

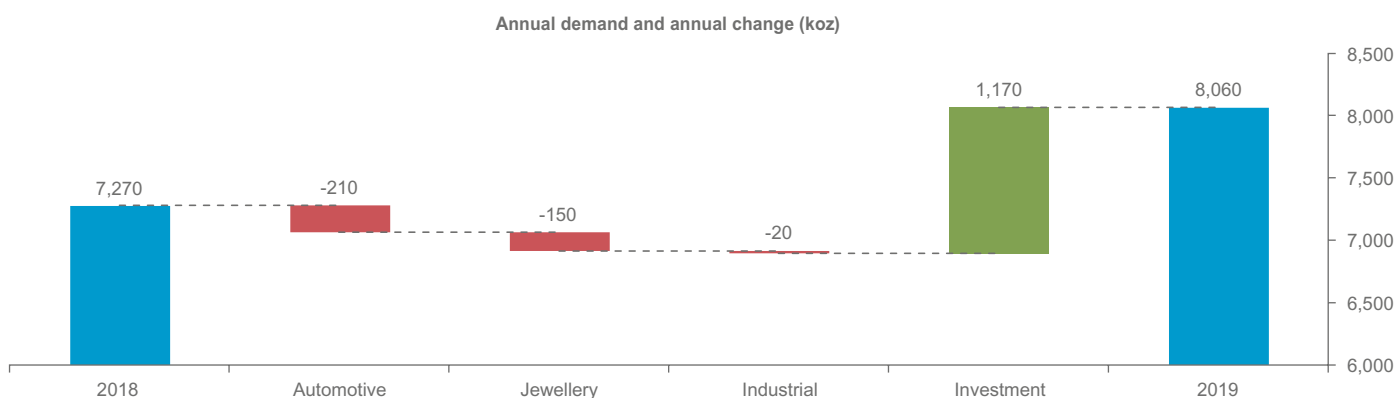
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FOREWORD

This edition of *Platinum Quarterly* considers platinum supply and demand developments for the fourth quarter of 2019 and for 2019, provided by SFA (Oxford). This edition also presents a new forecast for 2020, from Metals Focus, as they are the new independent provider of our data and commentary. We also provide our views on issues and trends relevant to investors considering exposure to platinum as an investment asset and an update on how our product partnerships continue to meet investors' needs.

Platinum supply and demand – balanced in 2019

Platinum supply and demand were similar in 2019 resulting in a balanced platinum market – a surplus of 65 koz – in contrast to the surplus of 790 koz in 2018. A significant increase in investment demand more than offset lower automotive, jewellery and industrial demand compared to 2018.



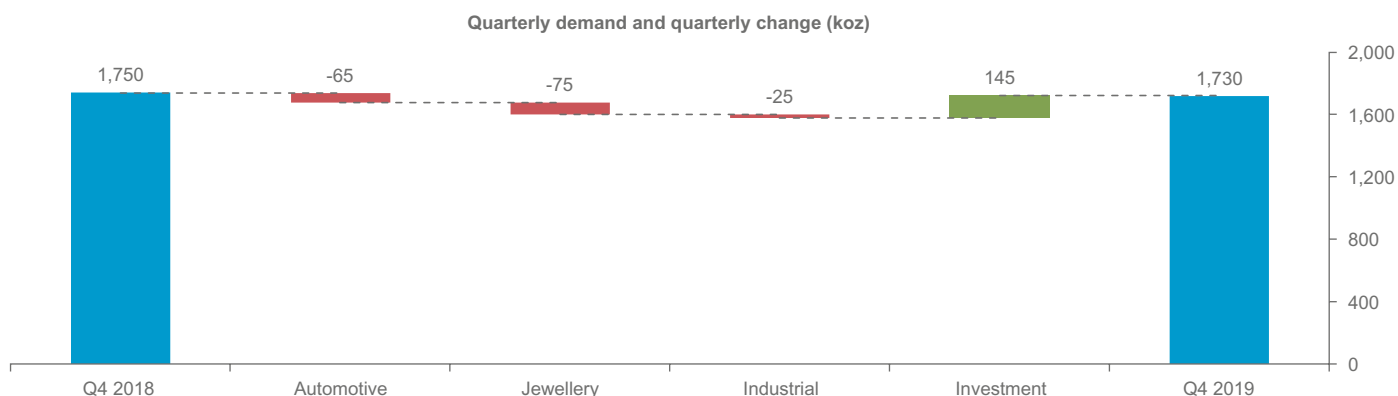
Source: SFA (Oxford)

Total demand in 2019 was 8,060 koz, 11% higher than in 2018. Exceptional investment demand of 1,185 koz (985 koz ETF and 215 koz bar and coin) was 1,170 koz higher than in 2018 and more than offset demand decreases in the automotive (-7%), jewellery (-7%) and industrial (-1%) segments.

Total 2019 supply of 8,125 koz increased by 1% (+65 koz) over 2018 with mining supply up 20 koz and recycling up 45 koz. Refined production was flat (+5 koz) with South African production down 55 koz and all other regions collectively up 60 koz. Recycling supply grew by 2% in 2019 with an increase in platinum recovered from autocatalysts (due to extremely high palladium and rhodium prices) more than offsetting a decrease in jewellery recycling (due to the low platinum price and lower jewellery sales in China).

Q4 2019 surplus on strong supply and weak demand

The platinum surplus of 385 koz in Q4'19 was 95 koz higher than the surplus in Q4'18 due to a year-on-year increase in mining supply of 4%, a 2% rise in recycle supply, and a 1% decline in total demand. Total mining supply benefited from 40 koz released from producer working inventory, a reflection of ongoing metallurgical lock-ups and releases in 2018 and 2019. This release compensated for losses due to electricity supply interruptions in South Africa. Q4'19 demand was 1% lower than Q4'18 due to lower automotive (-8%), jewellery (-13%) and industrial (-5%) demand, partially offset by strong Q4 investment demand.



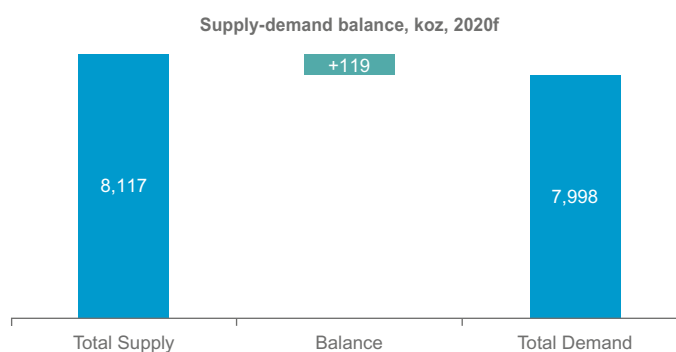
Source: SFA (Oxford)

Platinum supply and demand – introducing new 2020 forecast

Metals Focus, now providing supply, demand, balance and stock data, will naturally have their own insights, modelling and forecasts. The 2020 forecast indicates a market surplus of 119 koz with total supply of 8,117 koz and total demand of 7,998 koz.

Mine supply in 2020 will benefit from ongoing refining of work-in-process inventory from prior periods and be hampered by ongoing power interruptions and closure of some end-of-life shafts in South Africa. Recycling supply will stay at historically high levels, stimulated in 2019 in part by very high palladium and rhodium prices but is unlikely to rise further from this effect.

Demand in 2020 reflects increased automotive demand from heavy-duty vehicle growth and increased sales of diesel hybrid passenger vehicles, a bottoming-out of weak jewellery demand in China, particularly strong demand in glass manufacture and strong investment demand. ETF demand, forecast at 330 koz, is strong but far lower than the 985 koz in 2019.



Source: Metals Focus

The 2020 forecast is premised on a view that the coronavirus (Covid-19) becomes contained in a matter of months and that economic growth recovers later this year. However, if this projection proves optimistic, forecast demand could be materially lower.

The new 2020 forecast is for a surplus of 119 koz. Platinum demand growth is from higher platinum loadings on diesel vehicles in Europe (including mild-hybrid and plug-in mild-hybrid) and on heavy-duty vehicles in China.

We believe that a small amount of substitution of palladium by platinum has the potential to move the market from surplus to deficit, and that recognition of this potential was partly responsible for significant buying of platinum ETFs in 2019. This driver of increased investment in platinum ETFs is likely to continue in 2020.

The *Platinum Quarterly* data and report (starting on page 5) are prepared independently for WPIC by SFA (Oxford) from 2013 to 2019 and by Metals Focus from 1 January 2020.

The platinum investment case – constrained supply and demand growth potential

We believe that the fundamental drivers of value for platinum are being more widely considered and that the current investment case for platinum is more compelling than at any time since the launch of the WPIC in 2014. Supply remains constrained despite the significant increase in the price of the basket of metals sold from platinum mining in Southern Africa and nickel mining in Russia. However, there is insufficient confirmed capital investment to support a meaningful increase in the supply of platinum or palladium in the next 5 years. Consequently, platinum demand growth potential from autocatalysts and fuel cells together with a bottoming out of the long-standing decline in jewellery demand look poised to move platinum into future deficits and attract investment. The coronavirus has potential to reduce platinum demand if not contained within months. Platinum jewellery demand in China, 12% of demand in 2019 and having reduced significantly in recent years, is particularly vulnerable to the decline in store visits associated with containing the outbreak.

Looking forward, we see the following platinum demand growth drivers supporting investment and deficits:

- **Sustained investment demand:** We believe the market is underestimating the impact of the significant increase in physically backed platinum ETFs in 2019. These purchases of 985 koz, produced transactions in the over-the-counter (OTC) or spot market within 3 days of each ETF purchase to comply with listing requirements, and have resulted in significant additional holdings of physical platinum bars in vaults. This ETF buying was primarily by large institutional investors, who typically take 2-year to 3-year views and are unlikely to sell these holdings in the short-term, particularly if the platinum price increases, even to levels well above current levels. These large institutions have been aware for several years that platinum has traded at a significant discount to platinum's value-in-use, at levels far below those required to stimulate platinum (or palladium) supply growth and at a large discount to gold. Consequently, these investors are more likely to hold their positions until the platinum price is near parity with palladium (its most dominant value-in-use measure). We also believe that some large institutions that do not already own platinum ETFs are more likely to initiate holdings in a rising price environment. Increased investment and the maintenance of current investment will be enhanced if (or as) any evidence of demand growth becomes public.
- **Increased automotive demand as platinum replaces palladium in gasoline and diesel car emissions control:** The unavailability of palladium has become more pronounced into 2020. Deficits of between 1.2 moz and 1.9 moz are forecast by competent participants in the palladium market. Wider awareness that palladium supply is unable to respond to very high prices and physical buying by Chinese automakers (state owned joint ventures) are reflected in the palladium market price and its sustained backwardation. This is because over 80% of palladium is produced as a by-product, to nickel in Russia and platinum in South Africa. The Russian nickel orebody is particularly high grade and is run at full capacity but has very long lead times on output increases due to high capital investment and seasonal weather complexity. South African platinum producers typically make long-term investment decisions based on the fundamental supply-demand outlook. The current palladium price is unable to stimulate investment in growth as these producers know platinum is a far more likely mechanism to re-balance the market than additional palladium supply.

The palladium price rose above that of platinum in September 2017 and in 2020 to date has traded, on average, \$1,354/oz higher than platinum. This remains far above the level autocatalyst manufacturers suggested as the point of substitution in gasoline engines on cost grounds alone.

The high price, sustained demand growth and limited supply growth of palladium now makes material platinum demand growth due to substitution of some palladium in gasoline cars extremely likely. Details of this substitution remain proprietary and extremely confidential. Many market participants and investors are unable/unwilling to act until this confidential information is known. Fortunately, autocatalyst fabricators, including Johnson Matthey, are acknowledging that substitution can be done and is happening. This is still described as 'some years off' rather than explained as proprietary and confidential.

The magnitude of substitution is also becoming more widely considered. Some 9.7 moz of palladium are used annually in vehicle emissions control while only 3 moz of platinum are used in vehicles. Replacing only 5% of the palladium with platinum at a 1 to 1 ratio (also now more widely known) would require over 450 koz more of platinum and less of palladium; this will do little to ameliorate the palladium deficit yet creates a significant demand increase in platinum.

We expect increased insight into the details as to where substitution is occurring during 2020. Obvious quick wins are in large, low temperature gasoline V6 and V8 engines in the US, in lower temperature underfloor catalyst bricks in gasoline cars and in palladium-containing diesel autocatalysts. The last-mentioned accounts for over 700 koz of palladium per annum. Platinum substituting palladium in diesel catalysis – the natural and long-standing home of platinum – has much lower emissions control risk than substitution in gasoline catalysis. This should significantly shorten implementation lead time.

- **Increased diesel automotive demand due to increased sales:** Diesel sales increased in Germany, France and Spain in Q4 2019 and may have been assisted by the increased availability of diesel hybrid and plug-in hybrid models. It was also assisted by the extremely low levels of on-road NO_x emissions of new diesel cars. Several automakers have started mainstream promotion of diesel cars, something completely absent since September 2015 when Dieselgate occurred.

We believe the design, production and now sale of multiple diesel models was not discussed by automakers to avoid the reputational harm caused by Dieselgate but was an essential strategy to avoid fleet CO₂ fines estimated to be over €14 billion per annum from 2021 without meaningful sales of mild-hybrid diesel vehicles.

Higher sales in 2020 of diesel SUVs with low CO₂ and extremely low NO_x levels, that contain more platinum per vehicle than smaller diesel sedans, could materially lift platinum demand. Furthermore, mild hybrid diesel vehicles produce far less CO₂ than equivalent gasoline or even diesel vehicles and growth in sales of models, already on sale, will reduce CO₂ fines and boost automotive platinum demand in 2020 and beyond.

- **Growing demand for fuel cell electric vehicles:** There is increasing acceptance that fuel cell electric vehicles will sit alongside battery electric vehicles as part of a multi-drivetrain solution to achieve zero on-road emissions. News flow related to heavy duty and non-road fuel cell vehicle applications, including trains, increased significantly during 2019 and into 2020. Platinum's demand growth from fuel cells will be driven initially by heavy duty applications.

WPIC initiatives highlights

We continue to focus 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 increase significantly the awareness and ownership of platinum as an investment asset. Good progress and collaboration with our large and prestigious Chinese partners, including Bank of China, Agricultural Bank of China and China Gold Association, continues to raise public and institutional awareness of how to invest in platinum. Our China team continued to provide platinum training courses to our partners and to investors, training more than 3,000 bank employees alone in 2019. This training and collaboration with our four partners that are producing and selling platinum bars, has increased our attractiveness to Chinese institutions and is helping us develop a strong and diversified partnership pipeline in China for 2020. Our sponsorship of the China Gold Association's Conference in December in Shanghai expanded our network and highlighted the platinum investment case to a broader range of institutional investors.

In North America we have expanded our partner network to include partnerships with APMEX, the world's largest online retailer of precious metals, and MTB, a leading precious metals merchant and financier, part of the MKS PAMP Group. We believe our greater involvement in the promotion, supply and distribution of platinum products will support increased sales in North America in 2020.

The heightened global prominence of addressing climate change has elevated the importance of reducing CO₂ emissions from vehicles; making clean diesel and fuel cell electric vehicles more likely to provide short- and medium-term solutions in this regard. The sustained elevated level of global debt with negative yields maintains the increased investment attractiveness of precious metals, including platinum. This provides a helpful platform to enhance the demand growth potential that has already bolstered platinum's investment case.

Paul Wilson, CEO

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PLATINUM QUARTERLY Q4 2019

Table 1: Supply, demand and above ground stocks summary (2018 and 2019 SFA (Oxford), 2020 Metals Focus)

	Q3 2019	Q4 2019	2018	2019	2019/2018 Growth %	2020f
Platinum Supply-demand Balance (koz)						
SUPPLY						
Refined Production	1,465	1,570	6,120	6,125	0%	6,043
South Africa	1,055	1,180	4,470	4,415	-1%	4,332
Zimbabwe	115	115	465	465	0%	473
North America	80	95	350	370	6%	377
Russia	170	135	665	690	4%	690
Other	45	45	170	185	9%	171
Increase (-)/Decrease (+) in Producer Inventory	-40	+40	+10	+25	150%	+0
Total Mining Supply	1,425	1,610	6,130	6,150	0%	6,043
Recycling	500	505	1,930	1,975	2%	2,074
Autocatalyst	385	390	1,420	1,490	5%	1,553
Jewellery	115	115	505	475	-6%	463
Industrial	0	0	5	10	100%	58
Total Supply	1,925	2,115	8,060	8,125	1%	8,117
DEMAND						
Automotive	680	700	3,100	2,890	-7%	3,011
Autocatalyst	645	665	2,955	2,745	-7%	3,011
Non-road	35	40	145	150	3%	
Jewellery	525	485	2,245	2,095	-7%	2,070
Industrial	475	465	1,910	1,890	-1%	2,284
Chemical	175	145	570	605	6%	629
Petroleum	50	50	235	230	-2%	186
Electrical	50	55	205	195	-5%	139
Glass	65	35	245	240	-2%	483
Medical and Biomedical	45	75	240	240	0%	249
Other	90	105	415	380	-8%	598
Investment	230	80	15	1,185	N/M	633
Bars and Coins	35	40	280	215	-23%	303
Change in ETF Holdings	205	45	-245	985	N/M	330
Change in Stocks Held by Exchanges	-10	-5	-20	-15	-25%	0
Total Demand	1,910	1,730	7,270	8,060	11%	7,998
Balance	15	385	790	65	-92%	119
Above Ground Stocks	4,140*		3,160	3,225	2%	3,651**

Source: SFA (Oxford) 2013-2019, Metals Focus 2020. Note: The data provided cannot be compared on a like-for-like basis as Metals Focus and SFA (Oxford) use their own insights, modelling and forecasts.

Notes:

1. Numbers have been independently rounded. N/M means not meaningful.

2. Above Ground Stocks: *As of 31st December 2012 (SFA (Oxford)). ** 3,532 koz as of 31 December 2019 (Metals Focus).

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, Q1'14 or Q2'14. Quarterly and half-yearly estimates from periods earlier than in this report are contained in previously published PQs which are freely available on the WPIC website.

5. The data and estimates from 2013-2019 are based on historical data and trends as well as modelling, with varying degrees of accuracy depending upon the supply or demand category. Some historical views are based on data and modelling that pre-date WPIC publication of PQ.

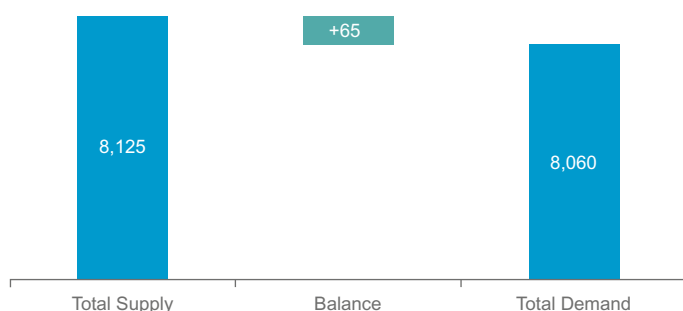
2019 FULL YEAR REVIEW (SFA (OXFORD))

Global demand increased by 11% (+790 koz) to 8,060 koz in 2019, owing to a dramatic jump in investment demand (+1,170 koz) which more than offset declines in automotive (-210 koz), jewellery (-150 koz) and industrial demand (-20 koz). Investment in platinum ETFs surged by 985 koz, with a large part of that gain occurring in the first quarter as investors took advantage of the low platinum price and its large discount to gold and palladium.

Total supply increased 1% (+65 koz) to 8,125 koz last year, owing to growth in recycling as primary supply was essentially flat. Global refined production was marginally higher (+5 koz) year-on-year at 6,125 koz, with growth in output from North America (+20 koz), Russia (+25 koz) and other regions (+15 koz) offsetting a decline in supply from South Africa (-55 koz), while Zimbabwean output was unchanged. Secondary production expanded by 2% (+45 koz) as growth in automotive (+70 koz) and industrial recycling (+5 koz) was partially offset by a decline in jewellery recycling (-30 koz).

With demand increasing by substantially more than supply, the market surplus narrowed to 65 koz (Chart 1).

Chart 1: Supply-demand balance, koz, 2019



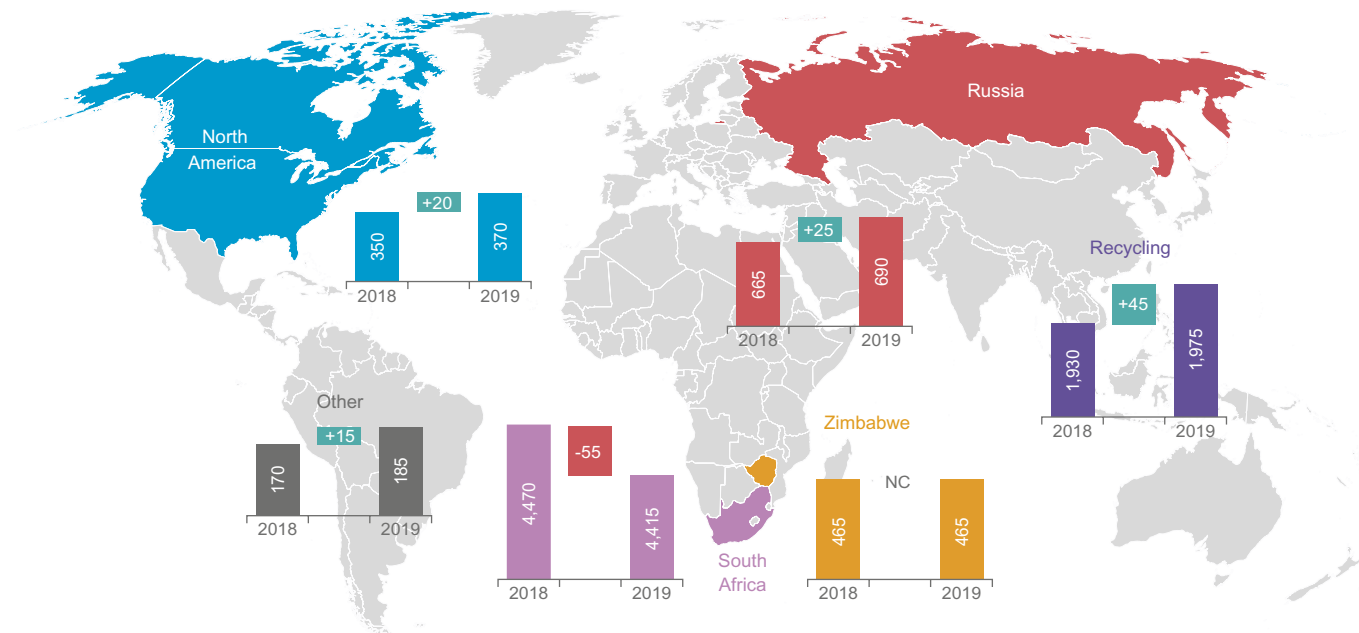
Source: SFA (Oxford)

Mine Supply

Global refined platinum supply was steady year-on-year in 2019 at 6,125 koz. South African production saw a decline of 1% (-55 koz) year-on-year to 4,415 koz owing to the optimisation and streamlining of Western Limb operations in addition to unprotected strike action on the Eastern Limb. Increased load-shedding during Q1'19 and Q4'19 resulted in the loss of some production as some mining operations were temporarily shut down owing to lack of power. In addition, load-shedding also impacted processing operations, meaning that an estimated 50 koz of work-in-progress (WIP) stock due to be refined last year has been pushed out to 2020.

Supply from Russia increased by 4% (+25 koz) year-on-year to 690 koz, largely owing to the release of WIP stock material in the first quarter of the year. Zimbabwean output remained flat at 465 koz last year. North American supply increased by 6% (+20 koz) year-on-year to 370 koz as a mine ramp-up in the US continues. Production from other regions recovered in 2019, increasing 9% (+15 koz) after falling by 6% in 2018. There was a net decrease in producer inventories of 25 koz during the year, meaning that total mining supply in 2019 was 6,150 koz, a marginal rise of 20 koz year-on-year.

Chart 2: Changes in supply, koz, 2019 vs. 2018



Source: SFA (Oxford)

Recycling

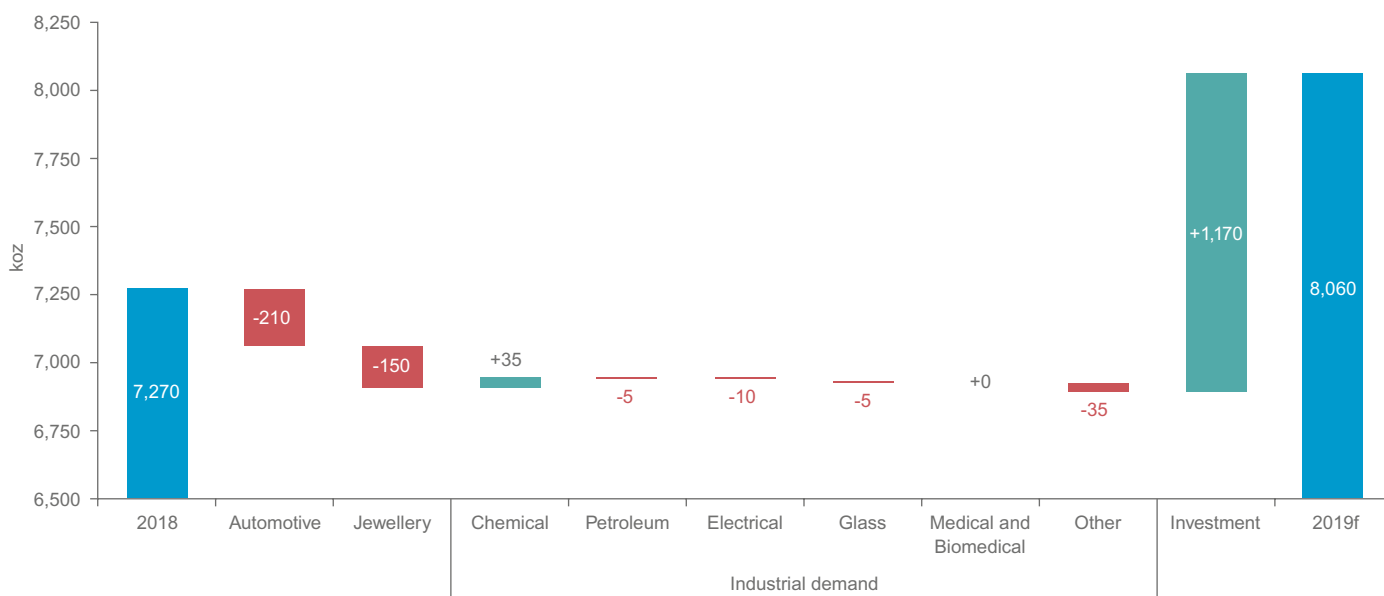
Secondary supply of platinum reached 1,975 koz in 2019, up 2% year-on-year, as expansion in autocatalyst recycling exceeded a decline in jewellery recycling. The volume of recycled jewellery dipped by 6% to 475 koz owing to the weak platinum price environment in Japan and the low price and challenging jewellery market conditions in China.

Autocatalyst recycling rose by 5% to 1,490 koz last year. Vehicles purchased in the mid-to-late 2000s are now increasingly reaching the end of their lives and are being scrapped. Over that period, a combination of strong car sales, rising autocatalyst loadings and very little substitution of platinum by palladium in diesel autocatalysts means that the amount of platinum recovered is growing. Following the palladium price hike to above \$1,000/oz in 2001, platinum use in three-way catalysts for gasoline vehicles also peaked in this period as a result of the substitution of some platinum for palladium.

The high palladium and rhodium prices compensated for a relatively low scrapped steel price in the second half of last year, and material flows from scrapyards were strong. However, the high palladium and rhodium prices have also caused some problems for the recycling industry in managing the increased working capital requirements. This, combined with refiners operating close to capacity in the northern hemisphere, has lengthened the processing time for recovery of refined metal.

Demand

Chart 3: Changes in demand by category, 2019 vs. 2018



Source: SFA (Oxford)

Automotive demand

Automotive platinum demand continued to decline in 2019, falling to 2,890 koz, down 7% year-on-year from 3,100 koz in 2018.

Western European demand continued to shrink, with lower diesel vehicle sales. However, the region remains by far the largest market for platinum in automotive applications. Diesel's share of new car registrations in Western Europe fell to 30.5% in 2019, from 35.9% in 2018 (source: ACEA), in an overall slow-growth light-vehicle market.

The introduction of Euro 6d emissions legislation and real driving emissions (RDE) testing, in stages from 2017 to 2020 (and beyond), has seen significant redesign of catalytic aftertreatment and the ways in which platinum is deployed, plus an increased variety of solutions according to vehicle size and engine designs. The standalone platinum-rich diesel particulate filter (DPF) is increasingly being replaced by a selective catalytic reduction (SCR) brick with particulate filtering capability, the SCRF. While SCR, which does not contain platinum, is the main NO_x-removing technique, platinum-containing NO_x storage catalysts (NSCs) are sometimes used in addition to SCR, and sometimes instead of a standalone diesel oxidation catalyst (DOC). The platinum-rich DOC remains part of the system in many cases too. Overall, maintaining the platinum content of light-duty diesel aftertreatment is vital to ensure automakers' compliance with the more demanding testing of tighter emissions standards.

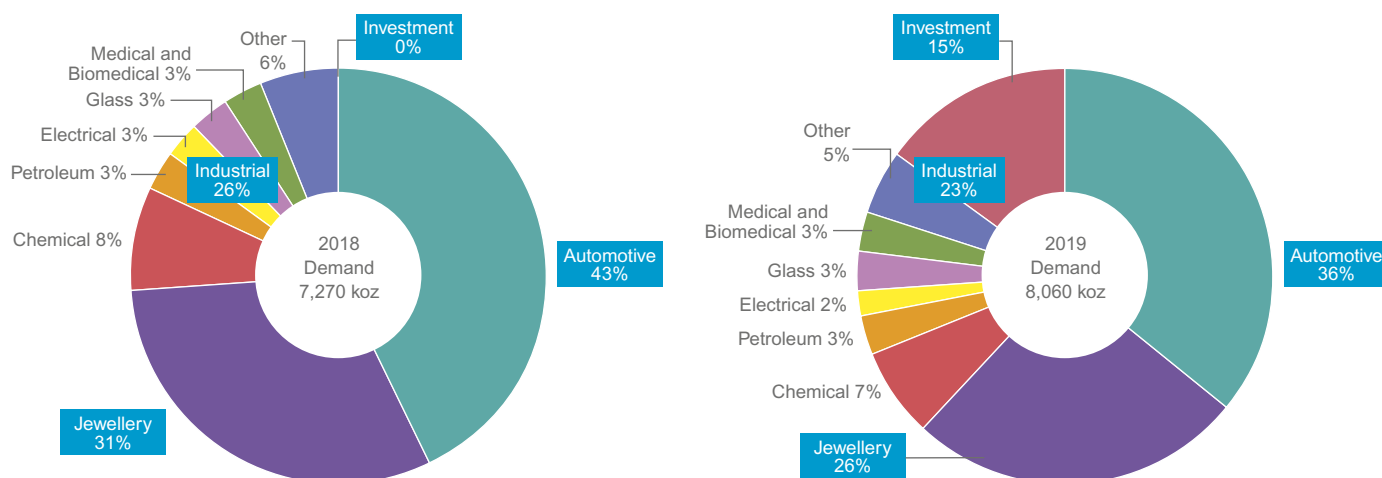
India, though a small market, saw the largest drop in percentage terms as light-duty diesel cars lost market share. The introduction of much more stringent BS VI emissions standards in April 2020 led many automakers to begin to axe smaller diesel cars from their ranges during 2019, in this very cost-conscious market. The additional cost of aftertreatment makes diesel cars, moving from a relatively cheap DOC under BS IV, increasingly uncompetitive compared to their gasoline equivalents for which the additional aftertreatment cost of upgrading to BS VI is much lower than for diesel powertrains. Diesel cars' former cost advantage has been further eroded as tax changes mean diesel fuel is no longer significantly cheaper than gasoline fuel.

Jewellery demand

Global jewellery demand is estimated to have contracted by 7% to 2,095 koz in 2019 relative to 2018 levels. Almost all the contraction was in China, where demand fell by 14% year-on-year to 945 koz. China's platinum jewellery market is now more than 1 moz lower than peak levels in 2013. Industry organisations and fabricators have ramped up efforts to bring more innovative products to market, but the effect on overall demand is yet to be seen. According to data from the National Bureau of Statistics of China (NBS), jewellery retail sales in mainland China grew by just 0.4% in 2019 – with annual metal price increases of 19% and 22% for gold and platinum respectively – making the jewellery industry the sector with the second-lowest growth among the 15 retail sectors that the NBS tracks.

Jewellery demand in Japan had a tumultuous year with strong buying in the first three quarters followed by a sharp fall at the end of the year, as the government implemented a sales tax hike from 8% to 10% on 1 October which impacted overall sales for the year. Demand in Japan fell by 15 koz to 330 koz in 2019. In the US, purchasing of platinum jewellery held up relatively well at 275 koz for the year (compared to strong demand of 280 koz in 2018), and solid bridal sales helped to offset ongoing structural changes in the jewellery industry as sales shifted from 'bricks and mortar' to e-commerce. The ongoing price discount to gold also aided platinum jewellery sales. It was a similar picture in Europe, although the shift to lighter-weight pieces dampened meaningful upside to jewellery sales, with demand reaching 260 koz. Platinum jewellery sales increased by an estimated 8% to 210 koz in India. An economic slowdown, along with high gold prices impacting jewellery store footfall and consumer budgets, hindered further upside to platinum jewellery demand.

Chart 4: Demand end-use shares, 2019 vs. 2018



Source: SFA (Oxford)

Industrial demand

Industrial demand for platinum fell by 1% (-20 koz) to 1,890 koz in 2019, with lower requirements for electrical devices (-10 koz), petroleum catalysts (-5 koz), glass fabrication (-5 koz) and other end-uses (-35 koz), while usage in medical applications remained flat year-on-year. However, greater chemical demand (+35 koz) partly negated the declines elsewhere last year, lessening the overall drop in industrial demand.

Chemical

Platinum use in the chemical industry rose by 6% to 605 koz last year, primarily owing to significant growth in China (+40 koz). China's chemical demand was boosted by the substantial expansion of paraxylene capacity in Zhejiang and Liaoning Provinces in 2019, associated with the construction of large integrated refining and petrochemical complexes in these regions, while domestic requirements for platinum-based propane dehydrogenation (PDH) capacity and silicone production also increased. Outside of China, demand was relatively stable last year, with a slight fall in the RoW region the main variation, owing to lower use in the PDH and paraxylene markets.

Petroleum

Net petroleum requirements dropped by 2% to 230 koz in 2019, as growth in China and the RoW was more than offset by reductions in North America and Western Europe. The closure of a large petroleum refinery in the US cut net demand in North America last year as recovered metal from the facility was returned to market, whilst refinery reductions also decreased new metal requirements in Western Europe. Conversely, faster growth of catalytic reforming and isomerisation capacity in China plus ongoing expansion in the RoW (e.g. in India and West Asia) lifted platinum use in these regions, supported by tighter automotive emissions standards (i.e. China 6 and Bharat Stage VI).

Electrical

Electrical demand decreased by 5% to 195 koz last year, following lower usage by hard disk drive (HDD) manufacturers in China and the RoW. HDD sales declined by 15% in 2019 with fewer units shipped in all segments, even in the enterprise market (down 10%), owing to soft PC sales and substitution to solid-state drives (SSDs). As a result, the total number of platters (disks) required for HDDs dropped by 8% year-on-year, weakening overall platinum consumption in the electrical sector.

Glass

Platinum use in glass fabrication declined by 2% to 240 koz in 2019, owing to weaker demand in the RoW, while requirements elsewhere remained relatively stable. Many of the new facilities and expansions in the RoW region were commissioned relatively early last year, including in Africa, South America and Russia, meaning much of the new metal required was likely purchased late in 2018 rather than in 2019, thereby boosting platinum requirements in 2018 at the expense of demand last year.

Other

Platinum consumption in other industrial end-uses weakened by 8% to 380 koz last year, largely owing to softer demand in Japan, North America and China. Lower ICE-based vehicle production in several regions, including China, the US and Europe, reduced platinum usage in other automotive applications, such as sensors and plugs, while thrifting by fuel cell manufacturers also decreased requirements for transportation and stationary fuel cell applications, despite further growth in unit volumes.

Investment demand

2019 was a remarkable year for platinum investment as global demand exceeded 1 moz. Record inflows into platinum ETFs along with solid bar and coin demand meant that investment demand reached 1,185 koz, which was only slightly offset by a decline in exchange stock holdings of 15 koz.

Net investment into platinum ETFs was 985 koz and each quarter saw net purchases for the first time since 2013. The majority of the gains occurred in the first quarter, when ETFs saw record inflows of 693 koz globally. The platinum price was trading below \$800/oz at the start of the year, close to its lowest level since 2008, and remained near to \$800/oz for the whole of the first quarter. Investors clearly took advantage of the low platinum price, with its large discount to gold and palladium also making it look cheap in relative terms. Such a large flow of money into ETFs indicates that a significant portion of the investment was by institutional investors.

South African investors acquired 418 koz in Q1'19, the largest quarterly increase in ETF holdings of any region last year. However, investors took some profits during the middle of the year as the rand price rose above ZAR14,000/oz for the first time since 2016.

With some additional purchases in Q4'19, total South African ETF holdings ended the year up 367 koz, which was enough to take total holdings to 1,169 koz, above 1 moz for the first time since 2015.

Investors in the UK increased their ETF holdings by the largest amount over the year, adding 420 koz. This saw UK holdings reach 820 koz and overtake those in the US where investors' net purchases of 130 koz took their total ETF holdings to 781 koz. Swiss ETF holdings expanded steadily through the year, growing by 66 koz, with total holdings reaching 466 koz. In Japan, investors made some additions to their ETF holdings in Q2'19, but some profit-taking in the second half of the year as the price rose above ¥3,300/g resulted in net sales of 13 koz for the year as a whole.

Bar and coin demand totalled 215 koz in 2019. Japanese investors' enthusiasm for platinum bars has cooled somewhat as they have become more accustomed to the weak platinum price, and so purchases were notably lower than in 2018 even though the price dipped below ¥3,000/g several times during the year. Global platinum coin sales were similar to those in 2018.

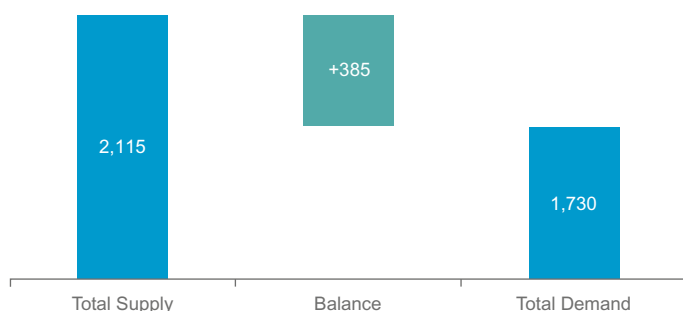
2019 Q4 REVIEW (SFA (OXFORD))

In Q4'19, refined platinum production grew slightly year-on-year (+5 koz) to 1,570 koz as South Africa (+10 koz), North America (+5 koz) and other regions (+5 koz) increased output. This was partly offset by a reduction in supply from Zimbabwe (-5 koz) and Russia (-10 koz) year-on-year. Total mining supply increased by 4% (+65 koz) year-on-year to 1,610 koz as producer inventory fell, contributing 40 koz to supply. Secondary platinum supply grew by 2% year-on-year (+10 koz) to 505 koz, as automotive recycling increased (+10 koz) while the contribution from recycled jewellery was unchanged.

Global platinum demand was 1,730 koz, down 1% year-on-year. Declines in automotive (-65 koz), jewellery (-75 koz) and industrial demand (-25 koz) more than offset a recovery in investment demand which was 80 koz in Q4'19 compared to a net decrease of 65 koz in Q4'18.

The fourth quarter saw total supply increase quarter-on-quarter whereas demand slipped back, which widened the market surplus to 385 koz (Chart 5).

Chart 5: Supply-demand balance, koz, Q4 2019



Source: SFA (Oxford)

Supply

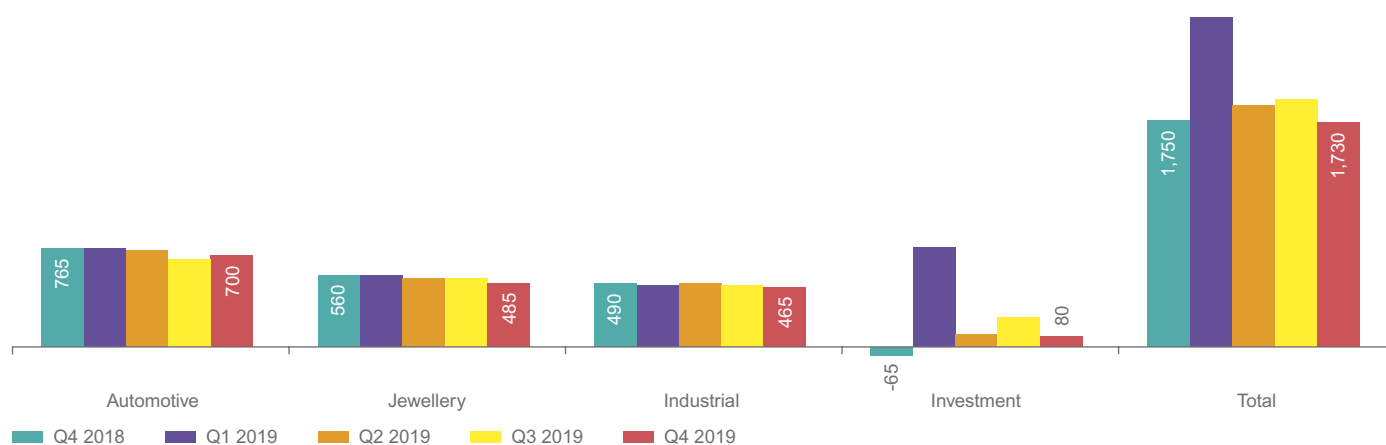
Refined platinum production was marginally higher year-on-year at 1,570 koz in Q4'19. South African output was adversely affected by a significant increase in electricity load-shedding during the period, but despite this refined production grew by 1% year-on-year to 1,180 koz in Q4'19. A combination of improved concentrator efficiencies and throughput together with the processing of high-grade ore stockpiles more than offset the loss in production related to Eskom power outages.

Output from Zimbabwe reduced by 4% year-on-year to 115 koz, while output from North America increased by 6% year-on-year to 95 koz as an expansion project continues to ramp up. Russian output was down by 7% year-on-year to 135 koz in Q4'19 while supply from other regions was up by 13% year-on-year to 45 koz. There was a net decrease of 40 koz in producer inventory levels during the quarter, resulting in total mining supply of 1,610 koz, an increase of 4% year-on-year.

In the fourth quarter, total secondary platinum supply was 505 koz. The amount of metal recovered from autocatalysts was up 3% year-on-year at 390 koz, whereas jewellery recycling was flat at 115 koz.

Demand

Chart 6: Platinum demand, koz



Source: SFA (Oxford)

Automotive demand

Fourth quarter automotive demand was down 8% year-on-year to 700 koz from 765 koz in Q4'18. Compared to the previous quarter though, demand was up 3% from 680 koz.

This was another quarter in Western Europe when vehicle sales patterns were significantly distorted in response to impending emissions legislation changes. Comparisons benefitted from a weak fourth quarter in 2018 after disruption from the introduction of WLTP emissions testing standards. The introduction of tougher EU-wide 95 g/km CO₂ emissions targets, beginning in January 2020 and coming from a fleet average of about 120 g/km CO₂ at the beginning of 2019, is forcing automakers to rethink their powertrain choices to avoid punitive fines.

Diesel passenger car registrations in the EU overall fell by 3.7% to 1.045 million units in Q4'19 from 1.084 million units in Q4'18 (source: ACEA). However, during Q4'19 several of the larger markets showed signs of recovery compared to Q4'18: diesel car registrations were up by 4.3% in Germany and by 7.3% in France, with double-digit growth in some of the smaller markets. Sales figures in December are likely to have been boosted by the pulling-forward of some sales, as some larger diesel cars with therefore high CO₂ emissions were registered early to avoid adversely affecting automakers' 2020 CO₂ figures.

Jewellery demand

Total platinum consumption for jewellery was an estimated 485 koz in Q4'19, a 13% fall on the same quarter in 2018. China's demand led the contraction with a year-on-year reduction of 60 koz to 225 koz. Platinum purchasing on the Shanghai Gold Exchange by jewellery end-users declined by 18% year-on-year in Q4'19. Fabricators reported that a significant drop occurred towards the year-end in both gold and platinum jewellery, flattening seasonality. Despite the differences between gold and platinum – in marketing and R&D efforts – both jewellery categories fell victim to changing consumer tastes as fewer shoppers purchased jewellery. This is confirmed by the lacklustre jewellery sales performance at major retailers. Chow Tai Fook's same-store sales volume dropped 9% and 47% for mainland China and Hong Kong & Macau, respectively. Luk Fook reported a 25% decline in its same-store sales for the group. The company explained that higher prices, the China-US trade war and social unrest in Hong Kong all impacted sales.

The retail sales environment following the consumption tax hike on 1 October in Japan was extremely challenging, particularly for discretionary products. Sales were also hampered by a record typhoon season in the region. Most consumers bought ahead of the tax hike, leaving demand higher than normal in Q3'19 but yielding the lowest quarterly platinum jewellery demand in Q4'19 since SFA began capturing quarterly data in 2013. Demand for platinum fell by an estimated 24% year-on-year to 65 koz in the quarter. Meanwhile, India is in the grip of a severe downturn in economic growth. High gold prices have led to shrinking sales of gold jewellery, so the modest growth in platinum jewellery demand, albeit not at the strong growth rates seen in the past, is still significant. Demand for platinum was an estimated 55 koz in Q4'19, a rise of 5 koz on the same period last year. US jewellery consumption remained flat year-on-year at 55 koz.

Industrial demand

Fourth quarter industrial demand for platinum declined by 5% year-on-year to 465 koz, predominantly owing to lower requirements for glass fabrication. Comparatively few new glass manufacturing facilities are expected to be commissioned in early 2020 versus the same period the year before, particularly in the RoW, reducing new metal buying by the glass industry in Q4'19. However, new paraxylene capacity commissioned in China during Q1'20 boosted chemical requirements in the last quarter of 2019, slightly offsetting the demand decline in the glass sector.

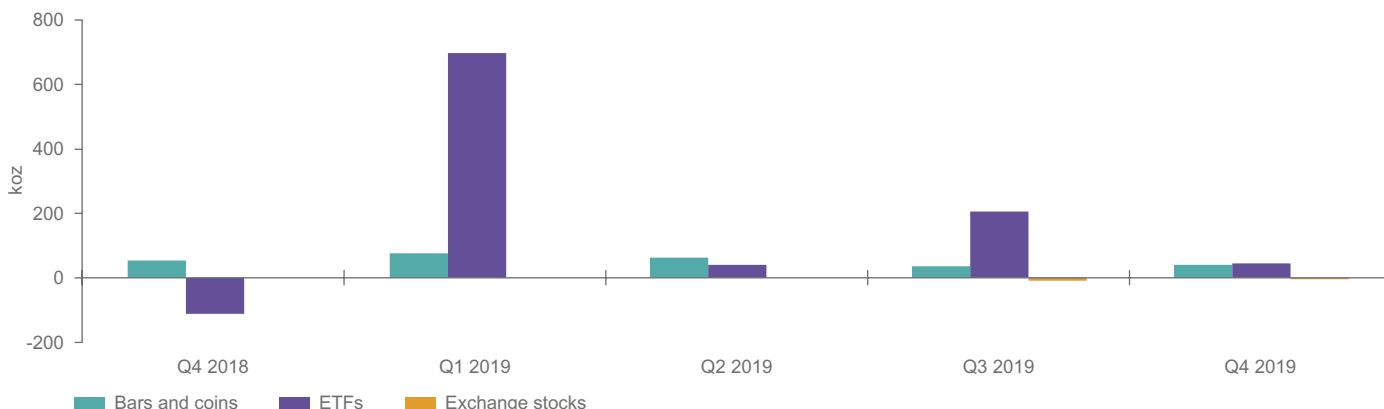
Investment demand

Total investment demand was 80 koz in Q4'19, as moderate purchases of ETFs and bars and coins were slightly offset by a fall of 5 koz in exchange stocks (Chart 7).

Bar and coin purchases totalled 40 koz, a modest increase over Q3'19, as bar investment was slightly higher and coin sales were at a similar level to the previous quarter. Japanese investment in platinum bars picked up slightly in Q4'19 compared to Q3'19 even though the local platinum price was, on average, slightly higher and the consumption tax was raised to 10% from 8% at the beginning of October.

Net purchases of ETFs totalled 45 koz. There were some distinct regional differences: Swiss investors added 22 koz whereas US ETF holdings fell by the same amount. South African investors added 20 koz to their holdings and UK investors' net purchases were 29 koz, while in Japan ETF holdings were down by 5 koz.

Chart 7: Platinum investment



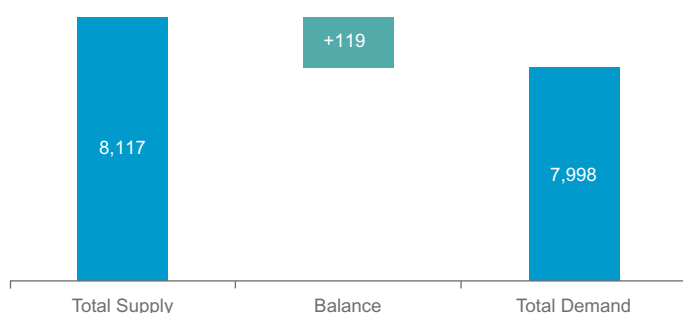
Source: SFA (Oxford)

2020 FORECAST (METALS FOCUS)

For 2020, global supply is forecast to reach 8,117 koz. This reflects total mining supply of 6,043 koz and global recycling of 2,074 koz. Set against this, total demand is expected to stand at 7,998 koz. The key sub-components are automotive demand (3,011 koz), jewellery demand (2,070 koz), industrial demand (2,284 koz) and investment demand (633 koz).

Overall, global platinum demand in 2020 is expected to fall short of supply generating a market surplus of 119 koz (Chart 8).

Chart 8: Supply-demand balance, koz, 2020f



Source: Metals Focus

Mine supply

Global refined production of 6,043 koz is forecast for 2020, supported by the refining of work-in-process inventory. South African output is forecast to decline modestly to reach 4,332 koz, with the expectation that continued power outages will affect all mines and refineries and there will be a drop in production due to the closure of several end-of-life shafts.

Growth in refined production is expected at two mine expansion projects in South Africa and one in the US. Refined production in Russia is expected to stabilise after planned smelter maintenance, while output from Zimbabwe is expected to remain stable. Our projections see no change to refined producer inventories in 2020.

Recycling

The recovery of platinum from autocatalysts in end-of-life vehicles is expected to remain at historically high levels in 2020, at a forecast total of 1,553 koz. However, we expect to see a smaller contribution from destocking by scrap yards, which was a feature for much of 2019.

Jewellery recycling is forecast to fall to 463 koz this year as lower volumes from China are only partly offset by gains elsewhere. The drop in China is due to the forecast decline in jewellery sales (and so fewer new-for-old transactions), plus a smaller remelt of slow selling trade stocks (as a good portion of the structural market change is now behind us). One driver of the gains in western markets is a forecast rise in the gold price, as consumers can often add platinum pieces to the gold items that they are taking to scrap collectors. The projected rally in platinum prices will also make collectors more eager to pass the platinum, they have collected, onto refiners.

Industrial recycling is expected this year to contribute 58 koz to global platinum supply.

Automotive demand

2020 may be the year that sees platinum automotive demand turn a corner. Our latest projections see demand rising modestly this year to reach 3,011 koz. The biggest contribution to the increase is forecast to come from China. We expect the share of China VI compliant heavy-duty diesel vehicles to increase considerably and, in doing so, will see platinum offtake from that segment almost double from its 2019 levels. Coupled with gains from the use in light commercial vehicle aftertreatment systems, total platinum demand in China is expected to continue increasing and reach 260 koz.

We expect a very slight increase in automotive demand in Europe which is arguably as important, if not more so, than the gains in China. We forecast 1,490 koz in 2020. In part this reflects diesel's market share of European passenger car production in 2020 being virtually unchanged compared to 2019, with sales lower but now reducing at a far slower rate than in previous years. Importantly, a far larger share of these (8.3% in 2020 compared to 4.4% in 2019) will be hybrid, requiring higher PGM loadings to deal with frequent cold starts. We expect that, even though the total number of diesel vehicles produced in 2020 will be lower than was the case last year, the amount of platinum they will use will increase.

Jewellery demand

Global demand is expected to see a further loss of demand in China, but this will be almost offset by gains elsewhere. Overall, jewellery offtake is expected to reach 2,070 koz this year.

In China, the challenge of competition from a more dynamic gold jewellery sector looks likely to persist, even if we have seen the worst of the associated losses, as sales of plain conventional platinum pieces gradually bottom out. A healthier overall result, however, has been ruled out by the outbreak of the coronavirus, which is expected to put strong pressure on the jewellery sector more generally. Sales of all jewellery will be hit hard by this as the Chinese New Year has traditionally been the peak time for the jewellery market. In addition, a slowing economy and weaker growth in disposable incomes will weigh on consumer spending on jewellery.

We should caution that this forecast is premised on a view that the coronavirus becomes contained in a matter of months and that economic growth soon resumes. However, this projection may prove too optimistic. On a more positive longer-term note, we have received feedback from some leading manufacturers that they will continue to make efforts in product development, focusing on more integration of alternative materials, to present the consumer with improved choices.

In contrast, demand in Japan is expected to grow in 2020 thanks to the boost from the Tokyo Olympics and the backdrop of benign economic conditions in the country. This also rests partly on the assumption that the coronavirus crisis in Asia dissipates within the next two to three months.

Demand in Europe and North America should also show gains as bridal sales continue to benefit from platinum's discount to gold. High-end jewellery and watch fabrication should also bounce back thanks to restocking and stronger consumer sales as US-China tensions ease. Lastly, we may start to see the substitution of palladium with platinum in white gold alloys, as platinum-based ones move beyond the trial stage.

We expect demand to recover in India 2020 due to improvements in the economy and an easing of the liquidity crunch. In particular, we expect economic growth to benefit demand during the second half of the year, in time for the festive and wedding season, encouraging stock building at the retail level and increasing sales to end consumers.

Industrial demand

Total industrial demand for platinum is forecast to increase to 2,284 koz in 2020. Key to this is the expected robust performance from the glass industry.

Chemical

Platinum chemical offtake is expected to face challenges in 2020, but total volumes will remain elevated by historical standards. We anticipate a small decline, largely premised on a slower pace of petrochemical capacity expansion in China. The coronavirus outbreak has already resulted in supply disruptions in the petrochemical industry, while plants that are currently under construction could also face delays. More generally, the weak oil price and rising US oil supplies could see investors re-evaluate their commitment to capacity expansion. Elsewhere, a small recovery is expected for platinum use in nitric acid production, as growth in fertiliser output continues. We expect platinum consumption in silicone production to also continue to strengthen.

Petroleum

In 2020, we expect net platinum fabrication to reach 186 koz. The ongoing coronavirus outbreak and consequent sharply lower fuel use will also negatively impact the petroleum industry. Meanwhile, after a rapid ramp-up in oil refining capacity in recent years, a rising petrol surplus has put pressure on refinery margins and capacity expansion has fallen. In the Middle East, geopolitical tensions and weak economic conditions will also slow capacity growth.

Electrical

The hard disc drive (HDD) industry is looking to maintain its competitiveness by boosting capacity through adding more disks per drive, or through the introduction of heat-assisted magnetic recording (HAMR) and microwave-assisted magnetic (MAM) recording. Helium-sealed HDDs, at present the mainstream technology in the data-storage sector, can incorporate up to 10 disks, compared to a maximum of five in conventional air-filled designs.

Looking ahead, both HAMR and MAMR drives are scheduled to achieve commercial production in the second half of this year, which should help HDDs retain their market share, including in nearline and data centre storage solutions. Having said all this, pressures on the sector, for instance relating to an ongoing shift to solid state drives, will persist. As such, we expect to see a modest decline for platinum offtake, which should reach 139 koz this year.

Glass

In 2020 we expect to see very strong demand from the glass sector. LCD glass furnace construction will be fuelled by healthy increases in Chinese capacity as well as the replacement of some Japanese furnaces with significantly larger ones. We expect demand for glass fibre manufacture to be steady, supported by continued growth in global capacity.

Medical and biomedical

The growing list of medical and biomedical product categories, that are consuming platinum, means that we expect this broad segment to achieve growth going forward, albeit modestly. However, there will be some offset from reduced dental demand, due to ongoing structural losses in this segment. Overall, in 2020, we expect global medical and biomedical demand will reach 249 koz.

Other

Total other industrial demand is forecast to reach 598 koz in 2020, the result of strong growth in platinum use in spark plugs and sensors and a healthy (yet still modest in absolute terms) fuel cell segment.

Taking each in turn, ever-tightening emissions legislation and higher demands on engines' ignition systems support growth in demand for platinum and platinum-iridium tipped sparkplugs, due to their superior performance over nickel tipped ones. Furthermore, the increasing complexity of vehicle emissions control requires more platinum-based sensors per car, driving automotive demand growth.

The fuel cell industry will continue to see increased platinum use in both stationary devices and across parts of the transportation industry. Platinum demand remains modest overall but will continue to realise year-on-year gains in 2020.

Investment demand

Total investment in 2020 is expected to reach 633 koz. We are forecasting that ETF holdings will rise by 330 koz. This would take total ETF holdings to a new record high of 3,707 koz by the end of 2020. Although we do not expect to see a repeat of 2019's record performance, our forecast of further upside for the platinum price will attract new investment in the ETF market, which should offset any profit taking. Furthermore, the expectation among some investors, that the massive platinum-palladium differential will result in substitution gains for platinum in the automotive industry, should also attract new inflows into platinum ETFs.

Coin and bar demand this year is expected to reach 303 koz. This subdued performance will reflect the fact that rising prices will generate two responses. First, some buying will emerge from those investors who decide to enter the market before further price gains emerge. This, however, will be partially offset as others decide to book profits.

ABOVE GROUND STOCKS

Our estimate of above ground stock, in line with the WPIC definition of above ground stocks,^{***} at 31 December 2019 is 3,532 koz. Global platinum demand in 2020 is expected to fall short of supply generating a market surplus of 119 koz. This will result in above ground stocks of 3,651 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.*

PLATINUM QUARTERLY Q4 2019

Table 2: Supply, demand and above ground stocks summary – (2013 to 2019 SFA (Oxford), 2020 Metals Focus)

	2013	2014	2015	2016	2017	2018	2019	2019/2018 Growth %	2020f
Platinum Supply-demand Balance (koz)									
SUPPLY									
Refined Production	6,070	4,855	6,160	6,035	6,125	6,120	6,125	0%	6,043
South Africa	4,355	3,115	4,480	4,255	4,380	4,470	4,415	-1%	4,332
Zimbabwe	405	405	405	490	480	465	465	0%	473
North America	355	400	385	395	365	350	370	6%	377
Russia	740	740	710	715	720	665	690	4%	690
Other	215	195	180	180	180	170	185	9%	171
Increase (-)/Decrease (+) in Producer Inventory	-215	+350	+30	+30	+30	+10	+25	150%	+0
Total Mining Supply	5,855	5,205	6,190	6,065	6,155	6,130	6,150	0%	6,043
Recycling	1,980	2,035	1,705	1,840	1,890	1,930	1,975	2%	2,074
Autocatalyst	1,120	1,255	1,185	1,210	1,325	1,420	1,490	5%	1,553
Jewellery	855	775	515	625	560	505	475	-6%	463
Industrial	5	5	5	5	5	5	10	100%	58
Total Supply	7,835	7,240	7,895	7,905	8,045	8,060	8,125	1%	8,117
DEMAND									
Automotive	3,125	3,250	3,365	3,455	3,325	3,100	2,890	-7%	3,011
Autocatalyst	2,985	3,100	3,230	3,315	3,185	2,955	2,745	-7%	3,011
Non-road	140	150	140	135	140	145	150	3%	
Jewellery	2,945	3,000	2,840	2,505	2,460	2,245	2,095	-7%	2,070
Industrial	1,485	1,575	1,685	1,790	1,685	1,910	1,890	-1%	2,284
Chemical	535	540	505	560	565	570	605	6%	629
Petroleum	50	65	205	215	100	235	230	-2%	186
Electrical	195	215	205	195	210	205	195	-5%	139
Glass	145	175	200	205	180	245	240	-2%	483
Medical and Biomedical	220	220	225	230	235	240	240	0%	249
Other	340	360	345	385	395	415	380	-8%	598
Investment	935	150	305	535	275	15	1,185	N/M	633
Bars and Coins	-5	50	525	460	215	280	215	-23%	303
Change in ETF Holdings	905	215	-240	-10	105	-245	985	N/M	330
Change in Stocks Held by Exchanges	35	-115	20	85	-45	-20	-15	-25%	0
Total Demand	8,490	7,975	8,195	8,285	7,745	7,270	8,060	11%	7,998
Balance	-655	-735	-300	-380	300	790	65	-92%	119
Above Ground Stocks	4,140*	3,485	2,750	2,450	2,070	2,370	3,160	2%	3,651**

Source: SFA (Oxford) 2013-2019, Metals Focus 2020. Note: The data provided cannot be compared on a like-for-like basis as Metals Focus and SFA (Oxford) use their own insights, modelling and forecasts.

Notes:

1. Numbers have been independently rounded. N/M means not meaningful.

2. Above Ground Stocks: *As of 31st December 2012 (SFA (Oxford)). ** 3,532 koz as of 31 December 2019 (Metals Focus).

PLATINUM QUARTERLY Q4 2019

Table 3: Supply and demand summary – quarterly comparison

	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q4'19/Q4'18 Growth %	Q4'19/Q3'19 Growth %
Platinum Supply-demand Balance (koz)										
SUPPLY										
Refined Production	1,300	1,605	1,665	1,565	1,470	1,610	1,465	1,570	0%	7%
South Africa	915	1,160	1,230	1,170	1,020	1,160	1,055	1,180	1%	12%
Zimbabwe	115	115	120	120	115	120	115	115	-4%	0%
North America	90	85	90	90	85	100	80	95	6%	19%
Russia	140	200	180	145	205	185	170	135	-7%	-21%
Other	40	45	45	40	45	45	45	45	13%	0%
Increase (-)/Decrease (+) in Producer Inventory	-5	+55	-20	-20	+5	+20	-40	+40	N/M	N/M
Total Mining Supply	1,295	1,660	1,645	1,545	1,475	1,630	1,425	1,610	4%	13%
Recycling	460	480	490	495	480	485	500	505	2%	1%
Autocatalyst	330	345	365	380	355	360	385	390	3%	1%
Jewellery	130	135	125	115	125	125	115	115	0%	0%
Industrial	0	0	0	0	0	0	0	0	N/M	N/M
Total Supply	1,755	2,140	2,135	2,040	1,955	2,115	1,925	2,115	4%	10%
DEMAND										
Automotive	800	815	715	765	760	750	680	700	-8%	3%
Autocatalyst	765	775	680	735	725	715	645	665	-10%	3%
Non-road	35	40	35	40	40	40	35	40	0%	14%
Jewellery	580	570	550	560	550	535	525	485	-13%	-8%
Industrial	475	475	465	490	470	485	475	465	-5%	-2%
Chemical	145	135	155	135	150	145	175	145	7%	-17%
Petroleum	55	55	55	55	50	50	50	50	-9%	0%
Electrical	55	50	50	55	55	50	50	55	0%	10%
Glass	60	60	65	65	65	75	65	35	-46%	-46%
Medical and Biomedical	55	70	45	70	55	70	45	75	7%	67%
Other	105	105	95	110	95	95	90	105	-5%	17%
Investment	60	-55	65	-65	770	100	230	80	N/M	-65%
Bars and Coins	85	70	70	50	75	60	35	40	-20%	14%
Change in ETF Holdings	-15	-125	5	-115	695	40	205	45	N/M	-78%
Change in Stocks Held by Exchanges	-10	0	-10	0	0	0	-10	-5	N/M	-50%
Total Demand	1,915	1,805	1,795	1,750	2,550	1,870	1,910	1,730	-1%	-9%
Balance	-160	335	340	290	-595	245	15	385		

Source: SFA (Oxford). NB: Numbers have been independently rounded. N/M means not meaningful.

PLATINUM QUARTERLY Q4 2019

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

	H1 2018	H2 2018	H1 2019	H2 2019	H2'19/H2'18 Growth %	H2'19/H1'19 Growth %
Platinum Supply-demand Balance (koz)						
SUPPLY						
Refined Production	2,905	3,230	3,080	3,035	-6%	-1%
South Africa	2,075	2,400	2,180	2,235	-7%	3%
Zimbabwe	230	240	235	230	-4%	-2%
North America	175	180	185	175	-3%	-5%
Russia	340	325	390	305	-6%	-22%
Other	85	85	90	90	6%	0%
Increase (-)/Decrease (+) in Producer Inventory	+50	-40	+25	+0	-100%	-100%
Total Mining Supply	2,955	3,190	3,105	3,035	-5%	-2%
Recycling	940	985	965	1,005	2%	4%
Autocatalyst	675	745	715	775	4%	8%
Jewellery	265	240	250	230	-4%	-8%
Industrial	0	0	0	0	N/M	N/M
Total Supply	3,895	4,175	4,070	4,040	-3%	-1%
DEMAND						
Automotive	1,615	1,480	1,510	1,380	-7%	-9%
Autocatalyst	1,540	1,415	1,440	1,310	-7%	-9%
Non-road	75	75	80	75	0%	-6%
Jewellery	1,150	1,110	1,085	1,010	-9%	-7%
Industrial	950	955	955	940	-2%	-2%
Chemical	280	290	295	320	10%	8%
Petroleum	110	110	100	100	-9%	0%
Electrical	105	105	105	105	0%	0%
Glass	120	130	140	100	-23%	-29%
Medical and Biomedical	125	115	125	120	4%	-4%
Other	210	205	190	195	-5%	3%
Investment	5	0	870	310	N/M	-64%
Bars and Coins	155	120	135	75	-38%	-44%
Change in ETF Holdings	-140	-110	735	250	N/M	-66%
Change in Stocks Held by Exchanges	-10	-10	0	-15	50%	N/M
Total Demand	3,720	3,545	4,420	3,640	3%	-18%
Balance	175	630	-350	400		

Source: SFA (Oxford). NB: Numbers have been independently rounded. N/M means not meaningful.

PLATINUM QUARTERLY Q4 2019

Table 5: Regional demand – annual and quarterly (2013 to 2019 SFA (Oxford), 2020 Metals Focus)

	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	2013	2014	2015	2016	2017	2018	2019	2019/2018 Growth %	2020f
Platinum gross demand (koz)														
Automotive	765	760	750	680	700	3,125	3,250	3,365	3,455	3,325	3,100	2,890	-7%	3,011
North America						420	465	500	460	425	430	430		
Western Europe						1,350	1,400	1,550	1,705	1,555	1,290	1,135		
Japan						580	590	510	455	440	430	410		
China						130	125	125	160	190	185	200		
India						165	170	175	170	175	195	150		
Rest of the World						480	500	505	505	540	570	565		
Jewellery	560	550	535	525	485	2,945	3,000	2,840	2,505	2,460	2,245	2,095	-7%	2,070
North America						200	230	250	265	280	280	275		
Western Europe						220	220	235	240	250	255	260		
Japan						335	335	340	335	340	345	330		
China						1,990	1,975	1,765	1,450	1,340	1,095	945		
India						140	175	180	145	175	195	210		
Rest of the World						60	65	70	70	75	75	75		
Chemical	135	150	145	175	145	535	540	505	560	565	570	605	6%	629
North America						55	55	50	50	50	50	50		
Western Europe						110	105	75	110	115	110	110		
Japan						10	10	10	15	15	15	15		
China						195	215	230	225	215	215	255		
Rest of the World						165	155	140	160	170	180	175		
Petroleum	55	50	50	50	50	50	65	205	215	100	235	230	-2%	186
North America						40	25	-25	90	55	55	5		
Western Europe						-45	-15	70	10	5	20	5		
Japan						10	-35	5	0	-40	5	5		
China						80	-5	45	80	45	10	30		
Rest of the World						-35	95	110	35	35	145	185		
Electrical	55	55	50	50	55	195	215	205	195	210	205	195	-5%	139
North America						10	15	15	10	15	15	15		
Western Europe						5	10	10	10	10	10	10		
Japan						15	15	15	15	15	15	15		
China						75	70	70	80	90	85	80		
Rest of the World						90	105	95	80	80	80	75		
Glass	65	65	75	65	35	145	175	200	205	180	245	240	-2%	483
North America						5	10	0	20	5	5	5		
Western Europe						-10	15	10	5	5	35	35		
Japan						0	-25	-5	-10	-10	0	5		
China						90	85	95	100	85	75	75		
Rest of the World						60	90	100	90	95	130	120		
Medical	70	55	70	45	75	220	220	225	230	235	240	240	0%	249
North America						90	90	90	90	95	95	95		
Western Europe						75	75	75	80	80	80	80		
Japan						20	20	20	20	20	20	20		
China						15	15	20	20	20	20	20		
Rest of the World						20	20	20	20	20	25	25		
Other industrial	110	95	95	90	105	340	360	345	385	395	415	380	-8%	598
Investment	-65	770	100	230	80	935	150	305	535	275	15	1,185	N/M	633
Total Demand	1,750	2,550	1,870	1,910	1,730	8,490	7,975	8,195	8,285	7,745	7,270	8,060	11%	7,998

Source: SFA (Oxford) 2013-2019, Metals Focus 2020. Note: The data provided cannot be compared on a like-for-like basis as Metals Focus and SFA (Oxford) use their own insights, modelling and forecasts.

Note:

1. Numbers have been independently rounded. N/M means not meaningful.

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 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.

Conformity factor (CF)

The EU is to allow automakers to exceed current Euro 6 NO_x limits, giving time to adapt to new real-world driving emissions rules. From September 2017 for new models and from September 2019 for new vehicles, a CF of up to 2.1 (110%) will be allowed over the 80 mg/km NO_x limit. This CF will be phased out at the latest in 2021, then from January 2020 (new models) and January 2021 (new vehicles) a lower CF of 1.5 will be allowed, reflecting statistical and technical uncertainty of the tests.

Diesel oxidation catalyst (DOC)

A DOC oxidises harmful carbon monoxide and unburnt hydrocarbons, produced by incomplete combustion of diesel fuel, to harmless 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

Tailpipe regulations covering emissions of particulate matter, hydrocarbons and oxides of nitrogen.

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.

Euro V/VI emission standards

EU emission standards for heavy-duty vehicles. Euro V legislation was introduced in 2009 and Euro VI in 2013/2014; will be widely adopted later in other regions.

Euro 5/6 emission standards

EU emission standards for light-duty vehicles. Euro 5 legislation was introduced in 2009 and Euro 6 in 2014/2015; will be widely adopted later in other regions.

Form factor

The size of a hard disk drive (e.g. 2.5-inch or 3.5-inch) which varies depending on the device the drive is used in.

GTL

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

HDD

Hard disk drive.

HDV

Heavy-duty vehicle.

ICE

Internal combustion engine.

koz

Thousand ounces.

LCD

Liquid-crystal display used for video display.

LCV

Light commercial vehicle.

Lean NO_x traps (LNT)

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

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.

moz

Million ounces.

NEDC

New European Driving Cycle vehicle emissions test.

Net demand

A measure of the theoretical 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, using engine and emissions technology similar to on-road heavy-duty diesel vehicles.

NO_x storage catalyst (NSC)

Used in light duty diesel aftertreatment to convert harmful oxides of nitrogen to harmless nitrogen and carbon dioxide. The PGM content is mainly platinum, with some rhodium. NSCs may be used in conjunction with SCR technology to minimise NO_x emissions.

OECD

Organisation for Economic Co-operation and Development, consisting of 34 developed countries.

oz

A unit of weight commonly used for precious metals.
1 troy ounce = 1.1 ounces.

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.

Producer inventory

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

RDE

Real Driving Emissions – the term used by the EU to define the testing protocol that will measure pollutants emitted from cars, including NO_x, 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 will apply to all registrations from September 2019.

Refined production

Processed platinum output from refineries.

Secondary supply

Recycling output.

Selective catalytic reduction (SCR)

PGM-free, converts harmful NO_x in diesel exhaust to harmless nitrogen, via a tank of urea solution. Used in heavy-duty diesel vehicles, increasingly competes with LNT in light-duty diesel vehicles. Contained within an aftertreatment system which normally requires a platinum-containing oxidation catalyst ahead of the SCR unit.

SGE

Shanghai Gold Exchange.

SSD

Solid-state drive.

Stage 4 regulations

European emission standards implemented in 2014 for non-road diesel engines.

Three-way catalyst

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

Tier 4 stage

Emissions standards phased in between 2008 and 2015 in the US for non-road vehicles.

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).

WPIC

The World Platinum Investment Council.

Ounce conversion

1 million troy ounces = 31.1 tonnes.

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