations ahead of mines, some producers took the opportunity to draw down their in-process inventory to support refined output. However, the ACP shutdown severely curtailed South African processing capacity and the recently announced closure of the ACP Phase B unit will impact output through Q4'20 until a planned switch-over to the repaired Phase A can be carried out. Most COVID-19 related losses were realised in the first half of 2020, however a few non-mechanised operations continued to ramp-up through the third quarter. At the end of October, the industry workforce has almost returned to its pre-pandemic complement. Throughput is close to pre-pandemic planned levels with mining disruption in the final quarter expected to be minimal. Russian output is expected to decline 6% (-45 koz) year-on-year to 672 koz, due to smelter maintenance and last year's refining of accumulated in-process inventory.

Zimbabwean production is predicted to increase by 4% (+17 koz) as losses due to COVID-19 mine shut-downs are offset by operations being able to refine accumulated in-process inventory. North American output is expected to remain stable year-on-year as a COVID-19 shutdown at a Canadian mine and reduced output from nickel mining is offset by the build-up from a US expansion project.

As a response to disruptions and the risk of constrained logistics in the first half of 2020, producers released refined inventory to supplement sales. The drawdown reversed in the third quarter as logistical challenges eased and normalising production allowed industry working inventories to be rebuilt. Further rebuild is expected in the final quarter, however unplanned disruption of processing infrastructure could see producers again turn to stockpiles to supplement sales.

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

koz



Source: Metals Focus

Recycling

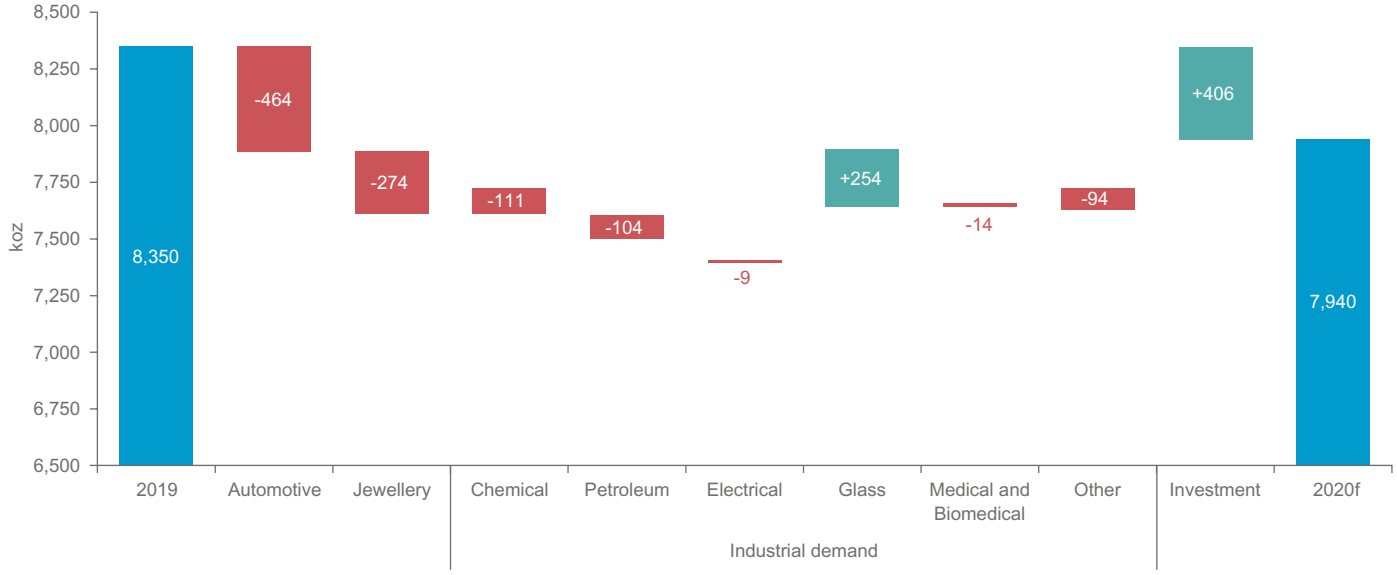
Dominated by the severe drop in recyclable material in Q2'20 and despite the healthy recovery during the rest of the year and the drawing down of unprocessed stock, recycling is still expected to be lower by 10% (-224 koz) for the full year.

We expect platinum autocatalyst recycling this year to weaken by 9% (-144 koz) to 1,486 koz. In spite of this, the total will still be the second highest on record. The decline reflects the impact of lockdown measures, which at times prevented consumers from selling back old vehicles and also scrapyards from delivering spent catalysts to smelters. The drop in new vehicle sales, as economic distress forces consumers to delay buying a new car, has weighed on the market. That said, there will be a partial offset as smelters and refiners react to the drop in their receipts of PGM-bearing material, to process stocks that had been accumulated in the previous year. Weakness for the year-to-date and little expected growth in Q4'20 mean that global jewellery recycling is on track to fall a significant 16% (-78 koz) in calendar 2020.

Demand

In 2020, demand for platinum is forecast to decrease from 8,350 koz to 7,940 koz, representing a loss of 5% (-410 koz). Automotive demand is expected to fall by 16% (-464 koz), jewellery demand by 13% (-274 koz), industrial demand by 4% (-79 koz) and investment demand (comprising bar and coin demand, changes in ETF holdings and changes in exchange stocks) is forecast to increase by 32% (+406 koz) year-on-year.

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



Source: Metals Focus

Automotive demand

Despite the strong Q3'20 recovery, global light-duty vehicle production for the full year is forecast to be down 17% and heavy-duty vehicle production is expected to drop by 14%. At times during the year two-thirds of global production was in China, as plants elsewhere came to a dramatic halt. Most North American and Asian countries, excluding China, are now almost fully operational again, but COVID-19 workplace requirements have weighed on effective plant capacity. With Western European production down 21% and other 'diesel-friendly' regions such as India down by 26%, platinum demand in automotive catalysts will suffer further. For the full year, demand is expected to drop 16% (-464 koz), with 70% of this reduction driven by lower demand in Europe (-23%, -321 koz). In contrast, China's resilience and the ramp-up to China VI standards is expected to result in an increase of 41% (+81 koz).

The downward revisions in 2020 are mostly associated with lower vehicle units as loadings are driven by the prevailing emissions legislation. Though implementation in some regions has been postponed in light of the pandemic, in most countries the OEMs' adoption of legislative changes has continued unaltered, accounting for higher metal loadings. In Europe, despite submission for a delay to Euro 6d (ISC-FCM) by European OEMs there have been no concessions given. In China, however, concessions were made and the nationwide implementation of China 6b (relating to the particulate number limits) has been postponed to January 2021. In any case, many Chinese cities and provinces have already implemented China 6a or 6b.

Jewellery demand

Platinum jewellery demand in 2020 is forecast to be 13% down on 2019, as the expected 4% (+22 koz) growth in Q4 will fail to make much of a dent in year-to-date losses.

There is continued uncertainty in North America stemming from fears over the magnitude and rise in COVID-19 infections and the impact of the presidential election. However, consumers have proved more resilient than expected and seasonal gifting and engagements are expected to remain little affected, even if weddings are postponed. Informed by orders in September, producers are optimistic and restocking through the retail supply chain in the run up to the holiday season is expected. Nevertheless, the full year figure is still expected to be down 20%.

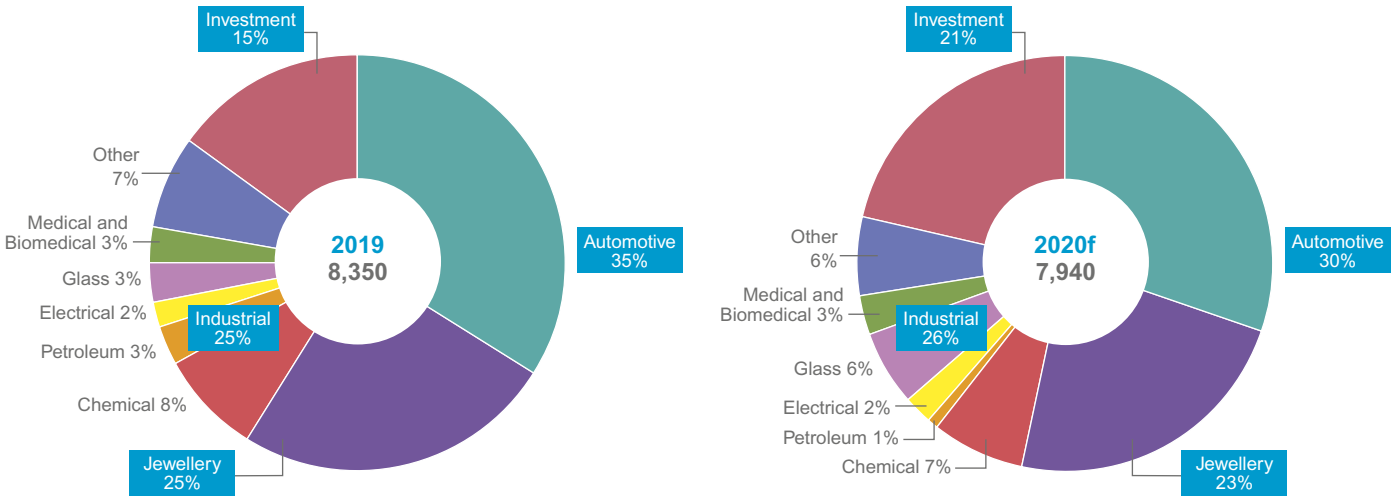
In Europe, the rise in COVID-19 infections also raises further concerns for a recovery in the jewellery sector. However, fabrication may remain quite resilient, through the contribution being made by the top-end branded sector. That should enable fabrication in 2020 to see a 17% drop on 2019.

On the back of the strong Q3'20 demand recovery in China, we have revised our 2020 forecast for platinum jewellery upwards. Demand in the country is now expected to decline 6% (-52 koz), reflecting the better-than-expected previous quarter, as well as supply chain improvements and product promotions planned for the final three months of the year.

Industrial demand

Total industrial demand is expected to continue to recover resulting in a 2020 total of 2,033 koz, marking a 4% (-79 koz) drop on the prior year.

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



Source: Metals Focus

Chemical

Similar to many industrial applications, the impact of a full-blown second wave COVID-19 crisis and the introduction of new lockdown measures could restrain the recovery in platinum use in the petrochemical industry during Q4'20. For the full year, platinum consumption is projected to drop by 16% (-111 koz) year-on-year to 587 koz.

Petroleum

A resurgence of COVID-19 in many countries, local lockdown measures, continued working from home and the weak aviation sector have all affected the near-term outlook for oil consumption. This, along with still high crude oil inventories, will continue to keep refining output well below normal levels in Q4'20. This in turn will limit capacity additions and a result, platinum offtake in the petroleum sector is expected to fall by 47% to 115 koz in 2020.

Electrical

Full year demand for 2020 is forecast to be 6% (-9 koz) down. In view of growing shipments of high-capacity drives for nearline and data central storage, the addition of platters per unit is expected to lead to higher platinum loadings per unit. This is likely to partially offset the downward pressure on platinum offtake due to falling HDD market shares in several categories.

Medical

Demand for platinum in medical devices and cancer treatment protocols are expected to be slightly down (6%, -14 koz) in 2020 as elective procedures and in-hospital oncology treatments are slower to resume in Europe and North America than previously expected. During 2020, oncology specialists reported seeing one-third less patients than in 2019, with remote consultations increasing dramatically. Specialists also report that limited visitor policies have seen an increase in treatment protocol change, where feasible, to include cancer medication which patients can self-administer. Despite these trends, in other regions we continue to see growth in the production of platinum-based active pharmaceutical ingredients for cancer treatment for both local and export markets.

Glass

LCD furnace installations are expected to accelerate in the final quarter of the year, as more new capacity that was originally pushed back, due to the crisis, starts to come on stream. This will result in glass demand more than doubling year-on-year in 2020 to 478 koz, although this compares with a historically low base last year.

Other

Given the large contribution of other automotive components in this category annual demand will be hard hit by the pandemic (in spite of the strong recovery that is underway), with a reduction of 16% (-94 koz) year-on-year.

Investment demand

This year, we expect global bar and coin demand to rise by 123% (+347 koz) to a five-year high of 629 koz. The most significant increases are expected in Japan (+234 koz) and North America (+80 koz). Gains might have been even stronger, had it not been for the difficulty at times during the year in securing product.

The net inflow into ETF holdings is expected to continue in Q4 as the current accommodative monetary and fiscal policies prevail, making the precious metals complex an attractive alternative investment. During 2020 and through to end-September, ETF holdings grew 452 koz and we expect they will continue to increase during the last quarter. Given the possible dampening effect of the election, we have conservatively estimated net inflows for the full year to reach 530 koz. This would leave global ETF platinum holdings at 3.9 moz by the end of 2020.

The uncharacteristically high inflow of platinum into NYMEX warehouses seen in Q2'20, persisted during Q3, with a net change of +342 koz. With sponge discounts and forward price premiums to spot prices persisting, we can expect to see these flows continue. However, if the arbitrage opportunity continues to shrink, we expect these flows to slow during the last quarter. Notwithstanding this, changes in exchange stocks could reach 500 koz by the end of 2020.

ABOVE GROUND STOCKS

Putting all the above factors together, we forecast a market deficit for 2020 of -1,202 koz, which will result in above-ground stocks falling to 2,360 koz by the end of 2020.

2021 OUTLOOK

Supply

In 2021 total supply is forecast to increase by 17% (+1,127 koz) year-on-year to 7,865 koz, recovering to 95% of the pre-pandemic level. Mine supply is expected to sharply rebound 20% (+976 koz) year-on-year to 5,772 koz following the extreme disruption of 2020.

South Africa will account for most of the gains and is forecast to rise 32% (+992 koz) year-on-year to 4,092 koz as output recovers following the processing infrastructure failure and pandemic curtailed operations of 2020. The mine restructuring and shaft closures of the previous few years, a response to the low PGM price environment, have now been fully implemented with the decline in mine capacity expected to stabilise in 2021. Reserve depletion will necessitate an additional Western Limb shaft closure, but losses will be offset as replacement shafts at the same mine complete their ramp-up.

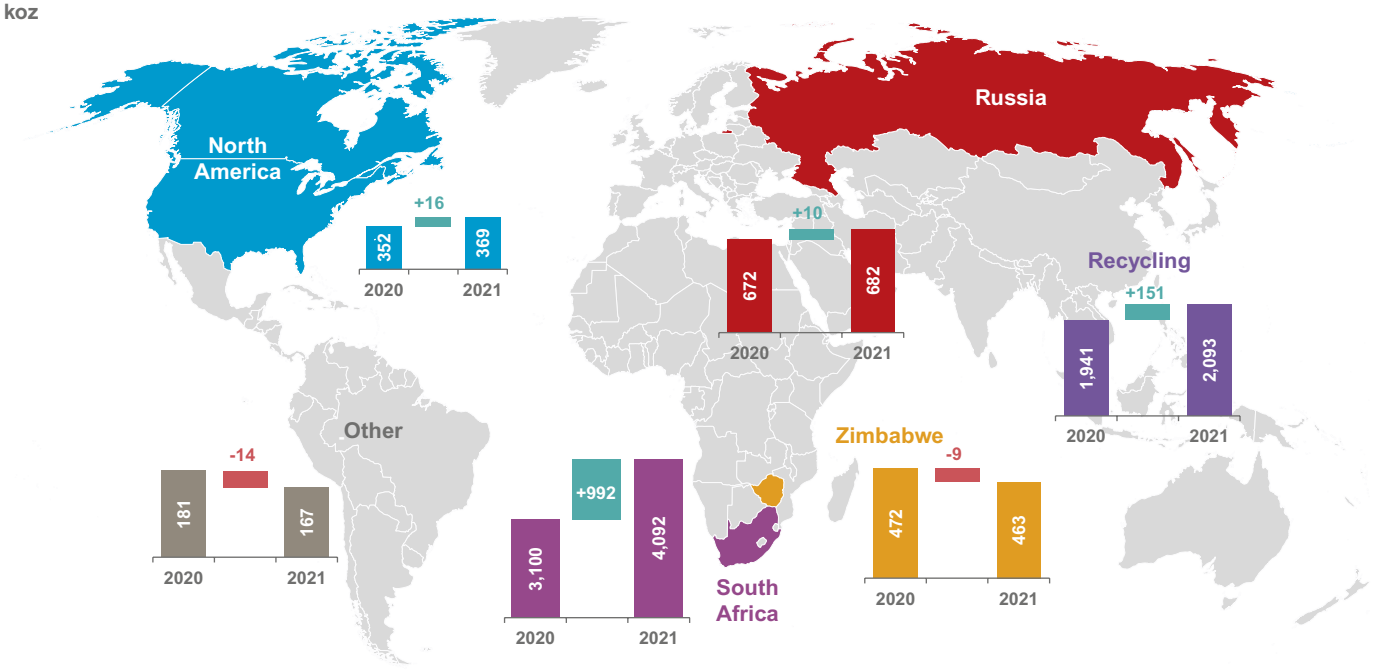
Existing growth projects continue to bring online modest additional volumes. However, in response to COVID-19 uncertainty, miners' reduced risk appetite will see deferred capital spending and delayed project development. Additionally, pandemic disruption meant equipment suppliers were unable to deliver key new project equipment items and as a result, volumes from project development will be less than originally planned. Given the increased PGM basket prices, the industry continues to assess further growth options with many targeting higher palladium lower platinum ore bodies. Feasibility studies for two major Northern Limb projects are expected by the end of 2021. However, unlike previous cycles mining companies are prioritising returning value to shareholders above development capital spend. This means that potential significant new volumes remain several years away.

Material risk for South African mine production remains, as the country's electricity supply crisis has worsened with cumulative load shedding in 2020 exceeding prior years. Eskom continues to warn that the electricity supply grid will be unreliable and supply unpredictable for the next year until maintenance programmes are completed in September 2021.

Russian output is expected to increase 2% (+10 koz) year-on-year to 682 koz as additional mine capacity is commissioned and a refinery upgrade reaches full capacity. North American output is forecast to reach 369 koz, up 5% (+16 koz), as declines in secondary by-product production from nickel mining are more than offset by growth from a primary producer.

Output from Zimbabwe is expected to be 2% (-9 koz) down as one mine complex, placed on care and maintenance due to COVID-19, returns to full production and output from a new mine development mostly offsets declines at two mines nearing their end-of-life.

Chart 9: Changes in supply, 2020f vs. 2021f



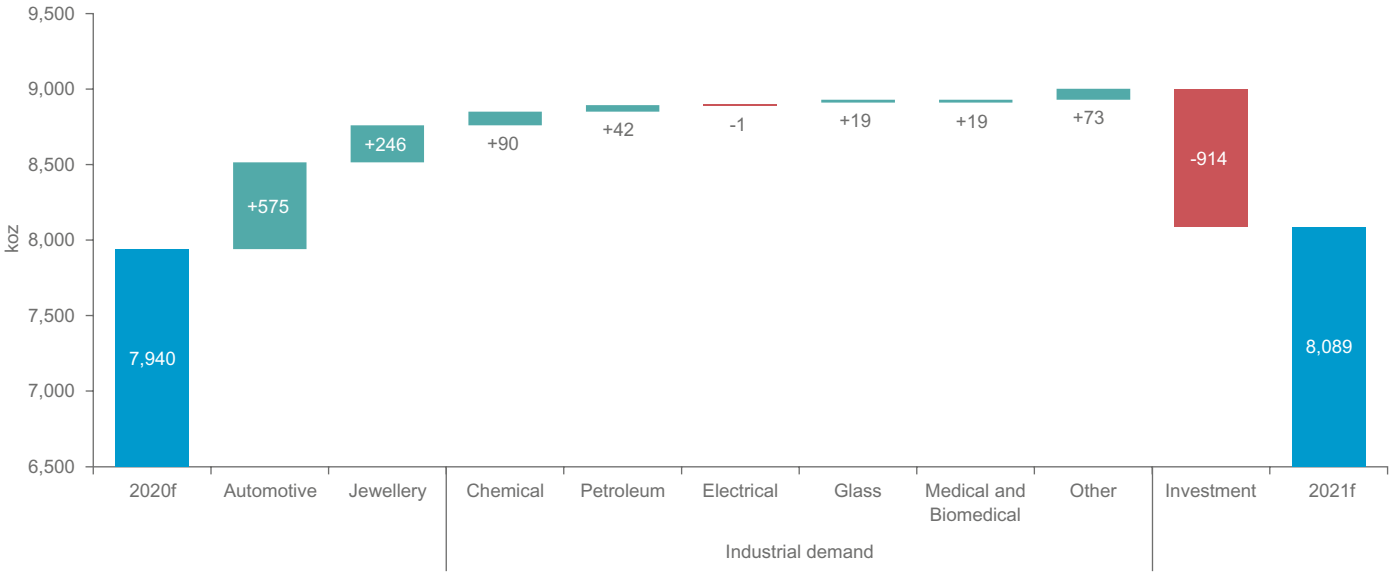
Source: Metals Focus

Global platinum supply from recycling is forecast to grow 8% to 2,093 koz (+151 koz). We forecast autocatalyst recycling to return to growth, with a 6% rise (+87 koz) to 1,573 koz as global logistics gradually return to pre-pandemic status and as economic growth gradually improves, new vehicle sales increase the volume of vehicles that are scrapped. Jewellery recycling volumes in 2021 are forecast to grow by 16%, as a result of fewer restrictions and relatively higher platinum prices, with China accounting for the bulk of gains.

Demand

As the world emerges from the pandemic over the course of 2021, we expect economic activity to gradually return to near pre-pandemic levels and automotive, jewellery and industrial demand to grow. However, as investment demand is not expected to repeat the record in 2020 it will decline. Total platinum demand in 2021 is therefore expected to increase 2% (+150 koz) to 8,089 koz.

Chart 10: Changes in demand by category, 2020f vs. 2021f



Source: Metals Focus

We forecast a 24% (+575 koz) increase in automotive demand as light-duty vehicle production is set to increase by 11 m units to 85 m and heavy-duty vehicle production grows by 5%. Even though light-duty production is expected to be 4m units below 2019, platinum demand is projected to increase to 4% above pre-pandemic levels due to the increase in loadings and substitution of platinum at the expense of palladium. Full compliance in 2021 of light-duty vehicles in the EU with Euro 6d, full implementation of China 6b for light vehicles on 1 January 2021 and, most importantly, China VI implementation by July 2021 for heavy-duty vehicles contribute to these higher platinum loadings. This increase in platinum demand also includes some platinum being used in place of palladium in gasoline autocatalysts and some shift from palladium to platinum in diesel aftertreatment systems. Substitution in gasoline engines in 2021 is expected in China and North America, where there is slightly greater flexibility in auto catalyst homologation rules.

Jewellery demand in 2021 is forecast to increase by 13% (+246 koz), with all regions seeing double-digit growth. This would leave total demand 28 koz down on 2019 pre-COVID-19 level, reflecting some lingering pandemic effects and lower sales due to expected higher platinum prices. Expected growth in North America is due to the normalisation of retailing activities (including stock replenishment), economic recovery, governmental stimulus support and still wide price differentials to gold. In Europe, low stock levels and increased demand from higher income groups, that have escaped the worst of the economic damage from the pandemic, could result in fabrication demand rising by as much as 20% in 2021. As China's government is expected to maintain their successful virus containment protocols, consumption is expected to improve further. We expect jewellery demand to increase by 13%, helped also by the platinum-gold spread and a push by local retailers and manufacturers.

Platinum use in the chemical industry is expected to rise by 15% (+90 koz) in 2021, with volumes just 3% (21 koz) below 2019 demand (which itself was a decade-high). All major areas are expected to record improvements next year, as economic activities gradually return to normal. An additional boost should come from China, where new mega-integrated refining and petrochemical plants are expected to come on-stream as the country remains committed to cut its reliance on imported petrochemicals in the long-term.

Assuming the global economy gradually improves as we progress into 2021, so will global oil refining output. That said, platinum demand, at 158 koz (+37%) next year, will remain 28% below its pre-COVID level due to several factors. First, the pandemic is likely to lead to some long-lasting damage to the oil industry, with demand taking years to recover. Second, prior to the crisis, the oil industry had already faced structural overcapacity and depressed margins. Substantial losses this year may well force many companies to accelerate refinery rationalisation, with some operations in Europe in particular facing risk of permanent closure. Some of these negative factors should be offset by the ongoing expansion of newly integrated crude-to-petrochemical units in China.

In the electrical and electronics sector, energy-assisted magnetic recording drives with 9-10 platters offer further cost advantages. These are scheduled for commercial shipment in 2021, strengthening HDDs' position in mass data storage. Despite this and following further inroads made by SSDs, platinum offtake is forecast to decline marginally by 1% (-1 koz) to 135 koz in 2021.

Medical demand is forecast to grow 8% (+19 koz) as demand for platinum based cancer treatments increase and the surgical procedures involving the use of platinum containing devices return to normal levels.

Plans to continue building LCD glass furnaces, primarily in China, as well as ongoing increases in global glass fibre capacity, should continue to support demand for platinum from that sector next year. At 497 koz we forecast demand will increase by 4% year-on-year.

Looking at other industrial demand we forecast a rebound of 15% to 556 koz next year, fuelled by higher automotive production, coupled with a rising number of sensors in each vehicle. Moreover, stationary fuel cell systems and green hydrogen electrolysis capacity are likely to start achieving some momentum towards the end of 2021. That said, headwinds from further waves of COVID-19 spread remain a major downside risk.

Bar and coin demand in 2021 is forecast to ease back to 485 koz, a drop of 23% year-on-year (-144 koz). However, the total will still remain high by historical standards. We expect this strength to emerge from buying on price dips as price remains volatile and for liquidations to remain modest despite our higher price expectations.

Following two years of unprecedented strong ETF demand, we anticipate that investment buying will slow down. Having said this, as the shadow of COVID-19 will most likely remain in place for a large part of 2021, investors should remain positive towards platinum and the wider precious metals complex. As deliveries into NYMEX in general have already slowed in October 2020 and on the assumption that arbitrage opportunities will over time wane, we expect to see exchange stock changes return to more normal low levels in 2021.

ABOVE GROUND STOCKS

The market is expected to be in a deficit of -224 koz in 2021, which would result in above-ground stocks reducing to 2,135 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.

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

	2013	2014	2015	2016	2017	2018	2019	2020f	2021f	2020f/2019 Growth %	2021f/2020f Growth %
Platinum Supply-demand Balance (koz)											
SUPPLY											
Refined Production	**6,060**	**4,865**	**6,155**	**6,030**	**6,125**	**6,125**	**6,094**	**4,777**	**5,772**	**-22%**	**21%**
South Africa	4,345	3,125	4,475	4,250	4,380	4,470	4,402	3,100	4,092	-30%	32%
Zimbabwe	405	405	405	490	480	465	455	472	463	4%	-2%
North America	355	395	365	390	360	345	356	352	369	-1%	5%
Russia	740	740	710	715	720	665	716	672	682	-6%	2%
Other	215	200	200	185	185	180	164	181	167	10%	-8%
Increase (-)/Decrease (+) in Producer Inventory	-215	+350	+30	+30	+30	+10	+2	+20	+0	>±300%	-100%
Total Mining Supply	**5,845**	**5,215**	**6,185**	**6,060**	**6,155**	**6,135**	**6,097**	**4,797**	**5,772**	**-21%**	**20%**
Recycling	**1,980**	**2,035**	**1,705**	**1,840**	**1,895**	**1,935**	**2,165**	**1,941**	**2,093**	**-10%**	**8%**
Autocatalyst	1,120	1,255	1,185	1,210	1,325	1,420	1,630	1,486	1,573	-9%	6%
Jewellery	855	775	515	625	560	505	477	398	462	-16%	16%
Industrial	5	5	5	5	10	10	58	57	57	-3%	1%
Total Supply	**7,825**	**7,250**	**7,890**	**7,900**	**8,050**	**8,070**	**8,261**	**6,738**	**7,865**	**-18%**	**17%**
DEMAND											
Automotive	**3,130**	**3,245**	**3,350**	**3,430**	**3,305**	**3,075**	**2,885**	**2,421**	**2,996**	**-16%**	**24%**
Autocatalyst	2,990	3,095	3,210	3,295	3,165	2,930	2,885	2,421	2,996	-16%	24%
Non-road	140	150	140	135	140	145	†	†	†	†	†
Jewellery	**2,945**	**3,000**	**2,840**	**2,505**	**2,460**	**2,245**	**2,100**	**1,826**	**2,072**	**-13%**	**13%**
Industrial	**1,490**	**1,580**	**1,700**	**1,805**	**1,700**	**1,940**	**2,112**	**2,033**	**2,276**	**-4%**	**12%**
Chemical	535	540	505	560	565	575	698	587	678	-16%	15%
Petroleum	50	60	205	215	100	235	219	115	158	-47%	37%
Electrical	195	215	205	195	210	205	145	136	135	-6%	-1%
Glass	145	175	200	205	180	245	224	478	497	113%	4%
Medical and Biomedical	220	220	225	230	235	240	249	235	254	-6%	8%
Other	345	370	360	400	410	440	577	483	556	-16%	15%
Investment	**935**	**150**	**305**	**535**	**275**	**15**	**1,253**	**1,659**	**745**	**32%**	**-55%**
Change in Bars, Coins	-5	50	525	460	215	280	283	629	485	123%	-23%
Change in ETF Holdings	905	215	-240	-10	105	-245	991	530	250	-47%	-53%
Change in Stocks Held by Exchanges	35	-115	20	85	-45	-20	-20	500	10	N/A	-98%
Total Demand	**8,500**	**7,975**	**8,195**	**8,275**	**7,740**	**7,275**	**8,350**	**7,940**	**8,089**	**-5%**	**2%**
Balance	**-675**	**-725**	**-305**	**-375**	**310**	**795**	**-89**	**-1,202**	**-224**	**N/A**	**N/A**
Above Ground Stocks	**3,465***	**2,740**	**2,435**	**2,060**	**2,370**	**3,165**	**3,561****	**2,360**	**2,135**	**-34%**	**-10%**

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.

Table 3: Supply and demand summary – quarterly comparison

	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q3'20/Q3'19 Growth %	Q3'20/Q2'20 Growth %
Platinum Supply-demand Balance (koz)											
SUPPLY											
Refined Production	**1,665**	**1,565**	**1,320**	**1,665**	**1,530**	**1,579**	**1,243**	**938**	**1,493**	**-2%**	**59%**
South Africa	1,230	1,170	874	1,218	1,122	1,189	832	514	1,056	-6%	105%
Zimbabwe	120	120	113	120	116	106	118	117	121	4%	4%
North America	90	90	85	99	79	94	98	87	70	-10%	-19%
Russia	180	145	204	189	174	149	150	176	200	15%	13%
Other	45	40	44	40	40	41	45	44	46	15%	4%
Increase (-)/Decrease (+) in Producer Inventory	-20	-20	+12	-28	-30	48	44	34	-58	N/A	N/A
Total Mining Supply	**1,645**	**1,545**	**1,332**	**1,637**	**1,501**	**1,627**	**1,286**	**972**	**1,435**	**-4%**	**48%**
Recycling	**490**	**495**	**549**	**520**	**540.21**	**556**	**489**	**419**	**505**	**-6%**	**21%**
Autocatalyst	365	380	413	387	410	420	406	309	378	-8%	22%
Jewellery	125	115	120	119	116	121	70	97	113	-3%	16%
Industrial	0	0	15	14	14	15	14	13	14	5%	8%
Total Supply	**2,135**	**2,040**	**1,881**	**2,157**	**2,041**	**2,183**	**1,776**	**1,391**	**1,940**	**-5%**	**39%**
DEMAND											
Automotive	**715**	**765**	**763**	**743**	**678**	**701**	**649**	**389**	**660**	**-3%**	**70%**
Autocatalyst	675	730	763	743	678	701	649	389	660	-3%	70%
Non-road	35	40	†	†	†	†	†	†	†	†	†
Jewellery	**550**	**560**	**539**	**535**	**515**	**511**	**395**	**393**	**498**	**-3%**	**27%**
Industrial	**475**	**500**	**556**	**570**	**563**	**422**	**530**	**352**	**509**	**-10%**	**45%**
Chemical	155	140	140	202	163	194	177	114	124	-24%	8%
Petroleum	55	55	55	55	55	55	34	20	23	-58%	12%
Electrical	50	55	35	36	38	36	32	29	37	-1%	26%
Glass	65	65	120	71	102	-69	110	26	138	36%	>±300%
Medical and Biomedical	45	70	62	62	62	62	59	59	59	-6%	0%
Other	105	115	145	144	143	145	118	104	129	-10%	24%
Investment	**65**	**-65**	**794**	**126**	**251**	**82**	**73**	**381**	**981**	**291%**	**158%**
Change in Bars, Coins	70	50	111	89	54	29	306	120	96	78%	-20%
Change in ETF Holdings	5	-115	687	50	207	47	-213	122	543	163%	>±300%
Change in Stocks Held by Exchanges	-10	0	-4	-13	-10	6	-20	138	342	N/A	147%
Total Demand	**1,805**	**1,760**	**2,652**	**1,975**	**2,006**	**1,716**	**1,647**	**1,515**	**2,648**	**32%**	**75%**
Balance	**330**	**280**	**-771**	**182**	**35**	**466**	**129**	**-124**	**-709**	**N/A**	**N/A**

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

Notes:

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

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

	H1 2018	H2 2018	H1 2019	H2 2019	H1 2020	H1'20/H1'19 Growth %	H1'20/H2'19 Growth %
Platinum Supply-demand Balance (koz)							
SUPPLY							
Refined Production	**2,905**	**3,230**	**2,985**	**3,110**	**2,180**	**-27%**	**-30%**
South Africa	2,075	2,400	2,091	2,311	1,346	-36%	-42%
Zimbabwe	230	240	233	222	235	1%	6%
North America	175	180	184	173	184	0%	7%
Russia	340	325	393	324	326	-17%	1%
Other	85	85	84	81	89	6%	10%
Increase (-)/Decrease (+) in Producer Inventory	+50	-40	-15	+18	+77	N/A	>±300%
Total Mining Supply	**2,955**	**3,190**	**2,969**	**3,127**	**2,258**	**-24%**	**-28%**
Recycling	**940**	**985**	**1,069**	**1,096**	**909**	**-15%**	**-17%**
Autocatalyst	675	745	800	830	715	-11%	-14%
Jewellery	265	240	240	237	167	-30%	-30%
Industrial	0	0	29	29	27	-7%	-7%
Total Supply	**3,895**	**4,175**	**4,038**	**4,224**	**3,166**	**-22%**	**-25%**
DEMAND							
Automotive	**1,605**	**1,480**	**1,506**	**1,379**	**1,039**	**-31%**	**-25%**
Autocatalyst	1,525	1,405	1,506	1,379	1,039	-31%	-25%
Non-road	75	75	†	†	†	†	†
Jewellery	**1,150**	**1,110**	**1,074**	**1,026**	**788**	**-27%**	**-23%**
Industrial	**960**	**975**	**1,127**	**985**	**882**	**-22%**	**-10%**
Chemical	280	295	342	357	291	-15%	-18%
Petroleum	110	110	109	109	54	-50%	-50%
Electrical	105	105	71	74	61	-13%	-17%
Glass	120	130	191	33	135	-29%	>±300%
Medical and Biomedical	125	115	124	124	117	-6%	-6%
Other	220	220	289	288	222	-23%	-23%
Investment	**5**	**0**	**921**	**333**	**454**	**-51%**	**36%**
Change in Bars, Coins	155	120	200	82	427	113%	>±300%
Change in ETF Holdings	-140	-110	737	254	-91	N/A	N/A
Change in Stocks Held by Exchanges	-10	-10	-17	-4	118	N/A	N/A
Total Demand	**3,720**	**3,565**	**4,627**	**3,722**	**3,162**	**-32%**	**-15%**
Balance	**175**	**610**	**-589**	**501**	**4**	**N/A**	**-99%**

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

Notes:

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

Table 5: Regional demand – annual and quarterly comparison

	2013	2014	2015	2016	2017	2018	2019	2020f	2021f	2020f/2019 Growth %	2021f/2020f Growth %	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
Platinum gross demand (koz)																
Automotive	**3,135**	**3,240**	**3,355**	**3,430**	**3,310**	**3,080**	**2,885**	**2,421**	**2,996**	**-16%**	**24%**	**678**	**701**	**649**	**389**	**660**
North America	425	465	500	455	420	425	338	285								
Western Europe	1,350	1,395	1,555	1,705	1,560	1,295	1,449	1,122								
Japan	585	585	510	450	440	430	328	279								
China	130	125	125	160	190	180	198	279								
India	165	170	180	170	175	195	††	††								
Rest of the World	480	500	485	490	525	555	572	455								
Jewellery	**2,945**	**3,000**	**2,840**	**2,505**	**2,460**	**2,245**	**2,100**	**1,826**	**2,072**	**-13%**	**13%**	**515**	**511**	**395**	**393**	**498**
North America	200	230	250	265	280	280	341	272								
Western Europe	220	220	235	240	250	255	237	197								
Japan	335	335	340	335	340	345	372	330								
China	1,990	1,975	1,765	1,450	1,340	1,095	872	820								
India	140	175	180	145	175	195	102	56								
Rest of the World	60	65	70	70	75	75	176	151								
Chemical	**535**	**540**	**505**	**560**	**565**	**575**	**698**	**587**	**678**	**-16%**	**15%**	**163**	**194**	**177**	**114**	**124**
North America	55	55	50	50	50	50	77	88								
Western Europe	110	105	75	110	115	110	125	110								
Japan	10	10	10	15	15	15	66	62								
China	195	215	230	225	215	215	220	178								
Rest of the World	165	155	140	160	170	185	210	149								
Petroleum	**50**	**60**	**205**	**215**	**100**	**235**	**219**	**115**	**158**	**-47%**	**37%**	**55**	**55**	**34**	**20**	**23**
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**	**136**	**135**	**-6%**	**-1%**	**38**	**36**	**32**	**29**	**37**
North America	10	15	15	10	15	15	38	36								
Western Europe	5	10	10	10	10	10	27	25								
Japan	15	15	15	15	15	15	20	18								
China	75	70	70	80	90	85	28	27								
Rest of the World	90	105	95	80	80	80	31	29								
Glass	**145**	**175**	**200**	**205**	**180**	**245**	**224**	**478**	**497**	**113%**	**4%**	**102**	**-69**	**110**	**26**	**138**
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	-132	42								
China	90	85	95	100	85	75	180	344								
Rest of the World	60	90	100	90	95	130	110	87								
Medical	**220**	**220**	**225**	**230**	**235**	**240**	**249**	**235**	**254**	**-6%**	**8%**	**62**	**62**	**59**	**59**	**59**
Other industrial	**345**	**370**	**360**	**400**	**410**	**440**	**577**	**483**	**556**	**-16%**	**15%**	**143**	**145**	**118**	**104**	**129**
Bar & Coin Investment	**-5**	**50**	**525**	**460**	**215**	**280**	**283**	**629**	**485**	**123%**	**-23%**	**54**	**29**	**306**	**120**	**96**
North America							159	239								
Western Europe							52	73								
Japan							46	280								
Rest of the World							25	37								
ETF Investment	**905**	**215**	**-240**	**-10**	**105**	**-245**	**991**	**530**	**250**	**-47%**	**-53%**	**207**	**47**	**-213**	**122**	**543**
North America							125	600								
Western Europe							509	180								
Japan							-13	50								
Rest of the World							370	-300								
Change in Stocks Held by Exchanges	**35**	**-115**	**20**	**85**	**-45**	**-20**	**-20**	**500**	**10**	**N/A**	**-98%**	**-10**	**6**	**-20**	**138**	**342**
Investment	**935**	**150**	**305**	**535**	**275**	**15**	**1,253**	**1,659**	**745**	**32%**	**-55%**	**251**	**82**	**73**	**381**	**981**
Total Demand	**8,505**	**7,970**	**8,200**	**8,275**	**7,745**	**7,280**	**8,350**	**7,940**	**8,089**	**-5%**	**2%**	**2,006**	**1,716**	**1,647**	**1,515**	**2,648**

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.

Table 6: Regional recycling – annual and quarterly comparison

	2013	2014	2015	2016	2017	2018	2019	2020f	2021f	2020f/2019 Growth %	2021f/2020f Growth %	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
Platinum recycling supply (koz)																
Automotive	**1,120**	**1,255**	**1,185**	**1,210**	**1,325**	**1,420**	**1,630**	**1,486**	**1,573**	**-9%**	**6%**	**410**	**420**	**406**	**309**	**378**
North America							520	489								
Western Europe							848	754								
Japan							116	117								
China							36	31								
Rest of the World							110	96								
Jewellery	**855**	**775**	**515**	**625**	**560**	**505**	**477**	**398**	**462**	**-16%**	**16%**	**116**	**121**	**70**	**97**	**113**
North America							3	3								
Western Europe							4	4								
Japan							187	162								
China							276	223								
Rest of the World							5	5								
Industrial	**5**	**5**	**5**	**5**	**10**	**10**	**58**	**57**	**57**	**-3%**	**1%**	**14**	**15**	**14**	**13**	**14**
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.

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 store digital data by magnetic platers.

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.

Paraxylene

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.

PDH

Propane dehydrogenation, where propane is converted to propylene.

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.

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) are 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

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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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