

# PLATINUM 2009



## Interim Review



Johnson Matthey

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*Flotation processing of milled ore is an important step in the production of platinum group metals in South Africa.*

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by David Jollie

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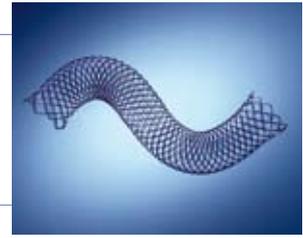
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Johnson Matthey

# EXECUTIVE SUMMARY

**The platinum market is forecast to be in a small annual surplus of 140,000 oz in 2009.** Net global demand for platinum is forecast to fall by 4.4 per cent, or 270,000 oz, to 5.92 million ounces. Global platinum supplies are expected to grow by 1.9 per cent to 6.06 million ounces. The platinum price began the year at a relatively soft \$934 but climbed to end September at \$1,287.



**Supplies of platinum are expected to increase by 1.9 per cent to 6.06 million ounces in 2009.** South African platinum sales should climb to 4.73 million ounces: despite lower production of platinum in concentrate, changes in pipeline stocks and sales of additional refined metal mean that supplies should rise. Platinum supplies from North America and Russia are set to fall to 255,000 oz and 745,000 oz respectively.

**Gross automotive platinum demand is set to contract by 33.0 per cent in 2009, to 2.48 million ounces, reflecting lower vehicle production in most major markets.** European demand will fall by 45.7 per cent due to a sharp decline in the



market share of the diesel passenger car and the continued introduction of palladium into diesel aftertreatment. This decrease will be partly offset by an expected 28.6 per cent fall in recovery of platinum from scrapped vehicles to 800,000 oz.

**Net demand for platinum from the jewellery industry is set to grow by an estimated 79.5 per cent to 2.45 million ounces in 2009.** In China, lower metal prices and improved profit margins drove very substantial restocking by the jewellery industry while underlying consumer sales of platinum jewellery also rose strongly. In Japan, net demand will rise due to a decline in the rate of recycling of old jewellery in response to the lower platinum price.



**Net physical platinum investment demand is expected to reach 630,000 oz in 2009, some 13.5 per cent more than in 2008.** Demand for coins and investment bars is set to rise to 95,000 oz. Demand through the various Exchange Traded Funds has responded to the rise in the platinum price and is forecast to climb to some 355,000 oz despite the lack of approval for a North American fund.

**Industrial demand for platinum is forecast to contract by 31.5 per cent to 1.16 million ounces after four years of growth.** Destocking of products and materials within the chemical and electronics industries will hit platinum demand there. In the



glass sector, the construction of new capacity which has taken place in recent years has slowed dramatically and the closure of a number of CRT television glass factories will also contribute to a fall in demand of almost 90 per cent.

**The platinum market is expected to tighten in 2010 as demand starts to improve.** These positive fundamentals might be expected to support the platinum price but external factors are likely to be more important. If the gold price remains strong, a recovery in demand for platinum could see it trading as high as \$1,550 during the next six months. If the dollar strengthens, or investors reduce their exposure to gold, then platinum could fall as low as \$1,280 during the same period.





**The palladium market is forecast to be in oversupply by 655,000 oz in 2009.** Net global demand for palladium is expected to fall by 3.8 per cent to 6.52 million ounces. Supplies of palladium (including sales of Russian state stocks) are also set to fall, by an estimated 1.8 per cent, to 7.18 million ounces. The price started the year at \$185 and investor interest drove it 58.9 per cent higher to \$294 at the end of September.

**Supplies of palladium are expected to decline by 1.8 per cent in 2009 to 7.18 million ounces, the lowest figure since 2003.** Sales from primary production in North America and Russia are set to fall. South African sales of palladium will increase despite lower underlying production this year while output from Zimbabwe will rise. We estimate that sales of palladium from Russian state stocks are likely to contribute some 960,000 oz to supplies as they did in 2008.



**Gross automotive palladium demand is forecast to fall by 12.7 per cent to 3.90 million ounces in 2009.** Demand in Japan, North America and the Rest of the World region will fall, in line with lower vehicle production. Chinese demand will rise by



135,000 oz. European demand is forecast to fall only marginally, despite a drop in vehicle production, as palladium benefits from a short term rise in the market share of the gasoline engine and its steady introduction into diesel exhaust aftertreatment.



**Net palladium jewellery demand is expected to rise by 7.6 per cent in 2009 to an annual total of 920,000 oz.** Palladium continues to make steady progress as a jewellery metal in Europe and North America, driving demand higher. The Chinese jewellery market appears now to have reached a level of maturity and demand there will rise to 680,000 oz as the level of recycling of scrap material declines.

**Net physical investment demand for palladium is forecast to grow by 51.2 per cent to 635,000 oz this year.** Demand for coins and small bars in North America will grow. More importantly, investment through Exchange Traded Funds is set to climb from 370,000 oz to 540,000 oz as investors return to the palladium market, enticed by the low price of palladium compared to the highs of mid-2008.



**Demand from the electronics industry is forecast to shrink by 9.1 per cent to one million ounces in 2009.** The economic slowdown has driven destocking and a fall in production volumes in



this industry, hurting demand. Net dental demand for palladium is set to decline by 3.2 per cent to 605,000 oz. Other industrial demand is expected to contract by 3.5 per cent to 415,000 oz.



**The palladium price performed strongly during the first nine months of 2009 with investors building very large net long positions.** If these funds maintain their buying activities, palladium could rise as high as \$390 over the next six months, particularly if automotive output starts to improve. However, a fall in the gold price or a strengthening of the US Dollar could drive the price as low as \$290 during the same period.

# SUMMARY & OUTLOOK

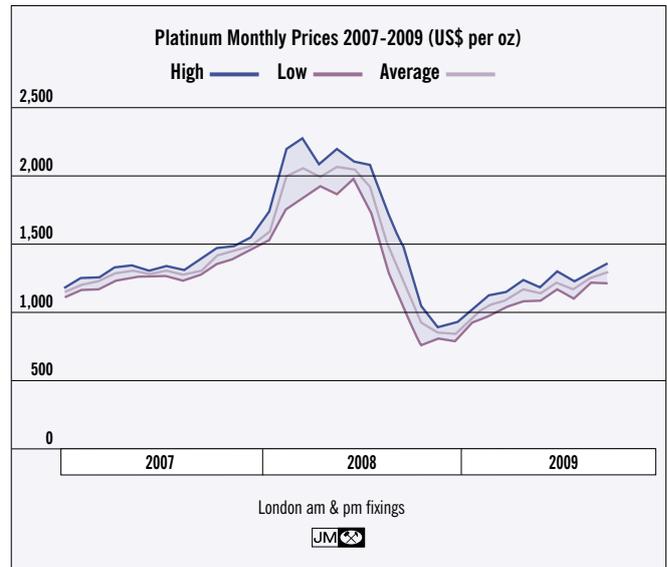
## PLATINUM

Net global platinum demand is forecast to fall by 4.4 per cent to 5.92 million ounces in 2009. Gross automotive demand is set to drop 33.0 per cent to 2.48 million ounces, the lowest figure since 2000. Industrial demand will shrink by 31.5 per cent to an estimated 1.16 million ounces due to soft consumer demand and inventory reductions in many sectors. Physical investment demand is expected to rise by 13.5 per cent. Net platinum demand from the jewellery sector is set to increase by 79.5 per cent to 2.45 million ounces.

Platinum supplies are likely to rise by 1.9 per cent to 6.06 million ounces in 2009. Underlying production of metal will fall in South Africa due to shaft closures, accidents and strike action.

However, we expect sales to rise to 4.73 million ounces. Supplies of platinum from Russia are set to fall to 745,000 oz. Supplies from North America will also fall but platinum supplies from Zimbabwe and elsewhere will climb. The platinum market is therefore forecast to be in a small surplus of 140,000 oz in 2009.

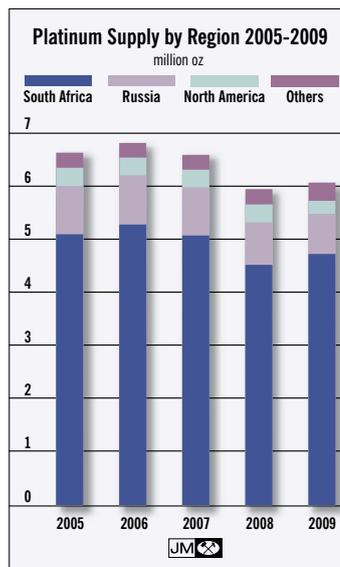
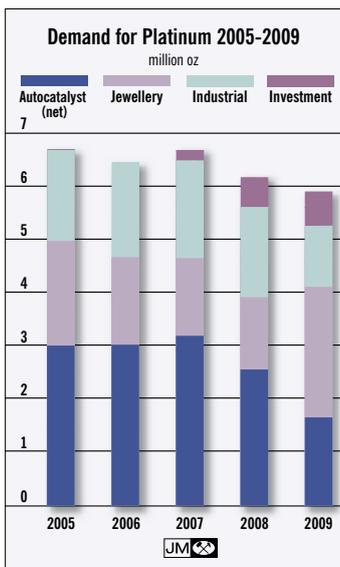
Despite this surplus, platinum gained 37.8 per cent in value in the first nine months of 2009, rising from an initial \$934 to end September at \$1,287. Short term market fundamentals seemed to have little impact on the price as a weak dollar and a strong gold price encouraged very substantial investor interest.



## Supply

Platinum supplies are forecast to rise from 5.95 million ounces in 2008 to 6.06 million ounces in 2009, reversing some of the decline seen last year. Sales of metal from South Africa and Zimbabwe are likely to rise while supplies from Russia and North America will fall.

The South African mining industry has again been hit by a range of problems. Output at Impala will drop due to



mine accidents and industrial action. Production at Lonmin will be hit by the decision to cut some production at its Marikana operations and the placing of its Limpopo mine on care and maintenance. Aquarius too will produce less platinum due to the temporary closure of its Everest mine because of subsidence. Anglo Platinum's output will be affected by the closure of some uneconomic shafts at its Rustenburg operations but will nonetheless grow since some of the interruptions occurring during 2008 – such as the flooding at Amandelbult – are not expected to recur in 2009.

Three new mines have started operations in South Africa this year and a number of others have increased production. Despite this, output of platinum in concentrate will fall. However,

changes in pipeline and refined stocks mean that supplies should rise by 210,000 oz to 4.73 million ounces.

Supplies of platinum from Russia are forecast to fall by 8.0 per cent to 745,000 oz. Alluvial platinum production is likely to decline by 35,000 oz this year and lower platinum group metal grades in the ore mined at Norilsk Nickel's operations are set to drive its production down to roughly 600,000 oz. Platinum supplies from North America will decrease by an estimated 21.5 per cent to 255,000 oz. Output at Stillwater is expected to remain steady but the shutdown of North American Palladium's mine and the accelerated closure of a number of nickel mines will depress supplies. Zimbabwean output should rise by 45,000 oz to 225,000 oz due to expansion there.

## Demand

Net demand for platinum is forecast to fall by 270,000 oz to 5.92 million ounces in 2009. Although poor economic conditions have affected most sectors, lower platinum prices have driven a rise in net jewellery demand and a fall in recycling of spent autocatalysts and other scrap material, limiting the overall drop in demand.

Gross autocatalyst demand is likely to fall by almost a third to 2.48 million ounces in 2009. The weak global economy has affected the car industry badly with vehicle production and sales dropping in most countries and platinum demand falling accordingly.

In Europe, weak consumer confidence has driven a move towards the smallest and cheapest vehicles. These are typically gasoline-fuelled and this has reduced the market share of the diesel engine, cutting platinum use. Platinum demand has been further affected by the ongoing introduction of palladium into the diesel market. So, despite a growing proportion of new diesel cars being fitted with platinum-containing particulate filters due to the new Euro 5 emissions rules, palladium has continued to erode platinum's dominance in this sector.

Lower metal prices and a steep fall in the number of vehicles scrapped will depress the amount of metal recovered from end-of-life automotive catalytic converters by 320,000 oz this year to an expected 800,000 oz.

Industrial demand will be negatively affected by the fragile global economy, shedding 530,000 oz to fall to only 1.16 million ounces this year. Net demand will fall in each of the chemical, electronics, glass and petroleum refining sectors. The sudden slowdown in consumer demand led to destocking of final products, intermediates and components in early 2009. Corporate credit remains hard to obtain and capital expenditure on new manufacturing capacity has fallen. Where facilities were already under construction, most have been completed, but demand for metal for new plants has fallen. With many factories operating at below full capacity, requirements for new metal to top up losses have also been low. However, demand has improved throughout the year in many sectors and will be stronger in the second half of 2009 than in the first six months.

Net jewellery demand has been particularly strong in 2009 and is expected to climb by 1.09 million ounces to 2.45 million ounces. Demand will fall in Europe and North America reflecting tough economic conditions. However, in Japan lower prices have reduced recycling flows. Although Japanese jewellery manufacturing levels will rise only slightly from last year, net demand will grow by 255,000 oz to 310,000 oz. More importantly, a lower platinum price has reignited demand in the Chinese jewellery sector which should leap by 900,000 oz to a record 1.75 million ounces this year. The lower metal price has encouraged manufacturers, wholesalers and retailers to replenish their stocks, particularly in the first half of 2009. Profit margins have also improved, attracting new manufacturers and retailers into the industry. With the retail price lower than in 2008, consumer purchases have increased strongly too. Although we expect industry restocking to slow in the second half of 2009, consumer purchasing should still maintain demand at close to record levels.

Physical investment demand should rise by 75,000 oz to 630,000 oz. Japanese investors seem set to purchase less platinum than in 2008 but this will be more than offset by higher net investment through Exchange Traded Funds in Switzerland and the UK.

Platinum Supply and Demand '000 oz		
	2008	2009
<b>Supply</b>		
South Africa	4,515	4,725
Russia	810	745
North America	325	255
Others	295	330
<b>Total Supply</b>	<b>5,945</b>	<b>6,055</b>
<b>Demand</b>		
Autocatalyst: gross	3,700	2,480
recovery	(1,120)	(800)
Jewellery	1,365	2,450
Industrial <sup>1</sup>	1,685	1,155
Investment	555	630
<b>Total Demand</b>	<b>6,185</b>	<b>5,915</b>
<b>Movements in Stocks</b>	<b>(240)</b>	<b>140</b>

<sup>1</sup> Industrial includes chemical, electrical, glass, petroleum refining and other industrial demand.

## Outlook

The state of the global economy remains key to the prospects for the platinum market over the coming months. Economic activity is slowly recovering but remains some way below the levels of early 2008. Demand is, though, expected to improve as industry returns to more normal buying patterns: the spate of destocking in almost every sector now seems to be essentially complete, allowing demand to start to recover in many areas.

Autocatalyst demand is returning. Vehicle sales are expected to be higher in 2010 than in 2009 but are not likely to challenge pre-crisis levels for several years. However, the auto makers have run down stocks of vehicles to very low levels and manufacturing volumes now reflect sales patterns. With some countries already emerging from recession, consumer confidence should improve gradually with vehicle purchases rising, stock levels stabilising and platinum demand strengthening. However, the impact of the end of the various national scrappage schemes is hard to forecast. Some sales have been brought forward by these incentives, distorting the market. Anecdotal evidence suggests, though, that these schemes do create some new demand. If this proves to be the case, then demand will only weaken marginally and temporarily as these schemes come to an end.

Of particular relevance to platinum, the market share of diesel vehicles in Europe is expected to rise in 2010. A temporary reduction in consumers' willingness to spend drove a move to smaller cars and to cheaper (to buy) gasoline vehicles this year. However, as consumer confidence returns, the share of diesel vehicles is likely to recover back towards the fifty per cent mark. While this will boost automotive platinum demand, this will be tempered by continuing substitution by palladium for some of the platinum in the diesel sector.

The weight of platinum recovered from spent catalytic converters will resume its growth in 2010. As the number of new vehicles purchased increases, more old vehicles will find their way into the scrap market than in 2009.

The outlook for the physical investment sector is largely dependent on Exchange Traded Fund (ETF) investors. While there was heavy disinvestment from ETFs during late 2008, there has been substantial net investment this year, encouraged by a steadily rising price. The launch of a Japanese platinum ETF has had little impact on the market to date. However, the possible launch of a US-based ETF could be more significant. If this is approved – as currently seems likely – it could lead to several hundred thousand ounces of additional investment.

Jewellery demand seems likely to soften somewhat during the next year. The very strong levels of platinum demand in China this year were partly due to a high degree of stock building which is unlikely to be repeated in 2010. Additionally, the use of recycled metal is now growing once more, displacing some new metal demand. However, unless the retail price of platinum jewellery rises substantially, any further increase in recycling levels and any decrease in consumer purchasing of jewellery are set to be limited in scope. More importantly for the health of the industry, platinum has been successful in capturing market share from white gold, suggesting that underlying demand should continue to remain healthy over the coming year. As Europe and North America emerge from their recessions, jewellery industry demand for platinum should start to recover in each region.

Supplies of platinum are expected to grow in 2010. Many of the highest cost shafts and mines in South Africa have been shut this year in response to low prices and a strong Rand. We do not currently expect much more rationalisation, and increased production from some of the newer operations in South Africa and Zimbabwe, as well as a gradual recovery in supplies from some of the larger operations, should boost supplies.

Overall, the platinum market should tighten in 2010 and could move into a modest deficit as the world economy improves. These positive fundamentals might be expected to support the platinum price. However, with much of the price rise from September 2008 to September 2009 having been driven by a weak US Dollar, a strong gold price and by growing investor interest, external factors are likely to be more important.

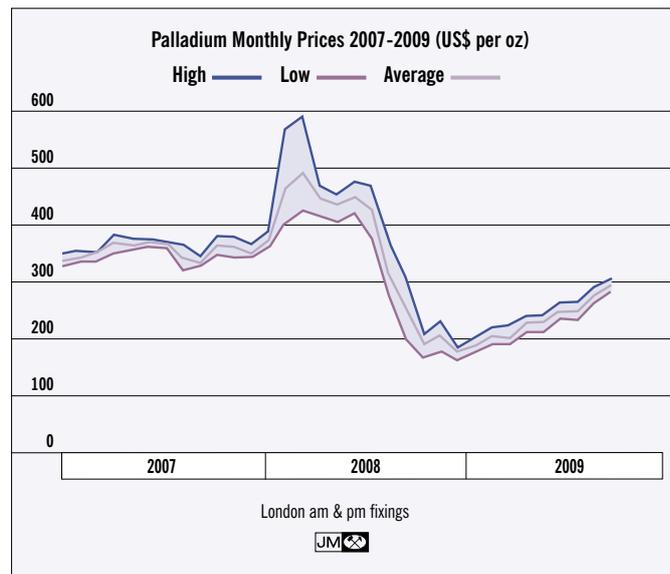
The prospects for the dollar are somewhat unclear but it currently seems that, despite very large long positions in the gold market, the price of that metal should gain support either from the threat of inflation or from worries over the health of the world's economy. If this proves to be the case, a recovery in demand for platinum could send it trading as high as \$1,550 during the next six months. If the dollar strengthens or investors reduce their exposure to gold, then the platinum price could suffer, falling as low as \$1,280 in the same period.

## PALLADIUM

Net palladium demand is forecast to decrease by 3.8 per cent to 6.52 million ounces in 2009 with purchases hit by the global economic slowdown. Gross autocatalyst demand is set to fall by 12.7 per cent to 3.90 million ounces. Electronics demand will fall by 9.1 per cent to one million ounces. Dental demand should decrease by only 3.2 per cent to 605,000 oz and other industrial demand is expected to decline by 3.5 per cent to 415,000 oz. Investment demand is forecast to rise by half to 635,000 oz in 2009. In the jewellery sector, net palladium demand will climb in every region, rising 7.6 per cent to a combined 920,000 oz.

Supplies of palladium are forecast to decrease by 1.8 per cent to 7.18 million ounces. South African supplies should rise by 4.1 per cent to 2.53 million ounces. Supplies of palladium from North America will fall by 17.6 per cent to roughly 750,000 oz. Sales of metal from Russian primary production are expected to decline by 3.7 per cent to 2.60 million ounces. However, we also expect sales of 960,000 oz from Russian state stocks which will result in supply exceeding demand by 655,000 oz.

However, despite another year of oversupply in this market, investors showed substantial buying interest in palladium through the futures markets, via the Exchange Traded Funds and in physical form. Speculation over the size of remaining Russian state stocks supported the price as did a weak US Dollar and a strong gold price. Palladium firmed throughout the first nine months of the year as a result, starting 2009 at \$185 and climbing to end September at \$294 (before breaching the \$300 level decisively in October).



## Supply

Supplies of palladium are forecast to decrease by 135,000 oz to 7.18 million ounces this year. Primary output – sales of metal from current mining operations – is likely to fall from 6.35 million ounces to 6.22 million ounces.

Palladium supplies from South Africa should rise by 100,000 oz to roughly 2.53 million ounces this year. Despite the range of challenges faced by the South African producers, increased output at Anglo Platinum's Mogalakwena operation and the newer mines will drive production of refined metal higher. Zimbabwean supplies of palladium are also expected to rise, by 35,000 oz, to 175,000 oz. North American supplies of palladium will fall this year, decreasing by an estimated 160,000 oz to 750,000 oz. North American Palladium placed its Lac des Iles mine on care and maintenance during late 2008 but we believe that some metal was refined and sold this year. At Stillwater Mining, increased output from the Stillwater mine will not quite balance the negative effects of lower production at its nearby East Boulder property. Additionally, the closure of a number of nickel mines in the Sudbury region of Ontario, and industrial disputes at other operations in this area, will further trim palladium supplies.

Sales of palladium from current mining in Russia – essentially from Norilsk Nickel's Russian operations – are forecast to fall to 2.60 million ounces this year. Although Norilsk Nickel is to trim its production of nickel, these cuts have come outside Russia and it will maintain domestic production. However, the highest pgm-content ore has been depleted over recent years and palladium grades will fall once again, depressing palladium production.

We continue to report sales of palladium from Russian state stocks as supplies since this metal has not previously been available to the market. Although little public information exists on the level of these sales, we estimate that the volumes sold will be similar to 2008 levels at some 960,000 oz in 2009.

## Demand

Net global demand for palladium is set to decrease by 255,000 oz in 2009 to 6.52 million ounces due to the weakness in the global economy. Demand will fall in each of the autocatalyst, chemical and dental sectors. However physical investment demand and net jewellery demand are both expected to rise.

Global light duty vehicle production is expected to decline by some 16.1 per cent to 57.2 million units this year. Gross automotive palladium demand will fall but has been comparatively resilient, decreasing only by 12.7 per cent to 3.90 million ounces. In North America, a sharp fall in vehicle output and a trend towards smaller vehicles are set to drive gross demand down from 1.29 million ounces to 935,000 oz. Lower vehicle production will also negatively affect demand in Japan and the Rest of the World region. Chinese automotive demand will grow by 135,000 oz to 520,000 oz as government incentives and economic stimuli support vehicle sales in that country.

In Europe, despite a 18.3 per cent fall in light duty vehicle production, demand will fall only by 20,000 oz to 985,000 oz. The introduction of scrappage schemes in many countries stimulated sales of the smallest, cheapest vehicles. These cars are almost always gasoline-fuelled and this has therefore boosted the market share of the gasoline engine and supported palladium demand. Palladium has also benefited from its increased use in diesel oxidation catalysts and particulate filters, leading to only a marginal decline in demand. Palladium recovery from spent autocatalysts will decrease to 950,000 oz in 2009. The high prices drove the recycling industry to reduce its stocks of scrap catalysts in 2008, leading to record levels of recycling. With these stocks lower and fewer vehicles scrapped this year too, palladium recovery is expected to fall.

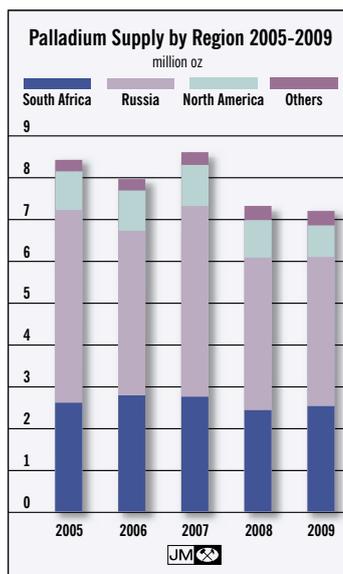
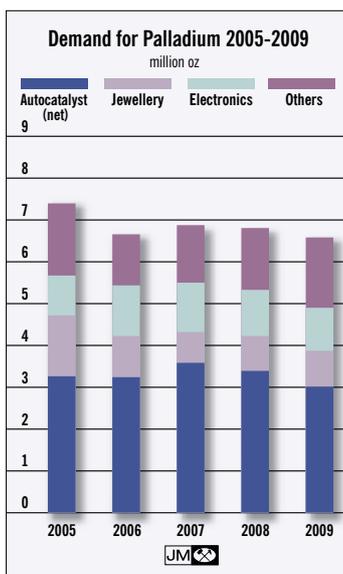
Palladium demand from the electronics industry is forecast to decrease by 100,000 oz to one million ounces this year. We have downgraded our figure for demand in 2008 as destocking began earlier in this industry than we had previously believed. Purchases of metal this year for lead frames and multi-layer ceramic capacitors will fall but, with destocking now complete, demand will be higher in the second half of 2009 than in the first half.

Net dental sector demand for palladium is expected to contract marginally to 605,000 oz. Despite some support in North America from the high price of gold and in Japan from reduced levels of recycling of Kimpala alloy, a slow decrease in the market share of precious metal-based dental treatments will depress demand.

Net jewellery demand is expected to climb to a global total of 920,000 oz. In Europe and North America, demand continues to grow steadily. The economic slowdown has helped palladium gain market share in men's wedding bands in North America while the approval of a palladium hallmark in the UK should help boost demand there. China, however, remains the largest jewellery market and while demand is expected to rise, this is due to

a fall in the recycling of old jewellery stock rather than to changes in manufacturing volumes. At the manufacturing level, a few companies have stopped producing palladium jewellery this year to focus on platinum but others appear to have gained market share as a result and production volumes should change little.

Physical investment demand for palladium is expected to increase by 215,000 oz to 635,000 oz for the year as a whole. Demand for coins and small bars should rise. However, strong growth in investment through Exchange Traded Funds will be more important, leading to anticipated demand of 540,000 oz. 2009 has seen additional activity through the London fund suggesting that the low metal price has attracted a number of new investors.



## Outlook

**The outlook for the palladium market is fairly positive over the next twelve months. Destocking of materials, components and end products in many industries has hit demand this year. While consumer demand is only expected to recover slowly in most major economies, destocking has slowed significantly. As a result, demand in many sectors should rebound in 2010.**

In the automotive sector, 2009 has been a very difficult year and 2010 is also expected to be challenging. However, vehicle production volumes are expected to recover to some extent. Palladium demand for use in three-way (gasoline) catalytic converters is thus expected to rise next year in North America, Japan, China and the Rest of the World region. In Europe, the market share of the diesel engine is likely to rebound after a temporary fall this year, denting palladium purchases for use on gasoline vehicles. However, we anticipate that platinum/palladium diesel autocatalysts will be introduced on more models in the next twelve months and that the average palladium content of such catalysts will rise. The early stages of the Euro 5 light duty emissions rules will drive additional filter fitment on new vehicles in Europe, boosting palladium demand as well as platinum demand since many of these filters will contain some palladium.

Autocatalyst recovery volumes should return to growth as the effects of the run-down in stock levels of 2008 recede. Rising vehicle sales should boost scrappage rates and the weight of palladium reclaimed will climb.

After several years of development, the palladium jewellery market in China appears to have reached a relatively mature state. Palladium has established itself firmly at the retail level in smaller cities in Sichuan and several other provinces. Very little Pd950 (95 per cent purity) stock remains for recycling and demand is unlikely to decline. However, in the absence of further promotional efforts within this market, demand is expected to show only organic growth from today's levels. Outside China, considerable potential remains for growth. The introduction of a hallmark within the UK has provided a boost in that market and the growing familiarity of US jewellers with palladium alloys should see North American demand increase next year.

Chemical sector purchases of palladium should rise next year and electronics demand should rise too, reflecting a gradual recovery in consumer and industrial spending.

On the supply side, primary production of palladium looks set to rise modestly in the short term. South African supplies are expected to climb as some newer mines ramp up production, and output from some of the more established operations gradually recovers. In North America, palladium production is expected to remain roughly steady in the near term. Little change is currently expected in primary production within Russia.

With demand rising and only modest growth in primary supplies of palladium expected, we believe that the size and fate of any Russian state stocks of palladium are of great importance in supply terms. While these are clearly finite, we expect that some metal will again be sold in 2010. If this proves to be the case, then the palladium market is likely once again to be in surplus. Without such sales, a deficit can be expected.

This conflict between a fundamental surplus and a shortage of primary supplies (i.e. sales to the market excluding movements of state stocks) can be seen in the behaviour of the palladium price. The existence of a surplus has weighed on the price over recent years. However, investors seem aware of the imbalance between demand and mine production and hold bullish views for the palladium price over the longer term.

At the end of September 2009, investors held very large net long positions in palladium. If these funds maintain their buying activities, the palladium price is likely to perform well and could rise as high as \$390 over the next six months, particularly if it is supported by some recovery in vehicle production volumes. However, any liquidation of gold investment positions or a strengthening of the US Dollar against the Euro would drive the price lower, with the possibility that palladium could trade as low as \$290 during the same period.

Palladium Supply and Demand '000 oz		
	2008	2009
<b>Supply</b>		
South Africa	2,430	2,530
Russia		
Primary Production	2,700	2,600
State Sales	960	960
North America	910	750
Others	310	335
<b>Total Supply</b>	<b>7,310</b>	<b>7,175</b>
<b>Demand</b>		
Autocatalyst: gross	4,460	3,895
recovery	(1,115)	(950)
Jewellery	855	920
Electronics	1,100	1,000
Other <sup>1</sup>	1,475	1,655
<b>Total Demand</b>	<b>6,775</b>	<b>6,520</b>
<b>Movements in Stocks</b>	<b>535</b>	<b>655</b>

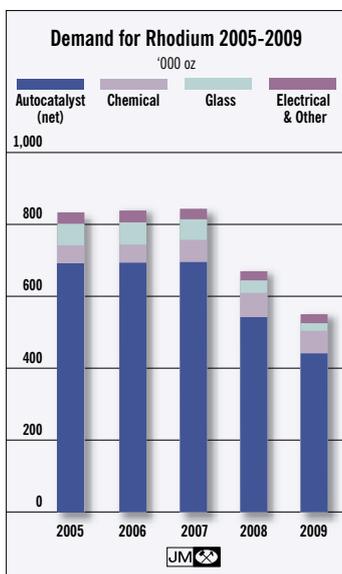
<sup>1</sup> Other includes physical investment, dental, chemical and other industrial demand.

**OTHER PGM**

**Rhodium**

Rhodium supply is set to rise by 3.5 per cent to an estimated 719,000 oz in 2009. Net demand for rhodium will be hit by soft purchasing by the automotive industry and is set to decrease heavily for the second successive year, falling 18.2 per cent to only 548,000 oz, the lowest figure for a decade. Overall, therefore, the rhodium market will be in substantial oversupply by some 171,000 oz this year.

Despite this surplus, the rhodium price appreciated by 32.0 per cent in the first nine months of 2009. It started 2009 at a Johnson Matthey Base Price of \$1,250 and the price was supported in the early months of the year by a lack of availability of metal recycled from spent autocatalysts. In the second and third quarters of 2009, weighty investor interest – particularly in Asia – drove the price upwards despite weak physical demand to end September at \$1,650.



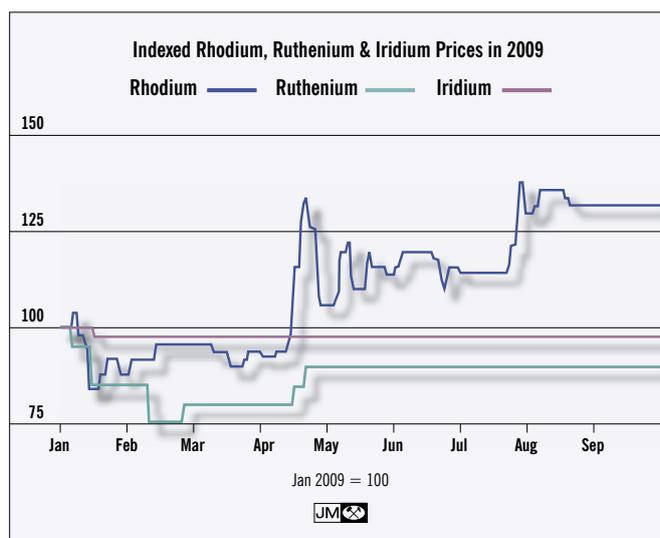
Global rhodium supplies are forecast to grow by some 24,000 oz to 719,000 oz in 2009 but will remain some way below the peak sales of 824,000 oz in 2007. Production of rhodium in concentrate from South Africa will fall. However, there were quite large additions to pipeline stocks during 2008 which we do not expect to be repeated in 2009. South African supplies are thus likely to rise to 620,000 oz. Russian supplies of rhodium are expected to decline to 65,000 oz. Rhodium supplies from elsewhere are set to fall by 2,000 oz to 34,000 oz.

Demand for rhodium is heavily dependent on the automotive sector with gross automotive demand having exceeded mine supply in recent years. The dramatic downturn in the world's automotive output has therefore hit rhodium demand especially hard. Global light duty vehicle production is forecast to fall by 16.1 per cent but gross automotive rhodium demand is set to decrease by 19.2 per cent to 618,000 oz. In large part, this fall in autocatalyst demand reflects the weakness in vehicle production. However, thrifting by auto makers and catalyst manufacturers is also having a negative effect. The high rhodium price from 2003 to mid-2008 drove concerted efforts to develop new, lower-rhodium catalysts which are being introduced progressively into the market, bringing down the average rhodium content of a new vehicle despite some support from new emissions legislation.

Rhodium recovery from spent autocatalysts is forecast to slip from 224,000 oz last year to 181,000 oz this year. Poor vehicle sales have hit the number of older vehicles scrapped. With fewer spent autocatalysts available for recycling, the weight of metal refined fell sharply in the first half of the year although it has since risen to healthier levels.

Demand for rhodium from the chemical sector will slip marginally to 66,000 oz. In the glass sector, demand will fall from 34,000 oz to 21,000 oz. There has been a rapid slowdown in the construction of new glass manufacturing capacity this year but the low price of rhodium has encouraged some companies to increase the rhodium content of their alloys, supporting demand at this level.

Anecdotal evidence suggests that the rhodium price was supported by significant volumes of short term investment by private investors in China and elsewhere in Asia during the middle of 2009. Since we believe this is speculative in nature, we exclude

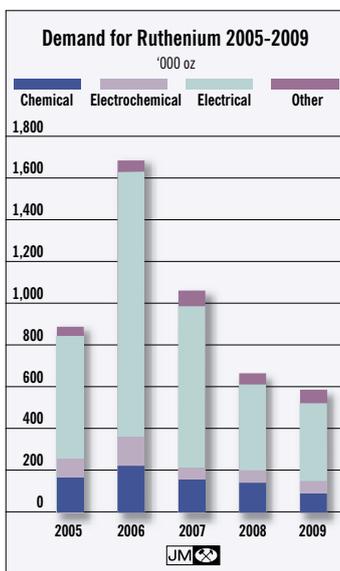


it from our estimates for demand.

Rhodium demand should increase over the next twelve months. We expect a return to growth in the glass industry with new fibre glass and LCD glass capacity installed. More importantly in the automotive sector, the rebuilding of vehicle inventories and a return to more normal consumer purchasing will increase gross demand. Nonetheless, recovery of vehicle output is expected to be slow and the effects of thrifting are likely to limit growth in metal usage in the short term. Recycling of rhodium from end-of-life autocatalysts will rise and with supplies from South Africa set to climb, the rhodium market will be in fundamental surplus during 2010 although the price may continue to derive support from the investment community.

## Ruthenium

**Net ruthenium demand is forecast to fall by 12.3 per cent to 583,000 oz in 2009 due to the economic downturn. Ruthenium started 2009 at a weak \$100, having already suffered from a slowdown in net purchasing by the hard disk sector. However, with the global economy weak and industrial demand soft, the price ended September \$10 lower at \$90.**



Ruthenium demand reached a record level in 2006 as the hard disk sector built stocks of this metal for use in new perpendicular magnetic recording (PMR) technology. This has continued to capture market share: it represented roughly 85 per cent of the entire market at the start of 2009 and will have progressed to almost a 100 per cent share by the end of the year. Although the electronics industry struggled with very low output in the first quarter of the year, consumer purchases of PCs are expected to be level with 2008 figures for the year as a whole. As a result, the amount of ruthenium actually deposited onto hard disks will increase. However, with additional refining capacity having been introduced for scrap material, manufacturers of hard disks and their precursor sputtering targets were able to meet most of their metal requirements by using recycled material and net demand for ruthenium will fall. Metal purchases for use in chip resistors will also decline and overall ruthenium demand from the electronics industry is set to fall by 9.0 per cent to 373,000 oz.

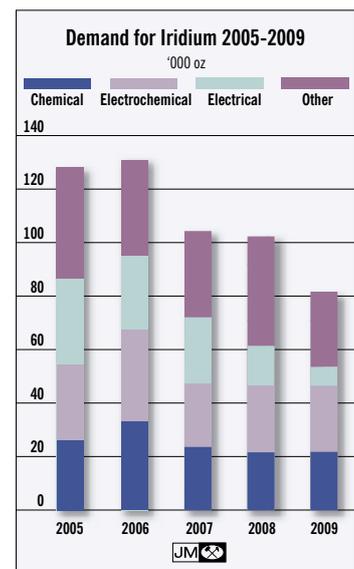
Chemical sector demand is likely to fall by 36.0 per cent to 89,000 oz. Electrochemical demand will decrease by 6.6 per cent to 57,000 oz although demand is being supported by a move away from mercury-based technology in the chlor-alkali industry. Other demand for ruthenium should rise by 16.4 per cent to 64,000 oz. We expect ruthenium demand to improve over the next twelve months as the

electronics sector recovers despite a less positive outlook for chemical sector demand.

## Iridium

**Iridium demand is set to decline by 22.5 per cent to 79,000 oz this year due to falling purchases by the electronics and automotive industries. This weak industrial demand affected the price of iridium. It started the year at \$435 and quickly stepped down to \$425 in mid-January. It remained at this level until the end of September.**

Chemical and electrochemical demand for iridium are expected to remain fairly flat at 21,000 oz and 23,000 oz respectively due to the completion of new facilities for acetic acid production and for the chlor-alkali process. Iridium purchases by the electrical sector will fall from 15,000 oz to 7,000 oz due to a fall in demand for iridium crucibles which are used in the manufacture of high-grade metal oxide single crystals. Demand from other applications – primarily for automotive spark plugs – will fall to 28,000 oz. We expect iridium demand to recover somewhat in 2010 as the health of the global economy improves.



# SUPPLIES, MINING & EXPLORATION

After a poor year in 2008, platinum supplies will recover somewhat in 2009, increasing to 6.06 million ounces as sales of South African metal rise, offsetting lower Russian and North American production. Palladium supplies will fall to 7.18 million ounces despite the anticipated sale of 960,000 oz of Russian state stocks. Rhodium supplies will rise to 719,000 oz.

## SOUTH AFRICA

Supplies of platinum from South Africa are set to increase by 210,000 oz to 4.73 million ounces in 2009. Refined production is expected to fall but will be augmented by sales of metal produced in late 2008 but not sold until 2009. Palladium supplies should climb to 2.53 million ounces while sales of rhodium are forecast to reach 620,000 oz.

## Anglo Platinum

Production of platinum in concentrate from Anglo Platinum's mines rose by 10 per cent to 1.24 million ounces in the first half of 2009. However, output from the group's refinery was up only 6 per cent, at 1.06 million ounces, as in-process inventories grew by 187,000 oz of platinum following maintenance at the Polokwane and Waterval smelters. This pipeline build-up should be drawn down in the second half, and for the year as a whole the group expects refined platinum production to reach 2.4 million ounces. Our forecast assumes that supplies to the market will exceed this: in the first half, sales were augmented by some 164,000 oz of platinum which was produced, but not sold, in late 2008.

In February 2009, Anglo Platinum announced a restructuring of its mining operations which will involve the closure of some high-cost shafts and will reduce output by some 140,000 oz of platinum annually.

The company also confirmed delays to some of its capital projects in response to lower prices and the global economic downturn. The Twickenham mine is now expected to reach full production in 2018 (a delay of 2 years) and Styldrift in 2017.

PGM Supplies: South Africa  
'000 oz

	2008	2009
Platinum	4,515	4,725
Palladium	2,430	2,530
Rhodium	574	620



However, despite these delays, Anglo Platinum believes that it has the potential to adjust annual production by up to 500,000 oz of platinum, by ramping up or down mining activities at the large Mogalakwena open pit and by managing its in-process inventories of pgm. It also believes that its underground mines could raise production by around 10 per cent if required.

## Impala Platinum

Impala Platinum refined 435,000 oz of platinum from its lease area in the first six months of 2009, down 7 per cent on the same period in 2008. The decline was largely due to a fall in the amount of Merensky ore mined and milled, due to lack of face availability; UG2 production was stable.

Production in the second half is likely to be weaker than in the first half of the year. In July, nine miners lost their lives in a major fall of ground at 14 shaft. The shaft shut-down and subsequent alterations to mining practices are expected to result in the loss of an estimated 50,000 oz of platinum production in the company's financial year to June 2010. This was followed by a two-week strike in late August, costing the company a further 40-50,000 oz of platinum output. Impala has suggested that production in its 2010 financial year could fall as low as 850,000 oz.

Impala's Marula mine on the Eastern Bushveld produced 38,000 oz of platinum in the first half of 2009. The ramp-up in production has been delayed by factors including labour unrest, poor productivity and safety stoppages. Currently, Marula is expected to achieve steady-state production of 125,000 oz of platinum per annum within 5 years. However, Impala has suggested that in order for this mine to remain viable, it will need higher Rand pgm prices along with improvements in safety, productivity and cost control.

Production from Impala's Zimbabwe operations is discussed on page 14, and from the Two Rivers joint venture on page 13.

## Lonmin

At Lonmin's main Marikana division, mill throughput fell by 3 per cent in the first half of 2009, reflecting the decision to terminate open-cast mining at the end of last year, and the removal of some uneconomic

underground production. To compensate for lower output from the mines, some low-grade stockpiles of open-cast ore were treated with an impact on overall grades and recoveries. As a result, production of platinum in concentrate totalled 292,000 oz in the January to June period, a decline of 7 per cent.

At the Pandora joint venture, ore is sourced from open pits and via Marikana shaft infrastructure: milled tonnage was up 16 per cent in the first half, while output of platinum in concentrate rose by 43 per cent to 26,000 oz.

Lonmin has once again been hit by smelter issues. The Number One furnace was shut down for a month following a matte run-out in mid-June. However, slag leaks subsequently occurred and remedial work is scheduled for the last quarter of 2009, with in-process inventories of pgm likely to increase in the second half of the year. The company currently expects platinum sales to total 680-700,000 oz during its financial year to September 2009, but supplies for the calendar year may be lower due to the planned furnace rebuild.

### Other Producers

The Northam mine milled some 940,000 tonnes of ore between January and June, a decrease of 6 per cent. This was largely due to difficult mining conditions on the Merensky Reef; UG2 production was largely unchanged and now accounts for 50 per cent of all ore mined. In contrast, sales of platinum climbed 32 per cent in the first half of 2009 to 113,000 oz; this metal is sourced from its own mine on the Western Bushveld and from concentrate purchase agreements. We estimate that 5,000-10,000 oz of this total came from Platmin's Pilanesberg project, which treated its first ore in April, and is one of three new platinum mines to commence concentrate shipments in 2009.

Platinum Australia's Smokey Hills mine also began concentrate production in early 2009, and during the first half delivered 7,000 oz of pgm to Impala Refining Services (IRS) under an off-take agreement. The company expects to achieve design production levels (95,000 oz of pgm annually) from January 2010.

The third of the new mines is Blue Ridge, which shipped its first concentrate to IRS in April. In July 2009, Aquarius Platinum took charge of operations at Blue Ridge as part of its acquisition of Ridge Mining.



At steady-state, this mine is set to contribute around 75,000 oz of platinum (125,000 oz of pgm) annually.

Aquarius Platinum also operates the Kroondal and Marikana mines, concentrate from which is refined by Anglo Platinum and IRS. At Kroondal, production of platinum in concentrate rose 11 per cent to 122,000 oz in the first half, while output from Marikana climbed to 47,000 oz as production ramped up.

Operations at Aquarius' Everest mine have been suspended since December 2008 following subsidence affecting the upper levels of the decline shaft. The company intends to establish two new decline shafts to access stoping areas: work began in July 2009 and is expected to take around 16 months to complete.

The Two Rivers mine, a joint venture between African Rainbow Minerals (ARM) and Impala, produced 118,000 oz of platinum in the year to June 2009, an increase of 20 per cent over the previous financial year. Plant optimisation and improvements in recoveries are expected to boost platinum output to around 130,000 oz in 2010. ARM is also in a joint venture with Norilsk Nickel at the Nkomati Nickel mine, where the mining of lower-grade ores resulted in lower pgm output of only 11,000 oz in the first half of 2009.

Eastplats' Crocodile River mine reported higher grades and recovery rates in the first half of 2009, and production of platinum in concentrate rose by 14 per cent to 33,000 oz. The development of the Crocette and Kareespruit sections at Crocodile River has been put on hold, as have the company's Eastern limb projects at Spitzkop, Kennedy's Vale and Mareesburg.

*Sales of metal from South Africa should increase this year despite a decrease in refined production.*

## RUSSIA

**Supplies of palladium from primary mining in Russia are forecast to decline to 2.60 million ounces in 2009. We expect palladium sales from Russian state stocks to be flat at 960,000 oz. Platinum supplies are expected to fall to 745,000 oz.**

Norilsk Nickel's production of platinum group metals fell by over 8 per cent in the first six months of 2009 compared to the first half of the previous year, despite the interruptions to production which had occurred in early 2008. Ore pgm grades have been falling for a number of years and palladium output therefore dropped from 1.40 million ounces to 1.28 million ounces and platinum production decreased from 327,000 oz to 300,000 oz.

PGM Supplies: Russia '000 oz		
	2008	2009
Platinum	810	745
Palladium:		
Primary Production	2,700	2,600
State Sales	960	960
Rhodium	85	65

For the year as a whole, while nickel output is set to be flat, palladium production is forecast to drop to roughly 2.60 million ounces – down from 2.70 million ounces in 2008 – and platinum production is expected to decline to roughly 600,000 oz.

Production of platinum from alluvial mining at Amur and

Korjak is likely to fall to 140,000 oz due to lower output at Korjak. Sales of platinum from the placer deposits in the Ural mountains are expected to be below 10,000 oz. Mining of the placer deposit at Inagli, South of Yakutsk in Eastern Siberia, ceased in 2008.

Although there do not seem to have been any significant shipments of palladium from Russian state stocks during 2009, we believe that 960,000 oz of metal which was shipped outside Russia during 2008 is likely to be sold to investors this year.

## NORTH AMERICA

**Palladium supplies from North America are set to decrease by 17.6 per cent to 750,000 oz in 2009, due to the closure of the Lac des Iles operations and a number of nickel mines. Sales of platinum should fall by 21.5 per cent to 255,000 oz.**

North American Palladium placed its Lac des Iles mine on care and maintenance in October 2008. Although no ore was mined or milled in the first three

quarters of 2009, our forecast includes the sale of metal which entered the refining circuit too late in 2008 to be delivered to the market until this year.

At Stillwater, production of platinum group metals is forecast to fall by 4,000 oz

to 495,000 oz in 2009. In the first half of the year, production at its Stillwater mine rose 11.9 per cent to 150,000 oz of palladium and 15.0 per cent to 46,000 oz of platinum, reflecting an increase in the weight of ore mined – due to the reallocation of miners from the East Boulder operation – and an increase in head grade. At East Boulder, pgm production dropped from 81,000 oz in the first half of 2008 to 67,000 oz.

PGM Supplies: North America '000 oz		
	2008	2009
Platinum	325	255
Palladium	910	750
Rhodium	18	12

## ZIMBABWE

**Supplies of platinum from Zimbabwe are forecast to rise to 225,000 oz in 2009. Annual sales of palladium are expected to increase to 175,000 oz.**

Production of platinum group metals in concentrate at Zimplats rose to 98,000 oz in the first half of 2009. The open pit at its Ngezi site closed ahead of schedule in late 2008 in response to low prevailing metal prices. However, the Number 1 portal reached full production in June 2009. As a result, additional tonnes of ore from underground made up for some of the decline in open pit tonnage. Additionally, the move towards more underground mining saw head grades improve, boosting pgm production over this period. The development of Portal 4 remains on schedule to reach full production in May 2011.

At the Mimosa mine, the Wedza phase 5.5 expansion was completed in the second quarter of 2009, raising annual production capacity to 200,000 oz of pgm in concentrate. The amount of ore mined in the first half of 2009 climbed by 16.3 per cent from a year earlier. Production of platinum in concentrate in the same period increased from 37,000 oz to 48,000 oz, reflecting lower mill availability in the first half of 2008. Production of palladium in concentrate rose by a similar 28.6 per cent to 36,000 oz.

PGM Supplies: Zimbabwe and Others '000 oz		
	2008	2009
Platinum	295	330
Palladium	310	335
Rhodium	18	22

# PLATINUM

Net global demand for platinum is forecast to fall by 4.4 per cent in 2009 to 5.92 million ounces. Gross automotive purchases are set to fall to 2.48 million ounces and industrial demand is forecast to drop to 1.16 million ounces. However, the low platinum price will drive net jewellery demand sharply higher to 2.45 million ounces globally. Net physical investment demand has also been strong and is expected to climb by 13.5 per cent to an estimated 630,000 oz.

## AUTOCATALYST

Gross demand for platinum from the automotive industry has been severely hit by the global slowdown in vehicle manufacturing and is expected to fall to 2.48 million ounces in 2009. This would represent a decrease of 33.0 per cent to the lowest global figure for demand since 2000.

## Europe

Demand for platinum from the European automotive sector is set to plummet by 900,000 oz to 1.07 million ounces in 2009. The sustained economic downturn will drive light duty vehicle sales across Europe 12.3 per cent lower to a forecast 15.8 million units this year. With auto makers also reducing inventories of unsold cars, production is expected to fall by 18.3 per cent.

Platinum demand has also been hit by a change in the type of vehicle purchased. Fleet purchases of new vehicles – predominantly diesel cars and vans – have been depressed throughout 2009.

The launch of incentive schemes in a number of European countries has helped to support vehicle production volumes, although the end of Germany's scrappage scheme in early September may affect sales in that country during the final quarter of 2009. However, where individual consumers have bought new vehicles under the various government incentive schemes, these have often been smaller, cheaper models, where diesel engines do not demonstrate their full economic value or where diesel variants are not available. Consequently, diesel market share fell throughout the first half of 2009 with only 45.9 per cent of all passenger cars sold in Western Europe during this period being diesel-powered, down from

52.7 per cent in calendar year 2008. Production will fall more sharply. With all diesel vehicles sold in Europe using platinum in their exhaust aftertreatment system, this will depress platinum demand.

There has also been an increase in the use of palladium in diesel oxidation catalyst (DOC) and particulate

filter (DPF) formulations in Europe. With over half of all DOCs and DPFs fitted to vehicles this year containing some palladium alongside platinum, demand for platinum will be cut further still.

However, the introduction of the first stages of Euro 5 emissions legislation – in September 2009 – for new light duty models is raising the proportion of new vehicles being fitted with platinum-containing diesel particulate filters, helping to increase platinum demand from the low levels of early 2009.

## Japan

Japanese auto makers are expected to purchase 465,000 oz of platinum this year for domestic production, a decrease of 23.8 per cent from 2008.

Production of passenger cars in Japan fell by 45.3 per cent in the first half of 2009 compared to the same period a year earlier. A large proportion of platinum bought by Japanese auto makers is used in catalysts fitted to vehicles sold into export markets with comparatively poor fuel quality. With sales in many Asian export markets such as Thailand weak, platinum demand is thus set to decline.

## North America

Platinum demand in the North American automotive sector is forecast to fall to 345,000 oz in 2009.

Production of light duty vehicles is expected to decrease by 30.9 per cent to 7.3 million units this year due to the recession in the USA. Low availability of credit, weak consumer purchasing and high inventories of unsold vehicles forced the auto makers to slash production in the first half of 2009. The US Government's scrappage scheme supported

	2008	2009
Europe	1,970	1,070
Japan	610	465
North America	505	345
China	185	215
Rest of the World	430	385
<b>Total</b>	<b>3,700</b>	<b>2,480</b>

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the automotive market in the middle of 2009 but manufacturing will still fall sharply overall. Although few catalysts fitted here contain platinum, this decline in automotive output will drive platinum usage on light duty vehicles down to roughly 250,000 oz.

Dismal economic conditions have also weighed on the heavy duty diesel market. Few companies have invested in new trucks or in retrofitting older vehicles. Platinum demand from this sector is therefore forecast to fall by a third to roughly 100,000 oz despite some additional sales as firms renew their fleets before new emissions rules are introduced in model year 2010.

### China

Chinese light duty vehicle production is expected to climb from 8.3 million units in 2008 to 10.6 million units this year, making China the largest vehicle market in the world. Although diesel market penetration remains low in the light duty vehicle sector, total platinum demand is forecast to climb by 16.2 per cent to 215,000 oz.

New emission rules were implemented in mid-2008 with Euro 4 equivalent limits applying in the cities of Beijing, Guangzhou and Shanghai and Euro 3 equivalent regulations elsewhere in the country. These have raised average platinum group metal loadings and, since they will be in force for the whole of 2009, will provide an additional boost to demand this year.

### Rest of the World

Autocatalyst demand for platinum from the Rest of the World region is forecast to fall by 45,000 oz to 385,000 oz this year. Although there are bright spots such as Brazil and India where output will rise, vehicle production will fall in most countries. In Korea, where many diesel cars are manufactured for sale in Europe, a fall in exports has hit platinum demand.

### Autocatalyst Recovery

The weight of platinum recovered globally from spent autocatalysts is forecast to drop by 28.6 per cent in 2009 to only 800,000 oz. High metal prices encouraged extraordinarily high levels of autocatalyst recovery during early 2008. With these stocks having been run down last year and fewer new vehicles

being purchased, the number of scrap catalysts available for reprocessing fell. As a result, the volumes of catalyst processed in the first half of 2009 were barely half what they had been one year earlier.

Recycling rates have started to recover as the introduction of numerous scrappage schemes has increased the number of spent autocatalysts returning to scrap processors. Nonetheless, the amount of platinum recovered will not quickly rebound to previous levels.

Platinum Demand: Autocatalyst Recovery		
	'000 oz	
	2008	2009
Europe	(385)	(290)
Japan	(60)	(50)
North America	(620)	(395)
China	(15)	(20)
Rest of the World	(40)	(45)
<b>Total</b>	<b>(1,120)</b>	<b>(800)</b>



## JEWELLERY

**Despite a difficult economic climate, a fall in the platinum price compared to 2008 has reinvigorated the platinum jewellery market in China and depressed jewellery recycling in Japan. Overall, global net demand is forecast to rise by almost 80 per cent to a net 2.45 million ounces in 2009.**

### Europe

Purchases of platinum by the European jewellery industry are set to fall by 15,000 oz to an estimated 185,000 oz in 2009.

The European luxury jewellery manufacturers have struggled with the effects of the financial crisis. Despite strong exports to Asia, sales have fallen and demand for platinum will decrease. Platinum use in the Swiss watch industry will also drop, reflecting lower production of the most expensive watches. The manufacturers and distributors of these products have minimised stock levels due to the recession and demand will fall as a result.

The UK platinum jewellery market has, though, performed fairly well so far this year, supported by a robust bridal market. While disposable consumer spending has fallen, the affordability of platinum has improved. The number of pieces hallmarked in the first half of 2009 fell by only ten per cent from the same period one year earlier. Economic conditions have since started to improve and the outlook for the jewellery industry for the remainder of 2009 has

brightened, with platinum demand likely to be steady year-on-year in this market.

## Japan

Net Japanese platinum jewellery demand is expected to climb by 255,000 oz to 310,000 oz. This higher figure for net demand in 2009 better reflects the underlying health of the jewellery sector than the 2008 figure.

The amount of recycling of old jewellery will fall to an estimated 230,000 oz this year. The lower metal price has reduced the incentive for consumers to trade-in broken or old jewellery. Although a recycling infrastructure now exists, the lower price has also driven some recyclers from the market, further reducing the amount of metal recovered.

Platinum retains a strong position in the jewellery market in Japan and the fall in its price – in absolute terms and relative to gold – has increased the weight of metal sold this year. Where jewellery stores have reduced retail prices, sales of platinum jewellery have strengthened, partly at the expense of white gold. However, where retailers have maintained selling prices in order to realise a profit on jewellery purchased at higher prices, sales have remained weak.

Sales of chain – including the semi-investment Kihei chain – have also been strong. With an increasing amount of chain produced in Japan for export to China, manufacturing volumes of platinum jewellery in Japan are expected to rise marginally this year.

## North America

The jewellery market in North America has struggled with worsening economic conditions and net platinum

demand is forecast to fall 28.2 per cent this year to only 140,000 oz.

The regional economy has been particularly weak throughout 2009 and spending on all jewellery and other discretionary items has been starkly lower than in 2008. Platinum has not escaped from this wider trend and retail sales have fallen with, for instance, a noticeable drift towards lower cost materials in the men's wedding band segment. With little credit available, retailers have again reduced working stocks, further hurting demand.

## China

The lower platinum price of 2009 compared to the previous year has had a hugely positive effect on net jewellery demand within China which is expected to rise to a record 1.75 million ounces.

Retailers and wholesalers had previously minimised their stocks of platinum in response to the rising metal price of recent years. Once the price fell, they took the opportunity to replenish stocks, adding counter space and replacing white gold jewellery with platinum jewellery in many cases. Attractive profit margins also encouraged new retailers into this sector. This widespread restocking drove a dizzying increase in production by the jewellery manufacturers in late 2008 and the first half of 2009 in particular.

Consumer purchasing has also responded to the fall in the platinum price. Improved affordability and continued domestic economic growth have considerably boosted the weight of platinum sold. The low price differential between gold and platinum has also allowed platinum to recapture market share from white gold jewellery. Together, these trends increased net platinum demand in the first half of 2009 to over one million ounces in China alone.

Price movements have also impacted upon jewellery recycling. The fall in the price of platinum during the second half of 2008 reduced the economic incentive for both consumers and retailers to recycle old jewellery – whether for cash or in part exchange for a new piece of jewellery. The proportion of recycled platinum used in jewellery manufacturing dropped from a peak of fifty per cent in early 2008 to below ten per cent at the start of 2009. However, recycling volumes have since increased as metal prices have

Platinum Demand: Jewellery '000 oz						
	Gross <sup>1</sup>		Recycling <sup>2</sup>		Net <sup>3</sup>	
	2008	2009	2008	2009	2008	2009
Europe	205	190	(5)	(5)	200	185
Japan	530	540	(475)	(230)	55	310
North America	200	145	(5)	(5)	195	140
China	1,060	2,050	(210)	(300)	850	1,750
Rest of the World	65	65	0	0	65	65
<b>Total</b>	<b>2,060</b>	<b>2,990</b>	<b>(695)</b>	<b>(540)</b>	<b>1,365</b>	<b>2,450</b>

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### NOTES TO TABLE

<sup>1</sup> Gross demand is equivalent to the sum of platinum jewellery manufacturing volumes and changes in unfabricated metal stocks within the industry.

<sup>2</sup> Recycling represents the amount of old stock and old jewellery recycled whether the metal is re-used within the jewellery industry or sold back to the market.

<sup>3</sup> Net demand (our headline figure) is the sum of these figures and therefore represents the industry's net requirement for new metal.

risen and the amount of metal recovered from old jewellery is forecast to climb to 300,000 oz.

Although the platinum price has risen since the start of 2009, retail prices remain some way below the levels of late 2008, suggesting that consumer purchasing should stay close to its current elevated level. However, with the amount of recycled metal being used in jewellery manufacture rising, and with restocking essentially complete, we expect net demand for the second half of the year to be closer to 700,000 oz.

### INDUSTRIAL

**Industrial demand for platinum is forecast to drop by 31.5 per cent to 1.16 million ounces in 2009 due to weak production and inventory reductions in many sectors in the first half of the year in particular.**

The chemical industry is expected to purchase 355,000 oz of platinum this year, 45,000 oz less than in 2008. Falling commodity prices have hurt demand for nitric acid and demand from this sector will decrease. Lower capital investment will mean less construction of new chemical facilities, denting demand for platinum for use in process catalysts too. The petroleum refining industry will also be affected by a decline in capital investment and demand here will fall to 205,000 oz.

Demand for platinum from the glass industry is set to tumble from 320,000 oz in 2008 to 35,000 oz in 2009. The fibre glass industry has suffered from overcapacity this year and few new facilities have been constructed, even in China, and platinum demand will be very much lower than in 2008. The closure of further CRT glass production facilities will also return some metal to the market. Platinum demand for the production of LCD glass for flat screen televisions will decline too as few factories are built during the economic downturn.

Platinum Demand: Industrial '000 oz		
	2008	2009
Chemical	400	355
Electrical	225	175
Glass	320	35
Petroleum	240	205
Other	500	385
<b>Total</b>	<b>1,685</b>	<b>1,155</b>

Platinum demand from the electrical sector is forecast to fall from 225,000 oz to 175,000 oz. Sales of electronic devices were very weak during early 2009 but have since rebounded: PC sales, for instance, are likely to reach a similar level to last year. However, the market share of notebook and laptop computers, which use smaller hard disks,

has grown, reducing the platinum content of a typical device. Together with destocking of materials and components earlier in the year this has driven platinum demand lower.

### INVESTMENT

**Net investment demand for platinum is forecast to rise to 630,000 oz in 2009, some 75,000 oz above the already extraordinarily high figure for 2008.**

Investors in Exchange Traded Funds (ETFs) are expected to purchase a net 355,000 oz of platinum in 2009, rather more than last year's 105,000 oz. Investment flows into the Swiss-based fund have been relatively steady throughout the year but investment into the London-based fund has been more volatile with periods of heavy buying in March and April.

The London-based fund obtained a cross-listing in Japan in August, generating a small amount of additional buying interest which is included in our European demand figure. The launch of a separate Australian-based fund in January 2009 has so far led to below 5,000 oz of incremental investment which is included in our Rest of the World figure. Plans to launch a US fund were revealed in April 2009 but there is currently no indication of when this might occur.

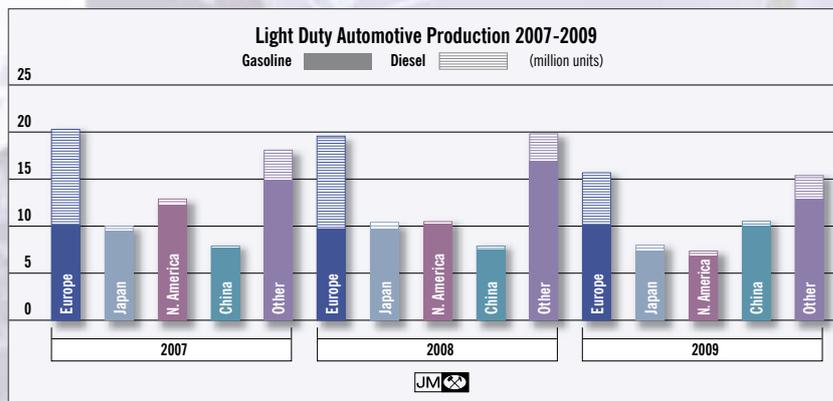
Japanese investors are also expected to purchase a net 170,000 oz of metal through accumulation plans and in the form of over-the-counter sales of large bars this year. The sharp fall in the platinum price and worries over the global economy drove very strong purchasing of platinum as a "safe haven" investment at the end of 2008 and in early 2009. However, as the world's economy has stabilised, buying interest has subsided and physical investment demand will be lower than last year in Japan.

Demand for coins and small bars is set to rise to 95,000 oz in 2009 due to increased interest in investing in precious metals in North America. However, although the Royal Canadian Mint and the Australian Mint have produced platinum coins this year, the US Mint did not offer any Platinum Eagle coins for sale in the first three quarters of 2009.

Platinum Demand: Investment '000 oz		
	2008	2009
Europe	105	355
Japan	385	170
North America	60	100
China	0	0
Rest of the World	5	5
<b>Total</b>	<b>555</b>	<b>630</b>

# THE GLOBAL AUTOMOTIVE MARKET IN 2009

Demand for all of the platinum group metals for use in catalytic converters is expected to fall for the second successive year in 2009. The slowdown in vehicle production began in North America and spread to Europe, Japan and elsewhere during the final months of 2008. This year has therefore seen the full effect of the weak global economy on the automotive sector.



## FALLING SALES

As the global economy slowed in late 2008, discretionary consumer spending contracted sharply. This is evident in vehicle sales where consumers simply kept their cars longer before replacing them or bought second-hand vehicles rather than new ones. A decrease in the availability of credit in North America and Europe also played its part in driving sales lower. Companies operating fleets of vehicles have opted to delay repurchasing, hitting sales too. In Western Europe, for example, light duty vehicle sales slipped 9.7 per cent lower in the first half of 2009 compared to one year earlier.

With sales slow, inventories of unsold vehicles ballooned and auto makers were forced to cut

production by more than the decrease in sales in nearly every region. As a result, global light duty vehicle production is expected to fall by 16.1 per cent to 57.2 million units in 2009, depressing platinum group metal demand.

## GOVERNMENT INCENTIVES

However, a number of schemes have been put in place in order to support the automotive industry.

The Chinese Government has reduced sales taxes on smaller cars and moved to make finance for vehicle purchasers more readily available. As a result, Chinese domestic light duty vehicle production is set to grow by 27.6 per cent to 10.6 million units. In Brazil, a reduction in industrial wholesale tax on vehicles with engines below 2.0 litres has cut the price of smaller cars and boosted sales accordingly.

Incentives to trade in old cars for new models have been introduced in many countries too. In the USA, the "Cash for Clunkers" scheme subsidised almost 700,000 sales. The German scrappage scheme was even more successful, driving sales to a ten-year high. Anecdotal evidence suggests that these incentives generated some new buying but also brought a large

number of sales forward. These accelerated purchases would normally have taken place in 2010 and this will therefore delay the speed of recovery in these markets over the short to medium term.

## CHANGES IN VEHICLE TYPE

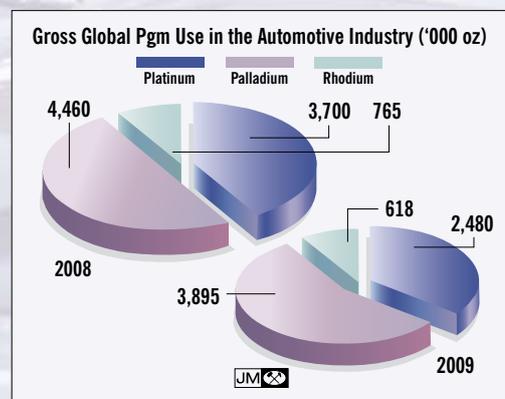
While incentive schemes have supported production levels, they have been most beneficial for smaller models. In some cases, as in Brazil and China, this has been explicitly driven by the incentives themselves. In other markets, consumers have opted to purchase smaller vehicles due to worries over their personal finances. This has led to a decrease in average engine size and a decline in catalyst size. Therefore, in areas where no new emissions rules have been introduced, the average pgm content of a vehicle has decreased.

With the very smallest models mainly gasoline-fuelled, the market share of the diesel vehicle in Europe has also fallen, hitting platinum demand particularly hard. A reduction in European fleet sales of primarily diesel vehicles will also weaken platinum demand. Palladium demand in Europe will, however, benefit from the increased production of gasoline vehicles.

Figures courtesy of IHS Global Insight.

*The economic slowdown has hit vehicle production around the world this year despite government incentives which have boosted the domestic markets in countries such as China, Germany and Brazil.*

*Although the total weight of platinum group metals used in the autocatalyst sector will fall in 2009, palladium demand will be supported by a short term increase in market share of the gasoline engine within Europe and by increased Chinese production.*



# PALLADIUM

Net palladium demand is forecast to decrease by 255,000 oz in 2009 to 6.52 million ounces. Gross autocatalyst palladium demand will decline by 565,000 oz to 3.90 million ounces. Demand for new metal from the jewellery sector is forecast to rise by 65,000 oz to 920,000 oz, while industrial and dental demand is expected to fall by 6.3 per cent to a combined 2.02 million ounces.

## AUTOCATALYST

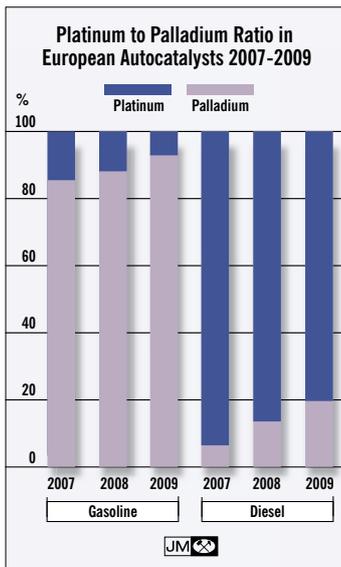
Gross demand for palladium from the auto makers is expected to fall by 12.7 per cent to 3.90 million ounces in 2009, the lowest figure since 2005. The onset of the global economic crisis hit output in 2008 and the downturn continued into this year with global light duty vehicle production forecast to fall by 16.1 per cent to 57.2 million units.

## Europe

Although European light duty automotive output is expected to fall to 15.8 million units, production of gasoline cars is expected to rise in 2009. As a result, gross palladium demand in this region is forecast to fall by only 20,000 oz from 2008 levels to 985,000 oz.

With almost all gasoline catalysts already palladium-based, there can be little further switching to palladium in this sector. Although the first stage of Euro 5 emissions rules was introduced in the second half of

*Increasing use of palladium in diesel oxidation catalysts and particulate filters will help to support automotive palladium demand in Europe this year.*



2009, driving average catalyst precious metal loadings higher, there has been a simultaneous decrease in average engine size. This has reduced the size of a typical three-way catalyst, outweighing the effect of marginally higher loadings. National scrappage schemes have, though, been successful in supporting sales of gasoline vehicles and palladium demand will be remarkably steady.

In the diesel market, the introduction of palladium into platinum-based catalyst formulations is continuing

at a rapid pace. Over half of all diesel catalysts manufactured for the European market now contain palladium in addition to platinum. The typical palladium content of such a catalyst is also rising and palladium now accounts for some twenty per cent on average of the precious metal content of a diesel exhaust aftertreatment system. Despite a fall in the number of diesel vehicles produced, palladium demand in the diesel sector will thus decline only marginally.

## Japan

Demand for palladium for use in autocatalysts fitted to cars manufactured in Japan is set to decline by 23.2 per cent to 680,000 oz this year, largely due to a similar percentage fall in domestic light duty vehicle production to a likely 8.0 million units.

The downturn in global sales only started to affect Japanese domestic production in the final quarter of last year and auto makers have since slashed production from 2008 levels in an attempt to maintain profitability. While the major Japanese manufacturers would normally cut output in their overseas factories, the depth of the downturn has forced them to suspend operations at many of their domestic factories too, hitting demand for palladium in this region.

## North America

The North American automotive sector has had an extremely challenging year with light duty vehicle sales forecast to fall from an already weak 14.9 million units in 2008 to only 11.8 million. As a result, the auto makers have cut production and gross palladium demand will fall by 27.5 per cent to an estimated 935,000 oz.

The weakness in the regional economy has resulted in a sharp decline in consumer confidence and spending, with car sales plummeting in response. A lack of available credit for consumers also made leasing of new vehicles much more difficult, further hurting vehicle demand. Where consumers have chosen to purchase new automobiles, they have also tended to buy smaller

Gross Palladium Demand: Autocatalyst '000 oz		
	2008	2009
Europe	1,005	985
Japan	885	680
North America	1,290	935
China	385	520
Rest of the World	895	775
<b>Total</b>	<b>4,460</b>	<b>3,895</b>

models with the sales of sports utility vehicles (SUVs) and light and medium duty trucks suffering. This has cut the size of a typical catalytic converter and further hurt palladium demand.

Although the market remains weak, the “Cash for Clunkers” scheme introduced by the US government in July did encourage sales of 690,000 vehicles. Credit availability has begun to improve and production levels have stabilised suggesting that the second half of 2009 could see some improvement in palladium demand.

## China

The Chinese automotive sector performed well during the first half of 2009. This strong performance seems set to continue for the rest of the year and domestic sales of light duty vehicles are forecast to rise from 8.6 million units last year to 11.0 million units in 2009, driving gross palladium demand 35.1 per cent higher to 520,000 oz for the year.

The huge economic stimulus provided by the Chinese government has had a significant effect on the appetite of domestic consumers. The increased provision of consumer credit and rebates for rural purchasers have brought car ownership within the reach of a larger fraction of the population, boosting sales, particularly of smaller domestically-produced models. The governmental decision to decrease purchase taxes for cars with engines of 1.6 litres or below has also aided sales of such vehicles, partly at the expense of luxury models and SUVs, reducing the average size of a catalyst in this market too. However, with Euro 3 and Euro 4 emissions rules having been imposed in different areas of China in mid-2008, catalyst metal loadings have risen, causing palladium demand to grow more quickly than vehicle output.

## Rest of the World

Gross autocatalyst palladium demand in the Rest of the World region is forecast to fall by 120,000 oz to 775,000 oz this year due to lower vehicle production in many countries. In Russia, the economic crisis has hit particularly hard with plunging vehicle sales dragging palladium demand lower despite the introduction of a scrappage scheme in the middle of the year. Of further note, Euro 4 emissions rules were to be introduced on

all new vehicles sold in Russia during 2010 but this has been postponed until 2012. Mexican production has also suffered, largely due to weakness in vehicle sales in the USA, its principal export market, and palladium demand will fall here too.

There are, though, some locations such as Brazil where the automotive market remains healthy. The Brazilian government cut sales taxes on smaller vehicles at the end of 2008, with sales rising to record levels for the first seven months of this year.

## Autocatalyst Recycling

950,000 oz of palladium are forecast to be recovered from end-of-life automotive catalysts during 2009, a fall of 14.8 per cent from the previous year. However, the longer term trend remains one of an increase in palladium recovery.

The recycling industry has suffered from weak new vehicle sales in many regions which have meant that fewer drivers have scrapped old cars. High metal prices in the first half of last year also encouraged recyclers to collect and process any stockpiles of catalytic converters that existed at that time. The volume of end-of-life autocatalysts available for reprocessing has therefore fallen, with the amount of palladium recovered falling likewise. Scrappage schemes have since boosted new vehicle sales and scrappage rates of used gasoline vehicles, supporting palladium recovery at this level. The German scheme has also driven the scrapping of newer vehicles than normal and palladium recoveries will rise in Europe.

Palladium Demand: Autocatalyst Recovery '000 oz		
	2008	2009
Europe	(300)	(335)
Japan	(70)	(50)
North America	(655)	(470)
China	(30)	(35)
Rest of the World	(60)	(60)
<b>Total</b>	<b>(1,115)</b>	<b>(950)</b>

## DENTAL

**Net demand for palladium from the dental sector is forecast to fall by 3.2 per cent to 605,000 oz this year despite some support from a high gold price and lower recycling rates in this industry.**

In Japan, we expect net palladium usage in the dental

Palladium Demand: Dental '000 oz		
	2008	2009
Europe	65	65
Japan	275	270
North America	270	255
China	0	0
Rest of the World	15	15
<b>Total</b>	<b>625</b>	<b>605</b>

sector to slip by 5,000 oz to 270,000 oz. There is a long term trend towards lower levels of dental treatment, reflecting improvements in dental healthcare, which has again hit gross palladium usage. The dental industry has also started to reduce its stocks of the palladium-containing Kinpala alloy by moving to a just-in-time delivery system. However, all these negative trends for palladium demand will be partially offset by a fall in the recycling of unused material.

North American dental demand for palladium is also forecast to fall this year, to 255,000 oz. A weak economy has encouraged patients to delay dental treatment where possible. Despite this, palladium has benefited from the high price of gold. This has driven a move towards the use of medium-gold content alloys from more expensive, gold-rich materials. These lower-gold content alloys are often palladium-based and their increased use has supported demand.

Palladium Demand: Electronics '000 oz		
	2008	2009
Europe	95	75
Japan	275	265
North America	125	110
China	240	215
Rest of the World	365	335
<b>Total</b>	<b>1,100</b>	<b>1,000</b>

### ELECTRONICS

**The electronics industry is expected to purchase a net one million ounces of palladium in 2009, a 100,000 oz fall from the previous year as the slowdown in the world's economy hits consumer sales and industry stock levels.**

The main use of palladium in the electronics sector is in the production of multi-layer ceramic capacitors (MLCC) which are used in consumer electronics. Although sales of electronic devices have recovered well from very low levels at the start of 2009, they will show little if any growth year-on-year. Demand for palladium from MLCC producers has been further depressed due to the widespread destocking of materials, components and finished goods across the market. Although this process is now complete, demand will still fall substantially this year.

Palladium demand for use in lead frames will also suffer due to lower production volumes and a loss of market share to base metal alternatives due to the price volatility of palladium during 2008. However, in some other electronics applications, such as plating, palladium often competes with gold. The sustained high price differential between these two metals

has allowed palladium to gain some market share, providing a minor positive note for demand. Net demand has been further supported by lower recovery of palladium from end-of-life electronic scrap due to the low metal prices of 2009.

### JEWELLERY

**Net palladium demand from the jewellery industry is forecast to climb by 65,000 oz to 920,000 oz this year with more metal purchased in every region.**

### China

At the manufacturing level, 2009 has seen significant changes in market share in the palladium jewellery sector in China. Margins on platinum jewellery have increased this year and some manufacturers have abandoned palladium production in order to focus all of their capacity on platinum. However, other companies have captured this market share, expanding their production. Overall production of palladium jewellery is therefore expected to be almost flat compared to 2008 levels.

At a retail level, the picture remains mixed. The availability of palladium jewellery varies between provinces and even between cities within one province, suggesting that retailers and wholesalers are not universally convinced of the potential of this material. Where it is readily available, however, consumer demand appears to be firm, suggesting that the market may now have reached a level of maturity in these locations.

Finally, the amount of palladium recovered from old jewellery is likely to drop, by 40,000 oz, to 50,000 oz this

Palladium Demand: Jewellery '000 oz						
	Gross		Recycling		Net	
	2008	2009	2008	2009	2008	2009
Europe	45	50	0	0	45	50
Japan	120	115	(40)	(20)	80	95
North America	60	70	0	0	60	70
China	740	730	(90)	(50)	650	680
Rest of the World	20	25	0	0	20	25
<b>Total</b>	<b>985</b>	<b>990</b>	<b>(130)</b>	<b>(70)</b>	<b>855</b>	<b>920</b>

See notes to table on page 17.

year. Large amounts of palladium stock were fabricated between 2004 and 2007 using Pd950 alloys (which contain 95 per cent palladium by weight). This material did not sell well and much has been reprocessed and converted into Pd990 (a 99 per cent purity alloy). Little of this Pd950 stock now remains and, with the rate of exchange of old jewellery by consumers still slow, recycling volumes have decreased and are expected to remain low in the short to medium term.

Overall, therefore, net demand is expected to increase from the 650,000 oz of palladium purchased in 2008 to a total of 680,000 oz in 2009.

### Other Regions

Palladium demand from the jewellery industry will increase in each of Europe, North America and Japan to a combined 215,000 oz.

European palladium demand should rise to an estimated 50,000 oz this year. A growing number of manufacturers now have expertise in working with this material and it can be seen at an increasing number of retail stores across Europe. As importantly, though, the introduction of a hallmark for palladium jewellery in the UK in mid-2009 is expected to add legitimacy to this material, boosting consumer interest.

In North America, jewellers will purchase 70,000 oz of palladium, an increase of 10,000 oz from last year. The economic crunch has boosted palladium sales in some sectors such as men's wedding bands where couples have focused their available budget on the woman's engagement and wedding rings and moved to cheaper materials for the man's ring.

In Japan, little palladium jewellery is manufactured or sold. However, palladium is used in most platinum and some white gold jewellery alloys. With the recycling of old jewellery falling this year, less palladium will be recovered and net demand will rise to 95,000 oz.

### CHEMICAL

**The chemical sector is expected to purchase a net 345,000 oz of palladium this year, little different to the 355,000 oz bought during 2008.**

A fall in demand for explosives and fertiliser has driven some nitric acid producers to cut production of this feedstock chemical. With catalyst utilisation below

last year's levels, the catchment gauzes in these facilities catch less platinum and are replaced less often and palladium demand for this application will therefore decline slightly.

The net weight of palladium purchased by the process catalyst industry – principally for the production of hydrogen peroxide, purified terephthalic acid (PTA) and vinyl acetate monomer (VAM) – is set to fall marginally too. Most of this metal is for installation in new production plants. While any plants already under construction will be completed despite the current unfavourable market conditions, a lack of availability of project finance will mean fewer new plants will be built this year and palladium requirements will decrease.

### INVESTMENT

**Net physical investment demand is forecast to rise by 215,000 oz in 2009 to a total of 635,000 oz.**

Investment demand for palladium in the form of coins and small bars is set to almost double to 95,000 oz this year. The Royal Canadian Mint restarted production of its palladium Maple Leaf coins in the middle of 2009 and demand has been supported by the rising price of all of the precious metals.

Net investment through Exchange Traded Funds (ETFs) will also increase strongly this year. 2009 has seen heavy buying of palladium (and few redemptions) through the European ETFs at numerous points in the year, driven by the low price of palladium relative to its previous highs. By the end of September, total positions had reached 1.08 million ounces, equivalent to net demand of 430,000 oz in the first three quarters of 2009. Although there is significant uncertainty in investors' behaviour over the rest of the year, we forecast net demand through ETFs to reach 540,000 oz this year, considerably more than the 370,000 oz purchased in 2008.

Palladium Demand: Chemical '000 oz		
	2008	2009
Europe	100	85
Japan	20	20
North America	55	50
China	60	75
Rest of the World	120	115
<b>Total</b>	<b>355</b>	<b>345</b>

Palladium Demand: Investment '000 oz		
	2008	2009
Europe	370	540
Japan	0	0
North America	50	95
China	0	0
Rest of the World	0	0
<b>Total</b>	<b>420</b>	<b>635</b>

# EXCHANGE TRADED FUNDS

**The launch of two sets of physically-backed Exchange Traded Funds (ETFs) in Europe in 2007 injected some vigour into the physical investment market for platinum and palladium. While many larger investors had already been able to gain exposure to the prices of these metals, these funds have allowed others to invest, from private individuals to pension funds.**

The ETFs which were launched were entirely backed with physical metal in that each investment in a new share in the ETF was balanced by the purchase of the appropriate amount of either platinum or palladium by the ETF. While investors maintain these positions, this metal is held off the market, leading to physical demand (in contrast to the leveraged and short funds later launched which have no impact on the physical market).

With more than two years of history since the launch of these funds, it is now possible to understand ETF investor behaviour to some extent. The Swiss-based fund appears to have attracted a buy-and-hold type investor looking for longer term profits. Indeed one of the larger initial investors in the Swiss funds was a pension fund.

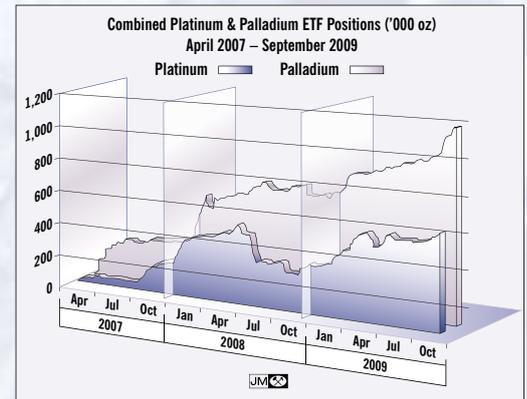
*The launch of Exchange Traded Funds has provided investors with another route to gain leverage to movements in metal prices.*



By contrast, in London, positions appear to be significantly more fluid with investors speculating on shorter term price movements. Although these investors may be willing to hold metal for the longer term, this has not been seen to date. What has been seen is a rapid increase in total metal holdings at times of rising prices and weighty sales as the price falls or as the value of other investments has fallen, necessitating the liquidation of these positions to cover losses incurred elsewhere. Our relatively positive outlook for the prices of both metals in 2010 suggests that net investment flows into the ETFs could again be substantial.

In April 2009, the launch of a US-based physically-backed fund was proposed. This is currently in the process of attempting to gain approval from the relevant licensing authority. In the USA, the existence of the liquid NYMEX futures market already provides a route for investors to gain exposure to the price of platinum and palladium. However, the US Federal Trade Commission has spent much of this year investigating excessive speculation in the futures markets for energy. The possibility remains that it will seek to impose limits on futures positions in other commodities, making an ETF a more attractive investment vehicle for larger investors. For private individuals, the smaller minimum holding of an ETF (likely to be 0.1 ounces compared to the 50 ounces of a NYMEX contract) may make an ETF the more practical option.

Further details on these funds were filed with the US authorities in October 2009 but they have not yet



received approval. If they were to be approved, we believe that they could readily generate additional physical investment of perhaps 200,000 oz of each metal in the first year of operation.

A cross-listed version of the London platinum and palladium funds started trading on the Tokyo Stock Exchange in August. In Japan, there is a considerable history of individuals investing in platinum either in physical form, through accumulation plans – where a set amount of Yen is invested per month with the combined positions of all investors then used to buy platinum bars – or via TOCOM futures. The launch of these funds might therefore have been expected to generate substantial interest from the investment community. However, the lack of a domestic sponsor and the ready availability of these other investment routes have meant that investor activity has been light so far.

2009 did also see the creation of Australian platinum and palladium funds early in the year. To date, there has been less than 5,000 oz of interest in either metal, perhaps unsurprisingly since Australian investors are already heavily exposed to the commodity sector.

*After substantial net redemptions of platinum and palladium ETF holdings in the second half of 2008, investors returned in the first three quarters of 2009.*

# OTHER PLATINUM GROUP METALS

Net rhodium demand is forecast to fall to 548,000 oz this year, largely due to a decline in usage by the automotive industry. Rhodium supplies are set to rise to 719,000 oz. The weak global economy will drive net ruthenium demand down to 583,000 oz and depress iridium demand to 79,000 oz.

## RHODIUM

The rhodium market is set to be in substantial oversupply – by 171,000 oz – this year. Net demand is expected to decline by 122,000 oz to 548,000 oz as metal purchases for use in catalytic converters fall heavily. Rhodium supplies are set to rise by 24,000 oz to 719,000 oz despite a decline in underlying production in South Africa.

## Autocatalyst

Gross rhodium purchases by the global automotive sector are forecast to decline by 19.2 per cent to 618,000 oz largely due to an expected 16.1 per cent drop in global light duty vehicle production.

The troubles in the global economy have had a severe effect on the automotive industry. In North America, light duty production volumes are expected

to fall by a steep 30.9 per cent. Many vehicles in this region have relatively high rhodium loadings and this will hit rhodium demand. However, despite numerous scrappage schemes, there will also be lower vehicle output in Europe, Japan and the Rest of the World region, further damaging rhodium demand. Demand will rise only in China, where government subsidies have supported the economy.

Rhodium demand has been further reduced by continuing thrifting of this metal from three-way catalysts. Prior to this year, rhodium prices had been at an elevated level for some time and the auto makers and catalyst manufacturers have devoted

significant resources to minimising rhodium usage without worsening catalytic performance. As a result, new, lower-rhodium loaded catalytic converters are being steadily introduced into the market. In 2009, this thrifting, together with the impact of a decrease in average vehicle size, will outweigh the effects of tightening legislation, depressing gross rhodium demand by more than the fall in vehicle production.

Less rhodium will be recovered from spent autocatalysts this year – 181,000 oz – than in 2008. The high rhodium price drove autocatalyst recovery to record levels during 2008, depleting stocks of old spent catalysts, as generous profits were available throughout the recycling industry. With fewer vehicles sold in North America, Europe and Japan this year, there has also been a decline in the number of newly-available spent catalysts. Recycling rates therefore fell heavily in early 2009 although they have since recovered somewhat.

## Other Demand

The glass industry is set to purchase a net 21,000 oz of rhodium this year, 13,000 oz less than in 2008 as less new capacity is installed. While the Chinese construction market remains robust, exports of fibre glass to other markets have fallen and there has been little production capacity installed in China this year. A temporary dip in demand for LCD glass for flat screen television sets also caused a hiatus in the construction of new production facilities. However, demand has been supported by the fall in the price of rhodium. Glass manufacturers typically have a range of platinum-rhodium alloys they can use in their processes. Addition of extra rhodium increases the durability of these alloys and a low metal price has encouraged the use of higher-rhodium alloys at a number of sites.

Chemical sector demand for rhodium is expected to decline by only 2,000 oz to 66,000 oz in 2009. Demand for rhodium from the nitric acid industry will fall, in line with platinum demand, as producers use metal from mothballed burners to meet their needs for top-up charges. In the process catalyst sector, there has again been construction of new capacity for acetic acid production and for the oxo-alcohol process and demand will be at similar levels to 2008.

Electrical and other industrial demand for rhodium is set to fall from 27,000 oz in 2008 to 24,000 oz this year.

Rhodium Supply and Demand '000 oz		
	2008	2009
<b>Supply</b>		
South Africa	574	620
Russia	85	65
North America	18	12
Others	18	22
<b>Total Supply</b>	<b>695</b>	<b>719</b>
<b>Demand</b>		
Autocatalyst: gross	765	618
recovery	(224)	(181)
Chemical	68	66
Electrical	3	3
Glass	34	21
Other	24	21
<b>Total Demand</b>	<b>670</b>	<b>548</b>
<b>Movements in Stocks</b>	<b>25</b>	<b>171</b>



## Supplies

Supplies of rhodium are set to grow by 24,000 oz to 719,000 oz in 2009. Although underlying production of metal in South Africa is expected to be flat, changes in pipeline stocks will boost supplies from that country by 46,000 oz to 620,000 oz. Rhodium supplies from Russia and North America are expected to fall to a combined 77,000 oz but sales of metal from Zimbabwe and elsewhere are set to rise to 22,000 oz.

## RUTHENIUM & IRIIDIUM

**Net demand for ruthenium is forecast to fall to 583,000 oz this year due to a decline in purchases by the electronics and chemical industries. Iridium demand will be hit by slow sales to the electronics and spark plug sectors and will drop by 23,000 oz to 79,000 oz this year. Underlying production of ruthenium and iridium should fall, in line with other platinum group metal production in South Africa, but both markets will be adequately supplied.**

## Demand

Net ruthenium demand is expected to decline by 82,000 oz to 583,000 oz this year.

Ruthenium demand for use in chip resistors and other circuitry components is expected to fall by 26,000 oz to 285,000 oz this year. A slowdown in sales of electronic devices has hit production volumes, while miniaturisation of chip resistors has further depressed metal requirements.

In the hard disk sector, perpendicular magnetic recording (PMR) has captured a growing share of the market. This has risen from 85 per cent at the start of 2009 and will approach a 100 per cent penetration level

	2008	2009
Chemical	139	89
Electrochemical	61	57
Electrical	410	373
Other	55	64
<b>Total Demand</b>	<b>665</b>	<b>583</b>

by the end of the year. With PC sales likely to be unchanged from 2008, the number of hard disks containing ruthenium will rise.

Nonetheless, purchases of new metal are likely to contract to 88,000 oz this year. The industry built up large stocks of ruthenium as PMR technology was adopted. With production volumes falling

dramatically in early 2009, many hard disk makers were able to meet all of their ruthenium requirements using recycled metal. The second half of the year has, though, seen a gradual improvement in demand for consumer electronics which should drive a rise in hard disk production and in ruthenium purchasing.

Demand for ruthenium from the chemical sector is likely to shrink by 50,000 oz to 89,000 oz this year. Low capacity utilisation at many production facilities has allowed the industry to extend catalyst lifetimes and reduce purchases of top-up metal. With fewer new plants being constructed too, ruthenium demand will decrease. By comparison, demand from the electrochemical sector will fall only marginally to 57,000 oz. Other industrial demand for ruthenium will increase to 64,000 oz.

Iridium demand will also fall this year, decreasing by 23,000 oz to 79,000 oz due to difficult conditions in the electronics and automotive industries.

Iridium crucibles are used in the production of high-grade metal oxide single crystals. Demand for these has fallen this year and iridium demand from the electronics sector will therefore fall by half to 7,000 oz.

Demand for iridium for use in spark plugs will shrink from 25,000 oz to 16,000 oz. Iridium spark plugs are used primarily in new vehicles rather than for retrofit and the contraction in the global automotive market this year will slash demand.

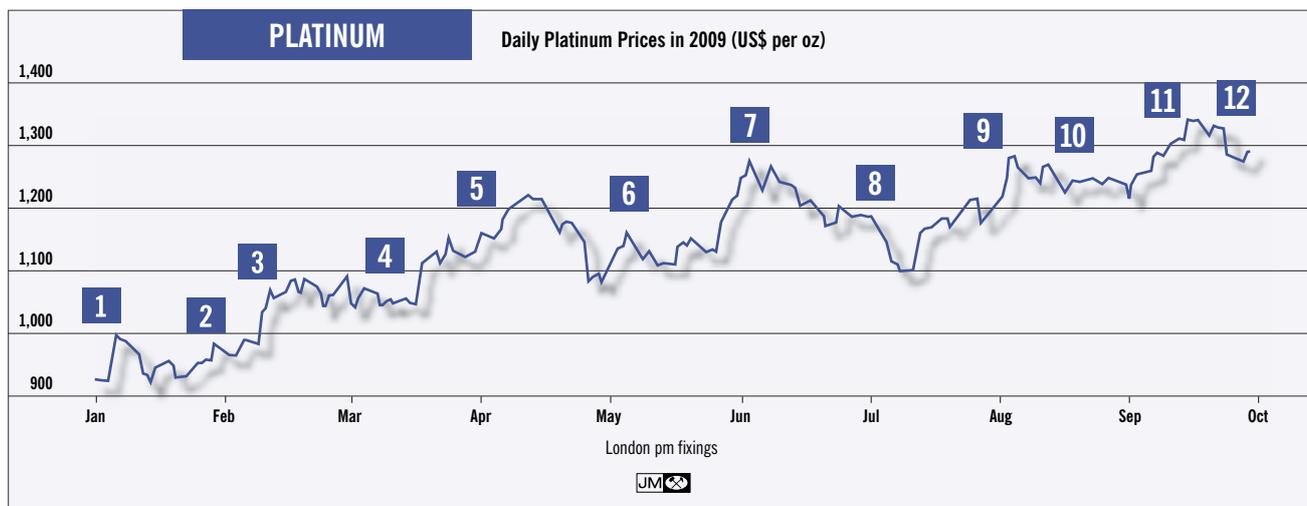
Elsewhere, legislation and environmental concerns continue to drive a move from mercury-based technology for the chlor-alkali process towards iridium/ruthenium-based membrane cell technology. This will support electrochemical iridium demand at 23,000 oz this year. Chemical sector demand, largely for acetic acid production, will remain flat at 21,000 oz.

## Supplies

Underlying refined production of ruthenium and iridium should fall in 2009 due to the range of challenges faced by the South African mining industry. However, with demand weak for both metals, each market should remain adequately supplied this year.

	2008	2009
Chemical	21	21
Electrochemical	25	23
Electrical	15	7
Other	41	28
<b>Total Demand</b>	<b>102</b>	<b>79</b>

# PRICES & FUTURES MARKETS



Although the platinum price fell heavily in the second half of 2008, it recovered well during the first nine months of 2009 despite weak physical demand.

**The platinum price performed strongly through the first nine months of 2009, averaging \$1,143.40, although it remained much lower than during the corresponding period in 2008. It began the year at \$934 and ended September at \$1,287, a rise of 38 per cent, driven higher by a weak US Dollar, good investor interest and a strong gold price.**

**1** Platinum began 2009 at \$934, a long way below the record levels of the previous year but already almost \$180 higher than the low of late October 2008. On the 5th of **January**, the Chinese Government announced plans to cut purchase taxes on new vehicles, adding some energy to the market. Strong physical demand on the Shanghai Gold Exchange (SGE) and from individual investors in Japan then forced the price up to \$1,000 for the first time in 2009 at the second fix on the 7th, before profit-taking drove the price back lower.

first nine months of 2009 of \$915 on the 15th. This fall, though, encouraged more physical buying by the Chinese jewellery industry and platinum reversed its direction, climbing to end the month strongly at \$983.

**3** Buying continued on the SGE and as investors drove gold higher, platinum followed, rising above \$1,000 on the 10th of **February**. A large discount opened up between sponge and ingot prices, demonstrating the weakness in automotive and industrial demand and the strength of the jewellery market. Warnings of a possible strike by South African mineworkers firmed the price and heavy Exchange Traded Fund (ETF) purchasing and rising net long speculative positions on NYMEX took platinum to a peak of \$1,113 on the 18th.

**4** A stream of negative stories from the automotive industry kept the pressure on the platinum price in late February and early **March**, sending it lower to \$1,044 on the 18th of March. Late that day, the US Government moved to inject huge amounts of money into its financial system in the form of quantitative easing. This reassured the markets and drove the dollar lower with commodity prices rising in response. Gold rose quickly and platinum followed with a bout of investment on NYMEX and through the London ETF driving platinum back to \$1,118 on the 20th.

**5** On the 3rd of **April**, a plan to launch a US-based platinum ETF was revealed and the platinum price rose to \$1,159, its highest point of the year so far. European ETF purchases and TOCOM investors kept applying

Average PGM Prices in \$ per oz (Jan-Sep)			
	2008	2009	Change
Platinum	1,811.26	1,143.40	(37%)
Palladium	405.11	235.60	(42%)
Rhodium	8,163.21	1,397.10	(83%)
Ruthenium	358.49	87.03	(76%)
Iridium	451.45	425.52	(6%)

*Platinum and palladium prices are averages of London am and pm fixings. Other pgm prices are averages of Johnson Matthey European base prices.*



Worries over the health of the global economy supported the gold price during the first nine months of 2009, helping platinum to gain ground during the same period.

upward pressure to the price and concerns over the forthcoming South African elections generated some nervous buying. Rumours of the launch of a South African platinum ETF maintained this momentum in the days before Easter. When the markets reopened, the gold price rallied on “safe haven” buying and platinum fixed at a high of \$1,229 on the 14th before reaching \$1,250 in the spot market later that day.

**6** Gold came under pressure over the possible sale of some of the International Monetary Fund’s gold reserves late on the 14th of April and softened. NYMEX positions in platinum started to shorten and Chinese physical buying dwindled. Commentators started focusing on the automotive sector and, with plenty of bad news available to analyse, the price drifted downwards. ETF investors started to liquidate some of their positions and support for the price evaporated. At the end of the month, Chrysler entered Chapter 11 bankruptcy, triggering substantial involuntary sales of metal, and forcing platinum to a low of \$1,076 on the 1st of **May** before it found some support from investors on the futures exchanges. Proposals to launch car scrappage schemes in Japan and the USA helped firm the price further and platinum moved into a range of \$1,125-\$1,150 in the second half of the month.

**7** At the end of May the US Dollar lurched lower on worries over the nation’s creditworthiness amidst the huge scale of bond issuing. Investors jumped into the gold market and platinum benefited too, rising from

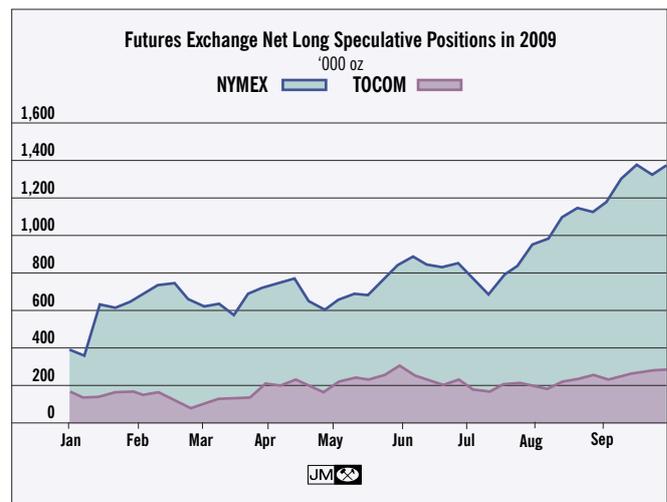
\$1,126 on the 28th of May to \$1,218 on the 1st of **June** despite weak physical demand. Some profit-taking was seen but rumours of production problems at Anglo Platinum’s Rustenburg mine still sent platinum spiralling up to a high of \$1,293 on the 5th.

**8** Physical purchasing of platinum in Shanghai shrank in response to the high price in early June. Worries over the South African mining sector provided some stability before a rising dollar weighed on platinum. Speculation that US regulators might seek to impose position limits on a range of commodities futures drove a sell-off on NYMEX and on TOCOM and platinum fell from \$1,208 on the 26th of June to only \$1,092 on the 13th of **July**.

**9** The platinum price was then rescued by currency movements: the dollar weakened, boosting commodity prices. Positive news from the automotive sector prompted investors to look further into the future and NYMEX net long speculative positions started to grow towards their highest level for over a year. When news of a serious accident interrupting production at Impala was followed by the eventual launch of the US vehicle scrappage scheme platinum finally re-emerged over the \$1,200 level. With further support from production cuts at Anglo Platinum’s Rustenburg operations, it fixed at a monthly peak of \$1,213 on the 28th of July.

Platinum briefly retraced its tracks under pressure from technical selling but found some physical support. Speculative investment continued and the threat of a strike at ESKOM drove the price to a peak of \$1,286 on the 5th of **August** before fears that US regulators

Investors returned to the platinum futures markets in early 2009 and built net long speculative positions to historically-high levels.



might impose rules to curb “excessive speculation” in commodities markets drove the price back lower.

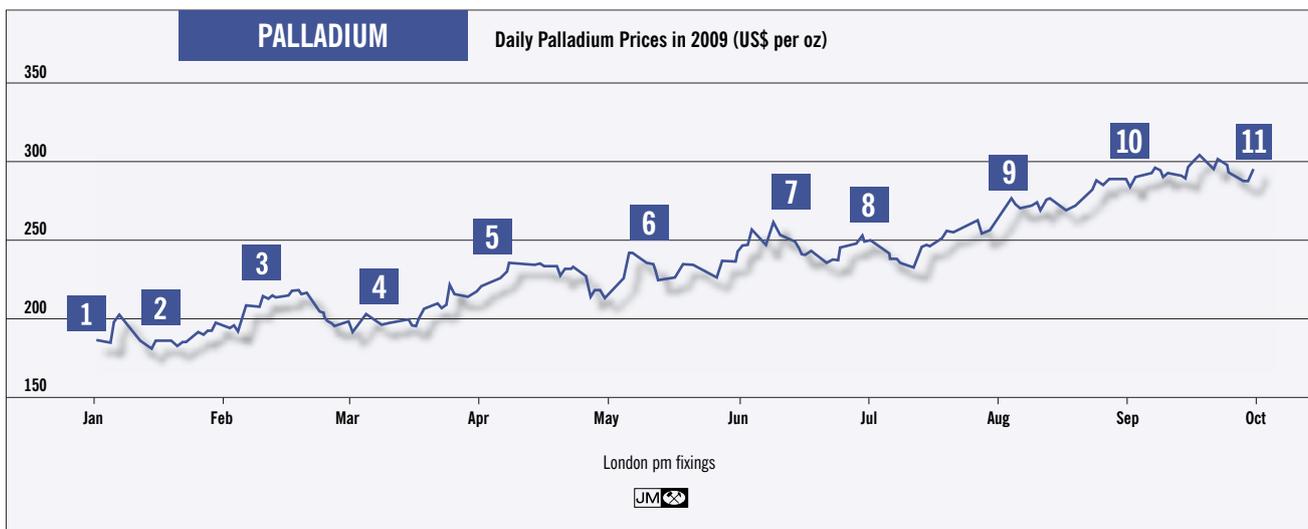
**10** The platinum price moved in a narrow range – considering recent levels of volatility – of \$1,220 to \$1,270 for much of August. The announcement of the forthcoming launch of a Japanese platinum ETF firmed the price on the 12th. When this was followed by good SGE purchasing and industrial action in South Africa, platinum rose as high as \$1,271 on the 14th. However, worries over the sustainability of Chinese economic growth drove platinum lower, close to the support at \$1,220, on the 18th. At the end of the month, neither the end of the US car scrappage scheme nor the outbreak of a strike at Impala’s Lease Area could propel the price out from this range in either direction.

**11** Investors continued to build long positions on the futures exchanges at the start of **September**. The strike at Impala provided some support for the price and the movement of gold towards the \$1,000 level drove platinum higher. It started climbing on the 2nd,

rising from \$1210 in London that afternoon. The dollar weakened and gold ticked higher. On the 8th gold broke through the four figure mark and good Chinese automotive sales data helped drive platinum out from its range to \$1,286 the following day.

The price was briefly halted by strong resistance but the dollar weakened again, dragging gold above \$1,000 on the 11th. Platinum broke through its resistance at \$1,300 to reach \$1,324 in the spot market in New York that day. It fell back on long liquidation but news of another fatal accident in the South African mining industry on the 14th sent platinum climbing again to its peak for the first nine months of 2009 – and its highest for a year – of \$1,343 on the 17th of September.

**12** Gold, though, could not remain above \$1,000 despite very substantial investor support. When the dollar started to strengthen in late September on residual worries over the health of the world’s economy, investors booked some of their profits in platinum, reducing their positions and driving the price lower, to \$1,287 where it finished the month.



*Investor interest was key to the strong recovery of the palladium price during the first nine months of 2009.*

**Palladium traded at an average price of \$235.60 during the first nine months of 2009. It performed strongly throughout this period despite a poor economic environment, rising 59 per cent from an initial \$185 to end September at \$294, driven by strong investment on the futures exchanges and via the ETFs. Mildly positive news from the automotive sector made up for slow demand elsewhere and firmed the price further in the third quarter.**

**1** Palladium started 2009 by fixing at \$185, already some 12.8 per cent above the low of \$164 recorded in early December 2008. Investors felt that much of the doom and gloom surrounding the automotive market was already accounted for in the palladium price and started to target the \$200 level. As platinum touched \$1,000 on the 7th of **January**, palladium too reached its target, moving to a monthly peak of \$202.50 before being halted by investor profit-taking.

**2** Palladium stayed within touching distance of \$200 until the 12th of January when the dollar rose on the prospect of a cut in European interest rates. Palladium softened and weak car production data prompted further investor sales, driving the price to a low for the first nine months of the year of \$177 on the 15th.

**3** A US Government decision to provide US\$825 billion to support its domestic economy reassured the markets. The dollar fell and palladium rose above \$180 on the 16th of January. Investors bought more metal through the ETFs and on NYMEX before encountering resistance close to \$200. They forced their way past on the 5th of **February** and a rising gold price nudged palladium to a high of \$219 on the 18th.

**4** ETF investors continued to build their holdings but long positions on NYMEX were liquidated, forcing the palladium price lower. As gold gave back some of its gains, palladium slipped below \$200 again in trading in New York on the 23rd of February. Investment activity slowed and the price stumbled lower to only \$191 on the 3rd of **March**. Investors dragged the price back over \$200 briefly on the 6th but it slumped back to spend most of the first half of the month just below that level.

**5** On the 18th of March, the US Government revealed plans to inject huge amounts of liquidity into the financial markets. The dollar fell and commodity prices raced ahead. Palladium clambered over \$200 on the 19th and climbed to \$222 on the 26th, aided by news of strong Chinese palladium import data. NYMEX investors joined in and, with gold rising too, coaxed palladium to a high of \$239 on the 14th of **April**.

**6** Concerns over the possible bankruptcies of General Motors and Chrysler now encouraged investors to start liquidating futures positions and palladium drifted lower to find support near \$220. It slipped to a low of \$212 on the 1st of **May** but rebounded to \$242 on the 8th as voracious Asian purchasing arose. Yet again, though, the weakness in the automotive industry exerted its influence, dragging palladium back down to its support close to \$220.

**7** Worries over the creditworthiness of the USA led investors to abandon the dollar at the end of May and move into gold as a “safe haven”. Palladium benefited

too, ending the month just below \$240. At the start of **June**, General Motors entered Chapter 11 and the reduction in uncertainty firmed palladium, which climbed to \$264 on the 5th. A dire automotive market drained the energy from palladium but investors provided support increasingly close to \$240.

**8** Industrial unrest in the South African mining industry encouraged further investment inflows into palladium at the end of June. The price rose from \$236 on the 25th of June to a short-lived peak of \$253 on the 1st of **July** before worries over the global economy sent jittery investors fleeing back into the US Dollar, with palladium retreating to \$232 on the 13th under pressure from long liquidation on NYMEX.

**9** With physical trading quiet, some positive news began to emerge from the auto makers and palladium investors responded by buying. The dollar weakened and when Impala revealed details of a fatal accident at its Lease Area on the 20th of July, the price rose above \$250. With this resistance broken, funds were attracted into palladium in greater numbers and net long speculative positions rose from 895,000 oz in mid-month to 1.2 million ounces at the end of July.

The US “Cash for Clunkers” scrappage scheme began on the 24th of July, sending palladium to a monthly high of \$263 on the 28th before a rising dollar temporarily halted the price. However, investors did not abandon palladium and seized on the threat of a strike at ESKOM to send it to a peak of \$280 on the 5th of **August**.

**10** The palladium price halted close to \$270 in mid-August but net long positions on NYMEX continued to grow. A sense of optimism started to return to the automotive market, suggesting that the outlook for palladium was improving. At the end of the month, large flows of metal into the London ETF impelled the price higher. It climbed to \$283 on the 24th before a strike at Impala and other South African supply interruptions added another touch of excitement, helping palladium to end the month at a healthy \$289.

The price ran into stiff resistance near the \$300 mark in the following days. However, investors chipped away at this and when gold broke through the \$1,000 level, palladium rushed to \$296 on the 8th of **September** before it lost momentum and stumbled back.

**11** Palladium found support at the \$290 level and, assisted by gold, it bounced back to \$299 on the 17th. Fund investors were not satisfied though and palladium finally rose through \$300 to fix at \$304 on the 18th, the peak for the first nine months of the year. Inevitably, profit-taking ensued and palladium fell back to \$294 on the 21st. ETF buying drove the price over \$300 again on the 22nd but little support was found. With gold softening and worries over the car industry resurfacing, palladium slipped back to end September at \$294.

## OTHER PGM

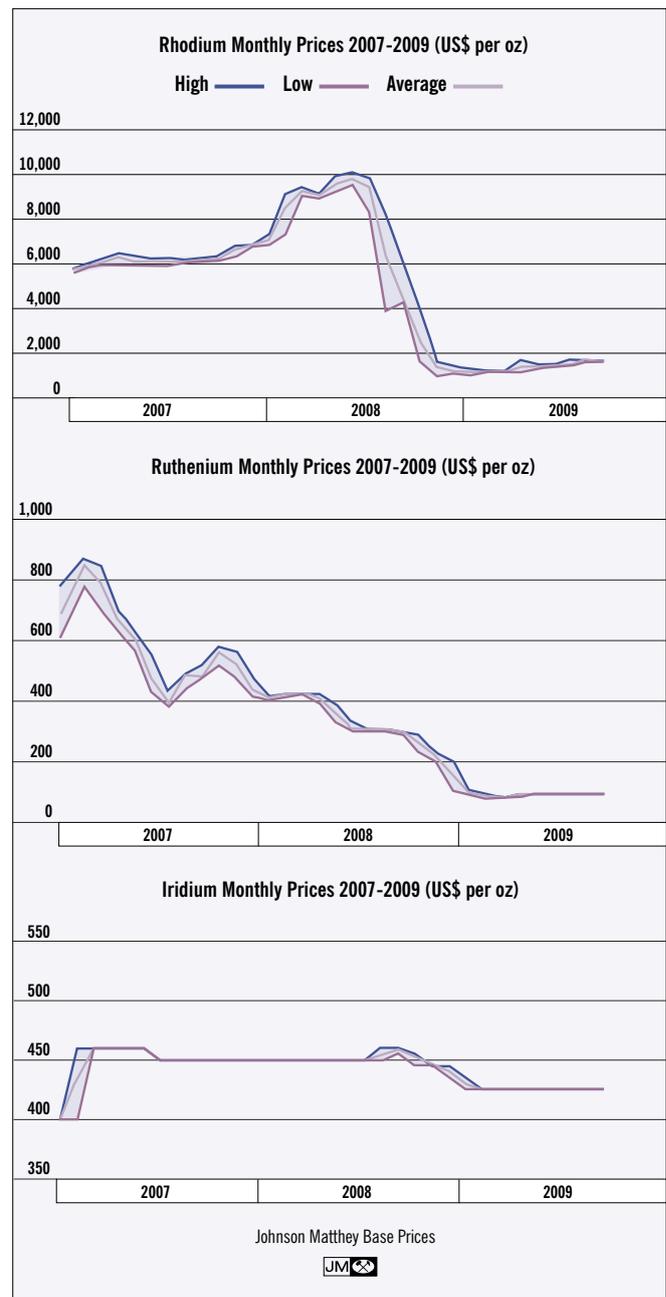
The price of rhodium remained depressed throughout the first nine months of 2009 due to weak automotive demand. It traded at an average \$1,397.10, a long way below the levels of 2008.

Rhodium started 2009 at a Johnson Matthey Base Price of \$1,250. Modest buying pushed the price up to \$1,300 on the 7th of **January**. However, low levels of physical purchasing were insufficient to support it and the price slipped to a low for the first nine months of the year of \$1,050 on the 14th of **January**. Light but steady purchasing drove it back up to \$1,200 for the second half of **February**. Although the price fell back to \$1,125 in late **March**, the belief that rhodium was cheap at this level encouraged some buyers and provided support.

In **April**, rumours of investor purchasing and stock building by the car companies helped rhodium from \$1,225 on the 15th to \$1,675 on the 22nd. Purchasing slowed and it dropped back just as quickly to \$1,325 at the start of **May**. Asian buying continued but was balanced by poor automotive demand and rhodium stayed between \$1,400 and \$1,500 for much of **June**.

In **July**, speculative and physical interest reappeared and the price leapt from \$1,430 on the 22nd to a peak for the first nine months of 2009 of \$1,725 on the 28th. Purchasing eased and rhodium retreated to \$1,650 where it found support from disruptions to the South African mining sector, ending **September** at that level.

Ruthenium began the year weakly at a Johnson Matthey Base Price of \$100. Hard disk manufacturers were able to meet most of their requirements with recycled metal and, with little support from physical purchasing, ruthenium fell to \$95 on the 6th of **January** and further to \$85 – less than ten per cent of its early 2007 peaks – on the 15th. It hit a low of \$75 in mid-

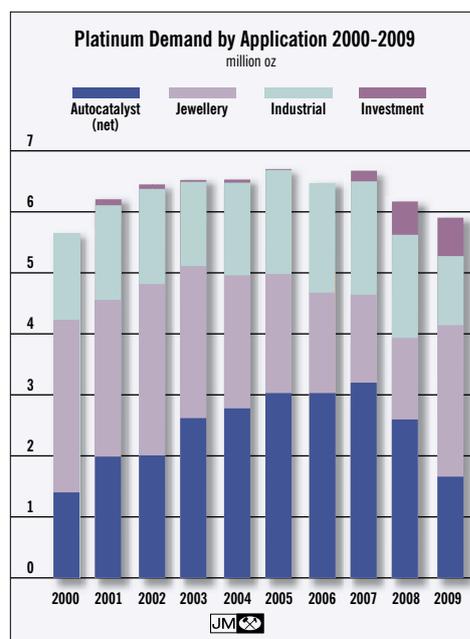
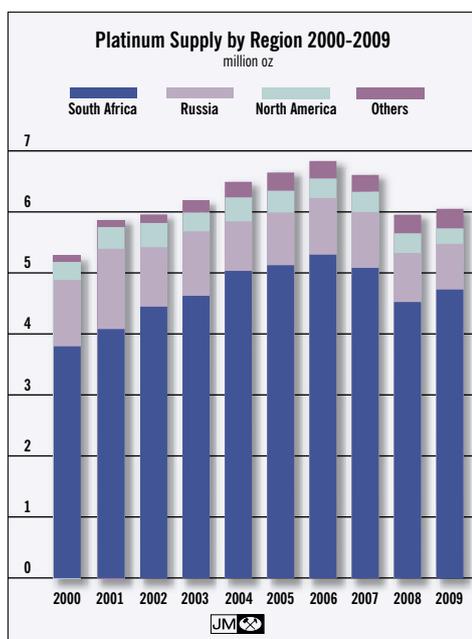


**February** before recovering to \$80 at the end of the month. Limited investor purchasing and some physical interest firmed the price further, sending it to \$90 in late **April** where it stayed until the end of **September**.

Iridium started the year at a Johnson Matthey Base Price of \$435. With industrial interest remaining weak, the price softened to \$425 on the 16th of **January**. With little buying or selling interest evident it remained at this level until the end of **September**.

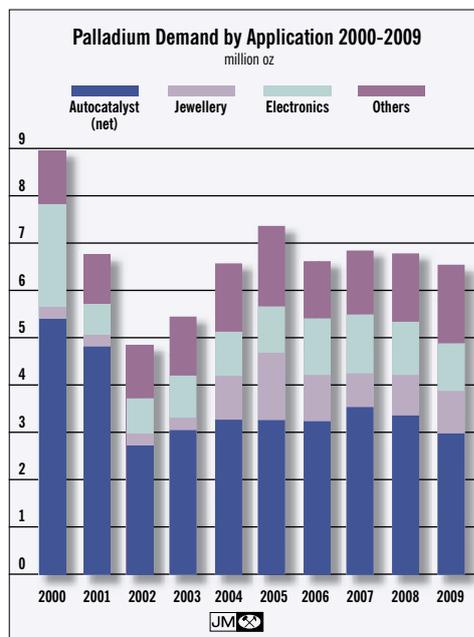
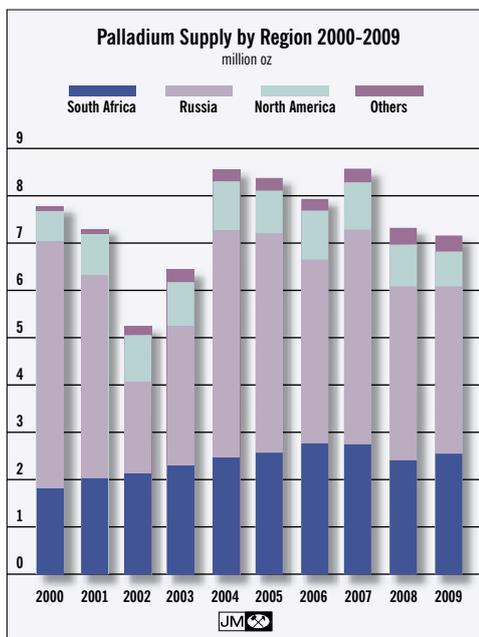
*Poor physical demand depressed the prices of ruthenium and iridium during the first nine months of 2009. Meanwhile, investors boosted the rhodium price.*

Platinum Supply and Demand											
	'000 oz	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Supply <sup>1</sup>	South Africa	3,800	4,100	4,450	4,630	5,010	5,115	5,295	5,070	4,515	4,725
	Russia <sup>8</sup>	1,100	1,300	980	1,050	845	890	920	915	810	745
	North America	285	360	390	295	385	365	345	325	325	255
	Others	105	100	150	225	250	270	270	290	295	330
	<b>Total Supply</b>	<b>5,290</b>	<b>5,860</b>	<b>5,970</b>	<b>6,200</b>	<b>6,490</b>	<b>6,640</b>	<b>6,830</b>	<b>6,600</b>	<b>5,945</b>	<b>6,055</b>
Demand by Application <sup>2</sup>	Autocatalyst: gross <sup>3</sup>	1,890	2,520	2,590	3,270	3,490	3,795	3,905	4,145	3,700	2,480
	recovery <sup>4</sup>	(470)	(530)	(565)	(645)	(690)	(770)	(860)	(935)	(1,120)	(800)
	Chemical	295	290	325	320	325	325	395	420	400	355
	Electrical	455	385	315	260	300	360	360	255	225	175
	Glass	255	290	235	210	290	360	405	470	320	35
	Investment <sup>7</sup>	(60)	90	80	15	45	15	(40)	170	555	630
	Jewellery	2,830	2,590	2,820	2,510	2,160	1,965	1,640	1,455	1,365	2,450
	Petroleum	110	130	130	120	150	170	180	205	240	205
	Other	375	465	540	470	470	475	490	495	500	385
	<b>Total Demand</b>	<b>5,680</b>	<b>6,230</b>	<b>6,470</b>	<b>6,530</b>	<b>6,540</b>	<b>6,695</b>	<b>6,475</b>	<b>6,680</b>	<b>6,185</b>	<b>5,915</b>
Movements in Stocks <sup>5</sup>	(390)	(370)	(500)	(330)	(50)	(55)	355	(80)	(240)	140	
Average Price (US\$) <sup>6</sup>	545	529	540	691	846	897	1,143	1,304	1,576	1,143	



Platinum Demand by Application: Regions											
	'000 oz	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Europe	Autocatalyst: gross	680	1,060	1,210	1,455	1,680	1,960	2,060	2,055	1,970	1,070
	recovery	(40)	(70)	(90)	(115)	(145)	(170)	(190)	(215)	(385)	(290)
	Chemical	100	105	115	105	115	100	100	110	105	75
	Electrical	80	65	40	35	40	40	25	15	15	15
	Glass	20	10	10	10	5	10	10	15	(25)	10
	Investment	0	0	0	0	0	0	0	195	105	355
	Jewellery	190	170	160	190	195	195	195	200	200	185
	Petroleum	15	15	15	15	15	15	20	25	35	25
	Other	105	155	190	185	190	175	175	185	185	150
	<b>Total</b>		<b>1,150</b>	<b>1,510</b>	<b>1,650</b>	<b>1,880</b>	<b>2,095</b>	<b>2,325</b>	<b>2,395</b>	<b>2,585</b>	<b>2,205</b>
Japan	Autocatalyst: gross	290	340	430	500	615	600	605	610	610	465
	recovery	(60)	(55)	(55)	(60)	(55)	(35)	(35)	(35)	(60)	(50)
	Chemical	20	25	30	40	40	50	50	55	55	45
	Electrical	90	80	55	40	50	65	55	35	30	30
	Glass	65	85	60	85	90	95	100	85	70	10
	Investment	(95)	45	40	(10)	15	(15)	(65)	(60)	385	170
	Jewellery	1,060	750	780	660	560	510	360	180	55	310
	Petroleum	5	5	5	5	5	5	5	5	10	10
	Other	35	35	55	40	40	45	40	45	45	35
	<b>Total</b>		<b>1,410</b>	<b>1,310</b>	<b>1,400</b>	<b>1,300</b>	<b>1,360</b>	<b>1,320</b>	<b>1,115</b>	<b>920</b>	<b>1,200</b>
North America	Autocatalyst: gross	620	795	570	885	800	820	705	850	505	345
	recovery	(350)	(370)	(380)	(420)	(435)	(505)	(575)	(605)	(620)	(395)
	Chemical	100	100	100	95	90	100	100	95	95	65
	Electrical	145	120	100	85	90	95	75	55	30	20
	Glass	50	35	30	(30)	(10)	5	10	25	(5)	(15)
	Investment	35	45	40	25	25	25	20	30	60	100
	Jewellery	380	280	310	310	290	275	245	220	195	140
	Petroleum	35	40	45	40	35	35	35	30	25	15
	Other	210	250	265	215	205	220	225	215	215	145
	<b>Total</b>		<b>1,225</b>	<b>1,295</b>	<b>1,080</b>	<b>1,205</b>	<b>1,090</b>	<b>1,070</b>	<b>840</b>	<b>915</b>	<b>500</b>
China <sup>9</sup>	Autocatalyst: gross	10	15	35	60	75	120	155	175	185	215
	recovery	0	0	0	0	0	0	0	(10)	(15)	(20)
	Chemical	20	10	10	10	10	10	65	70	60	75
	Electrical	20	15	15	15	20	25	45	20	30	20
	Glass	35	65	40	30	60	70	50	180	85	(35)
	Investment	0	0	0	0	0	5	0	0	0	0
	Jewellery	1,100	1,300	1,480	1,200	1,010	875	760	780	850	1,750
	Petroleum	15	15	5	5	5	5	10	10	10	10
	Other	5	5	5	5	5	10	10	15	20	20
	<b>Total</b>		<b>1,205</b>	<b>1,425</b>	<b>1,590</b>	<b>1,325</b>	<b>1,185</b>	<b>1,120</b>	<b>1,095</b>	<b>1,240</b>	<b>1,225</b>
Rest of the World <sup>9</sup>	Autocatalyst: gross	290	310	345	370	320	295	380	455	430	385
	recovery	(20)	(35)	(40)	(50)	(55)	(60)	(60)	(70)	(40)	(45)
	Chemical	55	50	70	70	70	65	80	90	85	95
	Electrical	120	105	105	85	100	135	160	130	120	90
	Glass	85	95	95	115	145	180	235	165	195	65
	Investment	0	0	0	0	5	0	5	5	5	5
	Jewellery	100	90	90	150	105	110	80	75	65	65
	Petroleum	40	55	60	55	90	110	110	135	160	145
	Other	20	20	25	25	30	25	40	35	35	35
	<b>Total</b>		<b>690</b>	<b>690</b>	<b>750</b>	<b>820</b>	<b>810</b>	<b>860</b>	<b>1,030</b>	<b>1,020</b>	<b>1,055</b>

Palladium Supply and Demand											
	'000 oz	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Supply <sup>1</sup>	South Africa	1,860	2,010	2,160	2,320	2,480	2,605	2,775	2,765	2,430	2,530
	Russia <sup>8</sup>	5,200	4,340	1,930	2,950	4,800	4,620	3,920	4,540	3,660	3,560
	North America	635	850	990	935	1,035	910	985	990	910	750
	Others	105	120	170	245	265	270	270	285	310	335
	<b>Total Supply</b>	<b>7,800</b>	<b>7,320</b>	<b>5,250</b>	<b>6,450</b>	<b>8,580</b>	<b>8,405</b>	<b>7,950</b>	<b>8,580</b>	<b>7,310</b>	<b>7,175</b>
Demand by Application <sup>2</sup>	Autocatalyst: gross <sup>3</sup>	5,640	5,090	3,050	3,450	3,790	3,865	4,015	4,545	4,460	3,895
	recovery <sup>4</sup>	(230)	(280)	(370)	(410)	(530)	(625)	(805)	(1,015)	(1,115)	(950)
	Chemical	255	250	255	265	310	415	440	375	355	345
	Dental	820	725	785	825	850	815	620	630	625	605
	Electronics	2,160	670	760	900	920	970	1,205	1,240	1,100	1,000
	Jewellery	255	240	270	260	930	1,430	995	715	855	920
	Investment <sup>7</sup>	0	0	0	30	200	220	50	260	420	635
	Other <sup>7</sup>	60	65	90	110	90	265	85	85	75	70
<b>Total Demand</b>	<b>8,960</b>	<b>6,760</b>	<b>4,840</b>	<b>5,430</b>	<b>6,560</b>	<b>7,355</b>	<b>6,605</b>	<b>6,835</b>	<b>6,775</b>	<b>6,520</b>	
Movements in Stocks <sup>5</sup>	(1,160)	560	410	1,020	2,020	1,050	1,345	1,745	535	655	
Average Price (US\$) <sup>6</sup>	681	603	337	201	230	201	320	355	352	236	



Palladium Demand by Application: Regions											
	'000 oz	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Europe	Autocatalyst: gross	1,900	1,730	1,370	1,220	1,105	975	890	920	1,005	985
	recovery	(15)	(30)	(45)	(70)	(110)	(165)	(225)	(300)	(300)	(335)
	Chemical	95	65	70	65	70	155	175	95	100	85
	Dental	100	50	55	70	80	75	75	70	65	65
	Electronics	265	35	85	85	115	80	105	160	95	75
	Jewellery	45	35	35	35	35	35	40	40	45	50
	Investment	0	0	0	0	0	0	0	280	370	540
	Other	20	20	15	20	25	20	25	20	20	20
	<b>Total</b>	<b>2,410</b>	<b>1,905</b>	<b>1,585</b>	<b>1,425</b>	<b>1,320</b>	<b>1,175</b>	<b>1,085</b>	<b>1,285</b>	<b>1,400</b>	<b>1,485</b>
Japan	Autocatalyst: gross	510	505	520	550	635	660	795	820	885	680
	recovery	(50)	(40)	(40)	(40)	(40)	(30)	(30)	(35)	(70)	(50)
	Chemical	20	20	20	25	25	25	25	25	20	20
	Dental	470	475	505	515	520	475	270	275	275	270
	Electronics	990	260	140	225	235	265	275	270	275	265
	Jewellery	150	140	165	160	155	145	130	95	80	95
	Investment	0	0	0	0	0	0	0	0	0	0
	Other	15	10	10	5	10	10	10	10	10	10
	<b>Total</b>	<b>2,105</b>	<b>1,370</b>	<b>1,320</b>	<b>1,440</b>	<b>1,540</b>	<b>1,550</b>	<b>1,475</b>	<b>1,460</b>	<b>1,475</b>	<b>1,290</b>
North America	Autocatalyst: gross	2,805	2,375	640	1,205	1,445	1,430	1,415	1,695	1,290	935
	recovery	(155)	(200)	(260)	(270)	(345)	(390)	(500)	(590)	(655)	(470)
	Chemical	65	75	75	70	85	85	80	75	55	50
	Dental	230	190	215	225	235	250	260	265	270	255
	Electronics	485	250	210	215	185	195	190	140	125	110
	Jewellery	10	10	10	10	10	20	40	55	60	70
	Investment	0	0	0	30	200	220	50	(20)	50	95
	Other	5	15	45	65	30	215	30	30	20	15
	<b>Total</b>	<b>3,445</b>	<b>2,715</b>	<b>935</b>	<b>1,550</b>	<b>1,845</b>	<b>2,025</b>	<b>1,565</b>	<b>1,650</b>	<b>1,215</b>	<b>1,060</b>
China <sup>9</sup>	Autocatalyst: gross	15	40	55	90	105	170	220	325	385	520
	recovery	0	0	0	0	0	0	0	(20)	(30)	(35)
	Chemical	30	30	40	40	50	55	65	80	60	75
	Dental	0	0	0	5	5	5	5	5	0	0
	Electronics	175	100	75	240	275	275	315	325	240	215
	Jewellery	20	25	30	25	700	1,200	760	500	650	680
	Investment	0	0	0	0	0	0	0	0	0	0
	Other	5	5	5	5	10	5	10	10	10	10
	<b>Total</b>	<b>245</b>	<b>200</b>	<b>205</b>	<b>405</b>	<b>1,145</b>	<b>1,710</b>	<b>1,375</b>	<b>1,225</b>	<b>1,315</b>	<b>1,465</b>
Rest of the World <sup>9</sup>	Autocatalyst: gross	410	440	465	385	500	630	695	785	895	775
	recovery	(10)	(10)	(25)	(30)	(35)	(40)	(50)	(70)	(60)	(60)
	Chemical	45	60	50	65	80	95	95	100	120	115
	Dental	20	10	10	10	10	10	10	15	15	15
	Electronics	245	25	250	135	110	155	320	345	365	335
	Jewellery	30	30	30	30	30	30	25	25	20	25
	Investment	0	0	0	0	0	0	0	0	0	0
	Other	15	15	15	15	15	15	10	15	15	15
	<b>Total</b>	<b>755</b>	<b>570</b>	<b>795</b>	<b>610</b>	<b>710</b>	<b>895</b>	<b>1,105</b>	<b>1,215</b>	<b>1,370</b>	<b>1,220</b>



Rhodium Supply and Demand											
	'000 oz	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Supply <sup>1</sup>	South Africa	457	452	490	544	587	627	666	696	574	620
	Russia <sup>8</sup>	290	125	90	140	100	90	100	90	85	65
	North America	17	23	25	26	17	20	17	20	18	12
	Others	3	4	10	14	16	17	19	18	18	22
	<b>Total Supply</b>	<b>767</b>	<b>604</b>	<b>615</b>	<b>724</b>	<b>720</b>	<b>754</b>	<b>802</b>	<b>824</b>	<b>695</b>	<b>719</b>
Demand by Application <sup>2</sup>	Autocatalyst: gross <sup>3</sup>	793	566	599	660	758	829	863	887	765	618
	recovery <sup>4</sup>	(79)	(88)	(99)	(124)	(140)	(137)	(171)	(192)	(224)	(181)
	Chemical	39	44	39	39	43	48	49	63	68	66
	Electrical	7	6	6	6	8	10	9	3	3	3
	Glass	42	41	37	26	46	57	65	59	34	21
	Other	10	10	10	13	14	20	23	24	24	21
<b>Total Demand</b>	<b>812</b>	<b>579</b>	<b>592</b>	<b>620</b>	<b>729</b>	<b>827</b>	<b>838</b>	<b>844</b>	<b>670</b>	<b>548</b>	
	Movements in Stocks <sup>5</sup>	(45)	25	23	104	(9)	(73)	(36)	(20)	25	171
	Average Price (US\$) <sup>6</sup>	1,998	1,604	838	530	986	2,056	4,552	6,191	6,564	1,397



## NOTES TO TABLES

<sup>1</sup>**Supply** figures represent estimates of sales by the mines of primary pgm. Additionally, we continue to report sales of metal which we do not believe has previously been available to the market – principally sales of Russian state stocks – as supplies.

<sup>2</sup>With the exception of the autocatalyst sector, **demand** estimates are net figures: i.e. demand in any individual sector is the total of purchases by consuming industries less any sales back to the market. Annual demand totals therefore represent purchases of new primary metal by consumers in a given year but do not include forward purchases of metal.

<sup>3</sup>**Gross autocatalyst demand** represents physical purchases of pgm by the auto industry for the manufacture of catalytic converters and is allocated to the region where the vehicle is manufactured.

<sup>4</sup>**Autocatalyst recovery** is metal recovered from scrapped catalytic converters and is allocated to the region in which the converter was scrapped as a negative contribution to demand. Figures for 2008 and 2009 have been adjusted to reflect better information on the location of origin of scrapped catalysts reprocessed. Figures for years before this have not been adjusted.

<sup>5</sup>**Movements in stocks** in any given year reflect changes in stocks held by fabricators, dealers, banks and depositories but excluding stocks held by primary refiners and final consumers. A positive figure (sometimes referred to as a 'surplus') reflects an increase in market stocks. A negative value (or 'deficit') indicates a decrease in market stocks.

<sup>6</sup>**Average price** figures for platinum and palladium are the mean of all daily fixing values in a given year except for 2009 which cover the period January to September inclusive. Average price figures for rhodium, ruthenium and iridium are based on Johnson Matthey base prices.

<sup>7</sup>The **investment** demand category combines the previous **investment: small** and **investment: large** categories for platinum. This category now comprises the long-term holding of coins and minted bars of 1 kg or less; investments held in allocated accounts for subscribers to accumulation plans; and metal held in Exchange Traded Funds. For palladium, investment figures are now shown separately, having previously been included in the **other** demand category.

<sup>8</sup>Prior to 2006 **Russian supply** figures are net of Russian and ex-CIS states' demand. From 2006 onwards Russian supply figures represent the total pgm shipped to all regions including Russia and the ex-CIS. Demand in Russia and the ex-CIS states is included in the Rest of the World region from 2006 onwards.

<sup>9</sup>Demand for platinum and palladium in **China** has been separated from demand in the Rest of the World region for the whole of the reporting period.

## GLOSSARY

BEE	Black Economic Empowerment	Platreef	A platinumiferous ore body in South Africa
CIS	Commonwealth of Independent States	PM	Particulate Matter
CO	Carbon Monoxide	PMR	Perpendicular Magnetic Recording
CSF	Catalysed Soot Filter	ppm	Parts Per Million
DMFC	Direct Methanol Fuel Cell	ppt	Parts Per Thousand
DOC	Diesel Oxidation Catalyst	PTA	Purified Terephthalic Acid
DPF	Diesel Particulate Filter	SCR	Selective Catalytic Reduction
ETF	Exchange Traded Fund	SUV	Sports Utility Vehicle
ETN	Exchange Traded Note	TOCOM	Tokyo Commodity Exchange
g	Gram	ton	Short ton (2,000 pounds or 907 kg)
HC	HydroCarbons	tonne	1,000 kg
HDD	Heavy Duty Diesel	TWC	Three-Way Catalyst
HIC	Hybrid Integrated Circuit	UG2	A platinumiferous ore body in South Africa
JV	Joint Venture	ULEV	Ultra Low Emissions Vehicle
kg	Kilograms	VAM	Vinyl Acetate Monomer
LCD	Liquid Crystal Display		
Merensky	A platinumiferous ore body in South Africa		
MLCC	Multi-Layer Ceramic Capacitor		
NO <sub>x</sub>	Oxides of nitrogen		
NYMEX	New York Mercantile Exchange		
OBD	On-Board Diagnostics		
oz	Ounces troy		
PDP	Plasma Display Panels		
PEMFC	Proton Exchange Membrane Fuel Cell		
PET	PolyEthylene Terephthalate		
pgm	Platinum Group Metal(s)		

### NOTE ON PRICES

All prices are quoted per oz unless otherwise stated.

R	South African Rand
£	UK Pound
\$	US Dollar
¥	Japanese Yen
€	Euro
RMB	Chinese Renminbi

## PICTURE CREDITS

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Headgear at Lonmin's Hossy shaft, front cover

Platinum bars, front cover and p2

Petroleum reforming plant, front cover and p2

Biliary platinum stent, front cover and p2

Parting basket for assaying, front cover and p3

Flotation processing at Impala lease area, inside cover

Melting of scrap jewellery in China, p2

Autocatalyst recycling, p2

Mototolo mine, p2 and p13

Unsold cars, p2 and p19

Komsomolsky mine in Norilsk, p3

Uncoated diesel filters, p3

Palladium jewellery purchase, p3

Multi-layer ceramic capacitors, p3

Employee at Mimosa flotation plant, p3

Palladium ingots, p3 and p24

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