

PLATINUM

Global demand for platinum grew by 8.6 per cent in 2007 to a record 7.03 million ounces. Autocatalyst demand grew by 320,000 oz, largely due to the strength of the diesel vehicle market. Purchases of new platinum by the jewellery trade were less affected by price than had been expected and fell by only 55,000 oz, with fabrication levels being supplemented by increased levels of recycling in China and Japan. Record platinum prices also had little impact on industrial applications which absorbed 110,000 oz more platinum in 2007 than in the previous year. The investment sector showed significant growth, buoyed by the launch of two new exchange traded funds.

AUTOCATALYST

Purchases of platinum by the autocatalyst sector rose by 8.2 per cent to a global total of 4.23 million ounces in 2007. Platinum use in catalysts fitted to European light duty diesel vehicles accounted for almost half of this total. However, the growth in demand last year derived not from this subsector but instead from booming car production in Asia and from the increasing fitment of platinum-containing aftertreatment to heavy duty diesel vehicles to meet tightening emissions legislation.

Europe

2.08 million ounces of platinum were purchased for the European autocatalyst market in 2007, an increase of 20,000 oz from 2006. The use of platinum on catalysts and filters for light duty diesel vehicles made and sold in Europe continues to be the most important segment of this demand, representing over 90 per

cent of metal consumed in the region's automotive sector.

While overall production of light duty vehicles changed little in Europe between 2006 and 2007, the proportion with diesel engines rose again to reach 53 per cent. It seems likely that this market share will continue to grow in 2008, with all of these vehicles fitted with platinum-

based oxidation catalysts. The number of cars with diesel particulate filters fitted in addition to oxidation catalysts is growing too, further augmenting platinum demand.

The heavy duty diesel (HDD) sector took an increasing amount of platinum to meet both Europe-wide emissions legislation and local rules such as London's Low Emissions Zone ahead of its launch in early 2008.

However, auto makers were encouraged by high price differentials to introduce palladium into diesel oxidation

catalysts in place of some of the platinum. With this trend accelerating last year – as a greater proportion of catalysts incorporated palladium – platinum consumption grew by less than would otherwise have been the case.

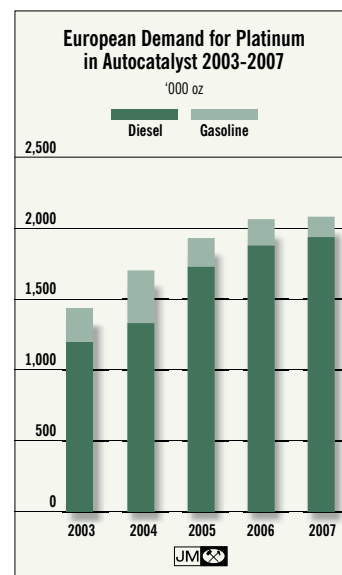
Japan

Demand for platinum from automotive manufacturers in Japan climbed by 1.6 per cent to 615,000 oz in 2007. Although most of the vehicles made in Japan have gasoline engines, platinum continues to be widely used in the principal export markets. Little platinum is used in formulations for domestic vehicles.

Light duty vehicle production rose slightly (by 1.0 per cent) to 11.1 million units in 2007. Japanese domestic sales, however, fell by 5.2 per cent and were only 5.32 million units for the entire year with the balance being exported. As might be expected, the Japanese car makers have moved to replace platinum with palladium in the catalysts fitted to most vehicles which are sold into the domestic market.

However, they have a more cautious attitude to changing catalyst formulations for their export markets. Fuel quality in much of Asia is variable and makes platinum a more suitable catalytic metal than palladium due to its higher sulphur tolerance. A 10 per cent increase in the sales to various export markets in 2007 therefore helped drive platinum use higher.

The heavy duty diesel market in Japan is also an



European purchases of platinum for use in autocatalysts grew to a record 2.08 million ounces in 2007.

Platinum Demand: Autocatalyst '000 oz		
	2006	2007
Europe	2,060	2,080
Japan	605	615
North America	705	930
China	155	215
Rest of the World	380	385
Total	3,905	4,225



The development of advanced thinner-walled substrates for autocatalysts provides opportunities for thrifting catalyst pgm content without affecting performance.

important contributor to platinum demand. With the next phase of Japanese emissions legislation to be introduced in 2009, engine and vehicle manufacturers have already started to fit aftertreatment to meet it. Catalysts and filters are also fitted to many of the trucks which are destined for the European and North American export markets. With the focus on meeting new emissions rules, there has been little attention paid so far to thrifting in this sector and demand for platinum has been growing at a healthy rate.

North America

Light duty vehicle production in North America fell from 15.9 million units in 2006 to 15.5 million units in 2007. Most of this decrease in output was accounted for by a fall in the number of cars made in the USA, while the number of trucks produced remained steady. However, platinum consumption rose to 930,000 oz due to the application of tighter emissions rules to medium and heavy duty diesel trucks.

The switch to palladium-based catalyst formulations from platinum-based ones in the gasoline sector continued. Although this has been underway for a number of years, the reduction in platinum use in gasoline vehicles accelerated in 2007 due to this metal's high price.

More important for platinum uptake was the growth in catalyst fitment in the diesel sector. While very few cars have diesel engines compared to the European market, the fuel efficiency of this type of engine has allowed it to gain market share amongst larger vehicles. Recent changes in emissions legislation mean that many medium duty diesel trucks now fall under passenger vehicle legislation. As a result, they were fitted with catalysts containing a significant amount of platinum for the first time in 2007.

In the heavy duty diesel sector (mainly larger vehicles used for hauling goods long distances), new legislation which effectively forced the use of catalysts was applied in 2007. Most of the emissions reduction technology fitted employed platinum as the active catalytic material. Although there was a dip in truck sales, as many consumers either delayed or brought forward vehicle purchases to avoid the impact of the extra cost of the aftertreatment, roughly 200,000 oz of platinum was purchased for this application.

China

Chinese purchases of platinum for use in autocatalysts climbed by a hefty 38.7 per cent in 2007 to 215,000 oz, reflecting both a tightening of emissions legislation and growing vehicle production. The Chinese economy grew by more than 10 per cent in 2007. However, annual car production rose by a remarkable 26.6 per cent to 5.5 million units. Almost all of these vehicles are gasoline-fuelled and all have catalysts fitted.

New emissions legislation, equivalent to Euro 3, was scheduled to come into force in July 2007 but was delayed until mid-2008 due to concerns over fuel quality. However, this had little impact on the platinum market. The most important urban markets such as Beijing, Guangzhou and Shanghai had already implemented this legislation (and Beijing will adopt Euro 4 in the first half of 2008). Many of the Western-Chinese joint venture operations were already fitting Euro 3-compliant catalyst systems to their vehicles too, using thrifted versions of European technology.

Rest of the World

Autocatalyst platinum demand in the Rest of the World region grew by 5,000 oz to 385,000 oz in 2007. All of the fastest growing global markets (other than China) are in this region, including India, South America and, reported here for the first time, Russia (see our special feature on pages 39 - 41 for more details).

However, increased car manufacturing in Korea was responsible for the majority of platinum demand last year. Many diesel cars are manufactured in Korea for export to Europe and, just as with European-made diesels, the catalyst technology is platinum-based.

Autocatalyst Recovery

The recycling of scrapped catalytic converters contributed 30,000 oz more platinum in 2007 than in the previous year. Of the total 890,000 oz that was reclaimed globally, almost 65 per cent came from scrap collected in the North American market.

The infrastructure for

Platinum Demand: Autocatalyst Recovery		
	'000 oz	
	2006	2007
Europe	(190)	(220)
Japan	(35)	(35)
North America	(575)	(575)
China	0	0
Rest of the World	(60)	(60)
Total	(860)	(890)



collecting and processing autocatalyst scrap in North America was already well-established. Changes in the amount of metal recovered therefore reflect trends in catalyst loadings employed on vehicles in the previous decade. While a difficult economic environment might have been expected to encourage the general public to delay replacing their automobiles, it has had less impact than anticipated. Platinum recovery from end-of-life scrap catalysts in North America therefore remained flat at 575,000 oz in 2007.

In Europe, the increasing number of catalysed diesel vehicles being scrapped is boosting platinum recovery, despite hefty exports of used vehicles to countries where they are re-used rather than being scrapped. In Japan, recovery rates were static with many second hand vehicles escaping the recycling chain due to their export to East Asia and the Middle East. Combined platinum recovery for these two regions climbed to 255,000 oz. Elsewhere, the number of autocatalysts being recycled in the Chinese market has started to grow, leading to a few thousand ounces of metal being reclaimed in 2007.

JEWELLERY

Global demand for new metal (net of scrap recycling) in the jewellery industry dipped slightly in 2007, falling 55,000 oz to a total of 1.59 million ounces. While the high prices and significant price volatility of platinum created a very challenging environment at all levels of the jewellery industry, demand from both the trade and consumers alike stayed strong for the majority of the year. In fact, some markets even managed to demonstrate growth in platinum demand during 2007.

Europe

European platinum jewellery demand in 2007 rose by 7.7 per cent, despite a high metal price, to a total of 210,000 oz. Retail sales rose in some markets but retailers and manufacturers alike devoted considerable attention to rationalisation of stock levels at every point along the jewellery value chain to keep financing costs under control. While this had no direct impact on consumer purchasing, it did reduce growth in demand by a few thousand ounces in 2007.



Platinum demand grew slightly in the European jewellery market with bridal sector and high-end sales both healthy.

The positives for platinum jewellery included the UK market where consumer demand for platinum remained strong. Platinum is positioned in the bridal sector and at the top end of the market and rising prices had little impact on hallmarking figures. Likewise, in Switzerland, statistics demonstrate that platinum watch production grew. 18,000 watches were manufactured, the highest figure in five years and second highest ever, showing the strength of platinum's positioning. The global luxury market fared remarkably well in 2007 too. Rapid economic growth in China and Russia supported imports of luxury, branded platinum jewellery manufactured in Europe.

However, platinum demand declined in many areas in 2007. The German market continued to be depressed and demand there, and in markets such as Italy, dropped. Platinum's performance was affected by high metal prices in the middle market but consolidated in the bridal and high-end sectors.

Japan

Purchases of fresh platinum by Japanese jewellery manufacturers fell for the fifth successive year to 280,000 oz in 2007. This is lower than our previous estimate as high platinum prices at the end of 2007 caused jewellery recycling rates to increase still further.

Platinum Demand: Jewellery '000 oz		
	2006	2007
Europe	195	210
Japan	360	280
North America	245	240
China	760	780
Rest of the World	80	75
Total	1,640	1,585



We believe that at least 200,000 oz of second hand jewellery was returned for recycling. Most of this metal was re-used in the jewellery trade.

Platinum remains the metal of choice in the bridal market but demand is falling due to declining marriage rates. It also faces growing competition on the basis of price in other jewellery sectors, particularly from white gold. The same cost pressures have been seen in the move from high-purity gold jewellery towards lower carat products.

More important, however, in the declining demand is a rapid rise in the amount of second hand platinum jewellery returned by consumers and subsequently resold or scrapped. This trend has partly been driven by increasing metal prices (although platinum remains below its 1980s peak in Yen terms at the time of writing). However, increased awareness by the general public of rising precious metals prices has played a part in encouraging this trend. As importantly, a significant commercial opportunity has arisen in the second hand jewellery market. The rising price of diamonds, gold and platinum have allowed collectors to make higher margins. More companies are registering for antiques dealer licences in order to enter this business too. As a result, the volume of recycled platinum employed in Japanese jewellery manufacture is now approaching the amount of new metal being used.

North America

Purchases of platinum by North American jewellery manufacturers declined by 5,000 oz in 2007 to a total of 240,000 oz. A sustained period of relatively high prices has been accompanied by an economic slowdown. Both have had some negative impact on consumer purchases of platinum. With imports of jewellery made outside North America also placing pressure on local manufacturing, demand therefore fell.

Some segments of the market remain notably strong: platinum is still performing steadily in the luxury goods sector and in the bridal market. However, an increase in the price of diamonds has placed pressure on wedding budgets. Couples have sought to make economies and there is clear evidence of a move to lower cost materials for men's wedding bands at least. At the lower and middle end of the market, platinum now holds a weak position as retailers are unable to



sell attractive products at the requisite price points.

With the average platinum price much higher in 2007 than in the previous year, the pressure on working capital at retailers and manufacturers intensified further. A number of bankruptcies in the wider jewellery sector also heightened credit risk, applying yet more pressure on the levels of stock throughout the trade.

Large quantities of second hand platinum jewellery were returned for resale or recycling in 2007.

China

Net demand for new metal from the Chinese jewellery sector rose by 20,000 oz in 2007 to a total of 780,000 oz. This marked a change from the recent falls in demand. The rising platinum price created difficulties for retailers and manufacturers, and caused an increase in the recycling of old jewellery. However, platinum demand was supported by novelty products in the form of beads or so-called "pigs" and memorabilia manufactured ahead of the 2008 Beijing Olympics.

Although the platinum price rose substantially in dollar terms during the year, the affordability of platinum jewellery was not as severely affected as in some other geographical markets. Due to a strengthening currency and the rapid pace and extent of economic growth, consumer desire for platinum remained healthy. Retail sales of platinum jewellery were robust, rising in value terms, partly aided by a simultaneous increase in the prices of the other major jewellery metals (gold and palladium).

Chinese manufacturers reported slightly higher levels of platinum jewellery production than in 2006,

but a high metal price encouraged them to use a greater amount of scrap material where they could. Some of this metal came from recycled retailer stock, some from old platinum jewellery exchanged for new pieces by consumers, and some, we believe, from scrap brought into China from other countries.

The Chinese jewellery trade coped well with the rising platinum price for most of 2007 but there were signs of strain in the final quarter. During the normal lull in manufacturing activity after the October National Holiday, platinum sales on the Shanghai Gold Exchange fell below 2006 volumes. In contrast, sales in the middle of the year had been at record levels, despite the historically high price at that point.

Jewellers intensified their efforts to minimise the cost of holding stock, for example by increasing the proportion of white gold in gem-set jewellery. The same retailers also delayed their purchases of replacement stock in the hope of a decrease in the price. With manufacturing volumes lower than in the first three quarters of the year, the jewellery makers reduced their working stocks too, trimming demand for new metal a little.

Chinese jewellery demand was supported in early 2007 by the production of beads (or so-called “pigs”) to mark the Year of the Pig. These may have added as much as 30,000 oz to demand in 2007. Towards the end of the year, manufacturers in Shenzhen started to produce Olympic memorabilia ahead of the 2008 Beijing games, contributing a further few thousand

ounces of demand to the 2007 total. These are also being manufactured in the first half of this year, and are therefore likely to boost demand in 2008.

Rest of the World

Demand for platinum for jewellery manufacturing in the Rest of the World region was down slightly in 2007 at 75,000 oz. Although US import tariffs on jewellery manufactured in countries such as Thailand made manufacturing in such territories less attractive, cost pressures did still encourage some imports into Japan and the USA from this region. Our numbers also contain, for the first time, a small amount of platinum demand – 5,000 oz in both 2006 and 2007 – for jewellery manufacturing in Russia.

CHEMICAL

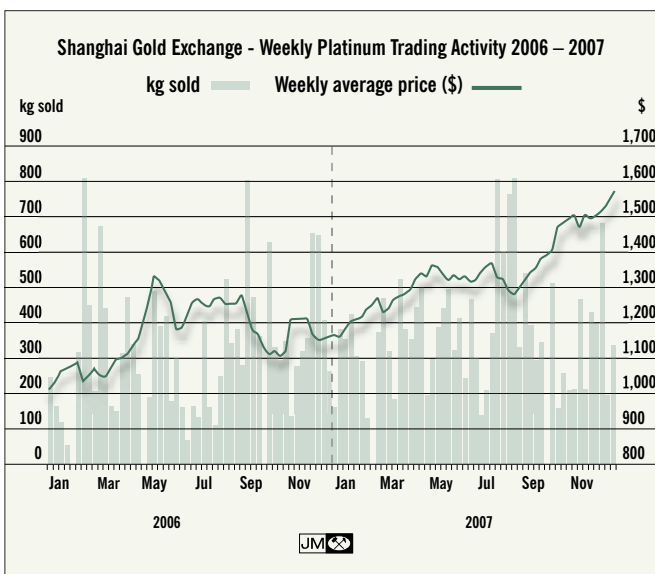
Chemical sector requirements for platinum fell marginally in 2007, to 390,000 oz. Platinum thriving had some impact but only just outweighed the effect of thriving bulk commodity chemical markets.

A good example was found in the silicones industry, where a number of companies revealed that they could trim the final platinum content of their products significantly by changing the raw monomer’s chemical structure. This results in a lower amount of the platinum homogeneous catalyst remaining trapped in the silicone product. However, as demand for pressure-release silicones is growing, total demand for platinum was steady in this application.

By contrast, demand for platinum from nitric acid manufacturers rose in 2007. Construction of new capacity has recently been concentrated near pockets of cheap natural gas – mainly in the Rest of the World region – as the process works by reacting natural gas with hydrogen to produce ammonia before converting this to nitric acid over the platinum-containing catalytic gauzes. Demand for nitric acid is also rising with key industries such as farming (which uses large volumes of nitrogenous fertilisers) and mining (which uses explosives) expanding once more.

Platinum Demand: Chemical '000 oz		
	2006	2007
Europe	100	110
Japan	50	55
North America	100	95
China	65	55
Rest of the World	80	75
Total	395	390

High prices had little if any impact on platinum sales, much of which is bought for the jewellery trade, on the Shanghai Gold Exchange until the final quarter of 2007.



ELECTRICAL

Demand from the global electrical and electronics sector climbed in 2007, moving from 360,000 oz to 425,000 oz. Growing production of computer hard disks was the main spur, reflecting continued strong sales of all manner of electronic devices and their increasing complexity.

Platinum Demand: Electrical '000 oz		
	2006	2007
Europe	25	30
Japan	55	60
North America	75	75
China	45	55
Rest of the World	160	205
Total	360	425



Figures suggest that global shipments of personal computers grew by 13.4 per cent in 2007 to 271 million units. Although the desktop computing market declined in value, the number of laptop devices being sold grew strongly.

The blossoming market share of perpendicular magnetic recording (PMR) disks in place

of longitudinal technology (LMR) had some impact on platinum demand. The amount of platinum used per disk has risen to increase storage capacity. However, the advent of PMR moderated the growth in disk production due to their inherently high capacity. While 2007 did see the launch of laptop computers using non-pgm flash memory in place of hard disk drives, these took little market share and platinum demand consequently continued to grow.



Strong growth in the flat panel display and fibre glass (shown above) markets in Asia boosted platinum demand last year.

releasing platinum back to the market as this technology loses market share to plasma display panels and LCD television sets.

The number of plants manufacturing fibre glass is also falling in Europe and in North America. However, much of this activity is simply the relocation of production capacity to China and the Rest of Asia to supply the booming construction market. Most demand for new metal for the fibre glass market therefore derives from China and the Rest of the World region.

GLASS

Glass industry platinum demand grew from 405,000 oz to 430,000 oz in 2007. Purchases of metal for installation in new manufacturing plants

Platinum Demand: Glass '000 oz		
	2006	2007
Europe	10	15
Japan	100	80
North America	10	25
China	50	140
Rest of the World	235	170
Total	405	430



for various types of glass in Asia drove demand higher.

More than a third of colour televisions shipped in 2007 used LCD glass and this technology is expected to capture more than half of the market in 2008. The glass manufacturers and electronics companies therefore continue to invest in new plants, particularly in Asia,

to meet rocketing consumer demand. The closure of old cathode ray tube (CRT) glass factories continued

PETROLEUM REFINING

Demand for platinum from the petroleum refining industry rose by 13.9 per cent to 205,000 oz in 2007. With oil prices high and demand for many petrochemical products buoyant, last year saw continued expansion of capacity in this sector. If oil prices remain above \$100 per barrel, further growth should occur.

This growth was seen in almost all regions with some new plant construction in Europe and North America. However, growth in refining capacity was greatest in the Rest of the World region, particularly in East Asia (outside China). 2007 demand was greatly boosted by construction of new capacity in India to meet booming regional demand.

There was, though, little effort to thrift platinum loadings. High prices encouraged refiners to run their plants at full capacity. This meant that there were few opportunities to change catalyst out where this

Platinum Demand: Petroleum Refining '000 oz		
	2006	2007
Europe	20	25
Japan	5	5
North America	35	35
China	10	10
Rest of the World	110	130
Total	180	205

was not absolutely necessary. In fact, tightening legislation on fuel quality and high economic growth meant that the priority for many companies was removing bottlenecks from their processes rather than reducing costs in any area. Looking further forward, the growing move towards green fuels should lead to additional platinum demand in this sector.

INVESTMENT

Net platinum demand for investment products rose to 170,000 oz in 2007, in sharp contrast to the net disinvestment which occurred during the preceding year. Net demand for coins and bars was negative but the launch of two platinum-based exchange traded funds, or ETFs, contributed 195,000 oz to overall demand for the first time.

Demand from platinum coins and bars was negative in 2007. In Japan, changes to one platinum accumulation plan resulted in net disinvestment. Where bars had previously been held for investors off the market, in allocated accounts, in mid-2007 subscribers to the plan were offered the choice of

Platinum Demand: Investment '000 oz		
	2006	2007
Europe	0	195
Japan	(65)	(60)
North America	20	30
China	0	0
Rest of the World	5	5
Total	(40)	170

moving to an interest-bearing account if they allowed their metal to be loaned out or otherwise employed. A significant number of investors chose to switch accounts, effectively returning metal to the market. Other investors sold large privately-stored bars back to the market too.

More importantly, though, April and May saw the creation of two exchange traded funds which were backed by physical platinum. Investor interest in the Swiss fund appeared to come mainly from institutional investors and only a relatively limited amount of metal – 55,000 oz – had been acquired by the end of 2007. Purchasing in the London-based fund started slowly but the rate of investment increased rapidly towards the end of the year as the price rose. In fact, 100,000 oz of platinum, or 70 per



cent of the 2007 total, was bought in November and December alone. Together, these two ETFs accounted for an entirely new demand of 195,000 oz in 2007.

Exchange traded funds were the most important part of the investment sector in terms of platinum demand in 2007 but some new coins were launched.

OTHER

Demand for platinum from other applications was unchanged at 490,000 oz in 2007. Signs of price sensitivity were seen in some markets but economic growth generally balanced this effect.

The spark plug sector provided a good example. There is evidence of some recycling of precious metal spark plugs and of thrifting of the platinum content in spark plug tips by manufacturers in response to rising metal prices. However, with production of platinum-based plugs starting in earnest in China last year, demand for platinum still grew marginally.

In the dental sector, the increasing use of ceramic technology for crowns and bridgework etched away at the market share of platinum, particularly as patients in the key German market have recently had to pay a greater percentage of the cost of their treatment. Purchases of new metal were also depressed by high levels of recycling as dental laboratories became ever more aware of the value of this scrap material. Net demand fell to 105,000 oz.

Platinum Demand: Other '000 oz		
	2006	2007
Europe	175	180
Japan	40	45
North America	225	230
China	10	10
Rest of the World	40	25
Total	490	490