

FOREWORD

This edition of *Platinum Quarterly* considers the platinum supply and demand developments for the first quarter of 2019 and provides an updated outlook for 2019. We also provide our views on issues and trends relevant to investors considering exposure to platinum as an investment asset and update you on how our product partnerships continue to meet investors' needs.

Platinum supply and demand – 2019

The 2019 forecast now foresees a reduced 375 koz surplus versus the prior estimate of 680 koz, due to a strong increase in investment demand that more than offsets slightly lower automotive, jewellery and industrial demand compared to 2018. Total demand in 2019 is forecast to rise 8% compared to 2018. The significant increase in ETF holdings in Q1'19 of 690 koz supports the increased investment demand forecast for 2019 of 785 koz. Supply is forecast to increase by 4% over 2018 with increases in both mining supply and recycling. Refined production is forecast to grow by 5%, as some mining projects ramp up, but it grows primarily due to the processing of pipeline material held up by smelter problems in 2018. Supply from recycling is forecast to grow by 3% as an increase in platinum recovered from autocatalysts more than offsets a dip in jewellery recycling due to the low platinum price.

Despite firm supply and weak jewellery and automotive demand in Q1'19 the forecast 2019 surplus is more likely to reduce further than to increase, as the year develops, due to downside supply risk and upside demand risk. There is potential for mine supply disruptions in South Africa due to the risk of power outages and industrial action related to wage negotiations. Diesel sales may increase in 2019 as all diesel cars sold in Europe after 1 September 2019 will emit NO_x below 168 mg/km and consumers can access independent tests to confirm this. Platinum use in gasoline cars, which is as yet unpublished proprietary information, may be quantified during 2019; providing potentially a material positive impact on platinum demand. The significant increase in investment demand by institutions in Q1'19 is likely to be medium to long term in nature, tightening the market balance and with potential to grow should demand estimates for 2019 increase further.

Q1 2019 strong ETF demand drives market deficit

Despite firm mining supply in the first quarter of 2019, contrary to the usual Q1 weakness, the highest ever quarterly investment demand resulted in a quarterly deficit of 550 koz. This is the largest since the WPIC commenced publication in 2014. Mining supply benefitted from the release of material built up during smelter problems in South Africa in 2018. The significant increase in investment demand appears to reflect anticipation of platinum demand growth potential over the next few years and the risk of South African supply disruption in 2019. The *Platinum Quarterly* data and report (starting on page 4) are, as always, prepared independently for WPIC by SFA (Oxford).

Supply – higher Q1 2019 and 2019 due to one-off release of refined platinum from pipeline stocks

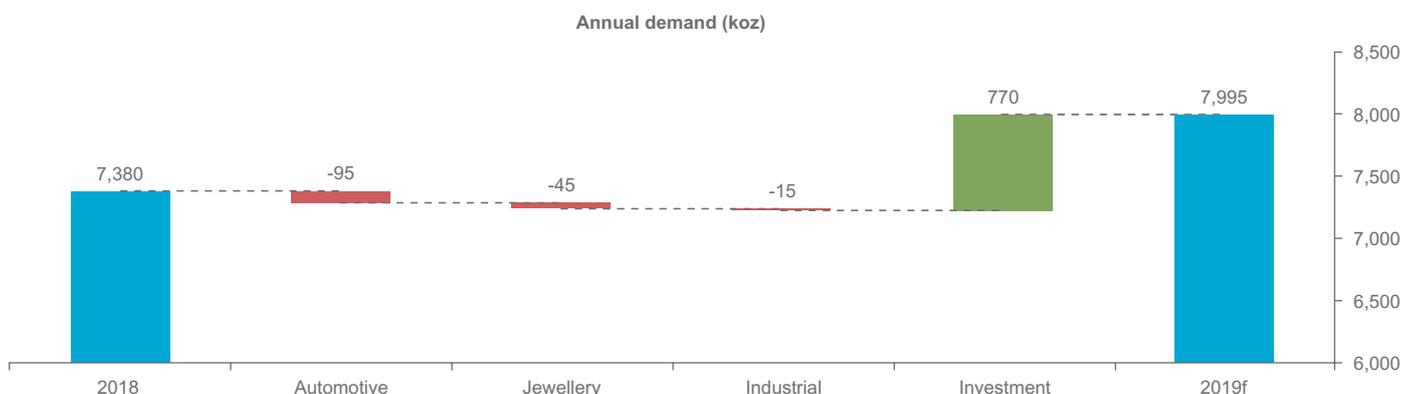
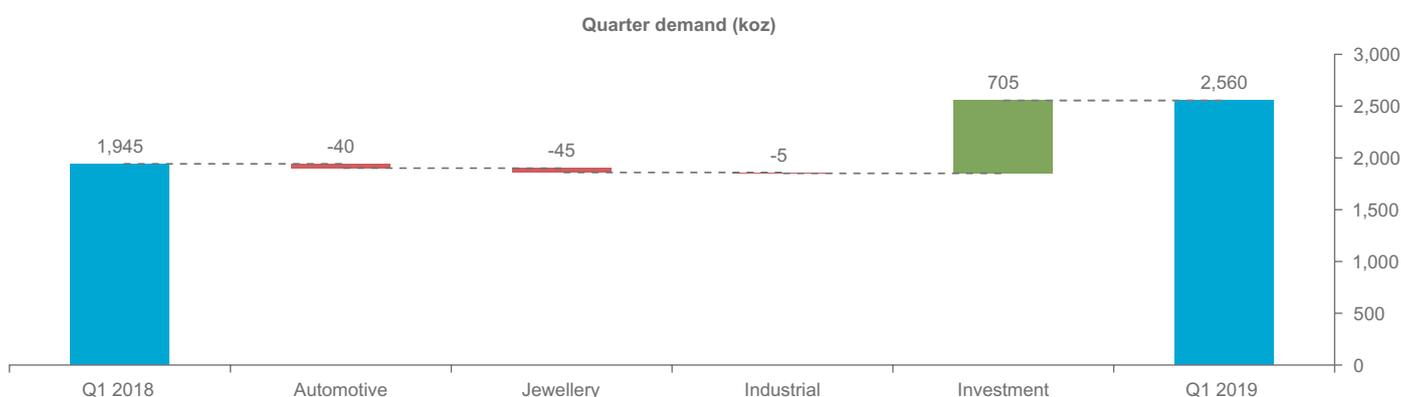
Total platinum supply of 2,010 koz in Q1'19 was up 15% (+265 koz) year-on-year. Total quarterly mining supply was up 19% year-on-year at 1,530 koz as South African output was boosted by the release of metal locked up by smelter repairs and maintenance in 2018. Recycling in Q1'19 rose 4% year-on-year to 480 koz as increased recovery from spent autocatalysts offset a small decline in jewellery recycling.

For 2019, refined production is expected to grow 5% over the course of the year, primarily due to the one-off release of work in process material in South Africa. Consequently, we expect 2020 refined production to be significantly below the 2019 level. The 2019 forecast allows for similar operational disruptions in South Africa to those experienced in 2018. Consequently, potential power disruption and industrial action represent risks that could materially reduce actual 2019 supply. Recycling is forecast to grow 3% in 2019.

Demand – Q1 2019 and 2019 up as declines in jewellery and auto demand are more than offset by surge in ETF demand

Q1'19 total demand increased by 32% year-on-year to 2,560 koz, the highest yet published by the WPIC, due to investment demand rising to 765 koz. This includes the largest-ever quarterly increase in ETF holdings of 690 koz and robust bar and coin demand of 75 koz. Automotive demand slipped by 5% year-on-year to 765 koz due to the decline in Western European diesel market share while jewellery demand fell by 7% year-on-year to 560 koz on weak sales in China.

Annual demand growth of 8% for 2019 is driven by growth in investment demand, which more than offsets lower automotive, jewellery and industrial demand declines this year.



The platinum investment case – strong investment demand, potential for substitution of palladium

Looking forward, we see the following demand growth drivers:

- In 2019, new coin and bar launches from partners such as the South African Mint and Royal Mint are likely to increase retail investment demand. Institutional investment demand has had an unprecedented start this year with ETF buying moving the market balance from a surplus in Q4'18 to a deficit in Q1'19.
- We also see stabilisation in the diesel share of Western European car sales as German regulatory initiatives address city access restrictions and consumer concerns. This has been enhanced as automakers increasingly use independent testing to present on-road NO_x emissions to consumers in an attempt to address car buyer concerns. More recently, some automakers have begun to stress that lower CO₂ emitting diesel vehicles still have a vital role to play in meeting looming European fleet CO₂ emissions targets.

- Substitution of palladium by platinum in gasoline autocatalysts should deliver future demand growth. Substitution has become more likely in new models due to the continued rise in the palladium price, increased palladium demand from the introduction of more stringent emissions limits in China and limited short-term palladium supply growth. A very limited amount of substitution will be significant for platinum demand.
- Further into the future, we see greater acceptance and interest in the development of fuel cell electric vehicles as part of a multi-drivetrain solution to achieve zero on-road emissions, with heavy duty applications likely to lead light duty.

WPIC initiatives highlights

We continue to develop product partnerships in two of our key target markets, China and North America. New partnership discussions are becoming more frequent as the WPIC brand and partnership track record with key players becomes more widely known. Our partnership with Bank of China (BoC) to promote its domestic platinum trading accounts is progressing well as our insights and expertise are transferred to BoC product managers through formal training forums. We have also partnered with the China Gold Association (CGA) who plan to include a module on platinum as part of their CGA Gold Analyst Training Programme. This is an important development and increases further the awareness in China of platinum's suitability as an investment asset.

We are pleased to confirm two new partnerships in the US with A-Mark Precious Metals and Sunshine Minting Inc. A-Mark is a leading precious metals trading company that supplies and distributes precious metal investment products. Sunshine Minting is one of the world's foremost independent mints, fabricating a range of investment products for national mints and private investment companies. These partnerships will increase further the number and availability of platinum investment options for investors in North America and worldwide.

The PGM mining industry has experienced a difficult period over the last few years. Its mining economics are driven by the revenues received from the "basket of PGMs" mined. This has improved recently, largely due to strong palladium and rhodium prices. It is worth noting that this allows increased strategic investment in demand creation and stimulation by the industry, most specifically in jewellery, investment and industrial applications including fuel cells. We are confident that this will improve further prospects for sustained future platinum demand growth.

Paul Wilson, CEO

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PLATINUM QUARTERLY Q1 2019

Table 1: Supply, demand and above ground stocks summary

	2017	2018	2019f	2018/2017 Growth %	2019f/2018 Growth %	Q4 2018	Q1 2019
Platinum Supply-demand Balance (koz)							
SUPPLY							
Refined Production	6,125	6,115	6,400	0%	5%	1,560	1,525
South Africa	4,380	4,460	4,685	2%	5%	1,160	1,105
Zimbabwe	480	465	470	-3%	1%	120	110
North America	365	355	400	-3%	13%	95	100
Russia	720	665	670	-8%	1%	145	165
Other	180	170	175	-6%	3%	40	45
Increase (-)/Decrease (+) in Producer Inventory	+30	+0	-25	-100%	N/M	-20	+5
Total Mining Supply	6,155	6,115	6,375	-1%	4%	1,540	1,530
Recycling	1,890	1,935	1,995	2%	3%	495	480
Autocatalyst	1,325	1,420	1,495	7%	5%	380	355
Jewellery	560	510	495	-9%	-3%	115	125
Industrial	5	5	5	0%	0%	0	0
Total Supply	8,045	8,050	8,370	0%	4%	2,035	2,010
DEMAND							
Automotive	3,320	3,105	3,010	-6%	-3%	780	765
Autocatalyst	3,180	2,955	2,855	-7%	-3%	740	725
Non-road	140	145	150	4%	3%	40	40
Jewellery	2,460	2,355	2,310	-4%	-2%	600	560
Industrial	1,700	1,905	1,890	12%	-1%	470	470
Chemical	590	575	615	-3%	7%	135	160
Petroleum	100	240	240	140%	0%	55	55
Electrical	195	190	190	-3%	0%	50	55
Glass	185	240	210	30%	-13%	45	50
Medical and Biomedical	235	240	240	2%	0%	70	55
Other	395	420	395	6%	-6%	115	95
Investment	275	15	785	-95%	N/M	-65	765
Change in Bars, Coins	215	280		30%		50	75
Change in ETF Holdings	105	-245		N/M		-115	690
Change in Stocks Held by Exchanges	-45	-20		-56%		0	0
Total Demand	7,755	7,380	7,995	-5%	8%	1,785	2,560
Balance	290	670	375	131%	-44%	250	-550
Above Ground Stocks	4,140*	2,175	3,220	31%	13%		

Source: SFA (Oxford). *As of 31st December 2012. NB: Numbers have been independently rounded. N/M means not meaningful.

Notes:

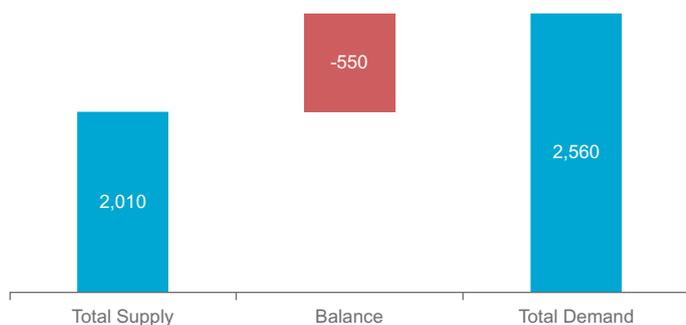
- All estimates are based on the latest available information. They are subject to revision in our subsequent quarterly reports in the event that additional information is identified.
- The WPIC did not publish quarterly estimates for 2013 or the first two quarters of 2014. However, quarterly estimates from Q3 2014, to Q4 2016 are contained in previously published PQs which are freely available on the WPIC website. Quarterly estimates from Q1 2017 and half-yearly estimates from H1 2017 are included in Tables 3 and 4 respectively, on pages 15-16 (supply, demand and above ground stocks).
- The 2019 forecasts are based on historical data and trends as well as modelling, with varying degrees of accuracy depending upon the supply or demand category. Investment demand is expected to be the least predictable segment. Some historical views are based on data and modelling that pre-date WPIC publication of PQ.

2019 FIRST QUARTER PLATINUM MARKET REVIEW

In the first quarter of 2019 platinum demand increased by 32% to 2,560 koz owing to a surge in investment demand. Industrial usage was essentially flat at 470 koz (-5 koz year-on-year), while autocatalyst and jewellery demand both declined. Investment demand increased to 765 koz, mostly due to a significant increase in ETF holdings which gained 690 koz, the largest quarterly increase yet seen. Bar and coin demand contributed a further 75 koz. Autocatalyst demand slipped by 5% year-on-year to 765 koz, owing to the ongoing decline in the Western European diesel market. Jewellery demand fell by 7% to 560 koz as the Chinese market had another weak quarter.

Total supply reached 2,010 koz in Q1'19, an increase of 15% (+265 koz) year-on-year. Total mining supply was up 19% year-on-year at 1,530 koz as South African output recovered following smelter problems in the first quarter last year. Recycling rose 4% to 480 koz as increased recovery from spent autocatalysts offset a small decline in jewellery recycling. The strong gain in demand during the first quarter significantly outweighed the growth in supply and resulted in the market being in deficit by 550 koz (Chart 1).

Chart 1: Supply-demand balance, koz, Q1 2019

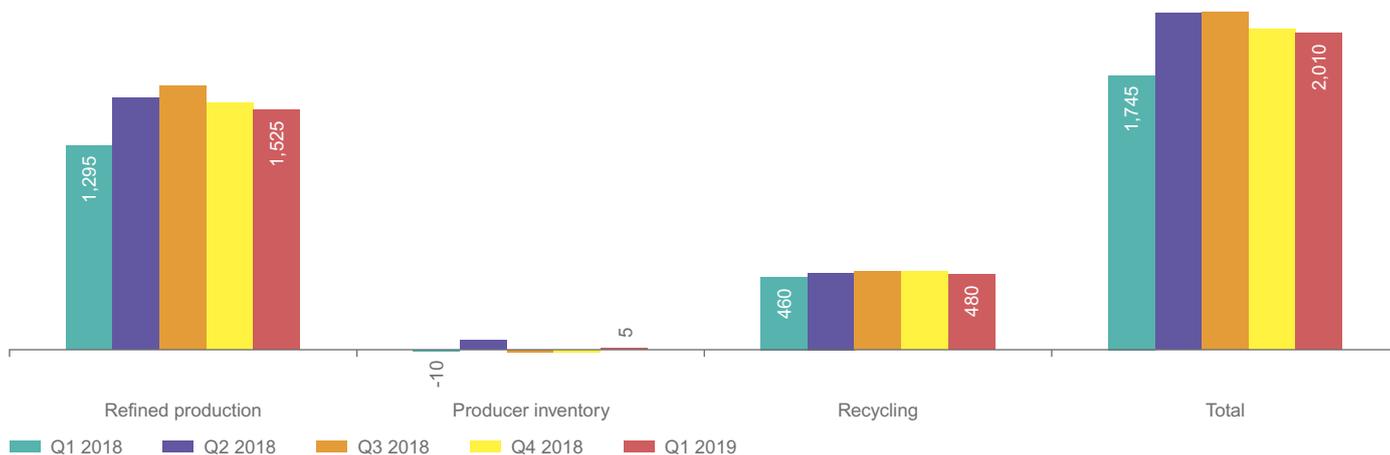


Source: SFA (Oxford)

Supply

Refined production was up by 18% (+230 koz) year-on-year to 1,525 koz in the first quarter of 2019 (Chart 2). This increase is mainly attributable to South Africa, where two unplanned furnace outages impacted refined production in the prior year period. South African output climbed by 21% (+195 koz) year-on-year to 1,105 koz. Smaller increases in output also occurred in North America (+10 koz, project ramp-up), Russia (+25 koz, planned rise in output for 2019) and other regions (+5 koz). There was a slight dip in output in Zimbabwe (-5 koz). Total mining supply is estimated at 1,530 koz for the first quarter, an increase of 245 koz (+19%) year-on-year.

Chart 2: Platinum supply, koz



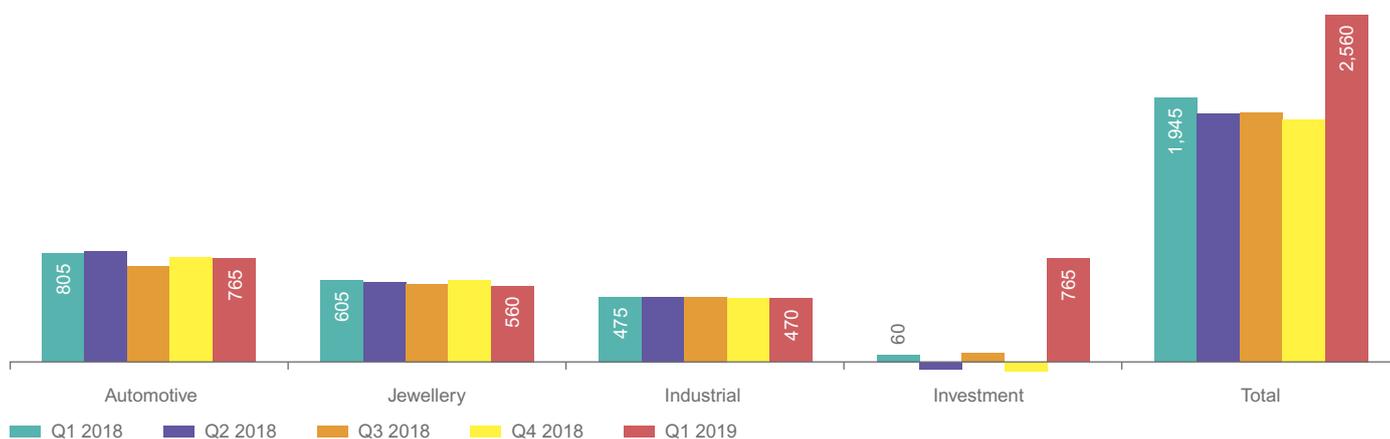
Source: SFA (Oxford)

Platinum recycling was 480 koz in Q1'19 as autocatalyst recycling grew by 8% year-on-year to 355 koz, while jewellery recycling fell 4% to 125 koz. Autocatalyst recyclers are still seeing large volumes of catalytic converters but these are down from the record level seen in Q4'18. The increasing number of diesel particulate filters, which are difficult to process, reaching recyclers is raising the amount of sorting required, but so far is not having a significant impact on the volume of platinum being produced. Jewellery recycling continues to remain subdued as a result of the persistently low platinum price.

Demand

Investment demand was the stand out area in Q1'19, rising by over 700 koz compared to Q1'18 (Chart 3), as ETF holdings surged by 690 koz. This more than offset declines in automotive (-45 koz), jewellery (-45 koz) and industrial (-5 koz) demand taking total demand up to 2,560 koz for the quarter (Chart 3).

Chart 3: Platinum demand, koz



Source: SFA (Oxford)

Automotive demand

Automotive demand in the first quarter reached 765 koz, down 5% from 805 koz in Q1'18, but down just 2% from 780 koz in Q4'18.

Western European car sales appear to be finding their natural level once again after the distortions and disruptions of the introduction of WLTP emissions testing in Q3'18. Several countries, however, have tax changes affecting vehicles in H1'19, which have had the effect of bringing forward some sales into Q1'19 (in Italy to avoid higher tax from 1 March on higher emitting vehicles) or delaying sales into Q2'19 and beyond until policy is clearer (in Spain where policies on internal combustion engine vehicles are under debate). Sales in the UK remain volatile as Brexit uncertainty continues.

Recent independent emissions tests, widely publicised in Germany and the UK, have shown diesels in a very positive light, supporting sales. In Germany, testing by ADAC (Allgemeiner Deutscher Automobil-Club eV) showed that all the Euro 6c and 6d-TEMP vehicles measured on-road to date meet much lower levels of nitrogen oxides (NO_x) emissions than currently required by the EU. The cars tested were not only significantly below the tolerance value of 168 mg/km for diesel cars, which is applied in the road test (RDE method), but also below the current Euro 6 WLTC limit of 80 mg/km. In the UK, the independent AIR alliance has launched the AIR Index and a searchable website for car buyers and policymakers with the results of on-road urban emissions tests. Vehicles are rated on NO_x emissions to show their relative impact on urban air quality, highlighting for buyers the many clean diesel cars that are readily available.

In India, light vehicle sales generally have been lacklustre in the first quarter of 2019 as private and business buyers remain cautious ahead of elections in Q2'19. Tight credit availability, despite an interest rate cut, plus a weak rupee have not helped either.

Jewellery demand

Jewellery demand for platinum fell 7% year-on-year to 560 koz in Q1'19. Chinese demand fell sharply, again, but at a slower rate than in Q4'18 which was a very poor quarter. Platinum trading volumes on the Shanghai Gold Exchange fell 18% in Q1'19, compared to a year earlier, to 130 koz but purchasing by jewellers dropped more than by industrial buyers. China's official data show mainland jewellery retail sales grew 2.6% in the first quarter of 2019, the worst start to the year since 2016. The volume of jewellery sold in Hong Kong also fell 1% year-on-year in the first two months of 2019. Chow Tai Fook showed a return to same-store sales growth in Q1'19, primarily in mainland China with Hong Kong improving only a little, following a decline in Q4'18. Gold products made up 64% of sales value at Chow Tai Fook in Q1'19, the highest proportion in at least three years.

Jewellery demand rose in all other regions but collectively demand growth has been slowing over the last two quarters. Semi-manufactured platinum imports into the US have had the strongest start to a year in more than 10 years. US GDP growth in Q1'19 came in above expectations but consumer spending remained weak. In India, tight credit lines for jewellers and a weak rupee impacted the overall jewellery market but platinum was the outperforming metal. The Japanese jewellery market remains stable but offers little growth as the platinum price has remained around the same level since Q3'18.

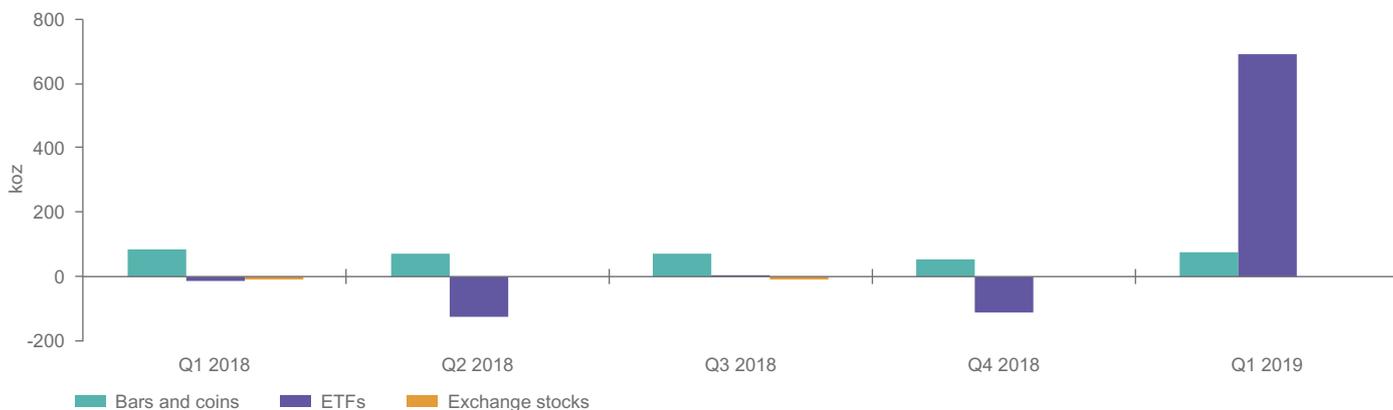
Industrial demand

First-quarter industrial demand decreased by 1% year-on-year (-5 koz) to 470 koz but was flat quarter-on-quarter. Greater platinum requirements for chemical catalysis, primarily in China, were outweighed by lower demand for glass fabrication and other end-uses. Major new paraxylene plants are due to be commissioned in China during the second half of this year, while new propane dehydrogenation units are set to be completed in the country throughout 2019, resulting in an increase in new catalyst purchases by the chemical sector in Q1'19. Conversely, however, the construction of fewer new glass fabrication facilities in China reduced new metal demand for tooling last quarter, while lower consumption in automotive sensors and fuel cells decreased platinum usage in other industrial applications.

Investment demand

In the first quarter of 2019 investment demand was 765 koz. This was mostly owing to a record inflow into ETFs, supported by solid bar and coin purchases (Chart 4).

Chart 4: Platinum investment



Source: SFA (Oxford)

In Q1'19, global ETF holdings expanded by 692 koz, the largest rise in platinum ETF holdings yet as all the main regions saw ETF holdings increase. The majority of the growth was in South Africa where investors added 418 koz to their holdings. The increase was larger than that seen in Q2'13 following the listing of the first platinum ETF in South Africa. Some investors may be positioning for a recovery in the platinum price, anticipating that it will reverse its underperformance compared to other precious metals. The platinum price has underperformed gold and palladium for quite some time, making it look cheap on both a relative and an absolute basis. There may also have been some rotation from PGM mining companies' equities into platinum. PGM miners' equities, which are listed in South Africa, had performed very strongly in the second half of 2018. The UK saw the next largest rise with 178 koz being added to ETFs. US investors increased their exposure to platinum by 79 koz while ETF holdings in Switzerland rose by 18 koz.

Bar and coin demand was 75 koz. The US Mint released both the bullion and proof versions of the platinum American Eagle coin in January which got the year off to a strong start for coin purchases. However, Japanese bar purchases were lacklustre despite the low platinum price.

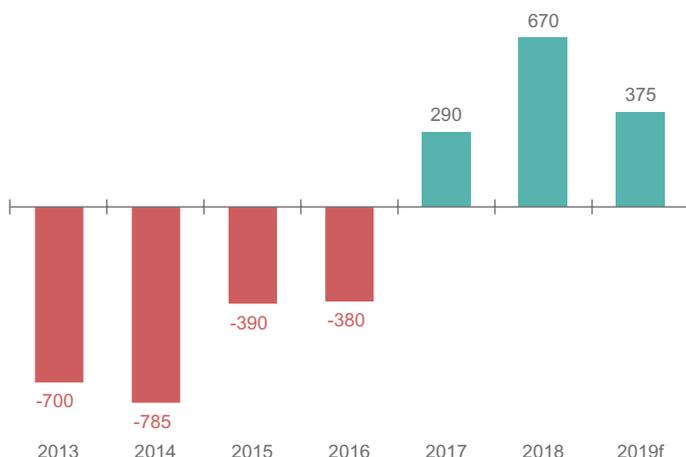
2019 FORECAST

Total supply is projected to rise by 4% to 8,370 koz this year as both primary and secondary supply are expected to increase. Refined production is forecast to expand by 5% to 6,400 koz (+385 koz) owing to a combination of higher production, as some projects ramp up, and processing of pipeline material that was held up by smelter problems last year. A small rebuild of producer inventory is expected, resulting in total mining supply of 6,375 koz. Recycling is forecast to grow by 3% to 1,995 koz (+60 koz) as platinum recovered from autocatalysts is estimated to be up by 5% to 1,495 koz, while jewellery recycling dips 3% to 495 koz owing to the low platinum price.

Global platinum demand is forecast to expand by 8% to 7,995 koz this year owing to a significant increase in investment demand which more than offsets modest declines in automotive (-95 koz), jewellery (-45 koz) and industrial (-15 koz) consumption. Investment demand is projected to increase by 785 koz in 2019 as solid bar and coin purchases add to significant ETF additions. The decline in automotive usage which has been driven by the falling diesel share in Western Europe eases to 3%, taking total automotive demand down to 3,010 koz. Jewellery requirements are expected to slip 4% to 2,310 koz as the continuing decline in jewellery demand in China more than offsets modest gains in other regions.

With demand increasing more strongly than supply this year, the market balance narrows to a surplus of 375 koz (Chart 5).

Chart 5: Supply-demand balance, koz, 2013-2019f



Source: SFA (Oxford)

Mine supply

Global refined production is forecast to reach 6,400 koz in 2019 (+5% or +285 koz), boosted by the processing of work-in-progress material that built up in 2018. The ramp-up of expansion projects could also contribute an additional 145 koz year-on-year. South African supply is forecast to grow to 4,685 koz (+5% or +225 koz), mainly because of this boost from pipeline material.

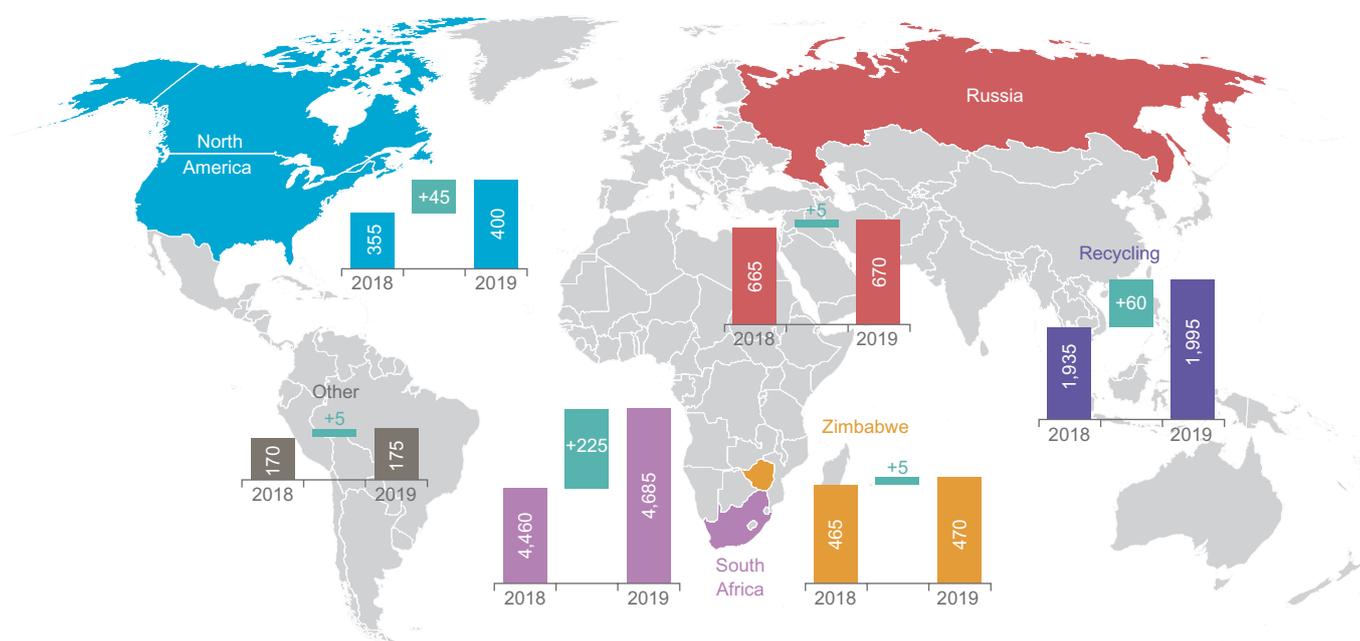
Supply from North America is set to increase by 45 koz to 400 koz (+13% year-on-year), with up to 20 koz of growth from an expansion project and the balance being a recovery in output in the Sudbury region following processing issues in 2018. Production from Zimbabwe should remain stable at 470 koz (+5 koz year-on-year), and a small pipeline release in Russia will mostly be offset by continued alluvial mine depletion to give 670 koz for the year (+5 koz). Total mining supply is forecast at 6,375 koz (+4% or +260 koz), with an estimated restocking of 25 koz in producer inventory.

Recycling

Recycling is forecast to provide 1,995 koz of metal to the market in 2019, a 3% increase on 2018. Autocatalyst recycling is predicted to grow by 5% this year to 1,495 koz, a deceleration from 7% growth in 2018, and jewellery recycling is forecast to drop 3% to 495 koz after a 9% decline in 2018.

The number of autocatalysts being processed by recyclers is expected to rise again in 2019. Platinum recycling is benefitting from the high palladium and rhodium prices, and lease rates are encouraging recyclers to process high volumes of material. The US scrap steel price has dropped to \$324/t in April from \$401/t in December. However, the price would have to fall further and remain low for a longer period before limiting the volumes of catalysts available. The rising amount of carbon in the recycling mix due to diesel particulate filters will remain an issue for recyclers throughout 2019 but is ultimately not expected to have a major impact on the amount of platinum being recycled. Jewellery recycling is forecast to fall again as the platinum price remains low.

Chart 6: Changes in supply, koz, 2019f vs. 2018



Source: SFA (Oxford)

Automotive demand

Automotive demand is projected to fall by 3% to 3,010 koz in 2019, down from 3,105 koz in 2018. This represents a slowing in the rate of decline in platinum autocatalyst demand, which decreased by 6% from 3,320 koz in 2017 to 3,105 koz in 2018.

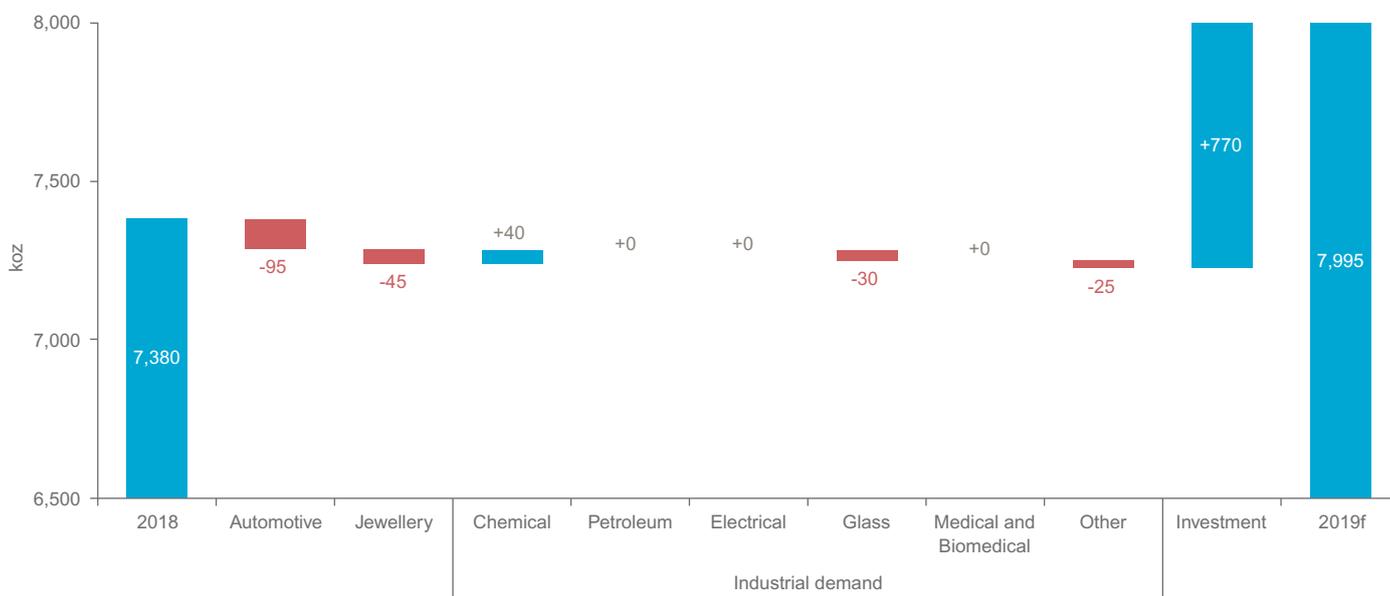
Several automakers now appear better disposed towards diesel than previously and are considering retaining diesel engine options in their product ranges for longer, rather than removing them from production at the earliest opportunity. This should support ongoing light-duty diesel vehicle sales, and the associated platinum content in their autocatalysts. This apparent renewed vote of confidence in diesel is driven largely by the need for automakers to meet very challenging fleet CO₂ emissions targets; diesels remain around 15%-20% more fuel efficient than their gasoline equivalents, so a sizeable diesel share can help automakers avoid substantial fines and damage to their reputation.

In March 2019, FCA Group announced it will revoke an earlier plan to cut diesel from its European passenger cars by 2022, and will retain flexibility over its use of diesel powertrains in certain models to avoid losing sales. Mazda, meanwhile, has announced a new low emission diesel engine to be used in its US light vehicles to help move the brand towards the premium segment.

The introduction of Euro 6d-TEMP legislation from September 2019 should provide more clarity to consumers and the media over the ability of the newer diesel cars to comply with the latest standards.

Vehicle sales in India, one of the largest diesel markets after Western Europe, are expected to resume modest growth in H2'19 once the country returns to normality after some disruption caused by uncertainty around the general election in Q2'19.

Chart 7: Changes in demand by category, 2019f vs. 2018



Source: SFA (Oxford)

Jewellery demand

Platinum jewellery demand is predicted to decline by 2% in 2019 to 2,310 koz. The contraction in Chinese jewellery demand in Q1'19 was larger than anticipated so the forecast for China this year has been reduced slightly.

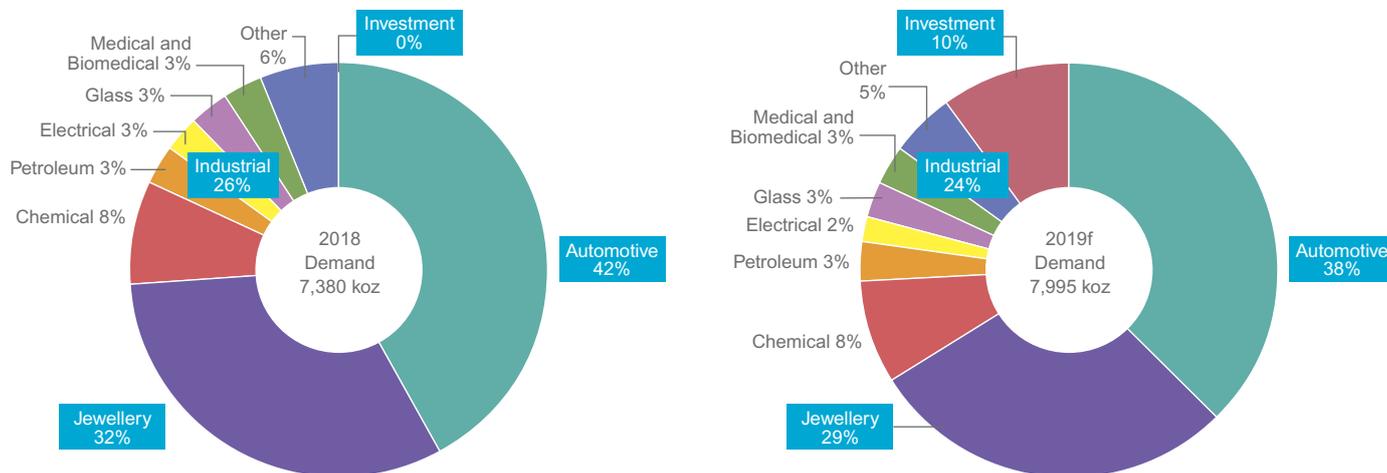
Consumer sentiment in China rose to new highs in February, but this has failed to feed through to jewellery demand as overall jewellery retail sales spending growth has been lagging consumer spending growth. Platinum jewellery is also likely to continue to underperform gold jewellery by a significant margin as jewellers favour promoting the larger segments of gem-set and gold products over platinum jewellery.

India is expected to make the largest contribution to platinum jewellery demand growth as the young market remains in its growth phase, supported by PGI. Indian platinum jewellery is also benefiting from the shift in the jewellery market from small independents to chain jewellery stores which have a higher share of platinum products. Additionally, government help for farmers and the middle class in the budget is likely to provide some benefit to consumer spending and jewellery sales. Growth in platinum jewellery sales is anticipated in the US, but at a lower rate than in 2018. The National Retail Federation expects overall US retail sales to rise 4% this year, a slowdown from 4.6% in 2018. Bridal demand in the US is forecast to perform quite well as the falling platinum price is in line with the trend for less expensive engagement rings, and PGI's campaign to use platinum for diamond mounts adds some demand. Japan and Western Europe have a stable base of platinum jewellery demand but are not expected to see notable increases this year.

Industrial demand

Industrial platinum demand is projected to decrease by 1% (-15 koz) year-on-year to 1,890 koz in 2019, with strong growth in chemical catalysis (+40 koz) failing to negate declining usage in glass fabrication (-30 koz) and other end-uses (-25 koz), while requirements for electrical components, medical applications and petroleum processes are all estimated to remain relatively stable this year.

Chart 8: Demand end-use shares, 2019f vs. 2018



Source: SFA (Oxford)

Chemical

Platinum use in chemical catalysis is predicted to rise by 7% to 615 koz this year, primarily owing to robust growth in China which should outweigh a small drop in demand in the RoW. Major new paraxylene plants are due to be commissioned in China towards the end of 2019 which, along with new propane dehydrogenation (PDH) units and growing silicone production, are expected to increase new catalyst requirements in the country this year. Conversely, however, paraxylene and PDH capacity growth is set to slow in Western Asia, slightly reducing new metal demand in the RoW region compared to last year.

Petroleum

Net petroleum requirements are forecast to remain unchanged at 240 koz in 2019, despite greater demand in China and North America, with lower usage in the RoW predicted to offset growth elsewhere. Oil refining capacity expansion is expected to accelerate in both China and the US this year, but ease somewhat in places such as India, following significant upgrades in the country last year (linked to impending Bharat Stage 6/VI standards). Some of the planned capacity expansions in China this year are also associated with the implementation of stricter emissions standards, with refiners upgrading units to be able to produce China 6-compliant fuels.

Electrical

Electrical demand is also expected to stay relatively flat at 190 koz this year, with only minor changes in platinum consumption in hard disk drives (HDDs) and other electrical components, mainly in China and the RoW. Growth in the high-capacity enterprise HDD segment should help to slightly increase the total number of platters shipped in 2019, lifting net platinum usage marginally, despite a further fall in overall HDD sales (-8%) to 346 million units.

Glass

Platinum requirements for glass fabrication are projected to decline by 13% to 210 koz in 2019, predominantly owing to a drop in demand in the RoW, while minor growth in North America and Japan is likely to be negated by falls in China and Western Europe. Fewer new glass plants and expansions are due to be commissioned in the RoW compared to last year, particularly in regions such as Africa, Latin America, and Southeast and Western Asia, reducing new metal requirements, although demand is still forecast to remain relatively high in India.

Other

Platinum consumption in other industrial end-uses is estimated to fall by 6% to 395 koz this year, largely owing to a dip in demand for use in fuel cells, although requirements for automotive sensors (O₂ and NO_x) should increase slightly in China and the RoW. Thrifting of platinum loadings in fuel cell stacks is predicted to temporarily reduce usage by manufacturers in places such as Japan and the US, despite growth in overall unit volumes used in transportation and stationary applications.

Investment demand

Global investment demand is forecast to be 785 koz this year, as much higher ETF demand more than makes up for a dip in bar and coin purchases. ETFs had a very strong start to the year in Q1'19, but holdings have subsequently slipped back slightly and are not expected to make much more headway. Coin demand is anticipated to remain robust but bar demand is forecast to be weaker than last year owing to subdued interest in Japan, where investors have become used to the low price and are no longer buying as strongly as they did when the price first fell below ¥4,000/g in 2015. Overall bar and coin demand is therefore expected to be somewhat lower than in 2018.

ABOVE GROUND STOCKS

The market has a surplus of 375 koz forecast for 2019, which will result in above ground stocks reaching 3,220 koz at the end of 2019.

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 Q1 2019

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

	2013	2014	2015	2016	2017	2018	2019f	2018/2017 Growth %	2019f/2018 Growth %
Platinum Supply-demand Balance (koz)									
SUPPLY									
Refined Production	6,070	4,855	6,160	6,035	6,125	6,115	6,400	0%	5%
South Africa	4,355	3,115	4,480	4,255	4,380	4,460	4,685	2%	5%
Zimbabwe	405	405	405	490	480	465	470	-3%	1%
North America	355	400	385	395	365	355	400	-3%	13%
Russia	740	740	710	715	720	665	670	-8%	1%
Other	215	195	180	180	180	170	175	-6%	3%
Increase (-)/Decrease (+) in Producer Inventory	-215	+350	+30	+30	+30	+0	-25	-100%	N/M
Total Mining Supply	5,855	5,205	6,190	6,065	6,155	6,115	6,375	-1%	4%
Recycling	1,980	2,035	1,705	1,840	1,890	1,935	1,995	2%	3%
Autocatalyst	1,120	1,255	1,185	1,210	1,325	1,420	1,495	7%	5%
Jewellery	855	775	515	625	560	510	495	-9%	-3%
Industrial	5	5	5	5	5	5	5	0%	0%
Total Supply	7,835	7,240	7,895	7,905	8,045	8,050	8,370	0%	4%
DEMAND									
Automotive	3,170	3,310	3,380	3,465	3,320	3,105	3,010	-6%	-3%
Autocatalyst	3,025	3,165	3,240	3,320	3,180	2,955	2,855	-7%	-3%
Non-road	140	150	140	135	140	145	150	4%	3%
Jewellery	2,945	3,000	2,840	2,505	2,460	2,355	2,310	-4%	-2%
Industrial	1,485	1,565	1,760	1,780	1,700	1,905	1,890	12%	-1%
Chemical	535	540	595	560	590	575	615	-3%	7%
Petroleum	50	65	205	215	100	240	240	140%	0%
Electrical	195	205	190	185	195	190	190	-3%	0%
Glass	145	175	200	205	185	240	210	30%	-13%
Medical and Biomedical	220	220	225	230	235	240	240	2%	0%
Other	340	360	345	385	395	420	395	6%	-6%
Investment	935	150	305	535	275	15	785	-95%	N/M
Change in Bars, Coins	-5	50	525	460	215	280		30%	
Change in ETF Holdings	905	215	-240	-10	105	-245		N/M	
Change in Stocks Held by Exchanges	35	-115	20	85	-45	-20		-56%	
Total Demand	8,535	8,025	8,285	8,285	7,755	7,380	7,995	-5%	8%
Balance	-700	-785	-390	-380	290	670	375	131%	-44%
Above Ground Stocks	4,140*	3,440	2,655	2,265	1,885	2,175	2,845	31%	13%

Source: SFA (Oxford). *As of 31st December 2012. NB: Numbers have been independently rounded. N/M means not meaningful.

PLATINUM QUARTERLY Q1 2019

Table 3: Supply and demand summary – quarterly comparison

	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q1'19/Q1'18 Growth %	Q1'19/Q4'18 Growth %
Platinum Supply-demand Balance (koz)											
SUPPLY											
Refined Production	6,125	1,550	1,580	1,590	1,295	1,595	1,675	1,560	1,525	18%	-2%
South Africa	4,380	1,090	1,155	1,120	910	1,150	1,240	1,160	1,105	21%	-5%
Zimbabwe	480	125	100	140	115	115	120	120	110	-4%	-8%
North America	365	85	95	95	90	85	90	95	100	11%	5%
Russia	720	205	185	190	140	200	180	145	165	18%	14%
Other	180	45	45	45	40	45	45	40	45	13%	13%
Increase (-)/Decrease (+) in Producer Inventory	+30	+75	-10	+25	-10	+55	-20	-20	+5	N/M	N/M
Total Mining Supply	6,155	1,625	1,570	1,615	1,285	1,650	1,655	1,540	1,530	19%	-1%
Recycling	1,890	480	480	505	460	485	490	495	480	4%	-3%
Autocatalyst	1,325	330	330	365	330	345	365	380	355	8%	-7%
Jewellery	560	150	150	140	130	140	125	115	125	-4%	9%
Industrial	5	0	0	0	0	0	0	0	0	N/M	N/M
Total Supply	8,045	2,105	2,050	2,120	1,745	2,135	2,145	2,035	2,010	15%	-1%
DEMAND											
Automotive	3,320	835	785	845	805	810	710	780	765	-5%	-2%
Autocatalyst	3,180	800	750	810	770	775	675	740	725	-6%	-2%
Non-road	140	35	35	35	35	40	35	40	40	14%	0%
Jewellery	2,460	590	580	680	605	590	575	600	560	-7%	-7%
Industrial	1,700	415	425	430	475	475	485	470	470	-1%	0%
Chemical	590	140	165	135	145	135	165	135	160	10%	19%
Petroleum	100	15	25	25	55	55	55	55	55	0%	0%
Electrical	195	45	50	60	55	50	50	50	55	0%	10%
Glass	185	50	45	35	60	60	75	45	50	-17%	11%
Medical and Biomedical	235	70	45	70	55	70	45	70	55	0%	-21%
Other	395	95	95	105	105	105	95	115	95	-10%	-17%
Investment	275	105	-10	100	60	-55	65	-65	765	N/M	N/M
Change in Bars, Coins	215	75	45	65	85	70	70	50	75	-12%	50%
Change in ETF Holdings	105	30	-40	55	-15	-125	5	-115	690	N/M	N/M
Change in Stocks Held by Exchanges	-45	0	-15	-20	-10	0	-10	0	0	N/M	N/M
Total Demand	7,755	1,945	1,780	2,055	1,945	1,820	1,835	1,785	2,560	32%	43%
Balance	290	160	270	65	-200	315	310	250	-550		

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

PLATINUM QUARTERLY Q1 2019

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

	2017	H1 2017	H2 2017	H1 2018	H2 2018	H2'18/H2'17 Growth %	H2'18/H1'18 Growth %
Platinum Supply-demand Balance (koz)							
SUPPLY							
Refined Production	6,125	2,965	3,170	2,890	3,235	2%	12%
South Africa	4,380	2,110	2,275	2,060	2,400	5%	17%
Zimbabwe	480	240	240	230	240	0%	4%
North America	365	180	190	175	185	-3%	6%
Russia	720	345	375	340	325	-13%	-4%
Other	180	90	90	85	85	-6%	0%
Increase (-)/Decrease (+) in Producer Inventory	+30	+15	+15	+45	-40	N/M	N/M
Total Mining Supply	6,155	2,980	3,185	2,935	3,195	0%	9%
Recycling	1,890	900	985	945	985	0%	4%
Autocatalyst	1,325	630	695	675	745	7%	10%
Jewellery	560	270	290	270	240	-17%	-11%
Industrial	5	0	0	0	0	N/M	N/M
Total Supply	8,045	3,880	4,170	3,880	4,180	0%	8%
DEMAND							
Automotive	3,320	1,695	1,630	1,615	1,490	-9%	-8%
Autocatalyst	3,180	1,620	1,560	1,545	1,415	-9%	-8%
Non-road	140	70	70	75	75	7%	0%
Jewellery	2,460	1,200	1,260	1,195	1,175	-7%	-2%
Industrial	1,700	850	855	950	955	12%	1%
Chemical	590	290	300	280	300	0%	7%
Petroleum	100	50	50	110	110	120%	0%
Electrical	195	100	110	105	100	-9%	-5%
Glass	185	90	80	120	120	50%	0%
Medical and Biomedical	235	125	115	125	115	0%	-8%
Other	395	195	200	210	210	5%	0%
Investment	275	185	90	5	0	-100%	-100%
Change in Bars, Coins	215	105	110	155	120	9%	-23%
Change in ETF Holdings	105	90	15	-140	-110	N/M	-21%
Change in Stocks Held by Exchanges	-45	-10	-35	-10	-10	-71%	0%
Total Demand	7,755	3,930	3,835	3,765	3,620	-6%	-4%
Balance	290	-50	335	115	560		

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

PLATINUM QUARTERLY Q1 2019

Table 5: Regional demand – annual and quarterly comparison

	2016	2017	2018	2019f	2018/2017 Growth %	2019f/2018 Growth %	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019
Platinum gross demand (koz)											
Automotive	3,465	3,320	3,105	3,010	-6%	-3%	805	810	710	780	765
North America	445	410	430		5%						
Western Europe	1,705	1,560	1,305		-16%						
Japan	455	440	420		-5%						
China	165	195	190		-3%						
India	165	165	190		15%						
Rest of the World	530	550	570		4%						
Jewellery	2,505	2,460	2,355	2,310	-4%	-2%	605	590	575	600	560
North America	265	280	305		9%						
Western Europe	240	250	255		2%						
Japan	335	340	345		1%						
China	1,450	1,340	1,175		-12%						
India	145	175	200		14%						
Rest of the World	70	75	75		0%						
Chemical	560	590	575	615	-3%	7%	145	135	165	135	160
North America	50	55	50		-9%						
Western Europe	110	120	110		-8%						
Japan	15	15	15		0%						
China	225	225	220		-2%						
Rest of the World	160	175	180		3%						
Petroleum	215	100	240	240	140%	0%	55	55	55	55	55
North America	90	55	55		0%						
Western Europe	10	5	25		400%						
Japan	0	-40	5		-113%						
China	80	45	10		-78%						
Rest of the World	35	35	145		314%						
Electrical	185	195	190	190	-3%	0%	55	50	50	50	55
North America	10	15	15		0%						
Western Europe	10	10	10		0%						
Japan	15	15	15		0%						
China	75	80	75		-6%						
Rest of the World	75	75	75		0%						
Glass	205	185	240	210	30%	-13%	60	60	75	45	50
North America	20	5	5		0%						
Western Europe	5	10	30		200%						
Japan	-10	-10	0		-100%						
China	100	85	75		-12%						
Rest of the World	90	95	130		37%						
Medical and Biomedical	230	235	240	240	2%	0%	55	70	45	70	55
North America	90	95	95		0%						
Western Europe	80	80	80		0%						
Japan	20	20	20		0%						
China	20	20	20		0%						
Rest of the World	20	20	25		25%						
Other industrial	385	395	420	395	6%	-6%	105	105	95	115	95
Investment	535	275	15	785	-95%	N/M	60	-55	65	-65	765
Total Demand	8,285	7,755	7,380	7,995	-5%	8%	1,945	1,820	1,835	1,785	2,560

Source: SFA (Oxford). NB: Numbers have been independently rounded.

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 III/IV standards (BS-III, BS-IV)

Bharat Stage III is equivalent to Euro 3 emissions legislation. Introduced in 2005 in 12 major cities across India and enforced nationwide from April 2010. Bharat Stage IV is equivalent to Euro 4 emissions legislation. Introduced in 2010 in 14 major cities across India and set to be enforced nationwide from April 2017.

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.

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 ounces = 31.1 tonnes.

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