

FOREWORD

This edition of *Platinum Quarterly* considers platinum supply and demand developments for the first quarter of 2020 and provides an updated outlook for 2020. The *Platinum Quarterly* report and data (starting on page 5) 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.

The impacts of the COVID-19 pandemic on global economies and markets continue to unfold. These impacts on the platinum market in 2020 are expected to reduce both demand and supply, but – due to dynamics peculiar to platinum and unrelated to the pandemic – the overall negative effects are far less than might be expected. However, forecasts of platinum supply and demand are likely to remain volatile for several months, particularly until Europe, North America and South Africa contain the spread of COVID-19 and the impact of the wide range of economic effects of the pandemic on platinum can be evaluated more accurately.

Platinum supply and demand – 2020

In 2020 total platinum supply is expected to be 7,197 koz, 10% (-836 koz) lower than the average of the past 5 years, with total platinum demand at 6,950 koz, down 13% (-1,034 koz) on the same basis. Consequently, the surplus expected for 2020 is 247 koz compared to the prior estimate of 119 koz.

The revised forecast of total platinum supply in 2020 of 7,197 koz is 13% (-1,065 koz) lower than in 2019 and reflects a 13% (-810 koz) decline in refined production and a 12% (-255 koz) decline in recycling supply.

Total platinum demand in 2020 is forecast to be 6,950 koz, 18% (-1,480 koz) lower than in 2019 due to lower demand from all four demand segments: automotive (-413 koz), jewellery (-315 koz), industrial (-104 koz) and investment (-647 koz). Despite forecast total investment demand in 2020 being 51% lower than in 2019, bar and coin demand is expected to be up 115% at 605 koz due to the (mainly retail) flight to hard assets associated with significantly increased global risk.

Q1 2020 was in surplus of 124 koz with total supply down 6% and total demand down 38%

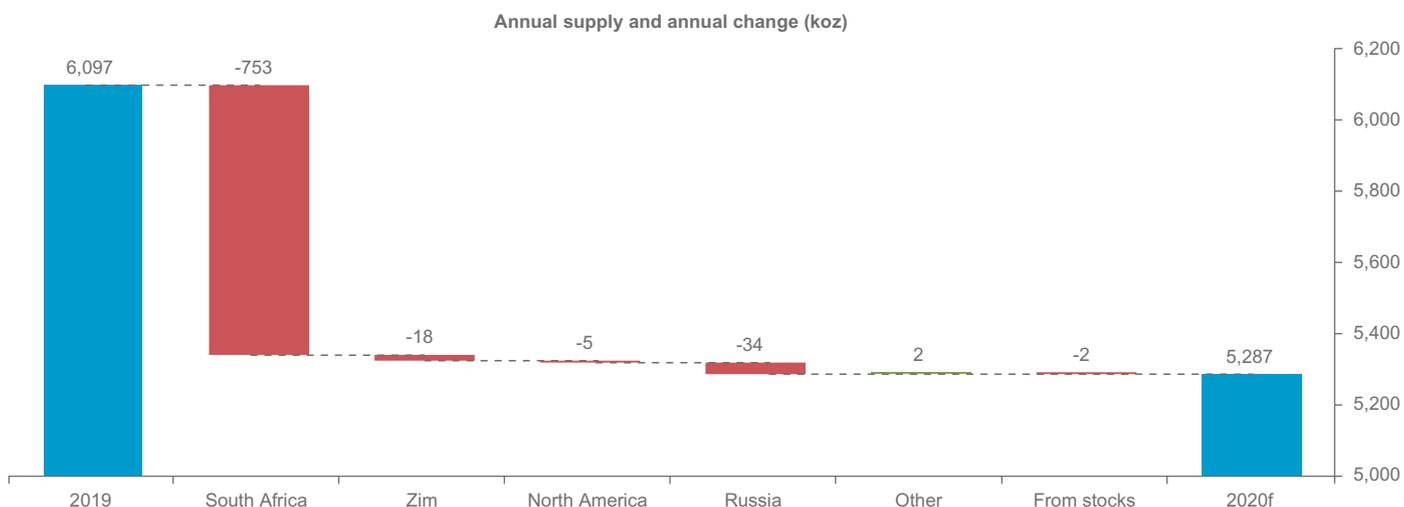
Supply in the first quarter of 2020 was 6% lower than in 2019 as the effects of the Anglo American Platinum converter plant outage and the mining shutdown in South Africa to prevent the spread of COVID-19 both occurred in the last month of the quarter. Refined metal released from process inventory (locked up in 2019) replaced some of the lost refined platinum production. Similarly, reduced platinum recycling, as a result of pandemic related logistics interruptions, were offset by the recycling of material backlogged at refiners in 2019.

Demand in the first quarter fell year-on-year by 38% (-1,000 koz) to 1,649 koz primarily due to investment demand being 90% lower from an exceptionally high base in Q1'19. Platinum automotive demand, down 17% and jewellery demand, down 26%, suffered from COVID-19 related shutdowns while segmental demand trends in industrial demand, down 3%, drove its demand change more than the pandemic. The growing actual and expected impacts of the pandemic on the world economy led to most equities and metals, including platinum, suffering price falls of between 10% and 35% during March. Platinum ETF outflows in March saw the quarter end with net sales of 213 koz. In contrast, the low price led to a surge in bar and coin demand to 312 koz, mainly in the US and Japanese markets.

The COVID-19 pandemic's impact on demand occurred earlier in the quarter than its impact on supply and this contributed to the surplus in the quarter of 124 koz.

2020 Supply – increased forecast risk and materially lower mine supply due to COVID-19 and smelting outage

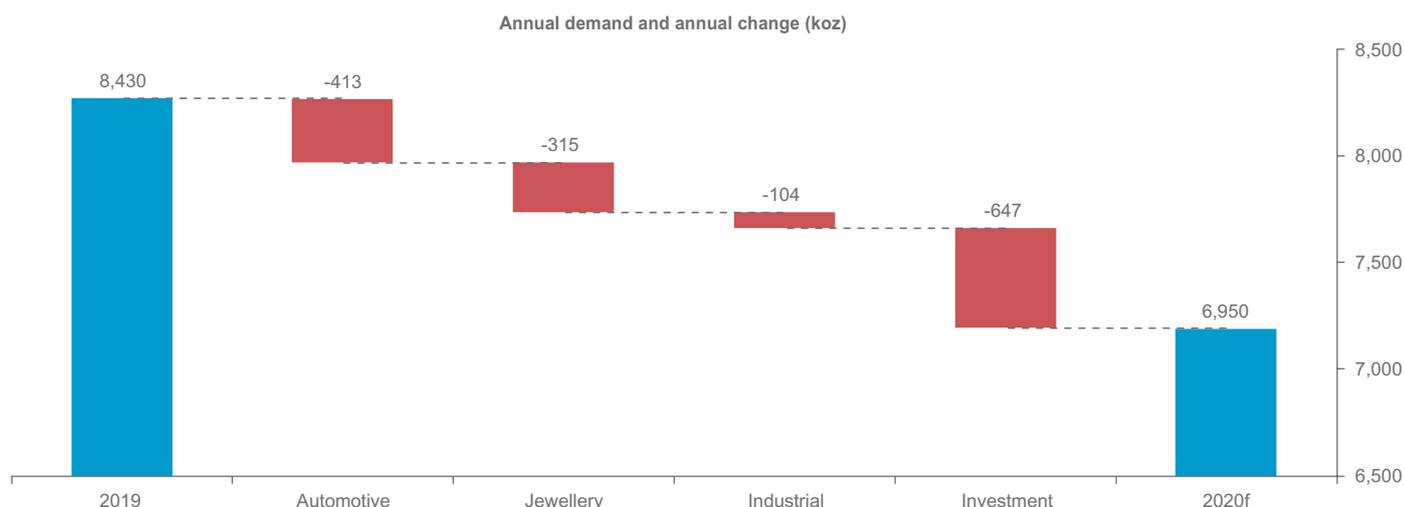
Total mining supply in 2020 is forecast to fall 13% (-810 koz) below that in 2019 to 5,287 koz. Over 75% of platinum mine supply in 2020 is expected from Southern Africa where uncertainty remains high regarding the impact the pandemic will have on mining operations. Mining supply from South Africa in 2020 is forecast to reduce by 753 koz from 2019 with at least 500 koz of the reduction due to repair downtime at the Anglo American Platinum converter plant and the balance largely due to COVID-19 related mining industry shutdowns.



2020 Demand – significant fall in demand dominated by impacts of the pandemic

Lockdowns in China in the first quarter of 2020 reduced jewellery sales and heavy duty automotive demand. Outside of China the falls in vehicle production, jewellery sales and industrial use in 2020 remain uncertain. The reduction in ETF demand in the first quarter is expected to be offset over the rest of the year and the exceptional bar and coin demand in quarter one, is expected to almost double by year end. Industrial demand remains robust and is least affected by the pandemic due to the nature of capacity growth and platinum use in developing technologies.

Despite the expected reduction in vehicle production in 2020 due to the pandemic, the implementation of stricter emissions standards in China and India, and the associated higher metal loadings per vehicle, will partly offset the volume-related reduction in automotive platinum demand.



The platinum investment case – platinum remains undervalued with demand growth potential not yet reflected

The particularly strong ETF investment demand in 2019 of c.1 moz – characterised by large institutional investors, who typically take 2-year to 3-year views and positions – has remained largely intact despite current events. We believe this reflects that these investors still expect platinum to reflect a materially higher value over the next 18 months. This investment opportunity, in our view, rests on two key issues within the context of the COVID-19 pandemic: constrained supply and demand growth potential; the latter including investment demand as increased global risk makes physical assets and precious metals more attractive investments.

Constrained supply – aggravated by smelting failure, COVID-19 shutdowns and reduced mining margin certainty:

Mining shutdowns to prevent the spread of COVID-19 are expected to reduce platinum mine supply by c.253 koz in 2020 yet this reduction will be eclipsed by the smelting outage, reducing refined platinum production in 2020 by c.500 koz. Platinum mining and primary smelting is not affected by the outage, but the mining output built up during the converter repair downtime is expected to take nearly two years to be processed through existing facilities. These unexpected reductions in supply come after a five-year period where South African platinum mines struggled to maintain production at roughly the same average annual level of 4,400 koz. Most platinum producers were operating at a loss in 2018 as decades of above inflation annual cost increases and low Platinum Group Metal (PGM) prices had reduced margins. In 2019 the unavailability of palladium and rhodium lifted their prices significantly which, together with the rand (ZAR) weakening materially against the US dollar, bolstered producer margins. The material falls in PGM prices this year as the pandemic unfolded has reduced producer margins, increased uncertainty in future prices and further reduced the likelihood of any near-term capacity growth. Mine supply risk is weighted to the downside.

Demand growth potential – up on COVID-19, climate change, palladium and investment:

The unprecedented negative fiscal impact on national governments due to the COVID-19 pandemic is likely to significantly restrict funding of the power grid and charging infrastructure necessary to support the mass roll out of Battery Electric Vehicles (BEVs). However, reducing climate change remains paramount, perhaps even heightened by the improved air quality experienced during lockdowns. This makes it essential to reduce CO₂ from internal combustion engine (ICE) vehicles at the lowest overall cost. Diesel vehicles, whether new sales or the existing fleet already on the road, emit between 20% and 35% less CO₂ than conventional gasoline vehicles. Encouraging new diesel sales, which are now low NO_x, and low CO₂, and preserving the CO₂ benefits of the on-road diesel fleet are both essential. Automakers in Europe have been preparing the technical changes to reduce new vehicle CO₂ emissions for several years. In 2020, we are likely to see increased platinum demand as automaker CO₂ strategies include the wide range of diesel and diesel hybrid vehicles already on sale and which have higher platinum loadings. Retrofitting of high-NO_x-emitting Euro 5 diesel cars has already commenced in Germany and if rolled out to the rest of Europe will increase platinum demand; materially if extended to similar Euro 6 cars that are pre Euro 6d-Temp (RDE) compliant.

The COVID-19 pandemic brought palladium's multi-year price surge to an end in February. However, palladium's 43% peak to trough price fall in February/March, more dramatic than other precious and industrial metals, bar rhodium (-60%), has been driven more by physical purchasing for vehicle manufacture in China than by investors. Changes in investor positioning in palladium, in futures and physically backed ETFs, were not significant in palladium's 2019 price rise, nor in the March 2020 collapse. Chinese automaker physical palladium purchases were key to 2019's price surge, driven by the implementation of strict China 6 emissions standards. In January/February 2020, Chinese passenger car production fell 48% year-on-year and stopped automaker palladium purchases. However, in March Chinese automaker output returned to pre-COVID-19 levels, resulting in spot buying to meet higher current loadings and causing the rapid price rebound. Palladium demand growth, unrelated to COVID-19, and its high price, still over \$1,000 /oz higher than platinum, maintains the need for platinum to replace palladium in autocatalysts in the world's two largest passenger car markets, China and North America.

During previous disconnects between the price of platinum and palladium, substitution of platinum for palladium balanced the two markets. Understandably, automakers and autocatalyst manufacturers have not published details of substitution underway – it is proprietary and confidential information and publication would risk increasing the platinum price – but is a process likely to continue during and after the pandemic.

The COVID-19 pandemic has increased significantly global risk by adding unprecedented economic stress to an environment already challenged by declining global growth, trade wars and the impasse between oil producers. The performance of gold has reflected its increased appeal as a risk hedge, despite its fall in March as large investors scrambled for cash to manage the collapse in equities. The increasing gold ownership and gold price are good for platinum, a reasonable proxy for gold and an undervalued alternative physical or physically-backed investment asset. The tighter platinum market is also expected to increase investor interest. The significant surge in platinum buying on the SGE and in platinum imports into China in 2020 suggest a significant response in China to the low platinum price not contained in the demand data we publish in this report. Sales of platinum on the Shanghai Gold Exchange (SGE) were up from an average of 171 koz per quarter in 2019 to 455 koz in Q1 2020. Similarly, direct platinum imports into China that averaged 573 koz per quarter in 2019 rose to 834 koz in Q1 2020. We believe this to be a prudent value response by long-standing manufacturing participants in platinum, industrial and jewellery, increasing stock levels for short- or long-term benefit.

WPIC initiatives highlights

The COVID-19 pandemic had material impacts on our product partners in the first quarter of 2020. These included unprecedented demand for platinum investment products as the platinum price fell to decade low levels. This was partly offset by closures of platinum investment product manufacturing (mints and refineries), inactive supply chains, complicated logistics and delays in product development initiatives. We worked closely with our partners, where possible, to heighten their focus on platinum, minimise negative impacts and assist them in meeting investor demand. Record bar and coin sales were recorded in Q1 2020 by most of our partners.

Most supply chain issues were not eased until after the end of the quarter, with bar and coin manufacturing yet to return to full volume. The wide range of COVID-19 related impacts are expected to slow product development initiatives by varying degrees dependant on region and the nature of the specific investment product.

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

In China, initiatives launched through our Shanghai office continue to promote broadly the awareness and ownership of platinum as an investment asset. Our partners in China experienced increased platinum demand as the platinum price fell significantly in March, partly as a result of this greater awareness of the opportunity. Our videoconference webinars and training with partners during various stages of pandemic related shutdowns proved very popular and effective. We are pleased with progress in 2020 and commenced two more new product partnerships: LPM, an online retailer headquartered in Hong Kong, and Zijin Gold, a subsidiary of the mining giant Zijin Group. Zijin plan to work with us to grow physical platinum sales alongside their extensive gold product offering, through bank distribution.

Japan also experienced unprecedented demand for platinum bars and coins in the quarter. We partnered with the Japan Bullion Market Association (JBMA) to increase the awareness and ownership of platinum by widely distributing our research and insights in the Japanese language. This market is the most mature for platinum bars and coins, with active two-way trade having been a feature for over 70 years.

In the US, we are pleased to note that we facilitated one of our partners to work with eBay to develop a platinum investment offering. We were also able to increase contact between our partners in Europe and those in the US, to find creative ways to supply product to meet the unprecedented demand in the first quarter. Many other dealers and wholesalers sold out of nearly all platinum bullion products. Product shortages continued throughout the latter part of the quarter and are expected to continue in the coming months. Lack of product from Swiss refineries and South Africa added to this shortage.

The excellent news that the South African Mint had launched a one-ounce platinum bullion coin (The Elephant in the Big Five series) was diluted as the initial minting sold out and no further production or exports from South Africa have been possible to date.

WPIC product partnerships work to increase the number, quality and awareness of platinum investment products available to investors worldwide. In addition, the established links between our partners and their clients, customers and partners are invaluable in increasing awareness of platinum as an investment asset. Our partners amplify the distribution of WPIC research and insights and contribute to meeting the research and insight needs of the growing pool of investors actively considering an investment in platinum.

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

Despite the serious and negative effects of the COVID-19 pandemic, platinum's demand growth potential is likely to endure through and after the pandemic due to its role in reducing 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

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PLATINUM QUARTERLY Q1 2020

Table 1: Supply, demand and above ground stocks summary

	2017	2018	2019	2020f	2020f/2019 Growth %	Q4 2019	Q1 2020
Platinum Supply-demand Balance (koz)							
SUPPLY							
Refined Production	6,125	6,120	6,094	5,287	-13%	1,579	1,283
South Africa	4,380	4,470	4,402	3,649	-17%	1,189	879
Zimbabwe	480	465	455	438	-4%	106	118
North America	365	350	356	352	-1%	94	93
Russia	720	665	716	683	-5%	149	150
Other	180	170	164	166	1%	41	43
Increase (-)/Decrease (+) in Producer Inventory	+30	+10	+2	+0	-100%	+48	+0
Total Mining Supply	6,155	6,130	6,097	5,287	-13%	1,627	1,283
Recycling	1,890	1,930	2,165	1,910	-12%	556	490
Autocatalyst	1,325	1,420	1,630	1,508	-7%	420	406
Jewellery	560	505	477	345	-28%	121	70
Industrial	5	5	58	57	-2%	15	13
Total Supply	8,045	8,060	8,262	7,197	-13%	2,183	1,773
DEMAND							
Automotive	3,325	3,100	2,894	2,481	-14%	703	634
Autocatalyst	3,185	2,955	2,894	2,481	-14%	703	634
Non-road	140	145	†	†	†	†	†
Jewellery	2,460	2,245	2,100	1,785	-15%	510	401
Industrial	1,685	1,910	2,184	2,080	-5%	447	534
Chemical	565	570	692	608	-12%	191	162
Petroleum	100	235	219	122	-44%	55	34
Electrical	210	205	145	141	-3%	36	32
Glass	180	245	303	478	58%	-26	132
Medical and Biomedical	235	240	249	229	-8%	47	59
Other	395	415	577	503	-13%	145	115
Investment	275	15	1,252	605	-52%	82	79
Bars and coins	215	280	281	605	115%	28	312
Change in ETF Holdings	105	-245	991	0	-100%	47	-213
Change in Stocks Held by Exchanges	-45	-20	-20	0	100%	6	-20
Total Demand	7,745	7,270	8,430	6,950	-18%	1,742	1,649
Balance	300	790	-168	247	247%	441	124
Above Ground Stocks	4,140*	2,370	3,160	3,730	7%		

Source: Metals Focus 2019-2020, SFA (Oxford) 2017-2018.

Notes:

1. Prior to 2019 numbers have been independently rounded to the nearest 5 koz.
2. Above Ground Stocks: *As of 31st December 2012 (SFA (Oxford)). ** 3,650 koz as of 31 December 2018 (Metals Focus).
3. Non-road automotive demand: † 2019 and 2020 included in autocatalyst.
4. All estimates are based on the latest available information, but they are subject to revision in subsequent quarterly reports.
5. 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 Q1 2018 and half-yearly estimates from H1 2018 are included in Tables 3 and 4 respectively, on pages 17-18 (supply, demand and above ground stocks).

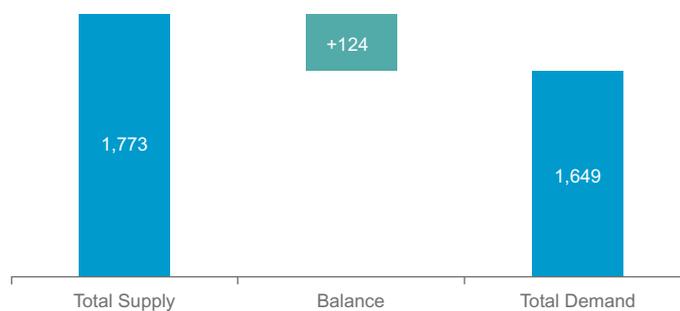
2020 FIRST QUARTER PLATINUM MARKET REVIEW

In the first quarter of 2020 demand for platinum was impacted by several fast-changing factors brought about mainly by the spread of the COVID-19 virus that left governments, companies and consumers reeling. Manufacturing and consumer buying related to platinum was severely curtailed in key markets because of government-imposed lockdown measures which, at different points during the quarter, affected close to half of the world's population. In the context of this global crisis platinum demand declined by 38% (-1,000 koz) to 1,649 koz year-on-year in Q1'20 owing, for the most part, to investment demand being 90% lower from an exceptionally high base in Q1'19. Platinum automotive demand, down 17% and jewellery demand, down 26%, suffered from COVID-19 related shutdowns while segmental demand trends in industrial demand, down 3%, drove its demand change more than the pandemic. The actual and expected impact of the pandemic on the world economy and global markets caused many equity and metal prices to collapse in March. Platinum ETF outflows in March saw the quarter end with net sales of 213 koz. In contrast, the low price led to a surge in bar and coin demand to 312 koz, mainly in the US and Japanese markets.

Total supply was 1,773 koz in Q1'20, representing an overall decrease of 6% (-108 koz). Total mining supply was down only 3% year-on-year to 1,283 koz, as the impact of the pandemic on mining occurred very late in the quarter and added to specific producer supply reductions unrelated to the pandemic. In addition, Q1'19 was heavily impacted by South Africa's electricity supplier Eskom load shedding, reducing the size of the year-on-year change. Autocatalyst recycling was down only 2%, as that industry too did not experience the full brunt of the lockdown constraints until late in the quarter. In contrast, jewellery recycling was down by 42%.

As platinum demand experienced the impact of the pandemic earlier than supply, the quarter was in surplus by 124 koz.

Chart 1: Supply-demand balance, koz, Q1 2020



Source: Metals Focus

Supply

South African production stayed virtually flat in Q1, rising by just 1% (+5 koz) year-on-year to 879 koz. Anglo American Platinum's production of refined platinum was effectively halted on March 6th due to the unplanned shutdown of the company's converter plant or ACP. This loss was partly offset by increases from Impala Platinum, where a drawdown of in-process inventory buoyed refined output. In an effort to curb the spread of COVID-19, the country entered lockdown on March 26th resulting in 6 days of lost mine production, although some limited mining and smelting continued.

Eskom implemented limited stage 2 load shedding, impacting some mining operations during the quarter, however, refined output was unaffected. This contrasts with Q1'19 when South Africa's ongoing power generating crisis resulted in significant lost production.

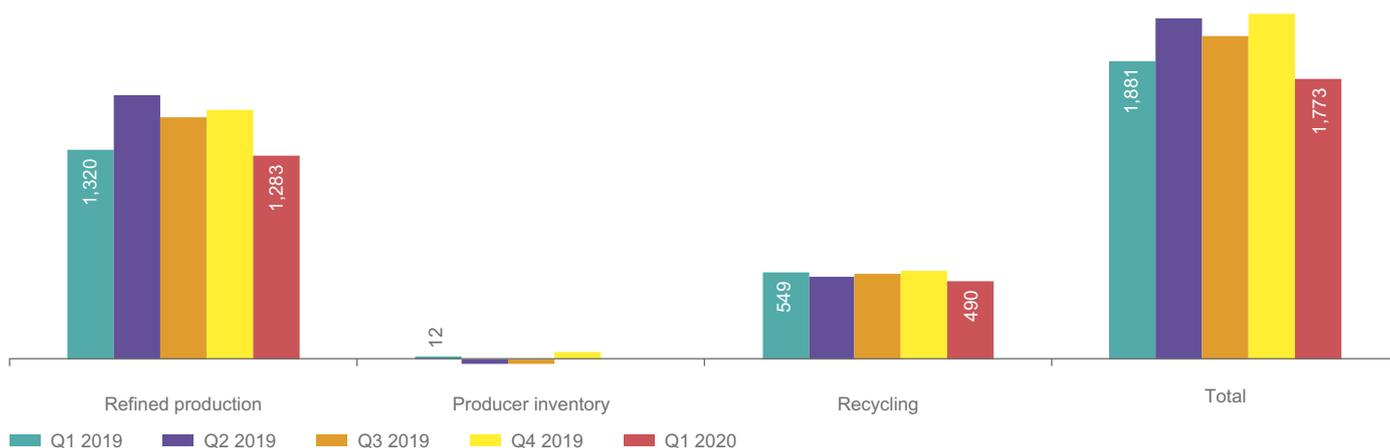
Zimbabwe posted a modest supply increase, up 1% (+6 koz) to 118 koz, due to higher output from Unki and Zimplats. The country entered lockdown on March 30th, however all mining operations have received approval to continue working. Russia represented the biggest change year-on-year, with production falling 26% (-54 koz) to 150 koz. This was a result of the pre-commissioning of the new refining plant at Nor Nickel, causing a build-up of in-process inventory. The year-on-year impact was compounded as output from Q1'19 benefited from a release of in-process inventory. North American mine supply grew 9% (+8 koz) year-on-year primarily due to increased output from Vale.

Recycling

During Q1'20 the recovery of platinum from spent autocatalysts reduced by 2% (-7 koz) year-on-year to 406 koz. However, the quarterly total remains high by historical standards due to some contrasting drivers. The important European and North American recycling market volumes were relatively strong through to early March for two reasons. First, autocatalysts being recycled now contain a higher portion of platinum-based catalysts reflecting the increase in their use in after-treatment systems in the early to mid-2000s, especially in Europe where the light duty diesel vehicle share grew from around 30% to 50%. Second, record palladium and near-record rhodium prices saw increased autocatalyst flows from scrapyards and aggregators, a theme which had characterised much of 2019. However, this was partly offset as the lockdown led to a steep fall in supplies of end-of-life vehicles in some jurisdictions towards the end of the quarter. In addition, capacity constraints in some parts of the smelting and refining industry, also a re-occurring theme from last year, weighed on the volume of platinum that was recovered.

Jewellery recycling declined by 42%, as consumer movement was severely constrained during the first part of the quarter, especially in Asia. In addition, the low and declining price during the quarter acted as a disincentive.

Chart 2: Platinum supply, koz



Source: Metals Focus

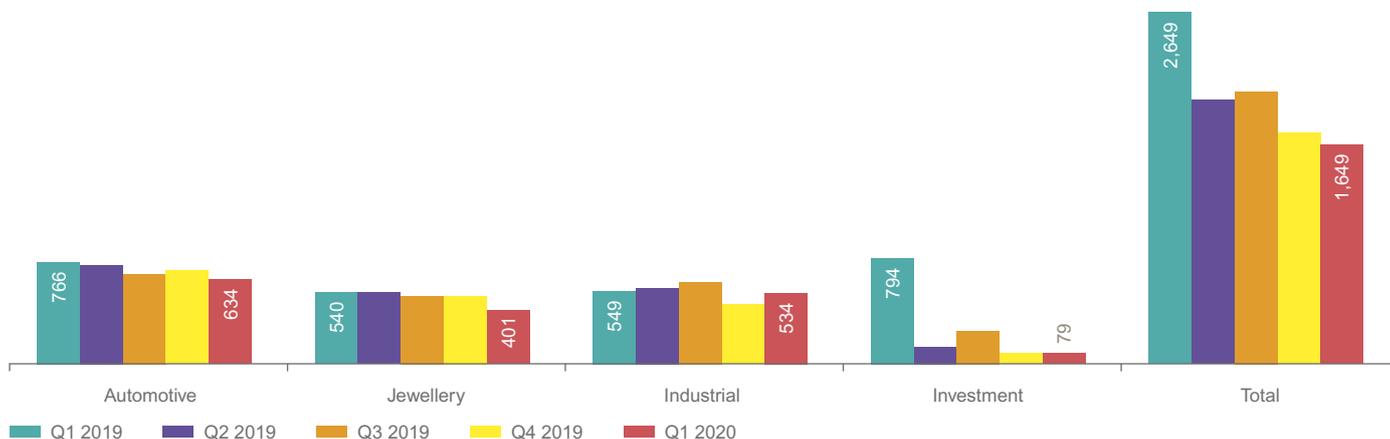
Demand

All segments of platinum demand were hurt by the expansive and sudden impact of the COVID-19 pandemic. Demand in Q1'20 fell year-on-year by 38% (-1,000 koz) to 1,649 koz. Although there were areas of demand that showed healthy growth, they were unable to offset the overall decline.

Automotive demand

Automotive demand was down 17% (-132 koz) to 634 koz in Q1'20 as COVID-19 induced plant closures led to a rapid drop in manufacturing output and an unprecedented fall in sales. These stoppages, first in China but soon thereafter globally, reduced demand for platinum during the quarter. COVID-19-related shutdowns started in China in late January and plants remained closed for an average of 16 days. In some provinces, such as Hubei, more deeply affected by the virus, operations were reported to have stood idle for periods of between 35 and 45 days. It appears that 'lost' vehicle production was close to 1.2 million units during this time. By the end of the quarter China emerged out of lockdown and markets were able to focus on the pace of recovery. Just as China started ramping-up, European and North American markets were shuttered. European plants were temporarily closed from as early as the second week in March, with most remaining shut for the whole of April and some reporting that they will remain idle throughout much of May. North America followed suit, with production halted in response to state and localised stay-at-home orders. Tightening emissions standards partly offset the loss of automotive platinum demand due to these closures. Some worth noting are: China 6 and VI, for light and heavy-duty vehicles respectively, and the early adoption thereof, and India's fast-approaching adoption of Bharat VI, effective from April 2020 for new production following its adoption in 2019 in the National Capital Region (Delhi).

Chart 3: Platinum demand, koz



Source: Metals Focus

Jewellery demand

Jewellery demand was down 26% (-138 koz) for the quarter as consumers cut back on non-essential spending. China’s platinum jewellery fabrication in Q1 dropped by 45% year-on-year. Demand in January remained lacklustre due to fierce competition from the gold jewellery market. The business was then interrupted over February as lockdowns were implemented and fears of contracting the virus grew. However, after the metal’s sharp price fall in early March, demand enjoyed a healthy recovery fuelled by bargain hunting. Additionally, some retailers’ attractive price promotion activities also provided support for the market. For instance, the unit price for some plain platinum jewellery, which is sold by weight rather than by piece, is only at around 60% of similar gold designs. Meanwhile, following the price correction, platinum jewellery gained market share from the white alloyed K-gold, driven by the comparative price advantage platinum now offers.

North American offtake began the quarter on a bright note, with retailers keen to stock up following a robust holiday season and as platinum’s metal discount to gold kept its margins attractive. However, as COVID-19-driven lockdowns were implemented in March and weddings were postponed, demand fell heavily, as only partial compensation was achieved through online sales.

European demand fell more steeply than in the US, chiefly as factories (especially in Italy) were obliged to close sooner with the earlier onset of lockdowns. Production for the high-end brands had also been hit by yet earlier restrictions on retailing in the key market, China. Indian platinum jewellery demand fell by 30%. This was largely due to a cautious approach adopted by consumers towards high value purchases like jewellery due to the slowdown in the economy. Later, as the lockdowns took effect in March, demand suffered even more notably. Several jewellers interviewed in India reported 60%-80% declines in that month.

Industrial demand

Q1’20 demand was down 3% (-14 koz) year-on-year to 534 koz. While chemical and glass demand grew during the quarter by 17% and 16% respectively, petroleum fell 37% and the other industrial sector, closely linked to the automotive industry, declined by 20% (-29 koz) to 115 koz.

Petroleum

Net platinum demand weakened in Q1'20, as the oil market suffered from the dual shocks of the COVID-19 pandemic and the collapse of the alliance between OPEC and Russia. Against this backdrop, oil prices experienced an unprecedented collapse. Meanwhile, global oil consumption contracted for the first time year-on-year in a decade during the quarter.

Historically, falling oil prices have tended to result in improved profit margins for oil refineries. However, with the pandemic-driven collapse in global demand, refinery margins fell in Q1, with some even slipping into negative territory. Against this backdrop, an increasing number of refiners cut output, while some plants also delayed planned maintenance work, both of which weighed on platinum consumption.

Chemical

Given the sharp fall in global economic activity, it may seem surprising that chemical demand grew year-on-year in Q1. This was entirely due to the continued paraxylene (PX) capacity expansion in China, the key driver of platinum demand in the global petrochemical industry in recent years. Meanwhile, as the majority of last year's new PX capacity was added during Q2-Q4, the comparison also came from a relatively low base. Indeed, following a surge in PX capacity in 2019, new capacity continued to ramp up in Q1'20. For instance, Zhejiang Petrochemical's No. 2 PX unit started its test-run before the Lunar New Year break.

Interestingly, while projections for new petrochemical plants in China seem to have been little affected by COVID-19, operating rates at existing plants have dropped, as a result of falling margins, rising inventories and temporary labour shortages.

By contrast, fabrication of addition-cure silicone (the single largest area of platinum chemical demand on a net basis) edged lower, as demand was affected by the global economic downturn, governments' lockdown measures and various restrictions on transportation and logistics. Meanwhile, the COVID-19 pandemic also led to major supply chain disruptions across the global fertiliser industry, which in turn reduced the use of platinum in the production of nitric acid.

Medical

The 5% year-on-year drop in medical demand left the Q1'20 total at 59 koz. The production of platinum containing APIs (active pharmaceutical ingredients) remained strong in the first two months of the quarter but the lockdown led to some production facilities being temporarily closed.

Glass

Platinum demand for glass manufacture in Q1'20 was up 16% (+18 koz) year-on-year to 132 koz and in sharp contrast to negative demand in Q4'19, suggesting that the large-scale Japanese decommissioning seen in Q4'19 has now run to conclusion for this cycle.

Electrical

Platinum demand in electrical applications fell by 9% (-3 koz) year-on-year, mainly because of a further decline in worldwide Hard Disk Drive (HDD) demand, which fell by 13% in Q1'20. Despite the strong gains in high-capacity nearline drives – due to: surging global demand from data centres, in turn linked to rising remote working, increased on-line learning and e-commerce activities – total shipments continued to decline as PC, enterprise drives and surveillance system sales all weakened. Meanwhile, increasing solid state drive (SSD) penetration continued to take market share from HDDs in the new field of next generation consoles.

Investment demand

First quarter bar and coin investment surged to 312 koz, a rise of 182% year-on-year. This was driven by a jump in bar and coin demand in both Japan and the US.

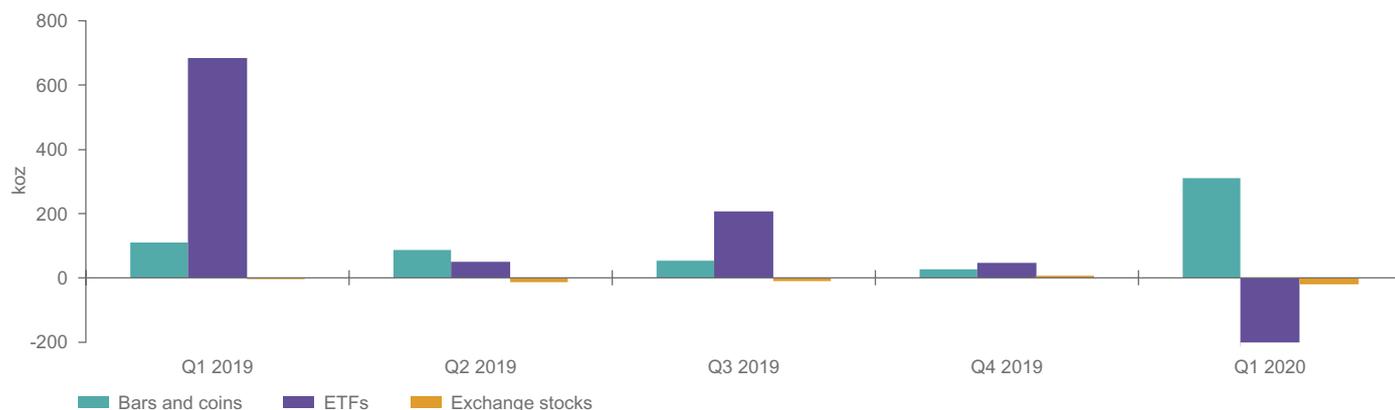
Q1'20 was a “vintage” quarter for Japanese retail investment in physical platinum. January started on a negative note, with the mini rally in local prices through the ¥4,000/g mark fuelling sizeable liquidations. However, this was eclipsed by the flurry of buying that emerged in March, as the yen-denominated platinum price fell to levels, not seen since the early 2000s. This saw net demand over the quarter jump to 155 koz.

In the US, coin and bar demand surged, an outcome that also benefited the country's gold and silver bar and coin investment. However, product shortages emerged, especially late in the quarter, which saw retail premiums jump.

Demand for coins and small bars shot up in Europe, albeit from a low base. As with Japan and the US, the increase was largely driven by bargain hunting following the price fall in March.

Global platinum ETF holdings reduced by 213 koz during Q1. Most of the outflows occurred in March when some investors sold platinum positions in order to raise cash amid a global equity collapse. Prior to that, global holdings had recorded modest growth to new all-time highs in early March, thanks to positive spill-overs from rising gold prices.

Chart 4: Platinum investment



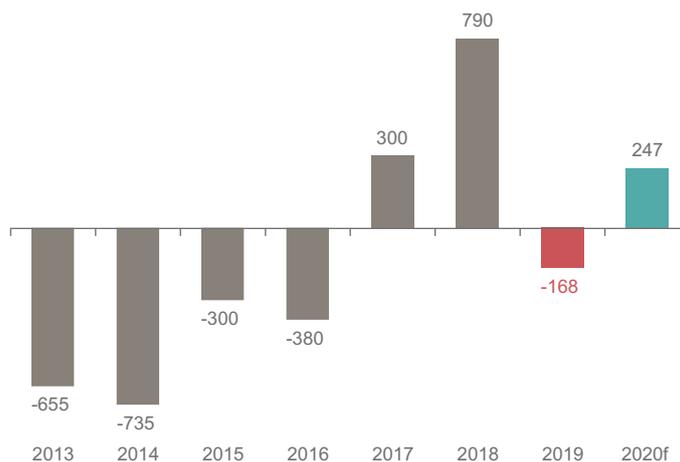
Source: Metals Focus

2020 FORECAST

As the year progresses, market focus will be on the rate of recovery and the extent to which a return to “normal” economic conditions can be achieved. Aside from the COVID-19 pandemic that will potentially leave indelible scars on many industries, there were and are many other factors that will likely influence demand for platinum. The cooling of the global economy, that was already underway before the COVID-19 crisis, the evolution of the trade war between the US and China, Brexit, the Russia-Saudi Arabia fall-out (in terms of oil production) all contribute to an outlook that is dramatically different from the prior year.

In 2020, global supply is forecast to be 7,197 koz, comprising refined mining production of 5,287 koz and 1,910 koz of recycling supply. Set against this, demand will be 6,950 koz, consisting of 2,481 koz of autocatalyst demand, 1,785 koz of jewellery demand, 2,080 koz of industrial demand and 605 koz of investment demand. On the back of these supply-demand dynamics, the platinum market in 2020 is forecast to shift from a deficit of 168 koz in 2019 to a surplus of 247 koz.

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



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

Supply

The impact of COVID-19 on the operating environment across much of the mining industry has introduced extreme forecast risk. Uncertainty surrounding country lockdowns, workforce social distancing measures and the risk of additional closures due to infections at mine sites has resulted in several producers withdrawing production guidance. Those that have maintained guidance highlight the fluidity of the situation and caution downside risk.

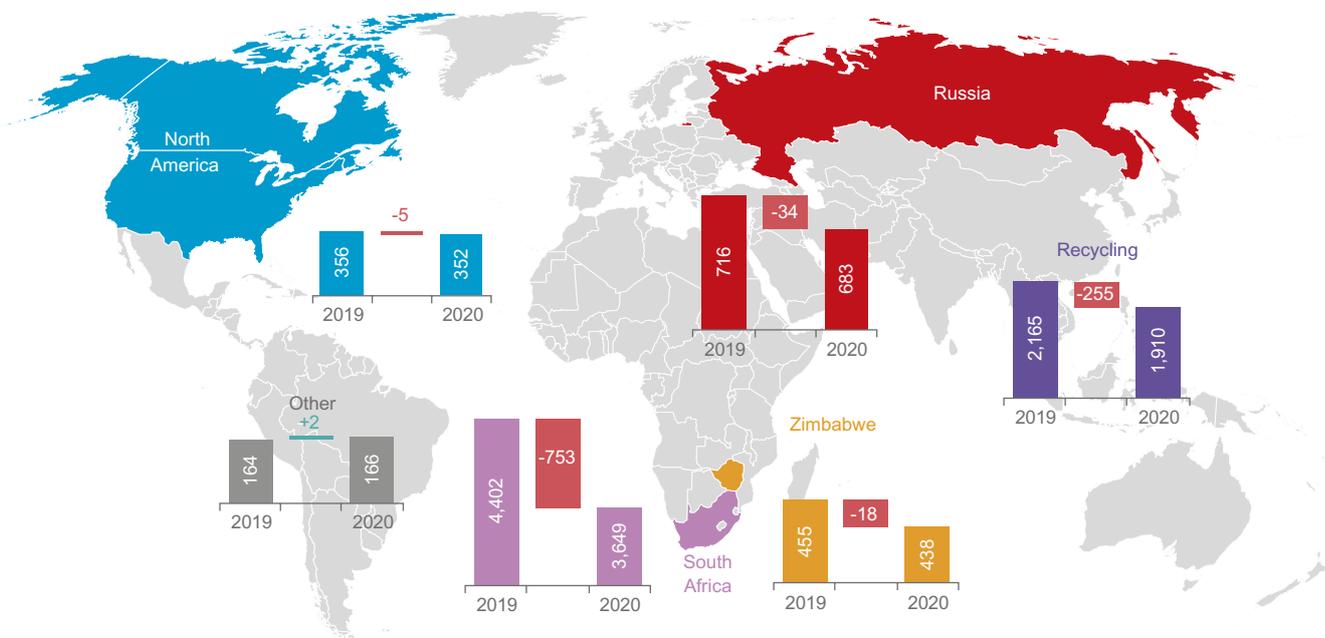
With those caveats in mind global refined production is forecast to fall 13% (-807 koz) to 5,287 koz in 2020. South Africa represents the bulk of the decline, with supply forecast to fall 17% (-753 koz) to 3,649 koz with at least 500 koz (in isolation) of supply lost due to the Anglo American Platinum Converter Plant (ACP) shutdown and further losses as a result of reduced production due to COVID-19-related restrictions.

Zimbabwean supply is forecast to decline a more modest 4% (-18 koz) to 438 koz. Mining operations have received dispensation to continue limited production over the lockdown period, but with country’s output dependant on South African refineries, logistical challenges remain.

Supply from North America is forecast to remain broadly flat. Impala Platinum’s Canadian operations have been placed on care and maintenance due to COVID-19 and growth at Sibanye-Stillwater’s US operations has been deferred. Russian supply is forecast to fall 4% (-27 koz) to 689 koz due to planned smelter maintenance at Nor Nickel.

Producer inventory is expected to remain unchanged as any build-up due to COVID-19-related logistical challenges are expected to be cleared before year-end.

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



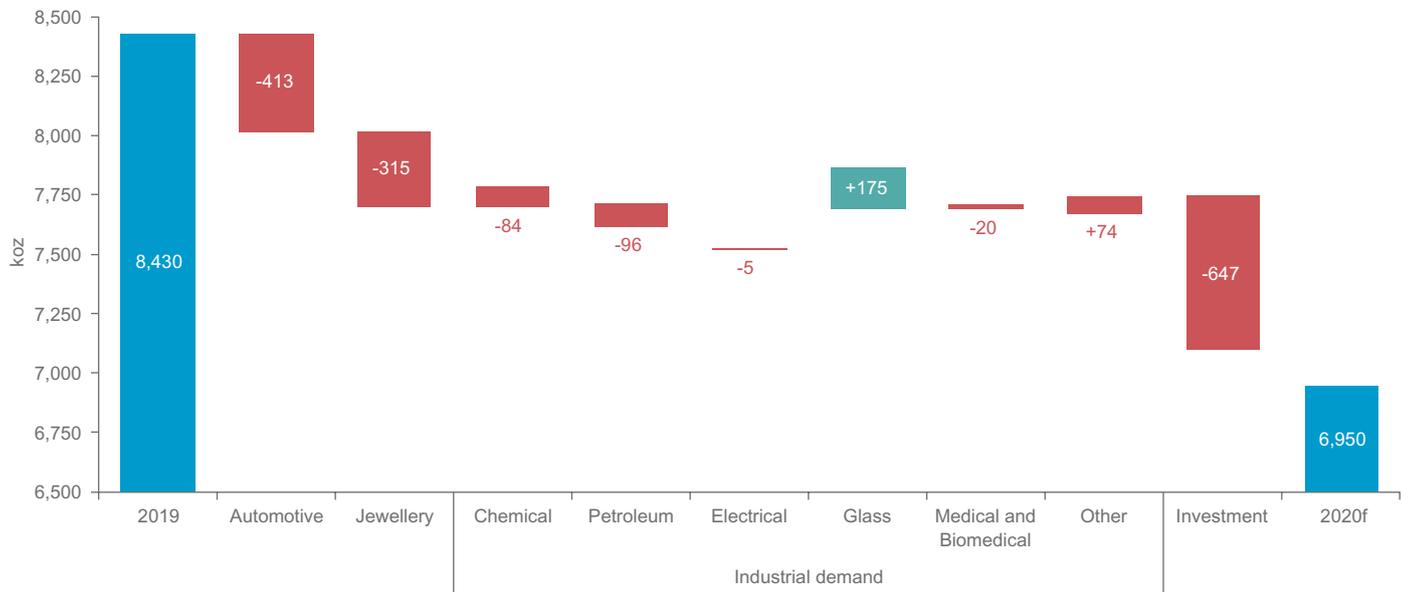
Recycling

This year, we expect autocatalyst recycling to fall by 7% (-122 koz) to 1,508 koz. Despite the expected decline this will still be the second highest total on record. The key issue driving this outcome will be the impact of the COVID-19 pandemic on automotive sales and, in turn, the expected drop in recycling as consumers delay trading-in their existing vehicles. However, there will be some offset as the decline in receipts by refiners and smelters allows the trade to process any backlogs of accumulated material. Furthermore, as scrapyards contend with lower receipts of end-of-life vehicles, the financial pressures this creates may result in a quicker pace of destocking of existing vehicles and parts held by scrap yards. Importantly, we believe this decline will not be repeated in 2021, when the growth in platinum autocatalyst recycling is forecast to return to levels more typical of recent years. Jewellery recycling for the full year is expected to decline by 28% (-132 koz), largely driven by consumer’s response to the prevailing price level.

Demand

In 2020 demand for platinum is forecast to decrease from 8,430 koz to 6,950 koz, representing a reduction of 18% (-1,480 koz). Automotive demand is expected to fall by 14% (-413 koz), jewellery demand by 15% (-315 koz) and industrial demand by 5% (-104 koz), notwithstanding the healthy increase in glass demand of 58% (+175 koz). Investment demand is forecast to be 605 koz.

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



Source: Metals Focus

Automotive demand

Based on the sales and production performance in Q1'20, light duty vehicle production is forecast to decline sharply overall this year. Many and varied unit forecasts for vehicle production in 2020 have been released in quick succession with average global cuts ranging between 14% and 20%. Metals Focus forecasts are based on an average reduction of 14%, on the assumption that the unprecedented stimulus measures unleashed across all key car markets will drive a robust recovery following the dramatic but relatively short-lived collapses in sales. Truck and bus forecasts have been cut by as much as 30% for the rest of the year. In line with such aggressive cuts in vehicle output, demand for all Platinum Group Metals (PGMs) will be reduced. Platinum demand for automotive catalysis is expected to be 2,481 koz, with European automotive demand down 20% followed by a 15% decline in North America and a 14% reduction in demand in our Rest of the World region.

Platinum demand in China is expected to increase by 14%, as the phasing in of China VI standards for heavy duty vehicles drives an increase in loadings that outweighs the expected decline in units produced. Higher palladium loadings in light vehicles is also expected to offset lower car and light truck production. It is finally worth noting that automakers have been given a reprieve of 6 months in respect of China 6 for light vehicles following a recent announcement by the National Development and Reform Commission (NDRC) in a bid to help dealers and producers wind down vehicle inventories.

India, yet to emerge from its lockdown, has not indicated any plans to delay implementation of Bharat VI applicable from April 2020. The production forecast for the diesel light vehicle category has been heavily downgraded by 33%, while gasoline light vehicle output was only revised down by 5%.

Jewellery demand

Platinum jewellery demand is forecast to decline by 15% (-315 koz) to 1,785 koz as the jewellery segment adapts its business model to contend with a drop in store footfall and a more cautious consumer.

Although life is starting to return to normal in most regions in China, a slowing economy and weaker disposable incomes will continue to weigh on consumer spending on jewellery. Additionally, feedback from manufacturers suggests that they will continue to develop lighter designs which more easily match consumers' budgets. There are some indications that, as the platinum price is expected to remain well below that of gold, consumers will continue to shift from white K-gold to platinum jewellery. Overall, we currently forecast a decline in China jewellery of 20% in 2020.

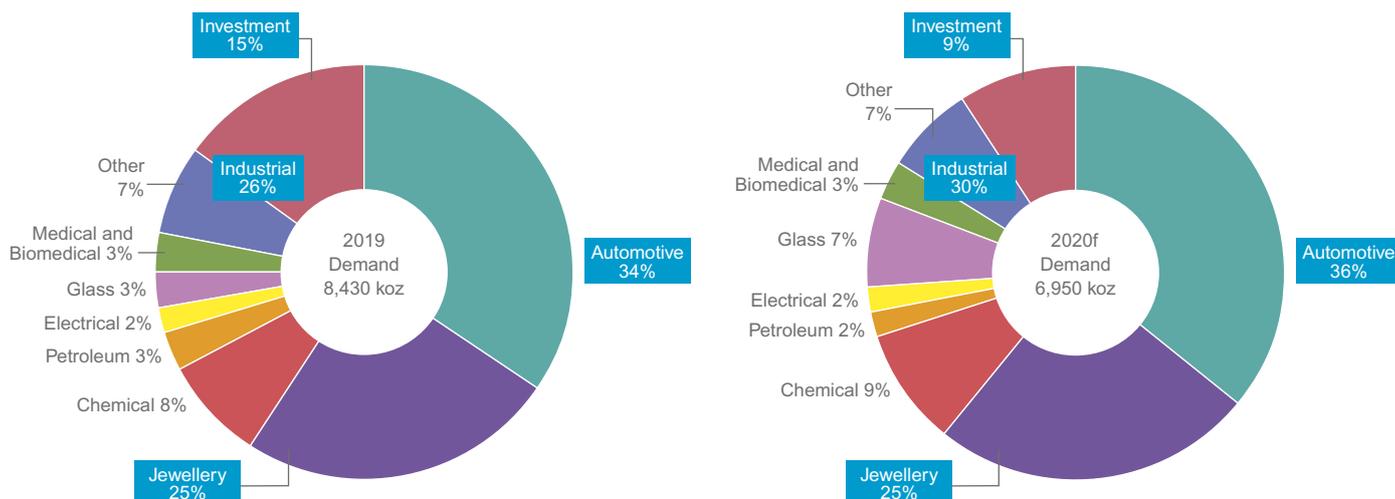
North America and Europe are expected to suffer more heavily in Q2'20, especially as discretionary goods should be among the last to recover as retailing restrictions are lifted. However, we expect a strong bounce back in the bridal market later in the year, as the peak engagement period approaches and rescheduled weddings go ahead. Top-end jewellery and watch sales may take longer to recover as conspicuous consumption is pared back, although late 2019 trade war concerns meant that the main brands began 2020 only lightly stocked.

In India, demand is anticipated to fall by 17% to the lowest level since 2016. Research indicates that consumers are likely to postpone any non-essential or high value purchases until at least August or September, because of the adverse impact on incomes due to the economic slowdown brought about by COVID-19. However, in Q4'20 as the festive and wedding season approaches demand should return to normal levels.

Industrial demand

Total industrial demand is expected to be 2,080 koz in 2020, representing a decline of 5% (-104 koz) year-on-year as most segments will suffer demand loss due to the pandemic.

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



Source: Metals Focus

Chemical

Chemical demand is projected to ease this year. Leaving aside COVID-19-driven losses, growth in petrochemical capacity is projected to moderate slightly in China from the exceptionally high level seen in 2019, resulting in lower demand for platinum catalysts. Despite the pull-back, the use of platinum in the chemical industry will remain high by historical standards.

Petroleum

Demand for platinum from the petroleum industry is expected to remain weak for the rest of 2020. As fuel consumption remains low, further contraction in oil refining output is expected in the coming months. The International Energy Association forecast that oil refining throughput in 2020 will fall by around 9% year-on-year. Meanwhile, oil companies have responded to the price collapse by announcing cuts to their capex this year, which will inevitably reduce oil refining capacity growth and the associated platinum demand.

Electrical

In line with the latest technology development roadmap by leading players in the sector, the commercialisation of energy-assisted magnetic recording HDDs, including HAMR (heat-assisted magnetic recording) and MAMR (microwave-assisted magnetic recording), is likely to be postponed to 2021, reducing demand within this segment. However, countering this is market share growth of nearline drives, driven by the pressure on data centres adjusting to a larger than normal remote workforce with increasing data storage and access requirements. Nearline drives have more disks inside and will partially offset the loss in other segments, resulting in demand for platinum being only marginally down.

Medical

The expected 8% (-20 koz) year-on-year drop in global medical demand to 229 koz in 2020 reflects the impact of the lockdown on some manufacturing sites and the focus of hospitals on life saving procedures. Improvement later this year will be seen as restrictions are eased and hospitals can increasingly offer other treatments.

Glass

Market feedback suggests that investments in capacity growth in China will be going ahead largely as planned. However, we have reduced our forecast to reflect possible disruptions and slower capacity expansion in the event that end-product demand is reduced. In addition, there is also some expected capacity building planned in Japan later in the year which will partially use the surplus metal which became available on the back of the Q4'19 decommissioning activities.

Other

Total other industrial demand for 2020 is forecast to be 503 koz down by 13% compared to 2019 given that this segment is highly dependent on the automotive sector. The decline in vehicle output will negatively impact demand for spark plugs and automotive sensors. Meanwhile, energy research firms forecast that a total of 2,188 MW of stationary fuel cell system will be shipped globally in 2020, up 38% from prior year acting as a counterbalance to the impact from the automotive sector's challenges.

Investment demand

Bar and coin investment demand is expected to surge by 115% (+324 koz) to 605 koz in 2020. This reflects far higher retail purchases in both Japan and the US, but not at the same rate as the dramatic volumes that were purchased during Q1'20. Retail interest will receive a boost from the launch this year of a new platinum bullion coin in South Africa.

Market volatility is likely to make investors more cautious during 2020. We expect the net sales in global platinum ETFs in Q1 2020 to be offset by a similar increase in ETF holdings during the balance of 2020 ending the year unchanged from the level at the end of 2019. Consequently, investment demand from ETFs is forecast at zero in 2020.

ABOVE GROUND STOCKS

We forecast a market surplus for 2020 of 247 koz, which will result in above-ground stocks reaching 3,730 koz at the end of 2020.

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.

WPIC above ground stock estimates from 2013 to 2018 were based on an estimate of these stocks (on the above basis) of 4,140 koz at 31 December 2012. WPIC above ground stocks are now based on the Metals Focus estimate at 31 December 2018 of 3,650 koz.

PLATINUM QUARTERLY Q1 2020

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

	2013	2014	2015	2016	2017	2018	2019	2020f	2020f/2019 Growth %
Platinum Supply-demand Balance (koz)									
SUPPLY									
Refined Production	6,070	4,855	6,160	6,035	6,125	6,120	6,094	5,287	-13%
South Africa	4,355	3,115	4,480	4,255	4,380	4,470	4,402	3,649	-17%
Zimbabwe	405	405	405	490	480	465	455	438	-4%
North America	355	400	385	395	365	350	356	352	-1%
Russia	740	740	710	715	720	665	716	683	-5%
Other	215	195	180	180	180	170	164	166	1%
Increase (-)/Decrease (+) in Producer Inventory	-215	+350	+30	+30	+30	+10	+2	+0	-100%
Total Mining Supply	5,855	5,205	6,190	6,065	6,155	6,130	6,097	5,287	-13%
Recycling	1,980	2,035	1,705	1,840	1,890	1,930	2,165	1,910	-12%
Autocatalyst	1,120	1,255	1,185	1,210	1,325	1,420	1,630	1,508	-7%
Jewellery	855	775	515	625	560	505	477	345	-28%
Industrial	5	5	5	5	5	5	58	57	-2%
Total Supply	7,835	7,240	7,895	7,905	8,045	8,060	8,262	7,197	-13%
DEMAND									
Automotive	3,125	3,250	3,365	3,455	3,325	3,100	2,894	2,481	-14%
Autocatalyst	2,985	3,100	3,230	3,315	3,185	2,955	2,894	2,481	-14%
Non-road	140	150	140	135	140	145	†	†	†
Jewellery	2,945	3,000	2,840	2,505	2,460	2,245	2,100	1,785	-15%
Industrial	1,485	1,575	1,685	1,790	1,685	1,910	2,184	2,080	-5%
Chemical	535	540	505	560	565	570	692	608	-12%
Petroleum	50	65	205	215	100	235	219	122	-44%
Electrical	195	215	205	195	210	205	145	141	-3%
Glass	145	175	200	205	180	245	303	478	58%
Medical and Biomedical	220	220	225	230	235	240	249	229	-8%
Other	340	360	345	385	395	415	577	503	-13%
Investment	935	150	305	535	275	15	1,252	605	-52%
Bars and coins	-5	50	525	460	215	280	281	605	115%
Change in ETF Holdings	905	215	-240	-10	105	-245	991	0	-100%
Change in Stocks Held by Exchanges	35	-115	20	85	-45	-20	-20	0	100%
Total Demand	8,490	7,975	8,195	8,285	7,745	7,270	8,430	6,950	-18%
Balance	-655	-735	-300	-380	300	790	-168	247	247%
Above Ground Stocks	4,140*	3,485	2,750	2,450	2,070	2,370	3,160	3,482**	7%

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

Notes:

1. Prior to 2019 numbers have been independently rounded to the nearest 5 koz.
2. Above Ground Stocks: *As of 31st December 2012 (SFA (Oxford)). ** 3,650 koz as of 31 December 2018 (Metals Focus).
3. Non-road automotive demand: † 2019 and 2020 included in autocatalyst.

PLATINUM QUARTERLY Q1 2020

Table 3: Supply and demand summary – quarterly comparison

	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q1'20/Q1'19 Growth %	Q1'20/Q4'19 Growth %
Platinum Supply-demand Balance (koz)											
SUPPLY											
Refined Production	1,300	1,605	1,665	1,565	1,320	1,665	1,530	1,579	1,283	-3%	-19%
South Africa	915	1,160	1,230	1,170	874	1,218	1,122	1,189	879	1%	-26%
Zimbabwe	115	115	120	120	113	120	116	106	118	5%	12%
North America	90	85	90	90	85	99	79	94	93	9%	-1%
Russia	140	200	180	145	204	189	174	149	150	-26%	0%
Other	40	45	45	40	44	40	40	41	43	-2%	6%
Increase (-)/Decrease (+) in Producer Inventory	-5	+55	-20	-20	+12	-28	-30	+48	+0	-100%	-100%
Total Mining Supply	1,295	1,660	1,645	1,545	1,332	1,637	1,501	1,627	1,283	-4%	-21%
Recycling	460	480	490	495	549	520	540	556	490	-11%	-12%
Autocatalyst	330	345	365	380	413	387	410	420	406	-2%	-3%
Jewellery	130	135	125	115	121	119	117	121	70	-42%	-42%
Industrial	0	0	0	0	15	14	14	15	13	-11%	-12%
Total Supply	1,755	2,140	2,135	2,040	1,881	2,157	2,041	2,183	1,773	-6%	-19%
DEMAND											
Automotive	800	815	715	765	766	747	678	703	634	-17%	-10%
Autocatalyst	765	775	680	735	766	747	678	703	634	-17%	-10%
Non-road	35	40	35	40	†	†	†	†	†	†	†
Jewellery	580	570	550	560	540	541	509	510	401	-26%	-21%
Industrial	475	475	465	490	549	574	614	447	534	-3%	20%
Chemical	145	135	155	135	138	200	162	191	162	17%	-15%
Petroleum	55	55	55	55	55	55	55	55	34	-37%	-37%
Electrical	55	50	50	55	35	36	38	36	32	-9%	-12%
Glass	60	60	65	65	114	71	144	-26	132	16%	>300%
Medical and Biomedical	55	70	45	70	62	67	72	47	59	-5%	26%
Other	105	105	95	110	145	144	143	145	115	-20%	-20%
Investment	60	-55	65	-65	794	126	251	82	79	-90%	-3%
Bars and coins	85	70	70	50	111	89	53	28	312	182%	>300%
Change in ETF Holdings	-15	-125	5	-115	687	50	207	47	-213	-131%	<-300%
Change in Stocks Held by Exchanges	-10	0	-10	0	-4	-13	-10	6	-20	<-300%	<-300%
Total Demand	1,915	1,805	1,795	1,750	2,649	1,987	2,051	1,742	1,649	-38%	-5%
Balance	-160	335	340	290	-768	170	-10	441	124	116%	-72%

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

Notes:

1. Prior to 2019 numbers have been independently rounded to the nearest 5 koz.
2. Non-road automotive demand: † 2019 and 2020 included in autocatalyst.

PLATINUM QUARTERLY Q1 2020

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

	H1 2018	H2 2018	H1 2019	H2 2019	H2'19/H1'19 Growth %
Platinum Supply-demand Balance (koz)					
SUPPLY					
Refined Production	2,905	3,230	2,985	3,110	4%
South Africa	2,075	2,400	2,091	2,311	10%
Zimbabwe	230	240	233	222	-4%
North America	175	180	184	173	-6%
Russia	340	325	393	324	-18%
Other	85	85	84	81	-4%
Increase (-)/Decrease (+) in Producer Inventory	+50	-40	-15	+18	215%
Total Mining Supply	2,955	3,190	2,969	3,127	5%
Recycling	940	985	1,069	1,096	3%
Autocatalyst	675	745	800	830	4%
Jewellery	265	240	240	237	-1%
Industrial	0	0	29	29	0%
Total Supply	3,895	4,175	4,038	4,224	5%
DEMAND					
Automotive	1,615	1,480	1,513	1,381	-9%
Autocatalyst	1,540	1,415	1,513	1,381	-9%
Non-road	75	75	†	†	†
Jewellery	1,150	1,110	1,081	1,019	-6%
Industrial	950	955	1,122	1,061	-5%
Chemical	280	290	339	353	4%
Petroleum	110	110	109	109	0%
Electrical	105	105	71	74	4%
Glass	120	130	185	118	-36%
Medical and Biomedical	125	115	130	119	-8%
Other	210	205	289	288	0%
Investment	5	0	920	332	-64%
Bars and coins	155	120	200	82	-59%
Change in ETF Holdings	-140	-110	737	254	-65%
Change in Stocks Held by Exchanges	-10	-10	-17	-4	78%
Total Demand	3,720	3,545	4,636	3,794	-18%
Balance	175	630	-598	430	172%

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

Notes:

1. Prior to 2019 numbers have been independently rounded to the nearest 5 koz.
2. Non-road automotive demand: † 2019 and 2020 included in autocatalyst.

PLATINUM QUARTERLY Q1 2020

Table 5: Regional demand – annual and quarterly comparison

	2013	2014	2015	2016	2017	2018	2019	2020f	2020f/2019 Growth %	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020
Platinum gross demand (koz)														
Automotive	3,125	3,250	3,365	3,455	3,325	3,100	2,894	2,481	-14%	766	747	678	703	634
North America	420	465	500	460	425	430	342							
Western Europe	1,350	1,400	1,550	1,705	1,555	1,290	1,443							
Japan	580	590	510	455	440	430	326							
China	130	125	125	160	190	185	217							
India	165	170	175	170	175	195	††							
Rest of the World	480	500	505	505	540	570	566							
Jewellery	2,945	3,000	2,840	2,505	2,460	2,245	2,100	1,785	-15%	540	541	509	510	401
North America	200	230	250	265	280	280	341							
Western Europe	220	220	235	240	250	255	237							
Japan	335	335	340	335	340	345	372							
China	1,990	1,975	1,765	1,450	1,340	1,095	871							
India	140	175	180	145	175	195	102							
Rest of the World	60	65	70	70	75	75	177							
Chemical	535	540	505	560	565	570	692	608	-12%	138	200	162	191	162
North America	55	55	50	50	50	50	77							
Western Europe	110	105	75	110	115	110	125							
Japan	10	10	10	15	15	15	66							
China	195	215	230	225	215	215	220							
Rest of the World	165	155	140	160	170	180	204							
Petroleum	50	65	205	215	100	235	219	122	-44%	55	55	55	55	34
North America	40	25	-25	90	55	55	30							
Western Europe	-45	-15	70	10	5	20	14							
Japan	10	-35	5	0	-40	5	7							
China	80	-5	45	80	45	10	66							
Rest of the World	-35	95	110	35	35	145	103							
Electrical	195	215	205	195	210	205	145	140	-4%	35	36	38	36	32
North America	10	15	15	10	15	15	38							
Western Europe	5	10	10	10	10	10	27							
Japan	15	15	15	15	15	15	20							
China	75	70	70	80	90	85	28							
Rest of the World	90	105	95	80	80	80	31							
Glass	145	175	200	205	180	245	303	478	58%	114	71	144	-26	132
North America	5	10	0	20	5	5	7							
Western Europe	-10	15	10	5	5	35	59							
Japan	0	-25	-5	-10	-10	0	-132							
China	90	85	95	100	85	75	260							
Rest of the World	60	90	100	90	95	130	109							
Medical	220	220	225	230	235	240	249	229	-8%	62	67	72	47	59
North America	90	90	90	90	95	95	‡							
Western Europe	75	75	75	80	80	80	‡							
Japan	20	20	20	20	20	20	‡							
China	15	15	20	20	20	20	‡							
Rest of the World	20	20	20	20	20	25	‡							
Other industrial	340	360	345	385	395	415	577	503	-13%	145	144	143	145	115
Investment	935	150	305	535	275	15	1,252	605	-52%	794	126	251	82	79
Total Demand	8,490	7,975	8,195	8,285	7,745	7,270	8,430	6,950	-18%	2,649	1,987	2,051	1,742	1,649

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

Notes:

1. Prior to 2019 numbers have been independently rounded to the nearest 5 koz.

2. India automotive demand: †† 2019 included in Rest of the World.

3. Medical: ‡ 2019 regional data not published.

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.

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 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.

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.

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 2002 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

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 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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