
PLATINUM QUARTERLY

Q4 2015

2nd March 2016

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FOREWORD

Platinum is a distinctive precious investment asset, the premier jewellery metal and an in-demand industrial metal. Our role is to improve understanding of the investment case for platinum and to ensure attractive investment products are available. Let me share a few words on these topics before highlighting a number of insights from this quarter's Platinum Quarterly Supply/Demand analysis.

Platinum's price performance

Explaining the price softness of platinum over the last three years has been a challenge. We have seen a welcome strengthening in the first two months of this year, but the longer term decline has been entirely against the strong fundamentals of the global platinum market. Most of the commodities that have declined in price over that period have been in surplus. As might be expected. However, platinum has declined in price, despite healthy deficits (over 5% on average) over the last four years.

Similarly most of the commodities whose prices have suffered significant declines in the past 12 months are massively exposed to China industrial demand (50-60% of their global demand). However, platinum is, at most, only 30% exposed to China. Further, at least 20%, two thirds of that exposure, is to China jewellery consumption, linked to personal disposable income which is growing at a rate almost double that of the overall economy. Again, not a logical rationale for platinum price softness.

So, platinum appears to have been traded as if it was a surplus industrial commodity, which it is not. We believe the decline in the platinum price that commenced in 2011 was driven largely by sales from investors' vaulted holdings. However, the current price is being set by momentum and short-term traders, with a tightened correlation between the gold and platinum prices. Also, the prevailing tide of analysis and media commentary has been pessimistic on most aspects of platinum demand and bullish on platinum supply. Our analysis supports different conclusions. Demand from all sectors is robust, with growth in European diesel platinum demand and resilient jewellery demand in Asia. Supply from primary producers is declining, due to an increased portion of uneconomic mining and the 80% reduction in annual mine capital expenditure over the last six years.

Finally, an observation. The platinum price has only four times previously, over the last forty years, been at a discount to gold for a sustained period. In all previous cases, the price has recovered strongly in the subsequent year.

Market development

I passionately believe that ridding the markets of unnecessary complexity and making it easier to invest in platinum, starting with basics such as improving the availability of metal for sale, will accelerate investment demand for this most precious of metals. My second topic in this Foreword is Market Development.

In the months since the WPIC was launched back in November 2014, we have sought to establish a reputation for delivering objective and reliable market insights, typified by the ongoing publication of this *Platinum Quarterly* data and analysis.

Alongside our research and data programme, we are implementing a comprehensive global market development strategy that will support future growth. This includes engaging with key financial institutions and market participants around the world to develop new products, fill geographic and sector gaps and stimulate further uptake of platinum by a broader range of investors.

In December last year we announced an exclusive partnership with Rand Merchant Bank intended to extend global reach of platinum bullion coin custodial certificates.

Through this, the WPIC now enjoys sole rights to identify and appoint partner licensees outside of South Africa capable of providing listed platinum-backed Bullion Coin Custodial Certificates (BCCCs) to investors. We believe the product is highly suitable for investors in many countries.

In January we announced that the WPIC had joined the Singapore Bullion Market Association (SBMA), reinforcing our ambitions in respect of both retail and institutional platinum investment products, such as bars and coins, exchange-traded funds and BCCCs in Asia. Singapore is a growing hub for precious metals investment and the industry value chain, with strong government backing for the precious metals business.

Finally, just last month the WPIC was delighted to support the Austrian Mint's issuance of a new platinum Vienna Philharmonic coin at the prestigious Berlin Coin Fair – the first platinum offering from the Mint.

Broadening the investor base for platinum through targeted market development is critical to the long-term success of the global platinum market. It is the nature of market development that very little can be said publicly pre-announcement, but we fully expect that in the months to come we will have a number of initiatives running with partners and we look forward to making further announcements throughout the year.

Platinum Quarterly

The launch of the Philharmonic coin takes me nicely to the launch of today's *Platinum Quarterly* data set. I say nicely because while many observers of the platinum market continue to highlight the industrial relevance of the metal, it is equally important to understand the major role consumer demand plays in platinum demand growth.

Today's report, while highlighting the diversified nature of demand, is perhaps the most valuable we, alongside our research partners SFA (Oxford), have published. I say this because, as this is the sixth quarter of data produced, we are now able to interpret and review elements of seasonality in both supply and demand segments such as jewellery. Our growing understanding of seasonal traits, will in turn, allow investors to make better informed decisions about the market.

Today's data covers the key final quarter of 2015, alongside the full year 2015 figures and a 2016 forecast. It shows that despite the weak price of platinum, the supply and demand fundamentals of the market remain robust.

A strong feature is automotive platinum demand up 5% year-on-year on the back of rising vehicle sales in Western Europe and the introduction of Euro 6 legislation. It is pleasing to see that consumers are peering through the fog of hyperbole and misinformation that engulfed the diesel market after the news regarding Volkswagen emissions testing broke last September. It is also abundantly clear that as countries endeavour to implement their commitments agreed at the Paris COP21 climate talks, diesel will continue to have a considerable role to play in helping to reduce CO₂ emissions. The most recent World Economic Forum Global Risk report, published in January highlighted that "after its presence in the top five most impactful risks for the past three years, the failure of climate change mitigation and adaptation has risen to the top and is perceived in 2016 as the most impactful risk for the years to come." While European automotive demand remains robust, it is pleasing to note that automotive platinum demand in India grew by 9%, where diesel's market share held up and vehicle sales increased.

Current estimates of the global jewellery outturn in 2015 are disappointing, slipping some 4% year-on-year. This was due to a decline in China. Elsewhere, the story was very different. Indian jewellery demand increased by 26% year-on-year, buoyed by bridal growth and the development of the men's platinum jewellery market too. Both Europe and North America also recorded strong single digit percentage gains in jewellery demand.

Industrial demand, a compendium of end-uses, grew by 4% (+55 koz) year-on-year, with increased metal required in the petroleum, chemical and bio-medical sectors.

Finally, investment demand had a positive year, at 260 koz in 2015, an increase of 110 koz from 2014. ETF volume reductions on a net basis globally, were more than offset by retail bar and coin volume growth. Of specific note was Japan, where investors bought on the back of historically low prices, steadily increasing their ETF holdings and bar purchases throughout the year, with the fourth quarter seeing record purchases of both bars and ETFs.

On the supply side, total platinum supply grew by 8% during 2015, with South Africa reaching levels similar to those prior to the five month 2014 strike and offsetting a 15% decline in recycling over the year. It will be interesting to see how primary supply levels move from this point onwards with many observers keen to understand how, in South Africa, observed falls in capital expenditure investment, increasing costs and a higher portion of loss making production might curb output.

Today's supply forecast for 2016 includes a reduction in planned South African output of 225 koz associated with industrial action related to wage negotiations, safety stoppages and a shaft closure due to fire. This reduction is partly offset by expected sales from producer refined working inventories of 100 koz in 2016 despite material consecutive sales in 2014 and 2015 from this source.

As I mentioned earlier, making the platinum market accessible and easy to understand are central tenets of our organisation. Consequently, we determined at the outset that it was essential to publish the first-ever, publically available estimate of Above Ground Stocks or vaulted investor holdings. We define Above Ground Stocks as the year-end estimate of the vaulted platinum holdings not associated with exchange-traded funds, metal held by exchanges or working inventories of mining producers, refiners, fabricators or end users.

Today's figures show that once again, the level of Above Ground Stocks fell in 2015, down by 380 koz to 2,315 koz. SFA's 2016 forecast predicts a further fall.

I recognise that no published estimate of above ground stocks can be perfect, due to the nature of unpublished confidential investor holdings in vaults. However, the volume is far less important than the investment motivations and time horizons of its owners, reflected in their propensity to sell the metal at market prices. Sales from Above Ground Stocks of over two million ounces since 2011 have been primarily responsible for price decline in the face of fundamental deficits each year. However, a change in sentiment by the owners of above ground stocks, to a belief that their metal holdings are likely to be worth more in the future, would quickly reduce this potential source of supply. The data published today, together with our longer term outlook shows continued deficits. We believe improved understanding of market balances within the context of sentiment-driven stock holding supports better informed investor decision making. Should the platinum market suffer supply shocks in 2016, the ability of Above Ground Stocks to sate appetite for platinum may be sorely tested.

Medium and long term outlook for platinum

We are also committed to bringing new and discrete studies to investors' attention, focused on the medium and long term outlook for platinum. I would like to mention two items, both accessible from our website home page www.platinuminvestment.com.

Recently, in response to specific requests, we published a forecast of supply and demand fundamentals for the next six year period. The report from GlauX Metal, led by the respected metals analyst, Dr David Jollie, forecasts ongoing deficits until 2021.

A key part of our role in facilitating better understanding of the platinum market is explaining where we believe the future drivers of growth will come from – how will the platinum market evolve and change in the future?

In addition to successful initiatives by Platinum Guild International (PGI) and WPIC, to stimulate jewellery and investment demand respectively, other developments support demand growth. For example, today's *Platinum Quarterly* reports a modest 35 koz increase in demand for platinum expected in 2016 mainly from use in hydrogen fuel cell technology.

Looking to 2020 and beyond, there are entirely plausible scenarios under which fuel cell electric vehicles become a significant part of the vehicle mix. This change offers considerable potential for platinum, with fuel cell vehicles having significantly higher platinum content than traditional vehicles. For those interested in exploring the subject in detail, there is a link on our website to a presentation on inflection points for PGMs, delivered in January to an investor forum in Cape Town.

Paul Wilson, CEO

PLATINUM QUARTERLY Q4 2015

Table 1: Supply, demand and above ground stocks summary

	2013	2014	2015	2016f	2015/2014 Growth %	2016f/2015 Growth %	Q3 2015	Q4 2015
Platinum Supply-demand Balance (koz)								
SUPPLY								
Refined Production	6,070	4,880	6,040	5,970	24%	-1%	1,615	1,545
South Africa	4,355	3,115	4,390	4,310	41%	-2%	1,180	1,145
Zimbabwe	405	405	385	430	-5%	12%	115	90
North America	355	400	395	390	-1%	-1%	90	110
Russia	740	740	715	675	-3%	-6%	190	160
Other	215	220	155	165	-30%	6%	40	40
Increase (-)/Decrease (+) in Producer Inventory	-215	+350	+60	+100	-83%	67%	+20	-15
Total Mining Supply	5,855	5,230	6,100	6,070	17%	0%	1,635	1,530
Recycling	1,985	2,040	1,725	1,960	-15%	14%	415	395
Autocatalyst	1,120	1,255	1,190	1,360	-5%	14%	295	270
Jewellery	855	775	530	595	-32%	12%	120	125
Industrial	10	10	5	5	-50%	0%	0	0
Total Supply	7,840	7,270	7,825	8,030	8%	3%	2,050	1,925
DEMAND								
Automotive	3,160	3,290	3,455	3,545	5%	3%	830	870
Autocatalyst	3,020	3,140	3,300	3,380	5%	2%	795	825
Non-road	145	155	160	165	3%	3%	35	40
Jewellery	2,945	3,000	2,880	2,920	-4%	1%	795	675
Industrial	1,520	1,555	1,610	1,570	4%	-2%	410	410
Chemical	540	575	585	585	2%	0%	150	125
Petroleum	115	65	160	125	146%	-22%	40	50
Electrical	190	190	150	150	-21%	0%	40	35
Glass	155	180	155	110	-14%	-29%	55	40
Medical and Biomedical	235	240	250	255	4%	2%	50	75
Other	285	305	310	345	2%	11%	75	85
Investment	935	150	260	130	73%	-50%	275	-105
Change in Bars, Coins	-5	50	480				170	210
Change in ETF Holdings	905	215	-240				110	-345
Change in Stocks Held by Exchanges	35	-115	20				-5	30
Total Demand	8,560	7,995	8,205	8,165	3%	0%	2,310	1,850
Balance	-720	-725	-380	-135	-48%	-64%	-260	75
Above Ground Stocks	4,140*	3,420	2,695	2,180	-14%	-6%		

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. The current estimates for both Q4 and H2 2015 are included in Table 3 on page 19 (Supply, demand and above ground stocks).

3. The 2015 and 2016 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.

2015 FULL YEAR REVIEW

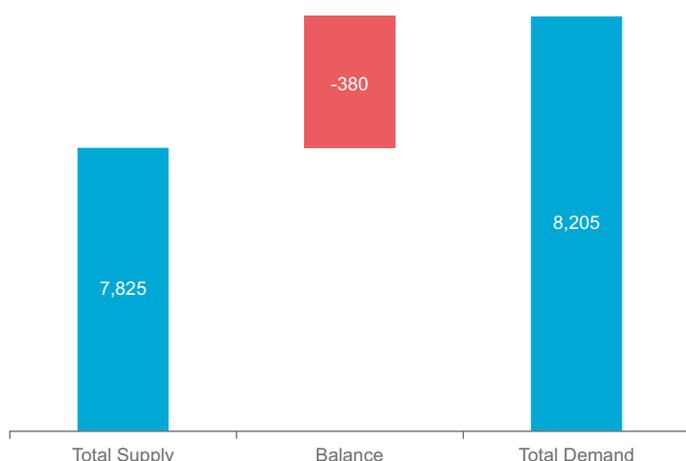
A number of different trends played out in the platinum market in 2015. Primary supply increased this year as total refined production in South Africa recovered to 2013 levels after a severely strike-affected 2014. However, secondary supply fell as declining metal prices reduced recycling of both jewellery and autocatalysts. Automotive platinum demand increased, driven by robust sales growth in Western Europe and greater platinum loading on vehicles, despite the negative publicity around diesel engine emissions. Investment demand had a positive year as the decline in the platinum price encouraged Japanese investors in particular to increase their purchases of platinum bars and this offset a fall in ETF holdings. Jewellery demand was negatively impacted by weaker sales in China.

Total platinum supply expanded by 8% this year to 7,825 koz as the recovery in South African output to pre-strike levels more than made up for a 15% decline in recycling which was caused by lower jewellery demand in China and weaker steel and PGM prices reducing vehicle scrappage rates and interrupting supply from collectors. Total demand increased to 8,205 koz as stronger automotive, industrial and investment demand more than offset a dip in jewellery demand, and exceeded global supply by 380 koz (Chart 1). The breakdown of demand changes from 7,995 koz in 2014 to 8,205 koz in 2015 is shown in Chart 4.

Mine supply

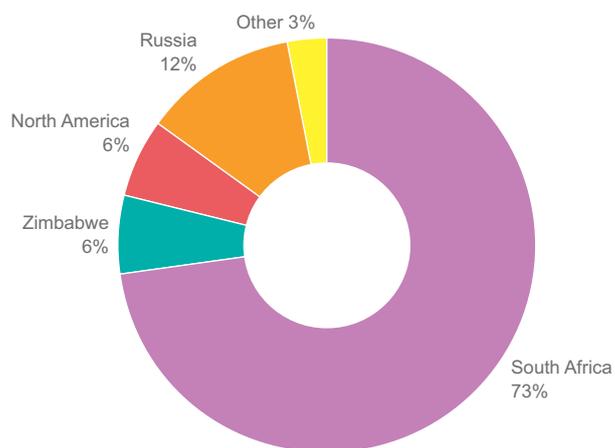
Refined production is forecast to have been 24% higher year-on-year at 6,040 koz in 2015, as South African production increased by 1,275 koz year-on-year to 4,390 koz (73% of global supply (Chart 2), compared to 64% in 2014). The normalisation of production at strike-affected operations accounts for 91% of South African supply growth in 2015, and most other operations also posted stable or higher production year-on-year. Safety-related stoppages and a price-induced closure resulted in small losses for a handful of mines (-45 koz for Western Limb operations, -15 koz for an Eastern Limb mine). In the rest of the world, production was flat in North America, but was lower in Zimbabwe (-20 koz, mine closure), Russia (-30 koz, pipeline inventory processed in the previous year) and Columbia (-30 koz).

Chart 1: Supply-demand balance, koz, 2015



Source: SFA (Oxford)

Chart 2: Global refined production, 2015

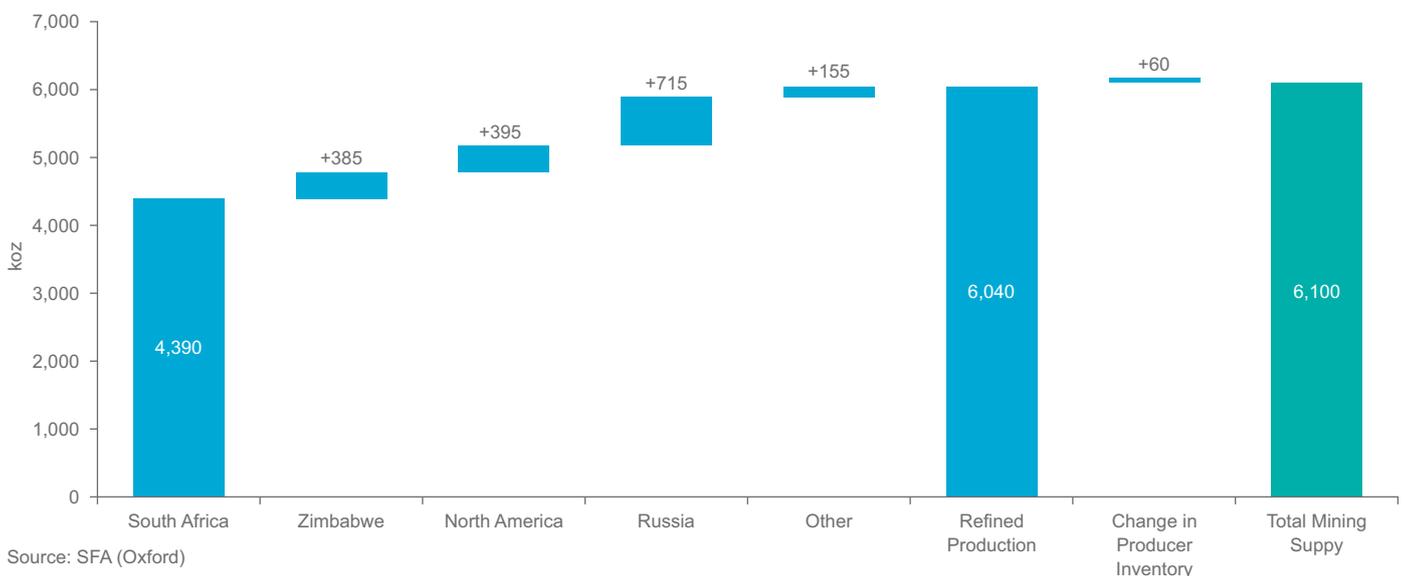


Source: SFA (Oxford)

South African refined production in 2015 was 4,390 koz, 205 koz greater than the 4,185 koz anticipated in the previous *Platinum Quarterly*, owing to reported output exceeding production guidance at many operations in the third and fourth quarters of the year. South African output in 2015 exceeded the 4,355 koz produced in 2013, by 35 koz (+1%). Production from Western Limb operations is estimated to have been lower by 14 koz compared to 2013, with mine closures resulting in a loss of 30 koz, while Eastern and Northern Limb operations have lifted production by a net 102 koz. Production from tailings retreatment was marginally higher (+4 koz).

A 60 koz decrease in producer inventory is currently estimated for the year, giving total mining supply of 6,100 koz, a 17% year-on-year increase over strike affected 2014 (Chart 3). This may well reduce as final production results are released. For those companies that have reported, sales in the second half of the year are 3% higher than H2'13 levels, and 26% higher than H2'14 sales.

Chart 3: Total mining supply summary, 2015



Recycling

Global supply from recycled platinum dropped 15% to 1,725 koz in 2015, with platinum recovered from autocatalysts 5% lower year-on-year at 1,190 koz. The decline in PGM prices reduced the flow of scrapped autocatalysts from collectors and the lower steel price also negatively affected auto scrappage rates, and with the metal prices continuing to decline into Q4'15 both effects resulted in platinum supply from recycling being lower than anticipated. Jewellery recycling was also negatively impacted by the declining platinum price in Japan, and in China by lower jewellery sales reducing jewellery recycling due to the use of older pieces to upgrade to larger newer ones. Overall global jewellery recycling fell by 32% to 530 koz compared to a 28% decline in the US dollar platinum price.

Automotive demand

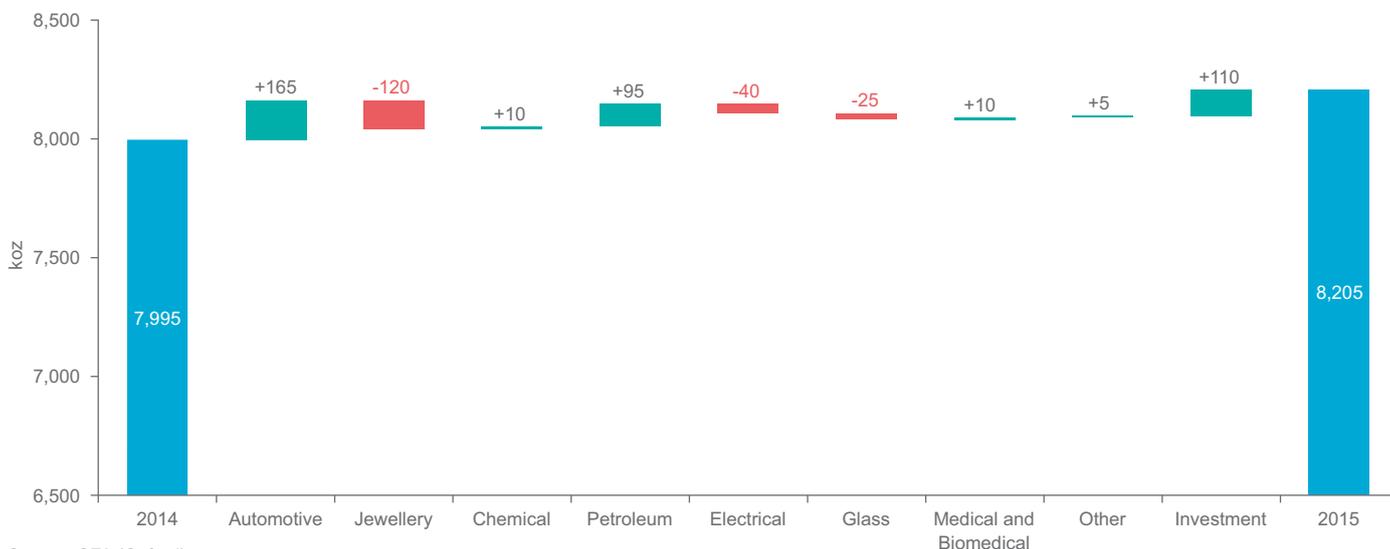
Gross automotive demand for platinum reached 3,455 koz in 2015, up 5% year-on-year from 3,290 koz in 2014. Demand growth was led by Western Europe (+9% year-on-year), where higher platinum loadings to achieve the final imposition of Euro 6 legislation for all vehicles and rising vehicle sales boosted platinum demand to 1,580 koz. Similar vehicle demand growth was seen from India (+9%) where diesel's market share held up and vehicle sales increased. However, in Japan, some palladium substitution for platinum in gasoline autocatalysts continues, bringing platinum loadings in gasoline autocatalysts there closer to the lower global norm.

According to LMC Automotive Western European light vehicle sales were just under 13.2 million units in 2015, some 8.9% ahead of 2014. This continued sales growth was driven by gradually improving economic conditions in most countries and an increased rate of fleet replacements.

Throughout 2015, real-world emissions from vehicles and urban air quality have been under increasing scrutiny, with diesel engines being highlighted as a source of pollutants. To this was added the VW scandal in September, which broke in the US but spread rapidly to other markets. The immediate impact was limited to a sharp fall in US diesel vehicles sales in Q4'15, but with diesel representing less than 1% of the US light vehicle market the impact on platinum demand was very minor.

Western Europe has long been the region with the highest share of diesel powertrains in its light vehicle fleet and hence where platinum demand was most at risk. For 2015, 51.9% of new car sales in the region were diesels (Source: LMC Automotive), very close to the level forecast at the beginning of the year before there was any public inkling of the VW scandal. Despite following, as forecast, a gently declining market share trend since 2011, recovering car demand in Western Europe took total diesel sales to 6.85 million units, up from 6.45 million units in 2014. This changing diesel share has been driven largely by changes in the relative merits and costs of different fuels, rather than by anti-diesel sentiment. The change in diesel share in France from over 70% to nearer 50% is the greatest change, where robustly diesel-supportive tax regimes have been in place, but are now eroding.

Chart 4: Changes in demand by category, 2015 vs. 2014



Source: SFA (Oxford)

Jewellery demand

Jewellery demand this year slipped 4% to 2,880 koz from 3,000 koz in 2014 as weaker demand in China, the largest market, more than outweighed the 9% combined gain in all the other regions. Platinum jewellery demand in China was down by 210 koz, 11%, from 1,975 koz in 2014 to 1,765 koz in 2015, while demand in all other regions was up by 90 koz or 9% from 1,025 koz to 1,115 koz. The slowdown in economic growth in China may have negatively impacted jewellery sales as consumers became more cautious. Retailers reported lower platinum jewellery sales during the year, with Hong Kong being more adversely affected than mainland China owing to a decline in tourists from the mainland. Retailers' store expansion on the mainland has continued and is focused on lower tier cities.

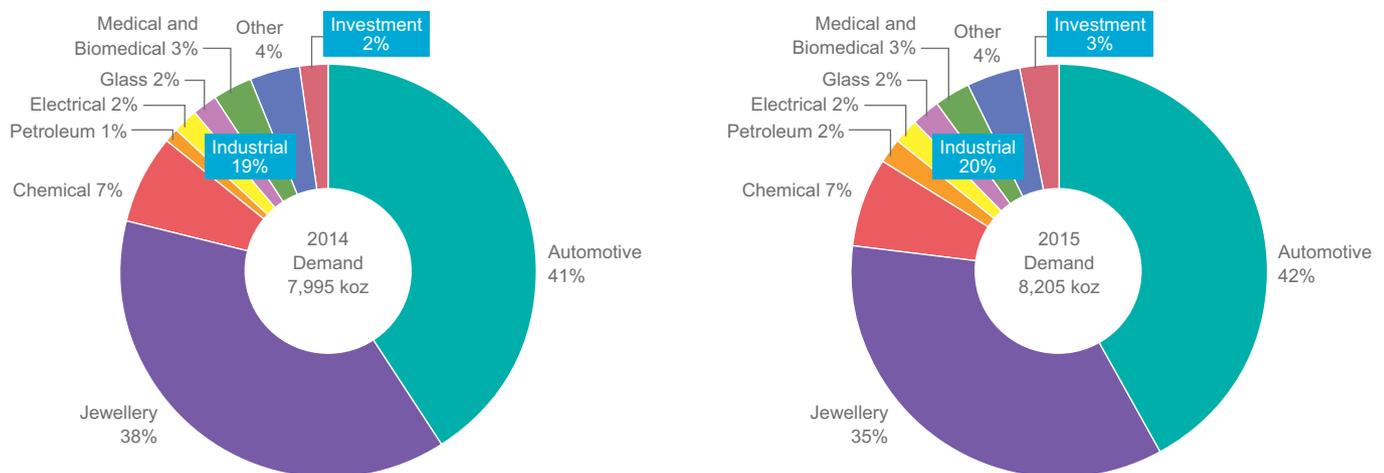
In India, platinum jewellery demand increased by 26% year-on-year to 220 koz as the bridal segment continued to grow robustly. Sales of men's jewellery also took off and although it remains a small part of the overall platinum jewellery market, the average weight per piece is quite high. Whereas gold jewellery is also seen as an investment, platinum jewellery is a symbol closely associated with love so pieces command a higher premium and sales have been helped by the price differential to gold.

Jewellery sales in the US had a strong year with demand gaining 9% to 250 koz, as with platinum trading at a discount to gold manufacturers and retailers took the opportunity to grow their platinum business.

Platinum jewellery demand also benefited from the lower metal price in Western Europe, gaining market share from white gold and palladium and growing by 7% to 235 koz.

Demand end-use shares for 2015 versus 2014 are shown in Chart 5.

Chart 5: Demand end use shares, 2015 vs. 2014



Source: SFA (Oxford)

Industrial demand

Platinum demand for industrial end-uses, including new plant capacity and replacement catalysts, both net of recycled catalysts, grew by 4% year-on-year (+55 koz) to 1,610 koz in 2015, driven mainly by higher net requirements in the petroleum sector (+95 koz) but also lifted by greater net usage in chemical processes (+10 koz), medical applications (+10 koz) and other end-uses (+5 koz). However, lower demand for glass fabrication (-25 koz) and electrical devices (-40 koz) offset some of this growth.

Regionally, Western Europe (+90 koz) accounted for most of the growth last year, underpinned by the petroleum and chemical sectors, whilst demand also increased in China (+60 koz) and Japan (+45 koz). In North America (-55 koz) and the Rest of the World (-85 koz), however, industrial usage of platinum declined in 2015, mainly owing to lower requirements in the petroleum, electrical and glass sectors in these regions.

Chemical

Platinum demand in chemical processes rose by 2% (+10 koz) to 585 koz last year, supported by demand growth in North America, Western Europe and China. North America's requirements were boosted by propane dehydrogenation (PDH) capacity expansion and greater nitric acid production, with the fertiliser industry also lifting demand in Western Europe. In China, lower platinum requirements for paraxylene production were outweighed by stronger demand for nitric acid and silicone production, as well as for the ongoing expansion of PDH and butane dehydrogenation (BDH) capacity in the country. Conversely, lower demand by paraxylene and nitric acid producers outweighed requirements for new PDH plants in the Rest of the World, whilst demand also decreased slightly in Japan.

Petroleum

Petroleum sector requirements increased by 95 koz year-on-year to 160 koz in 2015, with greater global demand for oil refining processes outweighing lower use by gas-to-liquids (GTL) plants in the Rest of the World. Western Europe accounted for the majority of refining demand growth, owing to reforming capacity expansions and fewer capacity reductions than previously envisaged. European refineries enjoyed better margins throughout 2015, with some being upgraded to improve efficiency and profitability rather than being shut down. Elsewhere, Japan's petroleum industry stabilised following substantial capacity cuts in 2014, whilst China's capacity growth accelerated, increasing new metal requirements. However, North America's demand declined, as some of the anticipated capacity growth in this region was delayed, and the Rest of the World's usage also fell as a result of fewer GTL and refining capacity expansions this year, offsetting demand growth in Japan and China.

Electrical

Platinum usage in electrical devices fell by 21% (-40 koz) to 150 koz last year as usage by hard disk drive (HDD) manufacturers decreased considerably owing to weaker demand for HDDs. HDD shipments declined by 17% year-on-year in 2015, as PC HDD demand slumped (-24%) despite major new software launches, whilst non-PC HDD deliveries dropped by 4%. The average form factor of shipped drives also contracted slightly in 2015, further reducing new metal buying by HDD manufacturers. Lower HDD demand mainly affected platinum requirements in the Rest of the World (-25 koz), with China's usage remaining stable.

Glass

Net platinum consumption by the glass industry decreased by 14% (-25 koz) to 155 koz in 2015, mainly owing to a greater number of plant closures returning metal to the market, particularly in the US, Japan and Western Europe. Many facilities were shut down in the US last year, whilst platinum recovered from plant closures in Q4'14 also reduced the amount of new metal purchasing in North America in 2015. The number of new plants and expansions commissioned in China and the Rest of the World was broadly similar to that in 2014, although plant closures in these regions rose slightly, whilst Japanese capacity continued to contract in 2015.

Other

Demand for other industrial end-uses climbed by 5 koz year-on-year to 310 koz, with growth in Japan and China outweighing slight falls in North America and the Rest of the World. Japan's consumption was lifted by developing demand from the fuel cell industry, particularly for use in fuel cell vehicles, whilst China's demand growth was driven by greater usage in automotive sensors and spark plugs. However, a reduction in turbine-powered plane shipments lowered North America's requirements and demand in the Rest of the World decreased in various other end-uses, hindering overall demand growth last year. Platinum demand in Western Europe stayed flat from 2014.

Investment demand

Global investment demand was 260 koz in 2015, an increase of 110 koz from 2014. However, this overall growth in investor interest masked a reduction in ETF holdings as bar and coin investment increased. Globally, ETF investors reduced their holdings by 240 koz, while bar and coin demand surged to 480 koz, mostly owing to a jump in bar purchases by Japanese investors. NYMEX exchange stocks rose by 20 koz.

The decline in the platinum price during the year clearly impacted investor sentiment as the price ended the year close to its lowest level since late 2008. In US dollar terms the price fell 28% during 2015, with similar declines in price in yen (-28%), euros (-20%), pounds sterling (-24%) and Swiss francs (-28%). The slump in the rand against the US dollar in December meant that the rand price recovered to end the year just 3% lower, and this recovery slowed, but did not reverse, the decline in South African ETF holdings.

However, in Japan investors took the view that the price decline made platinum a more attractive investment and steadily increased their ETF holdings and bar purchases throughout the year, with the fourth quarter seeing record quarterly purchases of both bars and the ETF.

2015 saw two quarters of net purchases and two quarters of net sales by ETF investors. However, overall global ETFs suffered significant outflows last year and holdings ended the year at 2.51 moz, 239 koz lower than at its start. South African ETFs had net increases in the second and third quarters that helped to lift total global ETF holdings to a record 2.93 moz at the end of August, just surpassing the previous record of 2.91 moz from July 2014. However, the fourth quarter saw record sales of 343 koz from South African ETFs. The final quarter and the year as a whole also saw disinvestment from US and European ETFs, with only Japanese investors bucking the trend as the ETF there gained 69 koz in 2015, half of which arrived in the fourth quarter.

During 2015 UK ETF investors reduced their net exposure during all four quarters, dropping their total holdings by 68 koz to 459 koz. Swiss ETF investors decreased their net holdings in three of the four quarters by a total of 41 koz to 424 koz, and US investors similarly reduced their ETF holdings in three of the four quarters for an overall decline of 55 koz to 489 koz.

The largest increases and decreases in net ETF holdings during the year were seen in South Africa, the region with the largest ETF. The two ETFs combined reached a record level of 1.43 moz in August, having gained 219 koz up to that point in 2015. However, subsequent net redemptions reduced the total amount of platinum held in these ETFs to 1.07 moz by the end of the year for an overall decline of 144 koz.

In 2015 bar and coin purchases increased to 480 koz, a dramatic rise when compared to the 50 koz that investors bought in 2014. The driver for this growth was Japanese investors who lifted their purchases of platinum bars each quarter during 2015 as the price declined. Buying surged in the second half of the year after the price fell below ¥4,000/g in July, with the fourth quarter reaching the highest level so far seen in the *Platinum Quarterly's* data.

Over the year coin purchases were a modest contributor to the higher bar and coin investment. Coin collectors bought the entire 2015 mintage of US American Eagle Platinum Proof 1 oz coins in a matter of minutes as the number available was limited to 4,000 and the US Mint did not produce any platinum American Eagle bullion coins last year.

2015 FOURTH QUARTER PLATINUM MARKET REVIEW

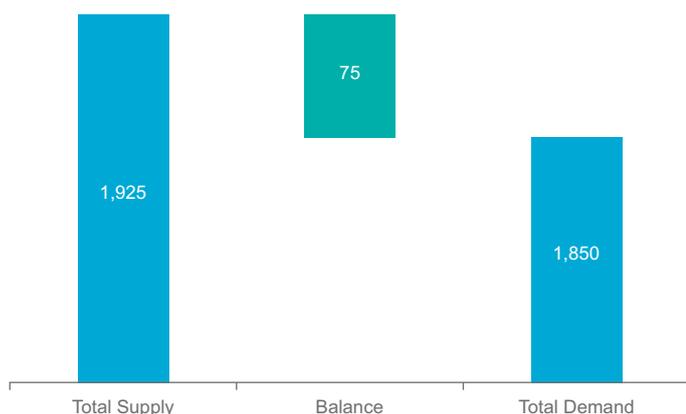
Investment demand once again had a strong impact on the market in the fourth quarter, with net sales from ETFs more than offsetting a record quarter for bar and coin demand that was almost entirely driven by Japanese investors' bar purchases as the metal price continued to decline.

The market had a surplus of 75 koz in the fourth quarter (Chart 6) as a significant quarter-on-quarter drop in demand outweighed a more modest decline in supply. Total demand was down 460 koz (-20%) quarter-on-quarter from 2,310 koz in Q3'15 to 1,850 koz in Q4'15, driven mainly by the seasonal fall of 15% in jewellery fabricator requirements from 795 koz in Q3'15 to 675 koz and the 380 koz swing from significant investment to disinvestment, which more than offset the 40 koz rise in automotive platinum demand. Total platinum supply fell 6% quarter-on-quarter to 1,925 koz, with total mining supply slipping 105 koz and recycling declining by 20 koz. Refined production fell 70 koz and producer inventory increased by 15 koz compared to a 20 koz decrease in the third quarter.

Supply

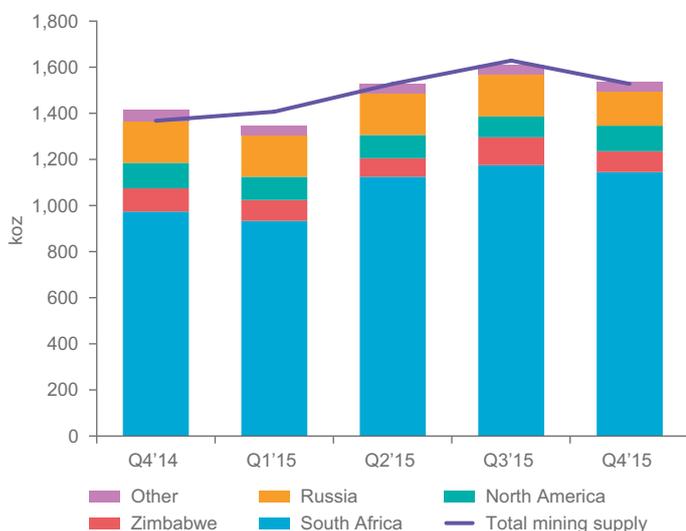
Total mining supply in Q4'15 (Chart 7) is estimated to be 6% lower than Q3'15 at 1,530 koz, with refined production lower by 3% (-45 koz) and a minor increase in working inventory (+15 koz).

Chart 6: Supply-demand balance, koz, Q4 2015



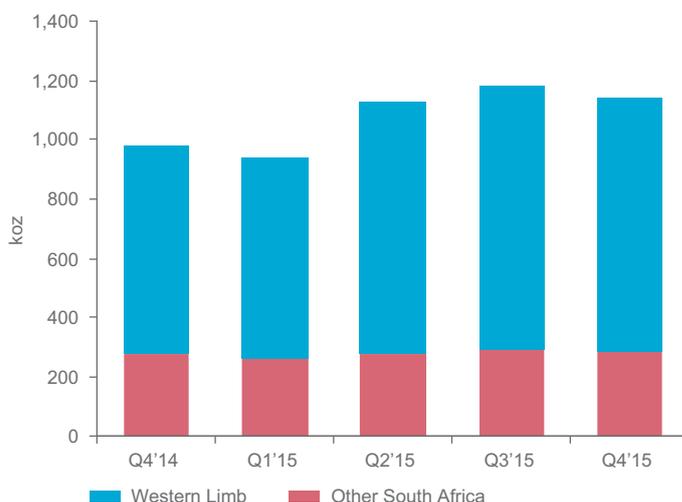
Source: SFA (Oxford)

Chart 7: Global refined production



Source: SFA (Oxford)

Chart 8: South African refined production



Source: SFA (Oxford)

Mining supply was 11% higher than in Q4'14, when producers were still ramping-up to pre-strike levels and some 40 koz of inventory was sold. Refined production from South Africa (Chart 8) is estimated to have increased from 980 koz in Q4'14 to 1,145 koz in Q4'15 (+17%), with Western and Northern Limb operations contributing an additional 170 koz, and a small (-5 koz) reduction in Eastern Limb supply. Tailings production remained stable year-on-year. In the rest of the world, production was 35 koz lower for Q4'15 year-on-year. Supply decreased in Russia (-15 koz, scheduled reduction in Q4'15 as January-September production exceeded target), Columbia (-10 koz, likely price-induced as these are very small-scale operations), with minor reductions in Zimbabwe and North America (-5 koz).

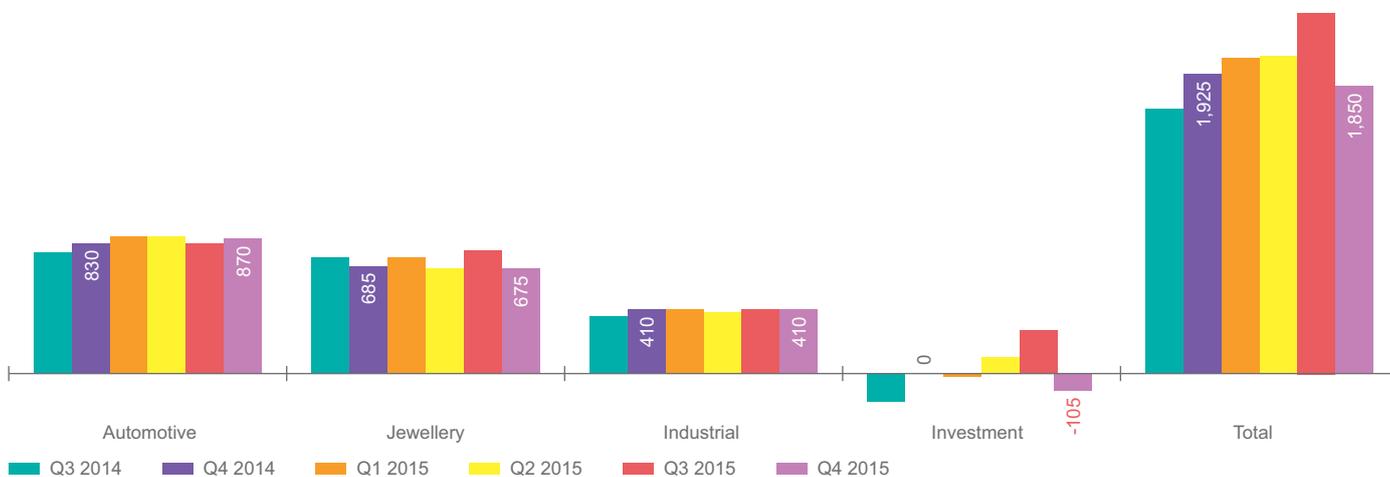
Platinum recovered from scrapped autocatalysts was 270 koz in the fourth quarter, down 11% year-on-year and 8% lower quarter-on-quarter as low steel and PGM prices were still a drag on scrappage rates.

Jewellery recycling slipped to 125 koz in the fourth quarter, 26% lower than in Q4'14 due to the decline of the metal price in Japan and subdued sales in China. Compared to Q3'15, total jewellery recycling increased 5 koz.

Demand

Total demand was down 75 koz (-4%) year-on-year from 1,925 koz in Q4'14 to 1,850 koz in Q4'15 (Chart 9) primarily as a result of the 105 koz decrease in quarterly investment demand more than offsetting the 40 koz increase in automotive demand. Global demand was 460 koz lower than in Q3'15. This decline was caused by weaker purchases by jewellery fabricators after a strong Q3'15 and a reduction in investor holdings.

Chart 9: Platinum demand, koz



Source: SFA (Oxford)

Automotive demand

Automotive demand reached 870 koz in Q4'15, up 5% from 830 koz in Q3'15 and also 5% higher than the 830 koz in Q4'14. Western Europe added around half of the Q4'15 growth, owing to higher vehicle sales and increased platinum loadings on vehicles, with vehicle growth in the Rest of the World and China contributing the remainder of the higher platinum requirements. North American and Indian demand were little changed quarter-on-quarter and year-on-year.

On-road autocatalyst demand rose from 795 koz in Q3'15 to 825 koz in Q4'15; despite the VW diesel scandal, overall vehicle sales were little affected. During the quarter VW announced a fix for its affected diesel engines in Europe, to be rolled out throughout 2016. This was largely positive for diesel's image, as it claims to enable the affected engines to meet emission standards without compromising engine output, fuel consumption or performance, and at minimal cost.

In India, which is second only to Western Europe for light-duty diesel market share, poor urban air quality led the courts in December 2015 to ban sales of diesel cars with 2 litre and larger engines in New Delhi until 31 March 2016.

Jewellery demand

Platinum jewellery demand in Q4'15 was 675 koz, down 15% on the previous quarter which had seen manufacturers increase their purchases ahead of the seasonally strong period for sales in the fourth quarter. Jewellery demand in Q4'15 was only 10 koz lower than Q4'14.

Chinese jewellery manufacturers' requirements for platinum declined in Q4'15 after the seasonal surge in Q3'15 ahead of the National holiday. Shanghai Gold Exchange trading volume decreased 21% in Q4'15 compared to Q3'15, but increased 4% from the same period in the previous year. The National holiday in October, a popular period for marriages and also gift giving, saw good retail sales. Retail sales were also helped in December due to the holiday season and the stable low price. However, Hong Kong jewellery demand was still down owing to reduced tourism from mainland China to Hong Kong.

In the US, demand was up around 12% year-on-year in Q4'15, as retail sales were encouraged by the lower metal price. The lower prices of the metal and diamonds have contributed to a decline in the growth rate of overall sales by value, but unit sales growth has been good. The US also increased imports of platinum jewellery in Q4'15.

Japanese platinum jewellery demand remained flat year on year in Q4'15, but increased quarter on quarter with fashion rings and pendent/necklace sales up. The warm winter reduced store closures due to snow and allowed for open necklines that showed off jewellery well. Low purity platinum jewellery sales decreased.

India is the strongest region in growth terms, with Q4'15 sales up over 10% quarter-on-quarter and over 20% year on year.

Industrial demand

Use of platinum in industrial applications, including use for new plant capacity and replacement catalysts, both net of recycled catalysts, remained static year-on-year and quarter-on-quarter at 410 koz. Lower demand for use in electrical devices (-15 koz), particularly HDDs, glass fabrication (-15 koz) and chemical processes (-10 koz) was offset by greater demand from the petroleum (+35 koz) and medical (+5 koz) industries compared to Q4'14. HDD shipments declined by 18% year-on-year in Q4'15, whilst fewer new glass plants were commissioned or close to completion in Western Europe and China, reducing new metal buying by glass fabricators in these regions. However, demand for petroleum refining applications grew in Western Europe, China and Japan in the last quarter, with Japan recovering from a weak Q4'14, during which refinery closures and reductions resulted in negative net platinum consumption.

Investment demand

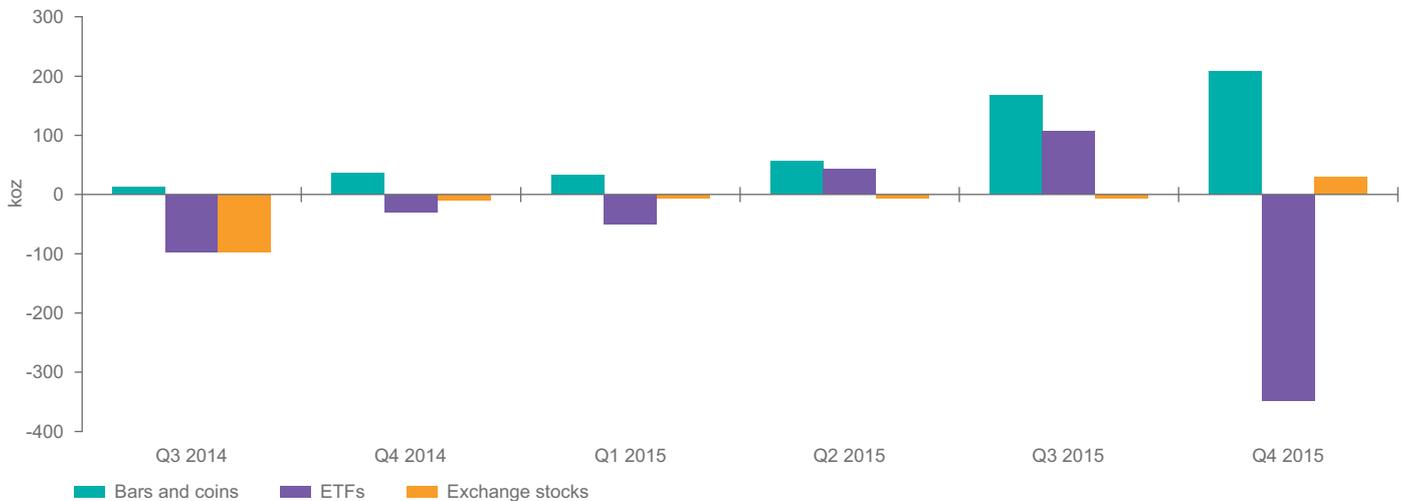
In the final quarter of the year overall investment in platinum fell by 105 koz as outflows from ETFs of 345 koz more than outweighed bar and coin purchases of 210 koz and an addition of 30 koz to exchange stocks (Chart 10).

With the platinum price reaching multi-year lows in the fourth quarter, investors' ETF holdings in the US and Europe continued to decline and South African ETF investors switched from being net purchasers to significant net sellers. The level of net sales in the US eased to 8 koz from 40 koz in Q3'15, as a reduction of 20 koz in October was followed by rises of 6 koz in both November and December. In Europe, Swiss and UK investors reduced their holdings by 15 koz and 14 koz respectively, similar to the declines in the third quarter. The South African ETFs both suffered significant redemptions in the fourth quarter, as total holdings fell by 343 koz, with the largest outflows occurring in October and November. Japanese investors bucked the trend, adding 35 koz to the ETF in Q4'15 following a 16 koz gain in Q3'15.

Net bar and coin purchases totalled 210 koz, up by 40 koz from the third quarter owing mostly to net bar buying in Japan increasing again as the price, which had first declined below ¥4,000/g in July, weakened further.

The US Mint released a limited number of 4,000 US American Eagle Platinum Proof 1 oz coins in early December and they sold out in a matter of minutes. The strong demand may have been encouraged by the lack of availability of the American Eagle Platinum Bullion coin which was not minted in 2015.

Chart 10: Platinum investment



Source: SFA (Oxford)

2016 FORECAST

The platinum market is forecast to have a deficit in 2016 of 135k oz, smaller than the deficits in the prior three years (Chart 11). The forecast revision from the near balanced market projected in the previous *Platinum Quarterly* is mainly due to lower expected levels of recycled platinum.

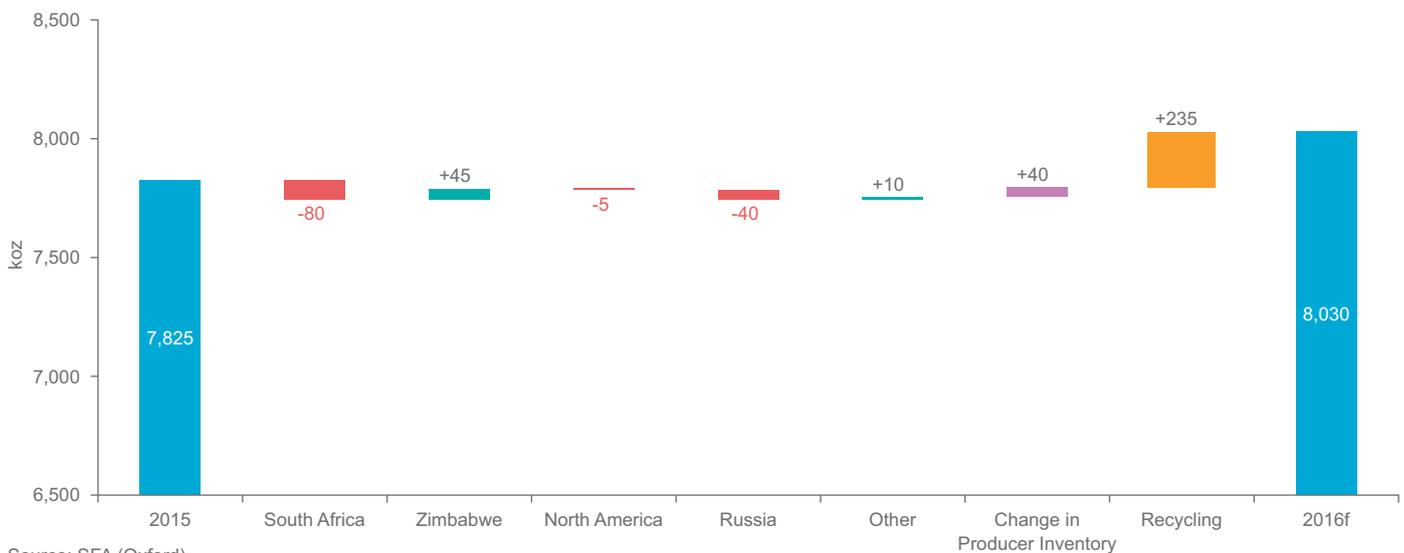
Chart 11: Supply-demand balance, koz, 2013-2016f



Source: SFA (Oxford)

Total supply is forecast to expand by 3% (+205 koz) to 8,030 koz (Chart 12) while global demand is predicted to dip slightly to 8,165 koz (-40 koz) in 2016 (Chart 13), leaving the market with a deficit of 135 koz.

Chart 12: Changes in total supply, 2016f vs. 2015



Source: SFA (Oxford)

Global refined supply is forecast to decrease by 1% to 5,970 koz in 2016. Total mining supply remains close to 2015 levels at 6,070 koz (-30 koz), with anticipated sales from producer inventory of 100 koz. Planned South African production is projected to rise by 3% to 4,535 koz, with ramp-up of new production capacity contributing to a net 120 koz increase in supply from Western Limb and tailings operations, but an adjustment for potential disruption (industrial action related to wage negotiations, safety stoppages, shaft closure due to fire) sees South African supply projected to be slightly lower year-on-year at 4,310 koz (-2%).

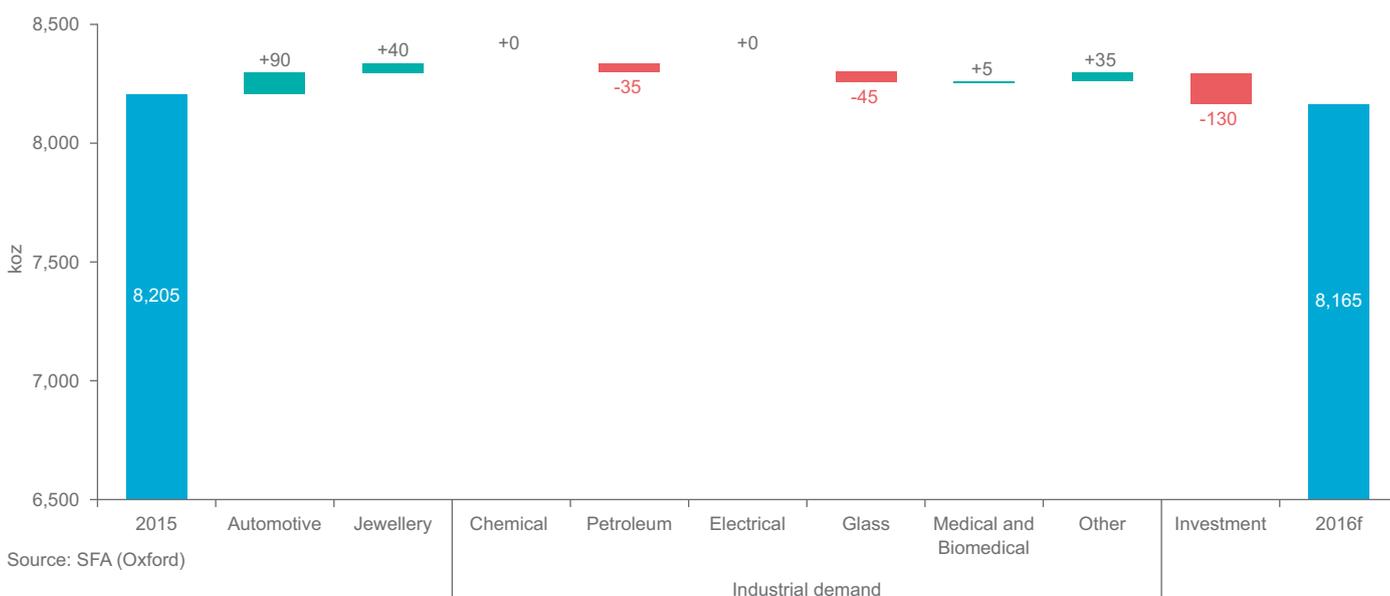
Production from Russia is anticipated to drop by 35 koz year-on-year (-5%) to 675 koz this year, because a lock-up of around 55 koz is expected in the pipeline owing to a reconfiguration of processing facilities. Completion of an expansion project sees output from Zimbabwe increase to 430 koz (+12%), while North American production drops very slightly (-5 koz) following a mine closure (depletion) in 2015.

Recycled platinum is forecast to expand by 235 koz (+14%) to 1,960 koz this year. The collection rate of scrapped vehicles is projected to recover to 2014 levels, as a modest recovery in the price of scrap steel and of PGMs is expected. The volume of recovered autocatalysts will therefore rise and the proportion of diesel catalyts and the loadings on those catalyts are also expected to increase. Jewellery recycling is estimated to be 12% higher (+65 koz) this year, as a recovery of the platinum price from 2015's low level should boost recycling in Japan. If the platinum price returns to the low level seen at the end of 2015, then secondary supply may not grow as anticipated.

Total gross demand is expected to dip by 40 koz from 8,205 koz in 2015 to 8,165 koz in 2016. Automotive platinum usage is projected to rise by 90 koz (+3%) to 3,545 koz this year, led by growth in Western Europe, India and China. Jewellery demand is estimated to be up 40 koz (+1%), from 2,880 koz in 2015 to 2,920 koz in 2016. However, industrial demand declines by 40 koz to 1,570 koz and lower investment demand is also anticipated.

Western Europe is expected to see another year of increasing light vehicle sales which are forecast to rise by a further 3% to 13.6 million units in 2016 (Source: LMC Automotive). Last year saw stronger economic growth and rising consumer confidence, but, although current consensus is that similar growth is expected, economic growth forecasts for 2016 are being cut and there is a risk that vehicle sales will not expand as projected.

Chart 13: Changes in demand by category, 2016f vs. 2015



Western Europe's diesel car market has so far come through the VW diesel emissions scandal that broke in September 2015 without significant reputational damage. The potential for a material decline in the diesel share of light duty vehicles could still remain if anti-diesel measures take hold, especially where air quality is a concern, and if consumer vehicle choice is impacted by such measures.

In the push to lower NO_x emissions and reduce real world driving emissions to legislated levels, it appears that PGM-containing lean NO_x traps (LNT) may lose share to non-PGM selective catalytic reduction (SCR). Diesel aftertreatment systems contain a diesel oxidation catalyst (DOC) and a diesel particulate filter (DPF) as well as either an LNT or SCR for NO_x treatment. Using SCR in preference to an LNT would only reduce the platinum content of the aftertreatment system by approximately 20% as the majority of the metal is found in the DOC and DPF. The recent vote in the European Parliament to allow higher than originally tabled Euro 6 NO_x emissions for several years under a system of conformity factors has added some clarity for potential purchasers of diesel cars. It gives automakers additional time to develop engines and aftertreatment for cleaner diesel vehicle emissions, supporting on-going platinum demand in this sector.

India has long regarded a sizeable diesel car share as key to reducing its vehicle carbon dioxide emissions, but overall urban air quality concerns led the Supreme Court to ban sales of cars with large diesel engines in New Delhi in December. In early 2016, the Indian government announced that to improve urban air quality the country will accelerate the adoption of tighter emissions legislation by leapfrogging from the current BS-IV (equivalent to Euro 4) standard to BS-VI (equivalent to Euro 6) by 2020. There had been fears of a diesel ban, or that PGM-based autocatalyst aftertreatment to meet BS-VI would be too costly, with either scenario leading to diesel demand destruction. This looks less likely now, and these legislative announcements are supportive of on-going diesel, and hence platinum, demand.

While oil prices, and hence diesel and gasoline pump prices, remain low, this is expected to lower the attractiveness of plug-in electric vehicles, sustaining demand for internal combustion engine vehicles and the associated demand for PGM-based autocatalysts.

Jewellery sales are expected to return to very modest growth, with demand at 2,920 koz for 2016, up 1% from 2015. Platinum trading on the Shanghai Gold Exchange increased in January which suggests that fabricators were restocking ahead of the Chinese New Year holiday and retail sales during the holiday are reported to have increased solidly over last year. India is expected to see continued strong growth in demand as PGI's Evara Platinum Blessings programme expands.

Use of platinum in industrial applications, including use for new plant capacity and replacement catalysts, both net of recycled catalysts, is projected to fall by 2% (-40 koz) year-on-year to 1,570 koz in 2016, primarily owing to lower usage in glass fabrication (-45 koz). Greater requirements for other end-uses (+35 koz), primarily fuel cells, are likely to be offset by reduced demand in petroleum processes (-35 koz), whilst demand from the chemical, electrical and medical industries is forecast to remain relatively steady from 2015.

On a regional basis, North America's demand in industrial applications is expected to grow substantially (+115 koz), boosted by the anticipated expansion of the region's oil refining capacity, although all of this demand growth is likely to be offset by reduced requirements in China (-35 koz), Japan (-40 koz) and Western Europe (-90 koz). Lower demand from the petroleum and glass sectors is expected in Western Europe (closures) and China (slower expansion), whilst greater consolidation of Japan's oil refining industry is also likely to lead to refinery closures during 2016, returning metal to market which should outweigh higher demand from fuel cell manufacturers. Industrial demand in the Rest of the World is set to increase only slightly this year.

Investment in platinum is forecast to be 130 koz in 2016. A modest price recovery is anticipated, but no new ETFs have been announced, so investment in ETFs is expected to rebound modestly and bar and coin purchases are likely to return to a lower, more typical, level. The Austrian Mint has announced that it will produce its trademark Vienna Philharmonic coin in platinum for the first time in 2016.

ABOVE GROUND STOCKS

During 2015 above ground stocks again provided supply to meet the market balance shortfall of 380 koz and consequently declined to 2,315 koz.

In 2016 the market is forecast to have a deficit of 135 koz, smaller than the deficits in the prior three years (Chart 11) and consequently above ground stocks are expected to end the year at 2,180 koz.

The WPIC definition of above ground stocks is: the year-end estimate of the cumulative platinum holdings not associated with exchange-traded funds, metal held by exchanges or working inventories of mining producers, refiners, fabricators or end-users.

PLATINUM QUARTERLY Q4 2015

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

	2013	2014	2015	2016f	2015/2014 Growth %	2016f/2015 Growth %
Platinum Supply-demand Balance (koz)						
SUPPLY						
Refined Production	6,070	4,880	6,040	5,970	24%	-1%
South Africa	4,355	3,115	4,390	4,310	41%	-2%
Zimbabwe	405	405	385	430	-5%	12%
North America	355	400	395	390	-1%	-1%
Russia	740	740	715	675	-3%	-6%
Other	215	220	155	165	-30%	6%
Increase (-)/Decrease (+) in Producer Inventory	-215	+350	+60	+100	-83%	67%
Total Mining Supply	5,855	5,230	6,100	6,070	17%	0%
Recycling	1,985	2,040	1,725	1,960	-15%	14%
Autocatalyst	1,120	1,255	1,190	1,360	-5%	14%
Jewellery	855	775	530	595	-32%	12%
Industrial	10	10	5	5	-50%	0%
Total Supply	7,840	7,270	7,825	8,030	8%	3%
DEMAND						
Automotive	3,160	3,290	3,455	3,545	5%	3%
Autocatalyst	3,020	3,140	3,300	3,380	5%	2%
Non-road	145	155	160	165	3%	3%
Jewellery	2,945	3,000	2,880	2,920	-4%	1%
Industrial	1,520	1,555	1,610	1,570	4%	-2%
Chemical	540	575	585	585	2%	0%
Petroleum	115	65	160	125	146%	-22%
Electrical	190	190	150	150	-21%	0%
Glass	155	180	155	110	-14%	-29%
Medical and Biomedical	235	240	250	255	4%	2%
Other	285	305	310	345	2%	11%
Investment	935	150	260	130	73%	-50%
Change in Bars, Coins	-5	50	480			
Change in ETF Holdings	905	215	-240			
Change in Stocks Held by Exchanges	35	-115	20			
Total Demand	8,560	7,995	8,205	8,165	3%	0%
Balance	-720	-725	-380	-135	-48%	-64%
Above Ground Stocks	4,140*	3,420	2,695	2,180	-14%	-6%

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

PLATINUM QUARTERLY Q4 2015

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

	Q4 2014	Q1 2015	Q2 2015	Q3 2015	Q4 2015	H1 2015	H2 2015
Platinum Supply-demand Balance (koz)							
SUPPLY							
Refined Production	1,420	1,345	1,530	1,615	1,545	2,875	3,160
South Africa	980	935	1,125	1,180	1,145	2,060	2,325
Zimbabwe	95	95	80	115	90	175	205
North America	115	100	100	90	110	200	200
Russia	175	180	190	190	160	370	350
Other	55	35	35	40	40	70	80
Increase (-)/Decrease (+) in Producer Inventory	-40	+60	-5	+20	-15	+55	+5
Total Mining Supply	1,380	1,405	1,525	1,635	1,530	2,930	3,160
Recycling	475	435	475	415	395	910	810
Autocatalyst	305	315	310	295	270	625	565
Jewellery	170	120	165	120	125	285	245
Industrial	0	0	0	0	0	0	0
Total Supply	1,855	1,840	2,000	2,050	1,925	3,840	3,975
DEMAND							
Automotive	830	880	880	830	870	1,760	1,700
Autocatalyst	795	840	845	795	825	1,685	1,620
Non-road	40	40	40	35	40	80	75
Jewellery	685	750	670	795	675	1,420	1,470
Industrial	410	410	390	410	410	800	820
Chemical	135	160	140	150	125	300	275
Petroleum	15	40	40	40	50	80	90
Electrical	50	40	35	40	35	75	75
Glass	55	35	30	55	40	65	95
Medical and Biomedical	70	60	70	50	75	130	125
Other	85	75	75	75	85	150	160
Investment	0	-20	100	275	-105	80	170
Change in Bars, Coins	40	35	60	170	210	95	380
Change in ETF Holdings	-30	-50	45	110	-345	-5	-235
Change in Stocks Held by Exchanges	-10	-5	-5	-5	30	-10	25
Total Demand	1,925	2,020	2,040	2,310	1,850	4,060	4,160
Balance	-70	-180	-40	-260	75	-220	-185

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

PLATINUM QUARTERLY Q4 2015

Table 4: Regional demand – annual and quarterly comparison

	2013	2014	2015	2016f	2015/2014 Growth %	2016f/2015 Growth %	Q1 2015	Q2 2015	Q3 2015	Q4 2015
Platinum gross demand (koz)										
Automotive	3,160	3,290	3,455	3,545	5%	3%	880	880	830	870
North America	435	475	500							
Western Europe	1,350	1,445	1,580							
Japan	580	585	570							
China	125	115	105							
India	160	160	175							
Rest of the World	510	510	525							
Jewellery	2,945	3,000	2,880	2,920	-4%	1%	750	670	795	675
North America	200	230	250							
Western Europe	220	220	235							
Japan	335	335	340							
China	1,990	1,975	1,765							
India	140	175	220							
Rest of the World	60	65	70							
Chemical	540	575	585	585	2%	0%	160	140	150	125
North America	75	70	85							
Western Europe	40	35	45							
Japan	30	30	25							
China	160	170	175							
Rest of the World	235	270	255							
Petroleum	115	65	160	125	146%	-22%	40	40	40	50
North America	40	25	-25							
Western Europe	-45	-15	70							
Japan	10	-35	5							
China	80	-5	45							
Rest of the World	30	95	65							
Electrical	190	190	150	150	-21%	0%	40	35	40	35
North America	20	20	15							
Western Europe	15	15	10							
Japan	20	20	15							
China	75	70	70							
Rest of the World	60	65	40							
Glass	155	180	155	110	-14%	-29%	35	30	55	40
North America	5	10	0							
Western Europe	-10	15	10							
Japan	0	-10	-5							
China	80	65	60							
Rest of the World	80	100	90							
Medical and Biomedical	235	240	250	255	4%	2%	60	70	50	75
North America	90	95	95							
Western Europe	90	90	95							
Japan	20	20	20							
China	15	15	20							
Rest of the World	20	20	20							
Other industrial	285	305	310	345	2%	11%	75	75	75	85
Investment	935	150	260	130	73%	-50%	-20	100	275	-105
Total Demand	8,560	7,995	8,205	8,165	3%	0%	2,020	2,040	2,310	1,850

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 oxidizes 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.

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.

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.

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.

SGE

Shanghai Gold Exchange.

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.

WPIC

The World Platinum Investment Council.

Ounce conversion

1 million ounces = 31.1 tonnes

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