
PLATINUM QUARTERLY

Q3 2017

21st November 2017

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FOREWORD

Platinum is a unique metal with uses that metamorphose over time. Platinum has such powerful attributes that it continues to create applications, proving its relevance in new conditions and environments time and time again; reduction in vehicle emissions with autocatalysts, innovative industrial applications, enabling medical and biomedical applications and achieving considerable consumer acceptance to establish a robust jewellery market. Critics of platinum's merit as an investment asset may fail to grasp the continuous value it brings to everyday life.

Critics also often hone in on automotive demand as a source of downside; however, today's *Platinum Quarterly* reveals that annual automotive demand for platinum was down just one percent in 2017 vs the previous year. Those who have written off the role of platinum in controlling emissions are clearly too hasty.

Also in 2017 automotive trends, initiatives were launched that can start to clear the uncertainty around diesel emissions. For example, the City of London's 'Cleaner Vehicle Checker' can enable consumers to make informed decisions. This approach to independent testing will also allow local regulators to quickly improve air quality.

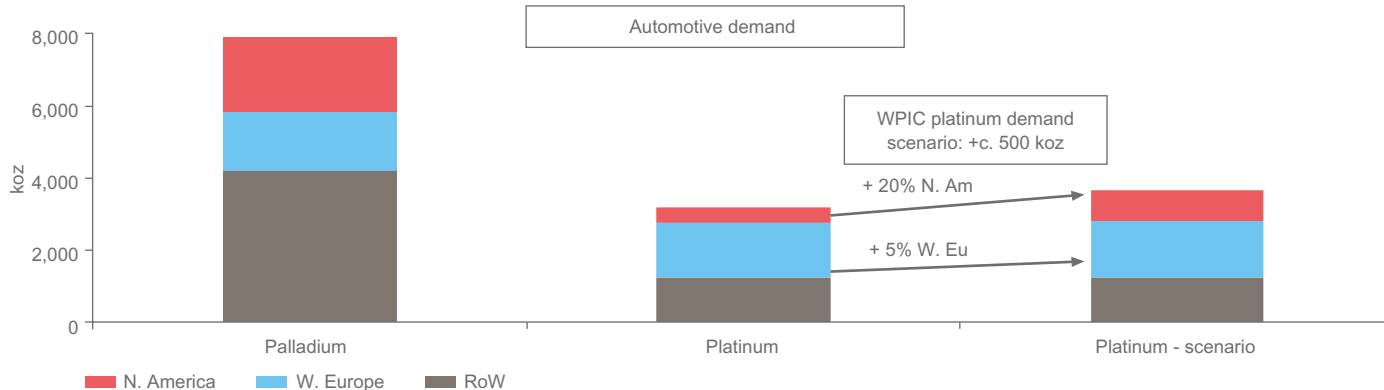
While the diesel debate plays out, a new and transformative platinum trend is also emerging. As part of our comprehensive Investor Development programme, we have been talking to an increasing number of investors on either side of the Atlantic. There is growing consensus that platinum could play a much greater role in supporting emissions control in gasoline cars, not just diesels, in the near future.

A number of US and European automakers are believed to be testing increasing platinum loadings on gasoline autocatalysts – reducing palladium, the price of which has surged in recent years, and increasing the use of platinum and rhodium.

While the market assumes that such switching will be meaningful as far as three years out, we believe the impact could be felt much sooner. Automakers typically hedge platinum group metals as much as three years in advance; and consequently would need to change current buying behaviour to reflect a change in future platinum group metal consumption.

We believe that just a small amount of switching out of palladium into platinum could have a significant impact on buying behaviour and therefore on the demand for platinum in the near term.

Our research team will continue to evaluate and scrutinise this substitution theme in the coming months. In the meantime, we present a scenario below. First, it shows that the weight of palladium consumption in automotive is much higher than for platinum. Secondly, it shows the potential upside to platinum demand if 20% of North American palladium automotive consumption and 5% of European palladium automotive consumption is replaced with platinum; the potential upside for platinum demand is material – perhaps an additional 500 koz per annum.



Source: SFA (Oxford): Data
 WPIC Research: Scenario, for illustrative purposes only

While there are a number of promising signs of growth visible on the demand side of the fundamental platinum equation, the supply side continues to show signs of tightening. In 2018, South African production is expected to fall a further two percent compared to this year, as the impact of announced mine closures take effect.

While recycling supply is predicted to increase in 2018, the extent to which a growth trajectory can be maintained is not clear-cut. Increasingly complex silicon carbide substrate autocatalysts are making the platinum tougher to recover; recycling is generally a thin margin business which can ill afford such technical challenges.

2018 is predicted to see the first increase in global jewellery demand for four years – up three percent on 2017. Meanwhile, industrial demand in 2018 is expected to surge by nine percent, the recovery will likely see platinum industrial demand return to ‘normal’ 2016 levels. 2018 is expected to see a return to a chunky market deficit of 275 koz.

The upcoming year is also shaping up to be another strong year for our market development efforts with several new partnerships agreed, while existing agreements flourished.

The WPIC’s partnership with BullionVault has been a success with over 9 koz of platinum vaulted since launch. Similarly, we watch with great interest how bullion coin and bar launches in the United Kingdom, by our partner The Royal Mint, develop in the coming months.

Our team at the WPIC continue to strive to make good on the promise we made to our members and wider platinum market stakeholders to stimulate investor demand for the metal and grow the market across the world. As always, we welcome your thoughts and ideas regarding *Platinum Quarterly* and we thank you for your interest in our ongoing activities.

Paul Wilson, CEO

PLATINUM QUARTERLY Q3 2017

Table 1: Supply, demand and above ground stocks summary

	2016	2017f	2018f	2017f/2016 Growth %	2018f/2017 Growth %	Q2 2017	Q3 2017
Platinum Supply-demand Balance (koz)							
SUPPLY							
Refined Production	6,035	5,935	5,855	-2%	-1%	1,550	1,495
South Africa	4,255	4,230	4,150	-1%	-2%	1,090	1,075
Zimbabwe	490	440	450	-10%	2%	125	95
North America	395	375	380	-5%	1%	85	95
Russia	715	710	705	-1%	-1%	205	185
Other	180	180	170	0%	-6%	45	45
Increase (-)/Decrease (+) in Producer Inventory	+30	+35	+0	17%	-100%	+75	-10
Total Mining Supply	6,065	5,970	5,855	-2%	-2%	1,625	1,485
Recycling	1,855	1,860	1,900	0%	2%	480	480
Autocatalyst	1,225	1,290	1,325	5%	3%	330	330
Jewellery	625	565	570	-10%	1%	150	150
Industrial	5	5	5	0%	0%	0	0
Total Supply	7,920	7,830	7,755	-1%	-1%	2,105	1,965
DEMAND							
Automotive	3,415	3,365	3,335	-1%	-1%	850	785
Autocatalyst	3,280	3,220	3,190	-2%	-1%	810	755
Non-road	135	140	145	4%	4%	35	35
Jewellery	2,605	2,590	2,655	-1%	3%	625	625
Industrial	1,795	1,640	1,790	-9%	9%	405	385
Chemical	595	585	600	-2%	3%	135	165
Petroleum	220	100	190	-55%	90%	10	25
Electrical	160	155	150	-3%	-3%	40	40
Glass	205	170	195	-17%	15%	50	20
Medical and Biomedical	235	240	240	2%	0%	70	45
Other	380	390	415	3%	6%	100	90
Investment	505	250	250	-50%	0%	90	-10
Change in Bars, Coins	460					70	45
Change in ETF Holdings	-10					20	-40
Change in Stocks Held by Exchanges	85					0	-15
Total Demand	8,320	7,845	8,030	-6%	2%	1,970	1,785
Balance	-400	-15	-275	-96%	N/M	135	180
Above Ground Stocks	4,140*	1,895	1,880	-1%	-15%		

Source: SFA (Oxford). *As of 31st December 2012. NB: Numbers have been independently rounded.

Notes:

1. 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.

2. The WPIC did not publish quarterly estimates for 2013 or the first two quarters of 2014. However, quarterly estimates from Q3 2014, to Q3 2015 are contained in previously published PQs which are freely available on the WPIC website. Quarterly estimates from Q4 2015 and half-yearly estimates from H1 2016 are included in Tables 3 and 4 respectively, on pages 16-17 (supply, demand and above ground stocks).

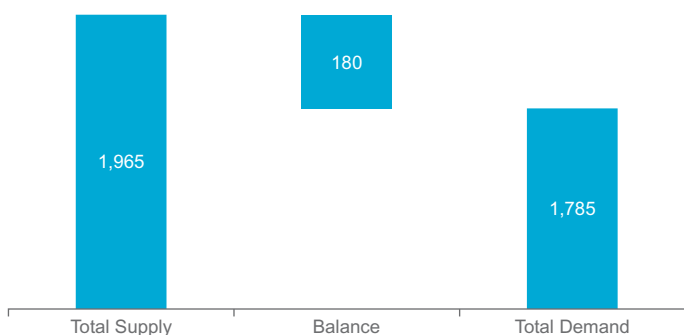
3. The 2017 and 2018 forecasts are based on historical data and trends as well as modelling, with varying degrees of accuracy depending upon the supply or demand category. Investment demand is expected to be the least predictable segment. Some historical views are based on data and modelling that pre-date WPIC publication of PQ.

2017 THIRD QUARTER PLATINUM MARKET REVIEW

In the third quarter platinum demand was 1,785 koz, 8% lower year-on-year, as jewellery, industrial and investment demand all declined. Jewellery demand was pulled down by weak fabricator usage in China outweighing gains in other regions. Industrial demand was reduced mainly by lower net petroleum requirements and fewer new glass facilities being commissioned, while investment demand turned negative with net sales from ETFs and exchange stock movements outweighing bar and coin purchases.

Total supply dipped 3% year-on-year to 1,965 koz as both primary and secondary supply declined, resulting in a market surplus of 180 koz (Chart 1). Total mining supply was 2% lower at 1,485 koz, while recycling slipped 6% to 480 koz even though autocatalyst recycling improved, as jewellery recycling in China dropped back to more normal levels.

Chart 1: Supply-demand balance, koz, Q3 2017

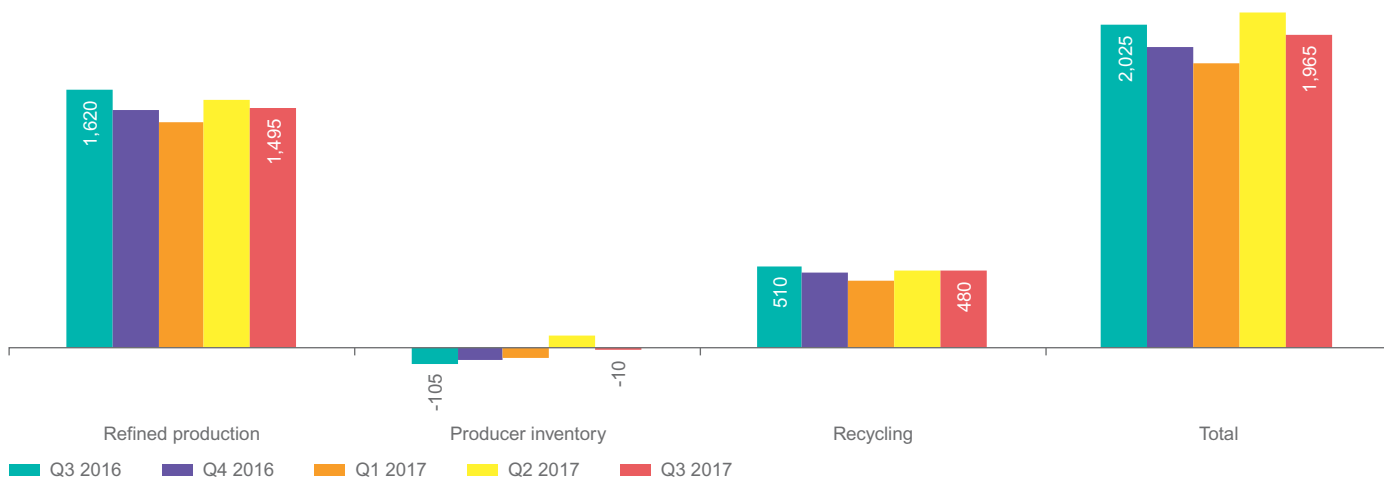


Source: SFA (Oxford)

Supply

Refined production (Chart 2) decreased to 1,495 koz in Q3'17 (-4% on the previous quarter), with output falling in South Africa (-1% quarter-on-quarter), Zimbabwe (-24%) and Russia (-10%). South African output is lower because of furnace maintenance and the temporary shutdown of a concentrator following a tailings dam leak. South African production totals 1,075 koz for Q3'17 (-9% year-on-year) and 3,185 koz for the first nine months of 2017 (-0.2% year-on-year).

Chart 2: Platinum supply, koz



Source: SFA (Oxford)

Production from Zimbabwe declined to 95 koz owing to furnace maintenance work. Russian supply fell to 185 koz, which is lower than the 205 koz produced in Q2'17 (boosted by processing of pipeline material), but in line with typical historical third quarter production levels. North American supply increased to 95 koz (+12% quarter-on-quarter) as a result of furnace maintenance in Canada that negatively impacted production levels during Q2'17. Overall, global refined production for Q3'17 is estimated at 1,495 koz, which is a 4% reduction from Q2'17 and an 8% fall year-on-year.

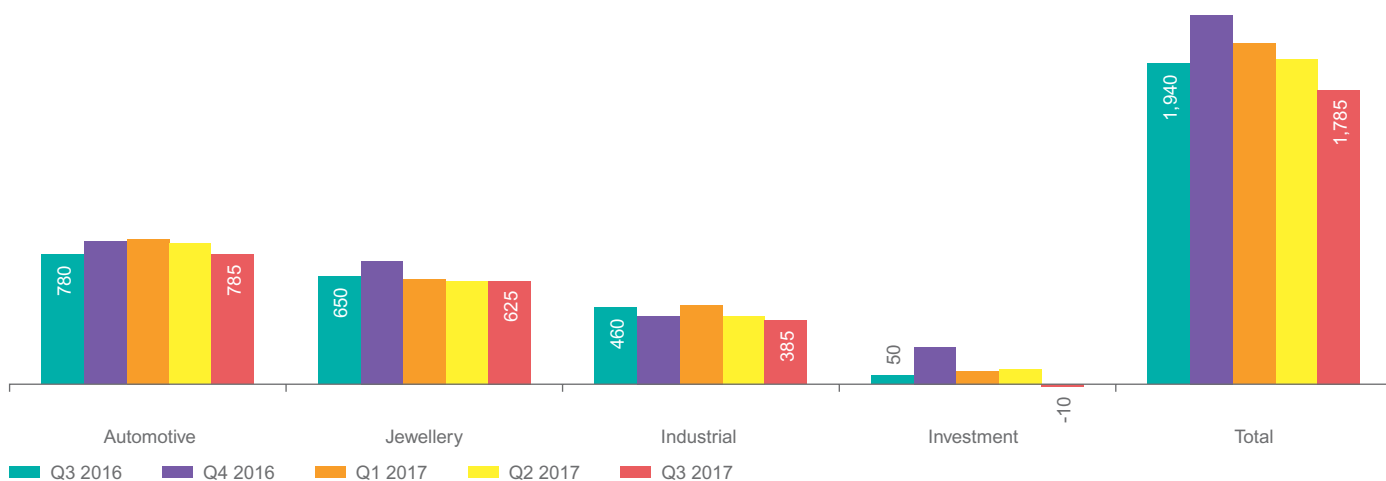
Producers added 10 koz to stock in Q3'17, almost balancing out a net 15 koz reduction in stock during H1'17. Total mine supply was 1,485 koz, 2% lower than in the prior year period.

Total platinum supply from recycling is estimated at 480 koz in Q3'17, down 6% on last year. The decline is due mostly to 2016 having seen a bump in Chinese jewellery recycling, while Japanese recycling was steady, bringing total third quarter jewellery recycling to 150 koz. Autocatalyst recycling is up 5% year-on-year to 330 koz for Q3'17, as Europe and North America are both seeing an increase in scrap flows. The high palladium price is also giving strong incentive for recyclers to process their autocatalysts.

Demand

Global platinum demand was 1,785 koz in Q3'17, down 8% year-on-year (Chart 3), as industrial demand in particular dropped significantly (-75 koz) mostly owing to lower capacity increases in the glass sector and lower net requirements in the petroleum sector due to refinery closures in Japan. Jewellery demand dipped 4% (-25 koz) as Chinese fabricator demand continued to decline and outweighed gains in most other regions. Overall investment demand was negative for the first time in two years as outflows from ETFs and exchange stocks outweighed bar and coin purchases. However, automotive demand grew 1% to 785 koz, helped by higher demand in heavy-duty vehicles.

Chart 3: Platinum demand, koz



Source: SFA (Oxford)

Automotive demand

In Q3'17, global automotive platinum demand was up 1% year-on-year at 785 koz, but showing typical seasonality was down by 8% from 850 koz in Q2'17.

Western Europe remains the largest diesel market, at just over 40% share, but volumes continue to decline as diesel's market share is now declining faster than overall growth in vehicle sales. Across the five largest markets, sales momentum is starting to slow in the UK and Germany, while sales remain strong in Italy and Spain, and reasonable in France. In Germany, diesel's share fell to 36.3% in September (source: KBA), though has been steady at 47% through Q3'17 in France (source: CCFA). Continued strong sales to fleets outweigh slower sales from private customers in Spain. In Italy, sales have been strong but some 15% year-to-date have been self-registrations, rather than fleet and consumer sales (source: Federauto). September, the final month of the quarter, is normally a strong month in the UK with the registration plate change, but instead, overall registrations fell 9.3% year-on-year (source: SMMT), as consumer sentiment continued to weaken.

Although China's light vehicle production has been downgraded somewhat in Q3'17, an increase in heavy-duty vehicle production estimates resulted in slightly higher automotive demand in this region.

Vehicle production estimates for India have been reduced slightly in Q3'17, but Indian passenger vehicle sales have been generally strong through the quarter, and are recovering after a series of setbacks (source: SIAM). Demonetisation at the end of 2016 and the changes to tax levels with the introduction of the Goods and Services Tax in July had left consumers uncertain over their future financial situation and reluctant to make major purchases. However, now that the tax levels have been clarified auto sales have returned to solid growth.

Jewellery demand

Jewellery demand in Q3'17 totalled 625 koz, down 4% year-on-year, which brings the total for the first three quarters to 1.89 moz, a marginal increase compared to last year.

In China, platinum jewellery sales are still struggling and platinum fabricator demand was down in Q3'17 year-on-year. Although overall precious metals and jewellery retail demand went up 1.8% year-on-year in the third quarter, most of that growth is due to gold, and platinum jewellery does not yet seem to have benefitted from the improved retail climate.

In India, July saw a drop in jewellery sales as many consumers bought early in June to avoid the Goods and Services Tax, which came into force from 1 July. However, fabricators and retailers will have been building up stock ahead of the first day of the festival of Diwali on 7 October, which is an extremely auspicious day to make purchases, particularly of precious metals.

Industrial demand

Net platinum requirements for industrial applications decreased by 16% year-on-year (-75 koz) to 385 koz in Q3'17, primarily owing to weaker demand for glass fabrication (-40 koz) and petroleum refining (-30 koz), whilst chemical demand also fell slightly (-5 koz). The ongoing recovery and recycling of platinum from closed refinery units in Japan returned metal to market during the third quarter which, along with slower capacity expansion in China, lowered new metal requirements in the petroleum sector. Platinum purchases by glass fabricators also declined versus Q3'16, owing to the relatively low number of new facilities scheduled to start up in the second half of this year compared to H2'16.

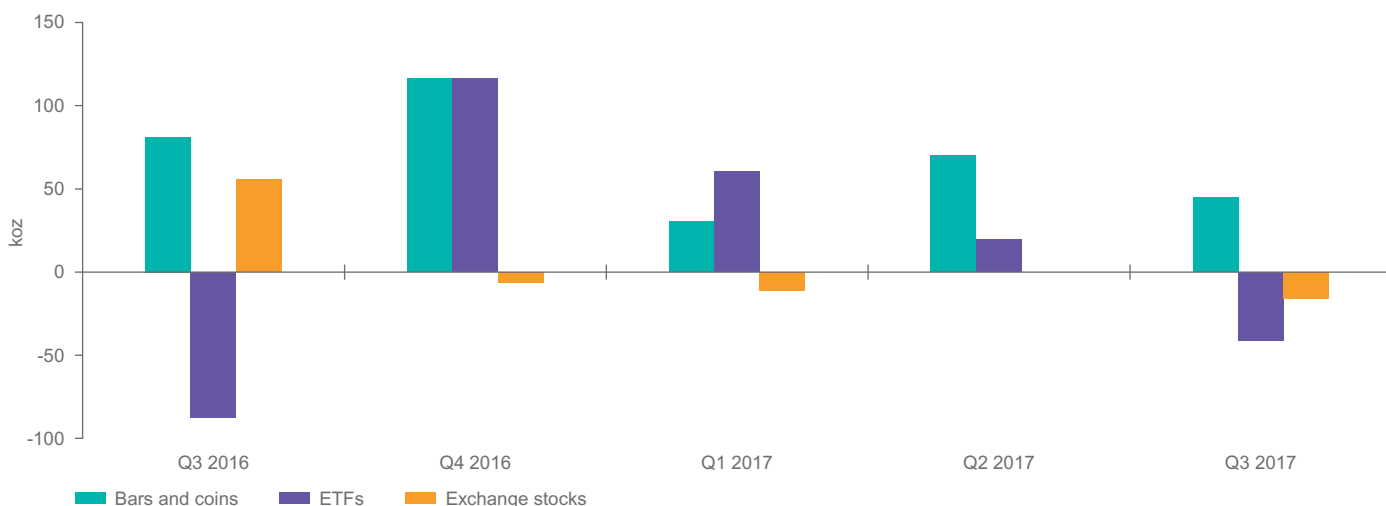
Investment demand

In the third quarter total investment demand was -10 koz (Chart 4) owing to net sales from ETFs and exchange stocks outweighing bar and coin purchases. Coin sales were boosted by the release by the US Mint of the American Eagle one ounce platinum proof coin, although the mintage was limited to 10 koz, but bar sales were somewhat lower quarter-on-quarter, leading to total bar and coin purchases of 45 koz. Japanese investors' net bar purchases were over 50% lower than in the second quarter despite the local platinum price remaining relatively low. This may be a result of the lack of volatility and opportunities to buy on price dips.

Overall in Q3'17 investors shifted to being net sellers of platinum from ETFs. Q3'17 started on a positive note, with global ETF holdings increasing in all regions in July. However, this was followed by declines in all regions in August and September, possibly driven by profit-taking, as the price had risen to over \$1,000/oz in early September from close to \$900/oz at the start of the quarter, which resulted in an overall drop of 41 koz in ETF holdings during the quarter.

The US was the only region to see a net gain in ETF holdings over the quarter, with investors adding 9 koz. ETF holdings declined in the UK (-20 koz), Switzerland (-6 koz), South Africa (-17 koz) and Japan (-6 koz).

Chart 4: Platinum investment



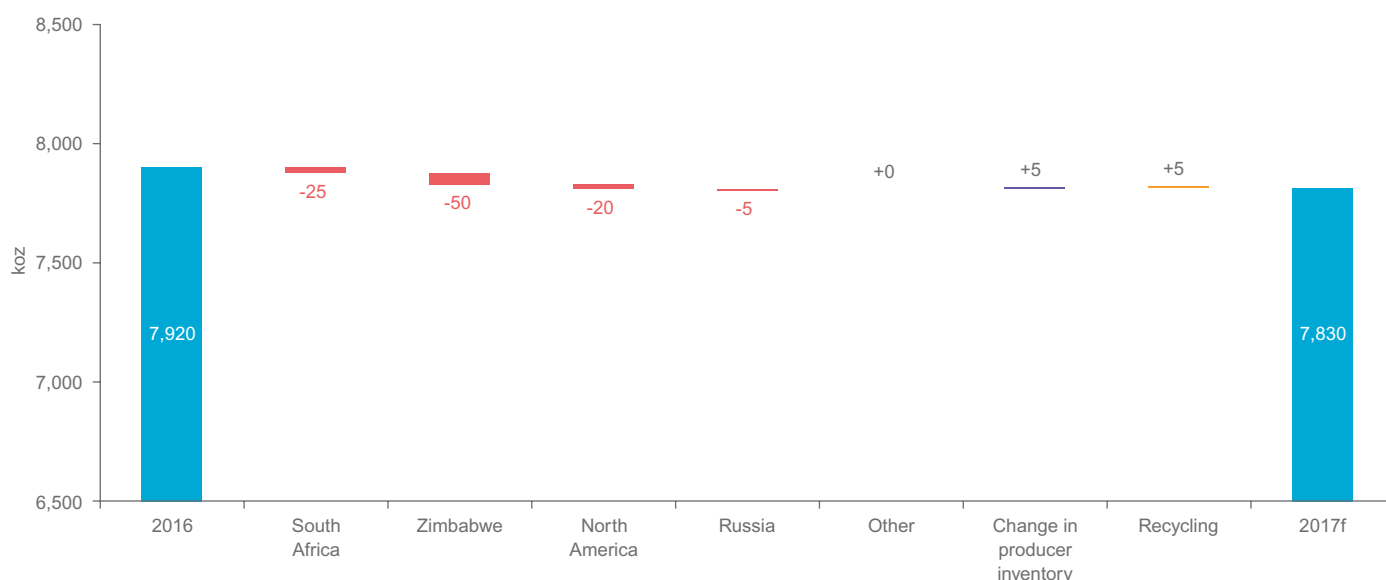
Source: SFA (Oxford)

2017 FORECAST

Global platinum supply is forecast to be 7,830 koz in 2017 (Chart 5), a drop of 1% year-on-year, as mining production is projected to be 95 koz lower, while recycled platinum supply grows by 5 koz.

Total mining supply is forecast to be 5,970 koz in 2017, down 2% from 6,065 koz in 2016 owing to reduced output in South Africa, Zimbabwe, North America and Russia. Overall, secondary supply of platinum is forecast to be little changed year-on-year in 2017. Jewellery recycling is expected to drop 10% to 565 koz this year as recycling in China returns to a more normal level, having been boosted by a return of stock in 2016, but this is mostly offset by continued growth in platinum recovered from spent autocatalysts.

Chart 5: Changes in total supply, 2017f vs. 2016



Source: SFA (Oxford)

Global demand is projected to decrease 6% to 7,845 koz this year as all the major end-use segments see reduced consumption. Industrial demand is expected to be 9% lower year-on-year at 1,640 koz as declines in petroleum, glass, chemical and electrical demand outweigh gains in medical and other segments. Autocatalyst and jewellery demand are both predicted to slip 1% to 3,365 koz and 2,590 koz respectively, and investment demand is forecast to be more subdued at 250 koz. This results in the market being close to balance with a 15 koz deficit (Chart 6).

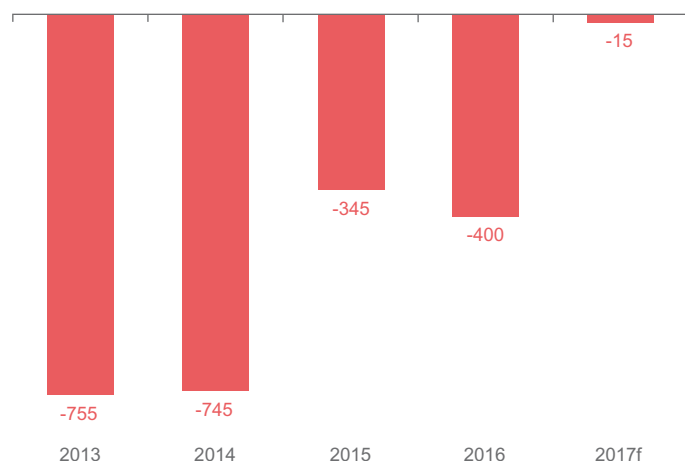
Mine supply

Global refined supply is forecast to drop by 2% to 5,935 koz in 2017. South African output is predicted to fall by 1% (-25 koz) to 4,230 koz this year. Further mine/shaft closures and restructuring plans have been announced in recent months, and furnace maintenance is expected to offset otherwise stable production levels. There have been fewer unplanned disruptions (safety-related stoppages), particularly in the first half of 2017, and cost optimisation strategies implemented over the past year mean that some Western Limb mines are now outperforming expectations. That said, a handful of operations in both South Africa and Zimbabwe are currently under review, and may close if a profit cannot be achieved.

Production from Zimbabwe is estimated to fall by 10% to 440 koz. North American supply is also forecast to decrease by 5% to 375 koz as a Canadian producer transitioned to a single furnace flowsheet. Output from Russia is projected to decline by 1% to 710 koz this year, owing to depletion at surface operations.

A reduction in producer stocks is forecast for 2017, and could be in the order of 35 koz. There was a very small net sale during the first nine months of the year (5 koz), though stock reduction is likely to take place in the second half of 2017 as furnace maintenance impacts on refined production levels. Total mine supply is estimated at 5,970 koz for 2017, down 2% from 2016 levels (6,065 koz).

Chart 6: Supply-demand balance, koz, 2013-2017f



Source: SFA (Oxford)

Recycling

Recycling supply is expected to remain fairly flat in 2017, rising 5 koz to 1,860 koz as growth in autocatalyst recycling is offset by a drop in jewellery recycling. Total jewellery recycling is predicted to contract by 10% (-60 koz) to 565 koz in 2017, as a decline to more typical levels in China is partly offset by some small growth in Japan, which are the two major regions.

Autocatalyst recycling is expected to see moderate growth in both Western Europe and North America. It seems that automakers' scrappage schemes in Europe have not spurred a large wave of new car sales. The upside appears to be limited to the small group who qualified for a scheme and were already planning to buy a new car and might now have traded in their old car instead of selling it on. The recent hurricanes in North America may lift the amount of scrap material available towards the end of 2017. If the Cox Automotive estimate of 600,000 damaged vehicles is accurate then this implies a 5% increase in the annual number of scrapped vehicles. However, the effect is not anticipated to be significant for platinum as the US is primarily a gasoline market.

Automotive demand

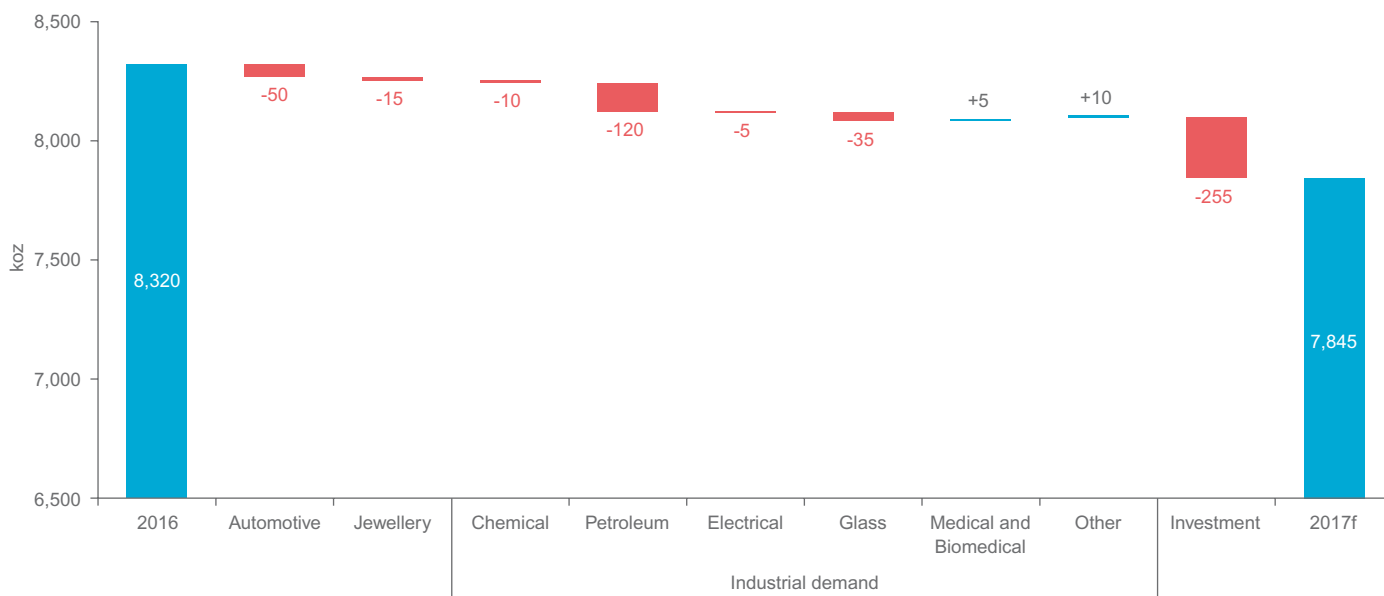
Annual automotive demand is relatively stable, with 2017 full-year demand forecast to reach 3,365 koz, down just 1% from 3,415 koz in 2016.

The UK, consistently one of the top five European car markets, expects to see registrations down 4.7% compared to 2016, to 2.565 million units for the full year. However, the impact on diesel is three times worse, expected to be 1.091 million units, down 15.1% on 2016, squeezing platinum demand (source: SMMT). While declining consumer and business confidence across the economy plays a part, confusion over the government's policy towards diesel is denting sales further. The industry is lobbying for government-backed incentives to promote low emissions diesel vehicles in November's budget, recognising that fleet renewal can be an effective way to help improve air quality. Euro 6 diesels currently face no barriers to use anywhere in the UK.

Western European car sales are expected to rise by around 2.7% in 2017, compared to 2016 (source: LMC Automotive). Spain has seen strong growth in vehicle sales all year as unemployment continues to fall, while the Italian and French markets remain strong and Germany expects to see overall sales rise.

Several automakers, including VW, Mercedes, BMW, Ford and Toyota, have launched scrappage schemes in Western European markets where drivers are offered incentives from around £1,500 to £7,000 off the price of one their new cars (any powertrain) in exchange for trading in an old diesel (or, in some cases, gasoline too) vehicle. Such schemes can help to boost automakers' sales when the market is slowing, as well as achieving governments' aim of improving air quality. The positive effect on sales is likely to be relatively limited by the number of vehicles involved; for example, the VW scheme in the UK when announced applies to owners of any Euro 1 to 4 diesel cars registered before 2010 and runs to the end of 2017.

Chart 7: Changes in demand by category, 2017f vs. 2016



Source: SFA (Oxford)

London launched the T-charge in October, adding a daily fee for entering the city centre zone for all vehicles which do not meet Euro 4 NO_x and PM standards, both diesel and gasoline. This is unlikely to deliver a significant boost to sales of new diesel vehicles in the near term, but certainly raises awareness of vehicular emissions, though Transport for London estimates that the T-charge will lead to around 40% of affected motorists upgrading their vehicles over the first year. Diesel continues to receive more negative than positive press coverage, but the greater clarity over real-world emissions that comes from the ‘Cleaner Vehicle Checker’, provided by independent Emissions Analytics, highlights that some new Euro 6 diesel cars have very low emissions. This shows that the technology exists for diesel car NO_x emissions to be on a par with those from gasoline cars.

Indian auto sales are expected to end the year more strongly than they began it, after demonetisation and uncertainty over the impact of the introduction of the Goods and Services Tax induced a slowdown earlier in the year. Several automakers are bringing additional production capacity online and introducing new models, though an anticipated rise of 3%-5% in the cost of ownership from rising fuel and insurance costs may curb sales growth.

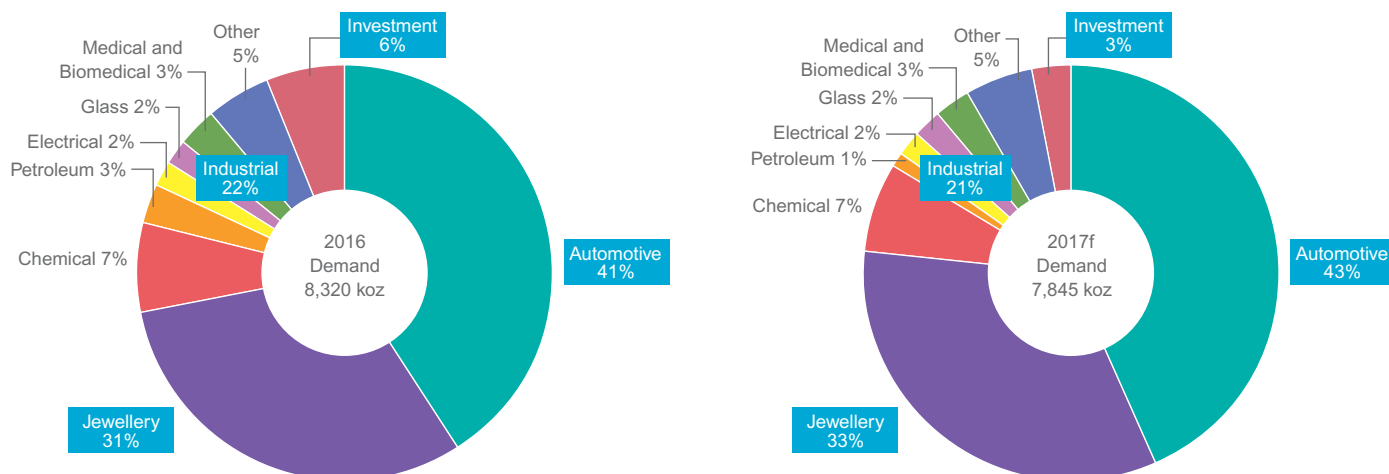
Jewellery demand

Jewellery demand is expected to shrink by 1% (-15 koz) in 2017 to 2,590 koz as the gains projected in most regions are outweighed by the ongoing decline of jewellery demand in China. China has seen a return to growth of the overall retail jewellery sector (including gold), as shown by the improved sales performance of major jewellery retailers such as Chow Tai Fook and Luk Fook, but unfortunately this improvement has not helped to lift platinum jewellery sales and demand is predicted to end the year down.

India saw very high platinum jewellery retail sales growth in H1’17 which was partly induced by purchasing ahead of the introduction of the Goods and Services Tax, and as a result is expected to see slower growth in H2’17. Despite this, 2017 as a whole is forecast to see platinum jewellery demand grow rapidly, as India continues to be the major source of growth in platinum jewellery demand.

The remainder of the world combined is projected to see moderate growth of 35 koz or +3%, supported by improving economic growth and positive consumer sentiment.

Chart 8: Demand end-use shares, 2017f vs. 2016



Source: SFA (Oxford)

Industrial demand

Industrial platinum demand is estimated to fall by 9% year-on-year (-155 koz) to 1,640 koz in 2017, largely owing to a sizeable drop in net petroleum requirements (-120 koz). A combination of slower refining capacity growth in China and the US and capacity cuts in Japan and Western Europe is anticipated to significantly reduce new metal requirements in the petroleum industry, whilst net platinum usage is also predicted to decrease for glass fabrication (-35 koz), chemical catalysis (-10 koz) and electrical components (-5 koz) this year.

Since the previous *Platinum Quarterly* report, historical demand estimates for other end-uses have been revised upwards by 15-25 koz per annum following further research which identified additional demand for automotive sensors. As a result, historical industrial demand figures and the 2017 forecast have been revised upwards by similar amounts.

Chemical

Platinum usage in chemical catalysis is projected to slip by 2% to 585 koz this year, softened by lower demand for nitric acid production and new dehydrogenation capacity, predominantly in China. Slower nitric acid capacity expansion and underutilisation of existing plants are anticipated to reduce platinum requirements in most regions, as demand for its key derivative, ammonium nitrate, declines. Fewer new propane dehydrogenation (PDH) plants are expected to start up in China in 2017, following strong capacity growth last year, compounded by major project delays and resulting in a further contraction in chemical demand this year.

Petroleum

Net petroleum requirements are forecast to drop to 100 koz in 2017 as a result of refining capacity curtailments in Japan and Western Europe plus slower capacity growth in China and the US. Capacity cuts in Western Europe (late 2016) and Japan (2017) are likely to return recovered platinum to market throughout the year, reducing demand to net negative levels in both regions, whilst a slower rate of capacity expansion in China and the US is also set to lower new metal demand this year, following strong growth in 2016. However, greater capacity expansion in the RoW should partly offset losses elsewhere, as new refineries are completed across Southern, Southeastern and Western Asia.

Electrical

Declining hard disk drive (HDD) demand is set to soften platinum usage in electrical devices by 3% to 155 koz in 2017, with HDD shipments predicted to fall by 4% year-on-year to 406 million units. For the first nine months of the year, HDD deliveries decreased by 4% to an estimated 299 million drives, largely owing to lower demand for PC drives (-15%), with a similar drop anticipated in the final quarter and therefore for the year as a whole. However, growing requirements for other electrical components is projected to partially offset lost HDD demand, helping to minimise the overall decline.

Glass

Glass demand is forecast to fall by 17% year-on-year to 170 koz this year, weakened by lower requirements for new facilities (slower capacity expansion) in China and the US following strong growth in 2016. Fewer new plants are expected to be completed in both countries compared to last year, whilst closures in the US and of liquid-crystal display (LCD) substrate facilities in Japan towards the end of 2016 are also predicted to reduce new metal requirements by returning platinum to market throughout 2017.

Other

Platinum consumption in other industrial end-uses is estimated to rise by 3% (+10 koz) to 390 koz this year, boosted by growth in fuel cells and other automotive components. Greater vehicle production in China and many RoW regions should lift platinum requirements for automotive sensors, whilst growing demand for fuel cells in the transport sector (buses, HCVs and non-road) is also likely to increase platinum usage, particularly in Japan.

Investment demand

Global investment demand is estimated to total 250 koz this year. Bar and coin purchases are expected to be lower than in 2016, mostly owing to reduced levels of bar purchasing in Japan as investors, having taken advantage of the initial price drop below ¥4,000/g to boost their bar investments in 2015 and 2016, have returned to making a more typical level of net purchases. ETF demand is projected to return to growth this year after slipping slightly in 2016.

2018 OUTLOOK

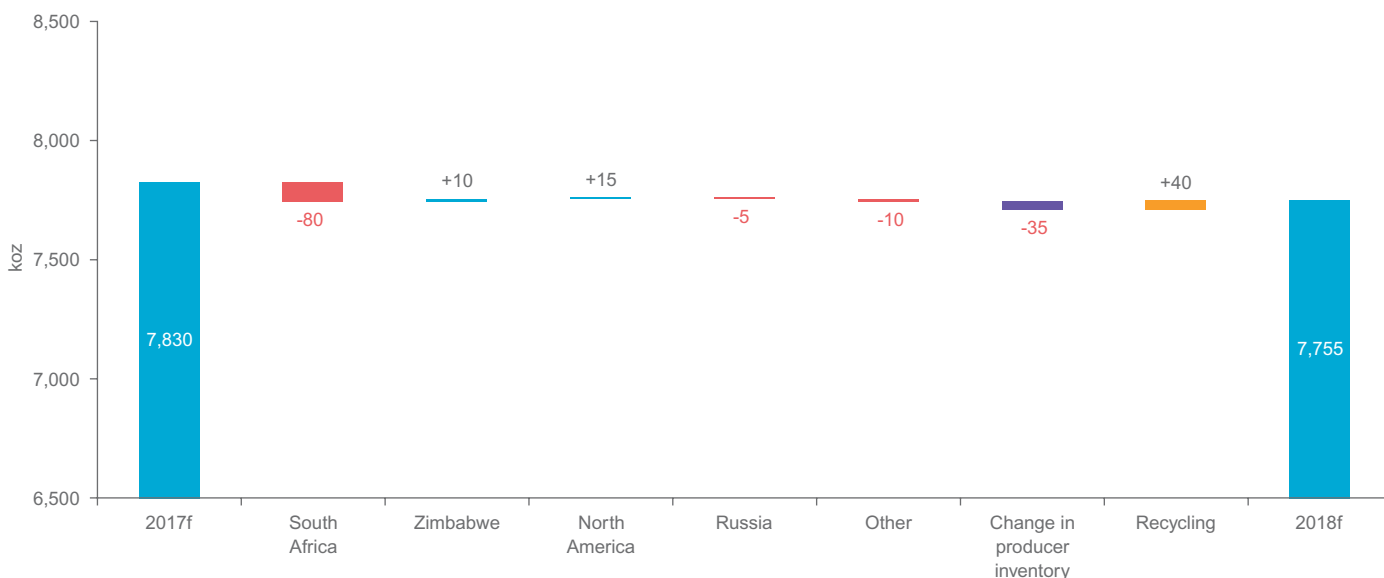
Total global supply is forecast to slip by 1% to 7,755 koz next year (Chart 9) as lower primary supply outweighs a gain in recycled metal.

Mine closures taking place during H2'17 will have a larger impact on production levels in 2018 (first full year of closure). Global refined supply is forecast to fall by 1% year-on-year to 5,855 koz, with South African output decreasing by 2% to 4,150 koz. Production from Russia and North America is forecast to remain stable at 705 koz and 380 koz, respectively.

Platinum supply from recycling is expected to grow by 40 koz (+2%) next year to 1,900 koz; of this, autocatalyst supply increases 35 koz to 1,325 koz, jewellery recycling expands 5 koz to 570 koz and industrial recycling stays flat at 5 koz.

Increasing amounts of diesel autocatalysts that are being returned for recycling contain diesel particulate filters with silicon carbide substrates which are more difficult for the recycling industry to process than cordierite substrates, and this is raising costs for the industry both to separate the material and to process it. The industry needs to become more adept at handling the silicon carbide substrates otherwise processing them could cause a bottleneck in the flow of material. In addition to passenger cars, growing numbers of light and heavy duty vehicles are reaching the end of their lives which is contributing to rising levels of platinum recycling in Western Europe and North America.

Chart 9: Changes in total supply, 2018f vs. 2017f



Source: SFA (Oxford)

Global platinum demand is projected to grow by 2% to 8,030 koz in 2018 (Chart 10), helped by a recovery in industrial demand to more typical levels and modest growth in jewellery demand.

Global automotive platinum demand is expected to remain stable, down just 1% to 3,335 koz in 2018 from 3,365 koz in 2017.

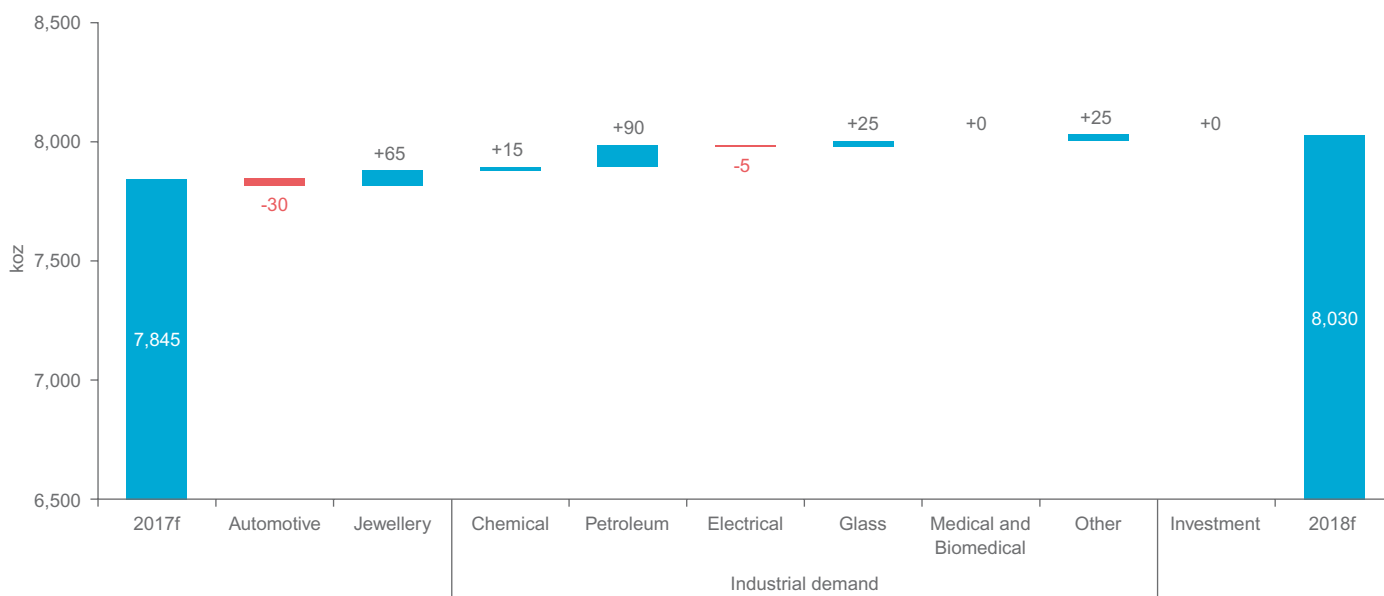
Western European car sales growth is set to slow from a very high base and with the UK a particular drag. UK registrations are estimated to fall by 5.4% on the 2017 forecast level, to 2.426 million units, and with consumers increasingly avoiding diesel cars, the forecast for diesel sales is down 9.4% on 2017's forecast to 0.989 million units, just 40.7% of total car registrations (source: SMMT). Growth in Germany is likely to moderate too, as there is limited scope to continue increasing sales after several strong years. Healthy economic expansion in Spain should see continued sales growth, and Italy too is expected to be a strong contributor to growth.

Global platinum jewellery demand is forecast to grow 3% (+65 koz) to 2,655 koz in 2018. This would be the first annual increase since 2014, as Chinese demand is anticipated to stabilise next year and growth is likely in other regions.

Indian jewellery demand is projected to continue its rapid growth with another double-digit gain in 2018, since consumers are expected to have adjusted to the Goods and Services Tax and PGI is continuing to support market development. The strong growth seen in Western Europe and the US this year is forecast to continue into the next, but Japan is expected to see a decline in demand.

Net platinum demand for industrial end-uses is forecast to rise by 9% (+150 koz) to 1,790 koz next year, almost fully recovering to 2016 demand levels following the decline this year. New metal requirements are anticipated to rebound in the petroleum (+90 koz) and glass (+25 koz) sectors, whilst growth is also predicted for chemical catalysis (+15 koz) and other end-uses (+25 koz). Fewer refining capacity reductions in Japan and less recycled platinum being returned to market are likely to lift metal purchases by the petroleum industry, whilst the start-up of new LCD substrate plants in China should increase demand for platinum in glass manufacturing. Greater silicone production and higher fuel cell demand are expected to boost requirements for chemical and other end-uses, respectively.

Chart 10: Changes in demand by category, 2018f vs. 2017f



Source: SFA (Oxford)

Total investment demand is forecast to be 250 koz in 2018. Coin purchases are predicted to remain at a similar level to 2017, but bar purchases, which are dominated by Japanese investors, are likely to be somewhat lower than this year because the yen is forecast to weaken, lifting the yen price of platinum, which will discourage purchases. ETF demand is expected to have another positive year.

ABOVE GROUND STOCKS

The market is forecast to have a deficit of 275 koz next year which would reduce above ground stocks to 1,605 koz at the end of the year.

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 Q3 2017

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

	2013	2014	2015	2016	2017f	2018f	2017f/2016 Growth %	2018f/2017f Growth %
Platinum Supply-demand Balance (koz)								
SUPPLY								
Refined Production	6,070	4,880	6,150	6,035	5,935	5,855	-2%	-1%
South Africa	4,355	3,115	4,465	4,255	4,230	4,150	-1%	-2%
Zimbabwe	405	405	405	490	440	450	-10%	2%
North America	355	400	385	395	375	380	-5%	1%
Russia	740	740	715	715	710	705	-1%	-1%
Other	215	220	180	180	180	170	0%	-6%
Increase (-)/Decrease (+) in Producer Inventory	-215	+350	+45	+30	+35	+0	17%	-100%
Total Mining Supply	5,855	5,230	6,195	6,065	5,970	5,855	-2%	-2%
Recycling	1,980	2,035	1,710	1,855	1,860	1,900	0%	2%
Autocatalyst	1,120	1,255	1,190	1,225	1,290	1,325	5%	3%
Jewellery	855	775	515	625	565	570	-10%	1%
Industrial	5	5	5	5	5	5	0%	0%
Total Supply	7,835	7,265	7,905	7,920	7,830	7,755	-1%	-1%
DEMAND								
Automotive	3,175	3,300	3,380	3,415	3,365	3,335	-1%	-1%
Autocatalyst	3,030	3,150	3,235	3,280	3,220	3,190	-2%	-1%
Non-road	140	150	140	135	140	145	4%	4%
Jewellery	2,945	3,000	2,880	2,605	2,590	2,655	-1%	3%
Industrial	1,535	1,560	1,685	1,795	1,640	1,790	-9%	9%
Chemical	535	555	605	595	585	600	-2%	3%
Petroleum	115	65	140	220	100	190	-55%	90%
Electrical	185	190	165	160	155	150	-3%	-3%
Glass	145	175	200	205	170	195	-17%	15%
Medical and Biomedical	220	220	230	235	240	240	2%	0%
Other	335	355	345	380	390	415	3%	6%
Investment	935	150	305	505	250	250	-50%	0%
Change in Bars, Coins	-5	50	525	460				
Change in ETF Holdings	905	215	-240	-10				
Change in Stocks Held by Exchanges	35	-115	20	85				
Total Demand	8,590	8,010	8,250	8,320	7,845	8,030	-6%	2%
Balance	-755	-745	-345	-400	-15	-275	-96%	N/M
Above Ground Stocks	4,140*	3,385	2,640	2,295	1,880	1,605	-1%	-15%

Source: SFA (Oxford). *As of 31st December 2012. NB: Numbers have been independently rounded.

PLATINUM QUARTERLY Q3 2017

Table 3: Supply, demand and above ground stocks summary – quarterly comparison

	Q4 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016	Q1 2017	Q2 2017	Q3 2017	Q3'17/Q3'16 Growth %	Q3'17/Q2'17 Growth %
Platinum Supply-demand Balance (koz)										
SUPPLY										
Refined Production	1,610	1,275	1,650	1,620	1,490	1,415	1,550	1,495	-8%	-4%
South Africa	1,190	810	1,200	1,180	1,065	1,020	1,090	1,075	-9%	-1%
Zimbabwe	110	130	120	120	120	115	125	95	-21%	-24%
North America	100	100	105	100	85	95	85	95	-5%	12%
Russia	160	190	180	175	170	140	205	185	6%	-10%
Other	50	45	45	45	50	45	45	45	0%	0%
Increase (-)/Decrease (+) in Producer Inventory	-40	+150	+60	-105	-75	-60	+75	-10	-90%	N/M
Total Mining Supply	1,570	1,425	1,710	1,515	1,415	1,355	1,625	1,485	-2%	-9%
Recycling	375	395	480	510	470	420	480	480	-6%	0%
Autocatalyst	270	280	340	315	290	300	330	330	5%	0%
Jewellery	105	115	140	195	180	120	150	150	-23%	0%
Industrial	0	0	0	0	0	0	0	0	N/M	N/M
Total Supply	1,945	1,820	2,190	2,025	1,885	1,775	2,105	1,965	-3%	-7%
DEMAND										
Automotive	845	875	890	780	865	875	850	785	1%	-8%
Autocatalyst	810	840	855	755	830	840	810	755	0%	-7%
Non-road	35	35	35	30	35	35	35	35	17%	0%
Jewellery	675	600	620	650	740	640	625	625	-4%	0%
Industrial	435	445	480	460	410	470	405	385	-16%	-5%
Chemical	130	150	140	170	130	150	135	165	-3%	22%
Petroleum	35	55	60	55	55	45	10	25	-55%	150%
Electrical	40	40	40	40	40	40	40	40	0%	0%
Glass	70	60	80	60	5	85	50	20	-67%	-60%
Medical and Biomedical	65	50	70	45	75	55	70	45	0%	-36%
Other	95	90	90	90	105	95	100	90	0%	-10%
Investment	-95	165	95	50	225	80	90	-10	N/M	N/M
Change in Bars, Coins	220	150	115	80	115	30	70	45	-44%	-36%
Change in ETF Holdings	-345	-25	-15	-85	115	60	20	-40	-53%	N/M
Change in Stocks Held by Exchanges	30	40	-5	55	-5	-10	0	-15	N/M	N/M
Total Demand	1,860	2,085	2,085	1,940	2,240	2,065	1,970	1,785	-8%	-9%
Balance	85	-265	105	85	-355	-290	135	180		

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

PLATINUM QUARTERLY Q3 2017

Table 4: Supply, demand and above ground stocks summary – half-yearly comparison

	H1 2016	H2 2016	H1 2017	H1'17/H1'16 Growth %	H1'17/H2'16 Growth %
Platinum Supply-demand Balance (koz)					
SUPPLY					
Refined Production	2,925	3,110	2,965	1%	-5%
South Africa	2,010	2,245	2,110	5%	-6%
Zimbabwe	250	240	240	-4%	0%
North America	205	185	180	-12%	-3%
Russia	370	345	345	-7%	0%
Other	90	95	90	0%	-5%
Increase (-)/Decrease (+) in Producer Inventory	+210	-180	+15	-93%	N/M
Total Mining Supply	3,135	2,930	2,980	-5%	2%
Recycling	875	980	900	3%	-8%
Autocatalyst	620	605	630	2%	4%
Jewellery	255	375	270	6%	-28%
Industrial	0	0	0	N/M	N/M
Total Supply	4,010	3,910	3,880	-3%	-1%
DEMAND					
Automotive	1,765	1,645	1,725	-2%	5%
Autocatalyst	1,695	1,585	1,650	-3%	4%
Non-road	70	65	70	0%	8%
Jewellery	1,220	1,390	1,265	4%	-9%
Industrial	925	870	875	-5%	1%
Chemical	290	300	285	-2%	-5%
Petroleum	115	110	55	-52%	-50%
Electrical	80	80	80	0%	0%
Glass	140	65	135	-4%	108%
Medical and Biomedical	120	120	125	4%	4%
Other	180	195	195	8%	0%
Investment	260	275	170	-35%	-38%
Change in Bars, Coins	265	195	100	-62%	-49%
Change in ETF Holdings	-40	30	80	N/M	167%
Change in Stocks Held by Exchanges	35	50	-10	N/M	N/M
Total Demand	4,170	4,180	4,035	-3%	-3%
Balance	-160	-270	-155		

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

PLATINUM QUARTERLY Q3 2017

Table 5: Regional demand – annual and quarterly comparison

	2013	2014	2015	2016	2017f	2018f	2017f/2016 Growth %	2018f/2017f Growth %	Q4 2016	Q1 2017	Q2 2017	Q3 2017
Platinum gross demand (koz)												
Automotive	3,175	3,300	3,380	3,415	3,365	3,335	-1%	-1%	865	875	850	785
North America	425	465	470	425								
Western Europe	1,350	1,440	1,545	1,625								
Japan	585	590	530	490								
China	130	125	130	170								
India	160	160	175	165								
Rest of the World	525	520	530	540								
Jewellery	2,945	3,000	2,880	2,605	2,590	2,655	-1%	3%	740	640	625	625
North America	200	230	250	265								
Western Europe	220	220	235	240								
Japan	335	335	340	335								
China	1,990	1,975	1,765	1,450								
India	140	175	220	245								
Rest of the World	60	65	70	70								
Chemical	535	555	605	595	585	600	-2%	3%	130	150	135	165
North America	55	55	65	55								
Western Europe	110	105	105	120								
Japan	15	15	10	15								
China	195	215	255	240								
Rest of the World	160	165	170	165								
Petroleum	115	65	140	220	100	190	-55%	90%	55	45	10	25
North America	40	25	-25	90								
Western Europe	-45	-15	70	10								
Japan	10	-35	5	0								
China	80	-5	45	80								
Rest of the World	30	95	45	40								
Electrical	185	190	165	160	155	150	-3%	-3%	40	40	40	40
North America	10	15	10	10								
Western Europe	5	10	10	10								
Japan	10	15	15	15								
China	75	70	60	60								
Rest of the World	85	80	70	65								
Glass	145	175	200	205	170	195	-17%	15%	5	85	50	20
North America	5	10	0	20								
Western Europe	-10	15	10	5								
Japan	0	-25	-5	-10								
China	90	85	95	100								
Rest of the World	60	90	100	90								
Medical and Biomedical	220	220	230	235	240	240	2%	0%	75	55	70	45
North America	90	90	90	90								
Western Europe	75	75	75	80								
Japan	20	20	20	20								
China	15	15	20	20								
Rest of the World	20	20	25	25								
Other industrial	335	355	345	380	390	415	3%	6%	105	95	100	90
Investment	935	150	305	505	250	250	-50%	0%	225	80	90	-10%
Total Demand	8,590	8,010	8,250	8,320	7,845	8,030	-6%	2%	2,240	2,065	1,970	1,785

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.

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.

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.

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 will be 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.

WLTP

Worldwide Harmonized Light Vehicles Test Procedure is a laboratory test to measure pollutant emissions and fuel consumption. WLTP replaces the New European Drive Cycle (NEDC).

WPIC

The World Platinum Investment Council.

Ounce conversion

1 million ounces = 31.1 tonnes.

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