PLATINUM 2010

Interim Review

Johnson Matthey

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Iron milling balls such as these are used to break ore down into smaller pieces as a first step in platinum group metal processing.

PLATINUM 2010

Interim Review

by **Jonathan Butler**

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Johnson Matthey

EXECUTIVE SUMMARY

The platinum market is forecast to be in surplus by 290,000 oz in 2010. Gross demand is set to rise by 11 per cent to 7.56 million ounces, driven by increased autocatalyst and industrial demand. Recycling of platinum from the autocatalyst and jewellery sectors is also set to increase, but will not offset the growth in gross demand. Net demand for platinum is set to rise by 6 per cent to 5.72 million ounces.

Supplies of platinum from current mining operations are expected to remain almost flat in 2010. Lower output from South Africa and North America in the first half of 2010 is set to reduce total annual mined output and sales of refined metal by a modest 15,000 oz to 6.01 million ounces. Output from Russia, Zimbabwe and others is expected to rise.

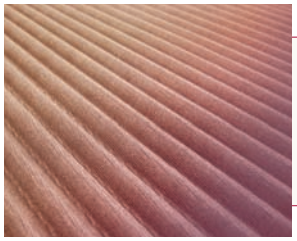
Gross demand for platinum from the autocatalyst sector is forecast to grow by 37 per cent to 2.99 million ounces. A more positive economic outlook and an improved credit environment are expected to lift sales, with a strong recovery in sales of diesel vehicles in Europe favouring platinum demand. A recovery of the heavy duty diesel market is also forecast to lift demand.

Purchases of platinum by the jewellery sector are expected to contract by 14 per cent to 2.42 million ounces. Higher platinum prices in 2010 have reduced jewellery purchases and stock building. The increased price has also helped to raise recycling levels, which are expected to result in net jewellery demand reducing by a quarter to 1.69 million ounces.

Identifiable physical investment demand for platinum is anticipated to decrease by 34 per cent to 435,000 oz in 2010. Steady trade in physically-backed exchange traded funds (ETFs) will provide the bulk of new demand, although this will be constrained by redemptions in the more mature funds.

Industrial demand is expected to recover strongly in 2010, raising platinum demand by 51 per cent to 1.72 million ounces. Improved consumer and business confidence should increase purchases of electrical and consumer goods, lifting demand for platinum in the chemical industry, the manufacture of LCD glass, and in electrical goods.

The rhodium market is forecast to tighten in 2010, with an oversupply of 79,000 oz compared with 241,000 oz last year. Supplies are set to fall by 7 per cent to 716,000 oz while gross demand is forecast to increase by 22 per cent to 876,000 oz. Higher autocatalyst, chemical and glass demand is responsible for most of this increase.



The palladium market is expected to be close to balance in 2010. We anticipate that supplies, including sales of metal from Russian state stocks, will remain at similar levels to last year, at 7.14 million ounces. Autocatalyst, industrial and investment demand is expected to increase, raising our gross demand figure to 8.94 million ounces. Net demand for palladium is expected to increase to 7.10 million ounces.

Supplies of palladium are forecast to total 7.14 million ounces in 2010. Reduced output due to strikes and supply interruptions in North America is likely to largely offset an increase in supplies from other regions. South African supplies are expected to increase by 115,000 oz to 2.49 million ounces. We estimate that sales of palladium from Russian state stocks will once again contribute around 1 million ounces to supplies.

Automotive demand for palladium is set to increase by 27 per cent to 5.15 million ounces in 2010. This rise is due to recovery of the automotive sector in all regions, together with strong demand from gasoline car markets in China and the Rest of the World region.

Gross demand for palladium in jewellery is forecast to fall by 19 per cent to 630,000 oz. Declining consumer and trade interest in palladium jewellery is expected to impact on demand in the Chinese market. Palladium jewellery demand is expected to increase in Europe.

Identifiable physical investment demand for palladium is anticipated to rise to 670,000 oz, an increase of 45,000 oz. Palladium ETF investment demand was strong in the first half of 2010, but has since slowed. Redemptions in the more mature funds should limit the increase in new demand.

Industrial demand for palladium is forecast to rise to 2.49 million ounces, returning close to its 2008 level. Increased production of electrical components for re-stocking following a dismal 2009 is expected to drive up electrical demand to 1.41 million ounces. Dental demand is expected to see a modest drop of 15,000 oz in line with long term trends towards new materials in dental treatment and improved dental health in general.

Recycling of palladium is set to increase by 29 per cent to 1.85 million ounces. Higher palladium prices are expected to lift recycling levels in the autocatalyst, electrical and jewellery sectors, offsetting gross demand to some extent.

SUMMARY & OUTLOOK

PLATINUM

- **The platinum market is forecast to be in surplus by 290,000 oz in 2010. Gross demand for platinum is set to rise by 11% to 7.56 million ounces.**
- **Supplies are expected to remain almost flat at 6.01 million ounces, while recovery of platinum from recycling is forecast to increase to 1.84 million ounces.**
- **Gross automotive demand for platinum is forecast to increase by 800,000 oz to 2.99 million ounces.**
- **Jewellery demand is set to soften by 14% in 2010 to 2.42 million ounces as consumers feel the effect of higher prices.**
- **Industrial demand is expected to rise by 51% to 1.72 million ounces, back to the 2008 level.**
- **Identifiable physical investment demand is forecast to decrease by 34% to 435,000 oz.**

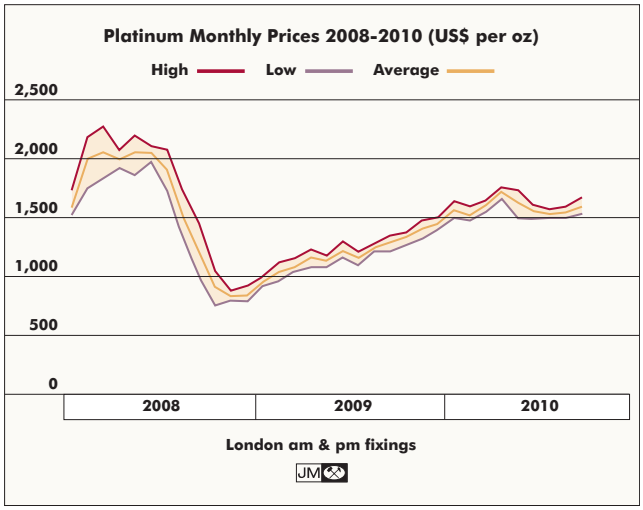
Platinum demand was boosted in the first nine months of 2010 by improved economic conditions, which lifted business and consumer confidence and led to a recovery of many industrial sectors. For the full year, gross platinum demand is expected to increase by 11 per cent to 7.56 million ounces. Supplies are anticipated to remain almost flat at 6.01 million ounces, while the weight of platinum recovered from open loop recycling is expected to increase to 1.84 million ounces. The global platinum market is therefore forecast to be in oversupply by 290,000 oz in 2010.

After a miserable 2009, the global automotive sector is expected to recover strongly in 2010 with global light duty vehicle production predicted by some analysts to be in the region of 70 million units for the full year. This represents an increase of over 10 million units compared with 2009. Gross purchases of platinum for use in autocatalysts are set to see an increase of 37 per cent to 2.99 million ounces in 2010 as the share of diesel vehicles sold in Europe recovers, and as year-on-year automotive sales increase. Although the first half of 2010 saw high levels of light duty vehicle production, full year production levels could be lower than those before the recession.

Europe will see the largest increase in automotive platinum demand, rising by 46 per cent to 1.42 million ounces. This is due not only to increased demand for vehicles as consumers and fleet buyers return to showrooms, but also to an increase in the share of diesel vehicles after a temporary decline in 2009. Various government incentive schemes, designed to stimulate new car sales last year, had the effect of increasing sales of small, gasoline vehicles at the expense of larger, diesel vehicles using platinum-based exhaust aftertreatment. Poor economic conditions and reduced credit availability in 2009 deferred purchases of fleet vehicles, which are predominantly diesel. A return to more normal car buying habits, as well as increased fleet sales, is expected to boost platinum demand in Europe.

Elsewhere in the world, demand for platinum in diesel exhaust aftertreatment systems is expected to increase in 2010 as sales improve in line with economic recovery. Demand for diesel emissions treatment systems in light and heavy duty vehicles alike is expected to rise as consumers and businesses invest in new vehicles. Economic recovery in export markets is likely to spur demand for platinum in light duty diesel vehicle production in Japan and the Rest of the World region. Tightening emissions standards around the world are also expected to lift platinum demand. In the North American market in particular, platinum loadings are set to rise on heavy duty diesel vehicles as manufacturers fit platinum ammonia slip catalysts in NOx aftertreatment systems.

The jewellery sector, after a strong year in 2009, is expected to reduce platinum purchasing by 390,000 oz, lowering gross platinum jewellery demand to 2.42 million ounces. For the first nine months of 2010, the price of platinum traded on average 31



The price of platinum continued its upward trend in the early part of 2010, trading generally higher than throughout 2009.

per cent higher than for the full year of 2009, impacting the retail price of platinum jewellery, particularly in the price-sensitive Chinese market. Full stock levels, thanks to last year's lower price, and reduced consumer spending this year are reflected in our forecast of reduced gross demand for platinum jewellery in China, down to 1.65 million ounces in 2010 from 2.08 million ounces the previous year. Japanese jewellery demand is expected to remain almost flat in 2010, following an adjustment in our figure for 2009 when, in the depths of the economic downturn, consumers reduced discretionary spending on platinum fashion jewellery items.

Gross industrial demand for platinum is forecast to increase by an impressive 51 per cent in 2010 as better economic conditions drive restocking and production levels across many industrial sectors. The chemical sector is expected to increase platinum purchases by 55 per cent to 450,000 oz as plants are run at higher capacity, boosting demand for process catalysts and platinum gauze in nitric acid production. Demand from the glass manufacturing sector is also set to increase substantially, albeit from a low level in 2009, as new LCD glass manufacturing lines are commissioned in Asia. This increases our demand figures for China, Japan and the Rest of the World region. We forecast that demand for platinum in the electrical sector will also pick up as the consumer electronics sector recovers from recession. Increased consumer and business spending on electrical goods is set to benefit demand for platinum in applications such as hard disk drives. Demand for platinum in medical applications is expected to be a solid 255,000 oz in 2010. We cover this sector in detail in our Special Feature on pages 21 and 22.

Identifiable physical investment demand for platinum is set to fall in 2010 by 225,000 oz to 435,000 oz. While demand for physically-backed Exchange Traded Funds (ETFs) remains high, particularly in North America, redemptions in the more mature European funds are anticipated to result in reduced demand for new metal. Net demand for large investment bars in Japan is likely to decline this year in line with the higher platinum price.

Recovery of platinum from open loop recycling in the autocatalyst, electrical and jewellery sector is set to rise by 435,000 oz in 2010 to 1.84 million ounces. Recycling of platinum from spent autocatalysts is expected to rise as metal is processed from vehicles scrapped under government incentive schemes. Higher platinum prices this year are also expected to stimulate recycling from the jewellery sector, moderating net demand for jewellery.

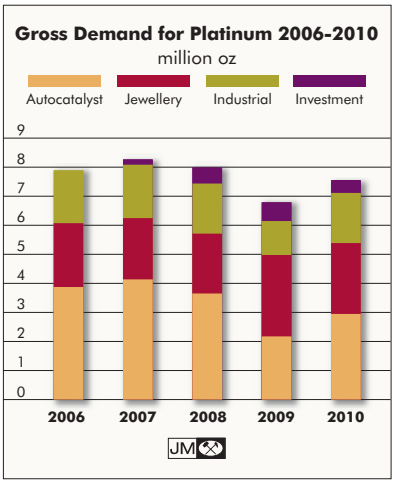
Platinum supplies are forecast to remain almost flat in 2010 at 6.01 million ounces. Supplies from current mining operations in South Africa are expected to decline slightly to 4.59 million ounces as the effects of a series of shaft closures, safety stoppages and strikes are felt. South African production of platinum is likely to be strongly weighted towards the second half of 2010, particularly for two of the major producers, Anglo Platinum and Lonmin, as stocks of unrefined platinum are processed.

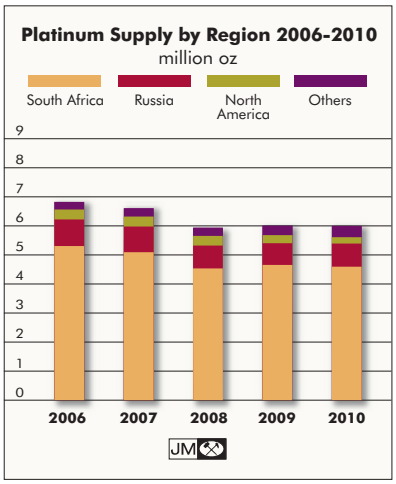
Supplies of platinum from North America are set to fall by 50,000 oz in 2010 as output for the first half of the year has been disrupted by labour disputes and difficult geological conditions. Russian shipments of platinum are expected to increase in 2010 to 810,000 oz due to improved production. Platinum output is expected to increase once again in Zimbabwe, by 50,000 oz, bringing total production to 280,000 oz. We anticipate that there will be modestly increased output from other mining regions.

The price of platinum continued to rise throughout the first four months of 2010 as industrial and automotive demand picked up and commodities benefited from a weaker US Dollar. Platinum peaked at $1,752 in late April but fell during May as concerns over sovereign

Platinum Supply and Demand
'000 oz

Supply	2008	2009	2010
South Africa	4,515	4,635	4,585
Russia	805	785	810
Others	620	605	615
Total Supply	**5,940**	**6,025**	**6,010**
Gross Demand			
Autocatalyst	3,655	2,185	2,985
Jewellery	2,060	2,810	2,420
Investment	555	660	435
Others	1,720	1,140	1,720
Total Gross Demand	**7,990**	**6,795**	**7,560**
Recycling	**(1,830)**	**(1,405)**	**(1,840)**
Total Net Demand	**6,160**	**5,390**	**5,720**
Movements in Stocks	**(220)**	**635**	**290**





debt and 'double dip' recession hit investor confidence. Platinum traded in general between $1,500 and $1,600 in the following months, with price dips stimulating strong physical buying in Asia. As gold reached record prices in September, platinum's price also rose, ending the nine month period at $1,662 – $162 higher than at the start of the year. Platinum's average price for the first nine months of 2010 was $1,581, 38 per cent higher than for the same period in 2009. Despite the recovery in automotive and industrial demand and the flat supply situation, external influences such as the weaker dollar and higher gold price seem to have a considerable bearing on the platinum price.

Outlook

The first half of 2010 saw a strong recovery in the world economy, driving up industrial demand for platinum. The outlook for the remainder of 2010 and 2011 is less certain, with the possibility that sovereign debt concerns, tighter credit, and national austerity measures may slow economic growth.

Autocatalyst demand for platinum is expected to continue to rise in 2011, driven by a recovery in demand for diesel cars in Europe. In the third quarter of 2010, signs were emerging in Europe and North America of a slowdown in recovery in the automotive sector, with monthly car sales lower than in previous months of 2010 although higher than in 2009. These trends could continue into 2011 if consumer spending on big-ticket items reduces. However, platinum demand will get a boost from tightening emissions standards, particularly for heavy duty diesels in North America.

Industrial demand is expected to continue its recovery in 2011 as higher output drives demand for platinum in process catalysts and in the electrical sector. Growth in traditional markets such as North America and Europe may be restrained, but high demand is likely to result from faster growth in China and the Rest of the World region.

The outlook for the identifiable physical investment sector is strongly predicated on sell-backs of existing ETF positions netting off the bulk of new investment demand. Levels of physically-backed ETF investment have grown quickly over the past two years; however, two-way trade has reduced the level of new metal in 2010, a trend we expect to continue in 2011. Jewellery demand for platinum may soften in 2011 as consumer spending is affected by weaker economic performance in North America and Europe.

Overall, we anticipate that the platinum market could remain in moderate surplus in 2011 with near-flat production, and rising demand offset by greater levels of recycling. The recent performance of platinum suggests that its price is currently largely unmoved by supply-demand fundamentals. It will remain strongly influenced by external factors such as the strength of the US Dollar, the gold market and speculative investor interest.

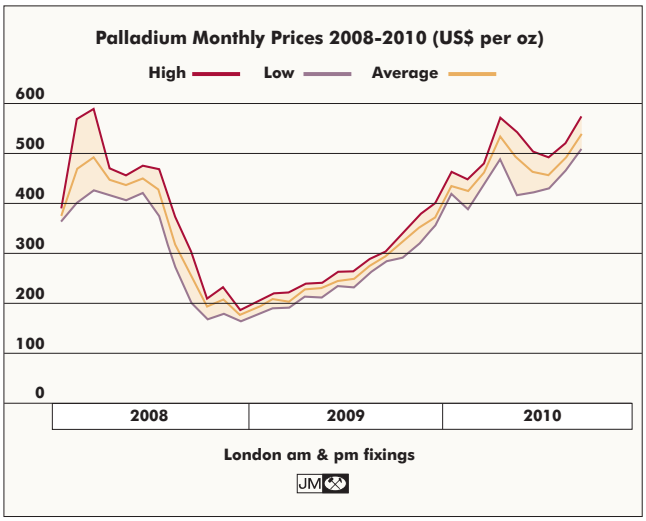
Sales of light duty vehicles in China are expected to grow strongly in 2010, boosting demand for palladium in gasoline autocatalysts.

PALLADIUM

- **The palladium market is forecast to be in a small surplus of 45,000 oz in 2010. Gross demand is expected to rise by 15% to 8.94 million ounces. Supplies of palladium are expected to remain almost flat at 7.14 million ounces.**
- **Recovery of palladium from recycling is set to increase by 29% to 1.85 million ounces.**
- **Gross automotive demand for palladium is set to rise by 27% to 5.15 million ounces, with purchases of palladium higher in all regions.**
- **Demand for palladium from the jewellery sector is expected to fall to 630,000 oz due to weaker Chinese demand.**
- **Gross industrial demand for palladium is expected to increase by 8% to 2.49 million ounces, driven by recovery of the chemical and electrical sectors.**
- **Net physical investment demand for palladium is anticipated to rise to 670,000 oz, an increase of 7%, principally due to investor appetite for ETFs.**

Palladium demand is forecast to recover well in 2010 as soaring automotive demand and strong purchasing from the industrial and investment sectors more than offset a decline in the jewellery market. Demand for palladium has been supported by improved economic and credit conditions, which have seen an upswing in new car registrations and sales of electrical items in key markets such as North America, Europe and Japan. The car industries of China and the Rest of the World region have continued their remarkable growth in 2010. Sales of predominantly gasoline models in those markets have strongly supported palladium autocatalyst demand. Supplies of palladium are set to increase in all regions apart from North America, where supply interruptions have moderated overall production. In line with our previous forecasts, we anticipate Russian palladium stock shipments in 2010 will be around 1 million ounces. This figure is consistent with the amounts reported in 2008 and 2009. With overall demand set to be historically high, and a flat supply situation, we forecast the palladium market will be in a small annual surplus of 45,000 oz in 2010.

Gross demand for palladium from the global automotive sector is set to increase to 5.15 million ounces in 2010, as vehicle production recovers in all regions. Light duty vehicle manufacture is expected to rise by some 10 million units as consumers and fleet operators, many of whom deferred purchases in 2009, return to car buying. As a result, palladium demand in exhaust aftertreatment, principally in gasoline light duty vehicles, is expected to soar with all regions seeing double-digit per cent increases. The biggest increase in demand is forecast to be in China, the world's largest car market. China is set to see an increase in automotive palladium demand of 36 per cent this year as production of almost exclusively gasoline cars reaches 15.8 million units, driven by demand from an increasingly affluent population and supported by government incentives providing credit support for purchases of small cars. Demand in the Rest of the World region is also set to increase markedly.



The palladium price reached levels not seen since 2008 as it benefited from commodity rallies in May and September 2010.

The increased proportion of palladium used in both gasoline and diesel exhaust aftertreatment systems has helped lift gross automotive demand for palladium. European gasoline catalysts now contain, on average, 97 per cent palladium, while diesel formulations have typically around 25 per cent palladium content. Increased production and sales of both gasoline and diesel vehicles in 2010 is expected to benefit palladium demand. The light duty gasoline sector is responsible for most of the total automotive palladium demand, although the light and heavy duty diesel vehicle sectors are both set to increase substantially this year.

Demand for palladium from the jewellery sector is expected to be tempered in 2010 by declining consumer and trade interest in the large Chinese market. Palladium jewellery demand is set to fall by 145,000 oz in 2010 to 630,000 oz, with

much of that fall attributable to a tailing off in demand in China. Other than in certain cities, palladium has struggled to maintain consumer interest, leading several manufacturers to cease palladium jewellery production. With near-flat demand for platinum jewellery in North America and Japan, we anticipate that demand for palladium as an alloying element will also stay flat. More positively for palladium, its use as a jewellery metal continues to grow in Europe, albeit from a low base.

Industrial demand for palladium is expected to grow by 8 per cent in 2010, rising to 2.49 million ounces. Consumers are expected to take advantage of better economic conditions and resume purchasing electrical goods, driving demand for palladium in electrical applications up by a forecast 135,000 oz. The use of palladium in multi-layered ceramic capacitors, ubiquitous in electrical items, is expected to be the key engine of that growth. With a sustained high price differential between palladium and gold, we expect to see palladium capture market share for plating applications. Chemical demand is set to increase by 60,000 oz as requirements for process catalyst are boosted by increased rates of factory utilisation. Use of palladium in dental applications is set to fall slightly in 2010 as greater use of ceramic crowns and base metals in treatments impacts on demand, and longer-term dental health and population trends begin to be felt.

Net identifiable physical investment demand for palladium is set to continue its upward trend in 2010, reaching 670,000 oz. Demand for palladium in physically-backed ETFs, particularly in North America, is expected to be responsible for much of this growth. Net investment flows into the US-based palladium ETF were very high in the early part of 2010, although they have slowed somewhat since. We anticipate that lower purchases of palladium coins and small bars in 2010 will also reduce demand, while redemptions of the more mature ETFs will lower new palladium investment demand in Europe.

Open loop recycling of palladium in the autocatalyst, electrical and jewellery sectors is forecast to recover to 1.85 million ounces, offsetting some of the improvement in gross demand. Recycling of palladium from spent autocatalysts is set to increase by 37 per cent in 2010, driven by higher metal prices and car scrappage schemes. Electrical recycling is also set to increase as consumers replace electrical goods, while palladium jewellery recycling is set to increase marginally led by consumers and retailers returning palladium jewellery in China.

Supplies of palladium are set to increase in all regions apart from North America, as higher mine production and better economics improve output. A fall in production from mines in North America of 26 per cent, to 560,000 oz, is forecast to leave total palladium production almost flat at 7.14 million ounces. The drop in North American production is a result of strikes, stoppages and more difficult geological conditions. Production in South Africa is expected to increase by 115,000 oz as expansion of mines exploiting palladium-rich deposits, including Mogalakwena mine and Nkomati Nickel, takes place. The supply situation in South Africa for palladium is markedly different to 2009, when sales were below the level of refined output.

Russian supplies are forecast to rise in 2010 through increased palladium primary production at Norilsk Nickel. Supplies of palladium are once again forecast to be augmented by substantial sales from state stocks, with the remainder of the large volumes of palladium shipped by Gokhran into Switzerland during 2007-2008 expected to be sold into the market. Our palladium supply numbers do not include several tonnes of palladium shipped from Russia into Switzerland in early 2010; we believe that this was simply a relocation of metal that had already been sold.

Palladium's price performed strongly in the first nine months of 2010, with solid industrial and investment demand, particularly from ETF investors. Peaking briefly at $571 in May, the price dropped substantially as part of the wider commodities sell-off. The price recovered in the following months, aided by investment inflows and a rising gold price. Palladium's price rose to the highest level in two and a half years, touching $573 as it rallied along with gold in late September. The average price for the first nine months of 2010 was $477, more than double the average price for the same period in 2009.

Outlook

The outlook for palladium remains positive over the next twelve months as automotive demand continues to increase in key markets for gasoline vehicles in China and the Rest of the World region. Assuming slower economic growth in the developed world, in the remainder of 2010 and into 2011 demand for palladium in industrial applications could soften in Europe and North America but remain strong in China and the Rest of the World. We anticipate that higher palladium production in all regions, combined with steadily increasing industrial demand, will keep the palladium market close to balance in 2011.

Economic conditions in 2011 are forecast to be mixed. After a strong recovery in 2010, a period of slower growth in 2011 is anticipated as consumers feel the effects of government austerity measures, interest rates begin to rise and the restocking that was evident in several industrial sectors during 2010 is completed. Significantly, we expect that while slower growth will impact developed economies in Europe, Japan and North America, China and the Rest of the World region will continue to see substantial economic growth, maintaining strong demand for palladium.

Growth in the automotive sector in 2010 is expected to continue in 2011, albeit at a slightly lower rate. Palladium demand in light duty vehicles is anticipated to increase alongside vehicle output. Growth in demand for palladium is expected in the light and heavy duty diesel sectors in Europe and North America as manufacturers add palladium to diesel aftertreatment systems.

Demand for palladium in industrial applications should rise in 2011, with subtle regional variations. Purchases of palladium by the chemical sector are expected to be higher in China and the Rest of the World region, driven by continuing demand for consumer products, but flat in other regions as consumer demand falters. The electrical sector is also likely to continue to perform well, with sales of consumer electronic devices buoyant in a number of regions.

The jewellery sector should see a slight decline in demand for palladium, despite the growing popularity of palladium as a jewellery metal in Europe. The outlook for gross palladium jewellery demand in China is less positive as the number of manufacturers in this market continues to decline and interest in palladium as a jewellery metal outside of certain specific regions remains uncertain.

Interest in identifiable physical palladium investments is expected to remain strong throughout the remainder of 2010. Demand could remain high for palladium ETFs if the strong price performance of commodities in general and palladium in particular during 2010 continues.

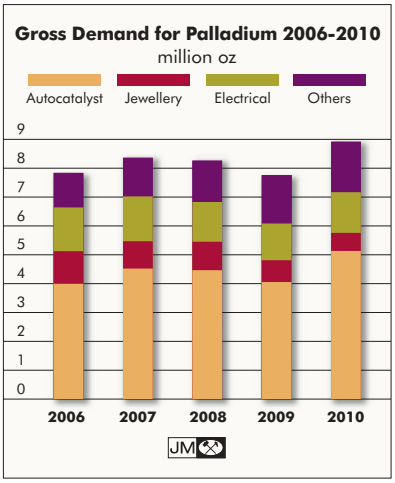
Recycling of palladium is expected to rise in 2011 in line with an expanding trade in end-of-life autocatalysts and electronic equipment. Recycling of palladium jewellery is likely to be low as retail stocks of recoverable material in China have mostly now been reprocessed, the main source now being old jewellery returned by consumers.

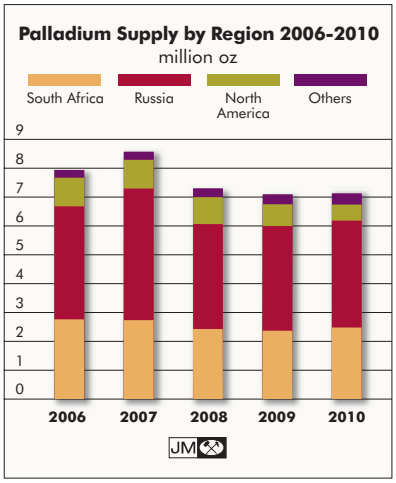
Supplies of palladium are expected to increase in all regions during 2011. Higher mine production is expected to continue in the regions that saw increased output in the first half of 2010. Production of palladium in North America, which was set back due to labour stoppages and mining difficulties in 2010, is expected to improve in 2011. Our forecasts assume that the remainder of the palladium shipped into Switzerland from Russian state stocks in 2007 and 2008 will have been priced and sold in 2010. It is unclear whether any Russian state stock remains to be sold in 2011.

Two crucial sensitivities are relevant to the outlook for palladium: shipments of Russian state stocks and upside demand from China. If no shipments of Russian state stocks of palladium take place in 2011, the palladium market could be substantially in deficit. Equally, the demand outlook for palladium is so strongly weighted towards Chinese economic and industrial growth that any softening of that growth could reduce demand, moving the market closer to balance. Although the supply-demand balance will be of importance during 2011, the current price of palladium appears to be decoupled from these fundamentals and more strongly tied to the fortunes of the gold price and performance of other industrial commodities.

Palladium Supply and Demand
'000 oz

Supply	2008	2009	2010
South Africa	2,430	2,370	2,485
Russia	3,660	3,635	3,710
Others	1,220	1,095	945
Total Supply	**7,310**	**7,100**	**7,140**
Gross Demand			
Autocatalyst	4,465	4,050	5,150
Jewellery	985	775	630
Investment	420	625	670
Others	2,420	2,300	2,490
Total Gross Demand	**8,290**	**7,750**	**8,940**
Recycling	**(1,615)**	**(1,430)**	**(1,845)**
Total Net Demand	**6,675**	**6,320**	**7,095**
Movements in Stocks	**635**	**780**	**45**





OTHER PGM

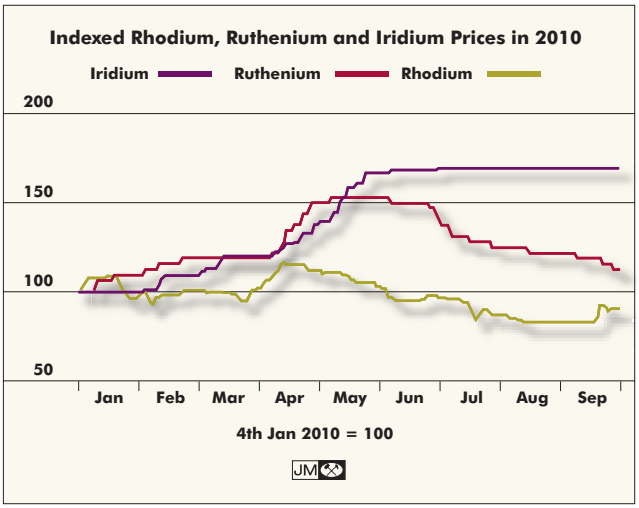
- **The rhodium market is forecast to be in a comparatively modest surplus of 79,000 oz in 2010.**
- **Gross demand for rhodium is expected to increase by 22% to 876,000 oz in 2010 as recovery in autocatalyst and industrial demand takes place.**
- **Recycling of rhodium from scrapped autocatalysts should increase to 239,000 oz this year, a rise of 28% compared with 2009.**
- **Supplies of rhodium are expected to fall by 7% in 2010 to 716,000 oz, helping to tighten the rhodium market.**
- **Demand for ruthenium is forecast to soar by 83%, totalling 1.05 million ounces in 2010, driven by strong electrical purchasing.**
- **Iridium demand is set to more than double to 204,000 oz on the back of strong industrial demand.**

Rhodium

The rhodium market is expected to tighten in 2010, moving from a surplus of 241,000 oz in 2009 to a more modest surplus of 79,000 oz this year. Supplies are expected to fall by 7 per cent to 716,000 oz while gross demand should increase by 22 per cent to 876,000 oz. Demand from the autocatalyst sector is set to increase by 17 per cent as consumer confidence returns to the car market, while industrial demand, particularly for rhodium in glass manufacture, is expected to pick up strongly.

Demand for rhodium in autocatalysts is expected to lift in 2010 as vehicle production volumes increase and purchases of gasoline vehicles with palladium-rhodium three way catalysts (TWCs) recover in almost every market. Only in Europe do we expect to see a flattening of demand for rhodium from the auto industry, principally due to the recovery of the share of diesel vehicles (which employ non-rhodium catalytic emissions systems). A concerted effort to reduce rhodium loadings in autocatalysts globally has reduced rhodium demand in previous years, however we expect that this trend will be outweighed by higher overall vehicle sales in 2010.

Industrial demand for rhodium is set to be boosted by an expansion in glass manufacturing facilities, particularly in Asia, which produce LCD glass for televisions and computer displays. The building of new LCD manufacturing lines in China, Japan and South Korea is expected to raise rhodium demand by 38,000 oz globally. This contrasts with the situation in 2009, when considerable amounts of rhodium were returned from cathode ray tube (CRT) glass manufacturing facilities and older fibre glass factories, mainly in China. Higher demand for consumer goods is also set to lift purchasing of rhodium for the process catalyst sector, further boosting industrial demand. In particular, new oxo-alcohol production capacity in Asia is forecast to increase rhodium demand.

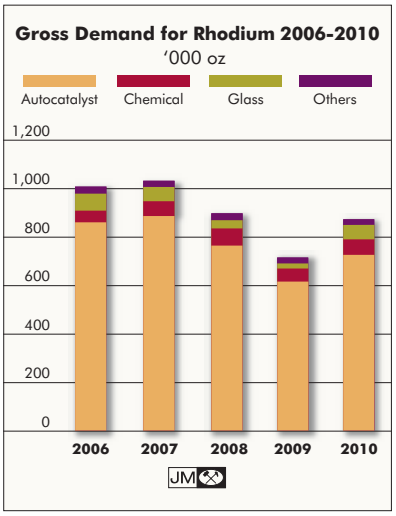


The iridium price performed strongly in the first nine months of 2010, while rhodium and ruthenium lost some of the gains made in the early part of the year.

Recycling of rhodium from autocatalysts is forecast to rise as the number of end-of-life vehicles containing relatively high loadings of rhodium in catalytic converters increases. Recycling rates are likely to be boosted by national car scrappage schemes, many of which came to an end this year. The 'long tail' of vehicle components still being processed from these schemes is likely to be felt through the remainder of 2010.

Supplies of rhodium are forecast to decline in 2010 as lower sales from South Africa and North America offset higher shipments from the Zimbabwean mining sector. Rhodium production in South Africa and North America alike has been beset by a series of shaft closures, safety stoppages and strikes, affecting pipeline and stock movements. Reduced availability of rhodium in the processing pipeline is also set to impact on supplies of the metal this year.

A tightening of the rhodium market in 2010 has been accompanied by a strengthening of the price. Rhodium traded at an average of $2,494 throughout the first nine months of 2010, 57 per cent higher than the average price for the full year of 2009. Speculative investment in the metal is likely to continue as the market remains relatively close to balance and automotive demand for TWCs in emerging markets such as China continues. 2011 is likely to see continued growth in automotive demand for rhodium as the use of palladium-rhodium catalysts grows in line with gasoline car fleet growth in China and the Rest of the World region. Industrial demand for rhodium could fall in 2011 as the restocking of LCD glass manufacturing facilities seen in 2010 slows and if consumer confidence in core markets falters. Similarly, reduced demand for consumer products could affect demand for rhodium in process catalysts.

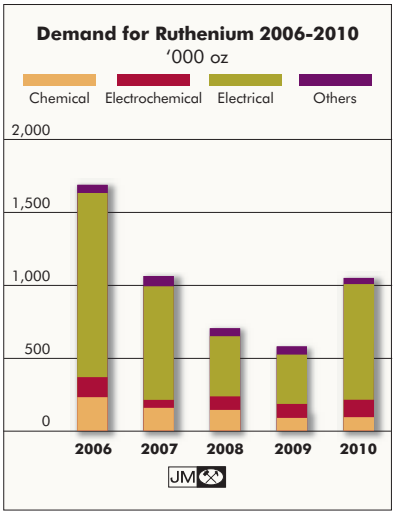


Ruthenium

Ruthenium demand in 2010 is expected to soar to 1.05 million ounces, up from 574,000 oz in 2009. Much of the additional demand in 2010 will come from the electrical sector, particularly the use of ruthenium in hard disk drives. The switch to ruthenium in the Chinese chlor-alkali industry is also likely to strongly drive demand for the metal this year. Despite the high demand levels for ruthenium, we anticipate that any shortfall in supply will be met from above-ground stocks this year.

The electrical sector has seen a significant recovery in 2010, with consumer purchases of electrical items increasing in the more favourable economic climate. Demand for ruthenium in perpendicular magnetic recording (PMR) hard disk drives has increased in line with a restocking of inventories in 2010 and higher levels of consumer purchasing of a variety of electrical goods, from PCs to digital TV recorders. We anticipate there may be some slowing of the electrical sector in 2011 compared with the exceptional figure seen in 2010 which was driven by first half stock building.

As the Chinese chlor-alkali industry upgrades to ruthenium-iridium membrane cell technology, we expect that demand for ruthenium will be boosted. Demand could be moderated in 2011 if consumer confidence falters in North America, Europe and Japan, lowering electrical demand for the metal.

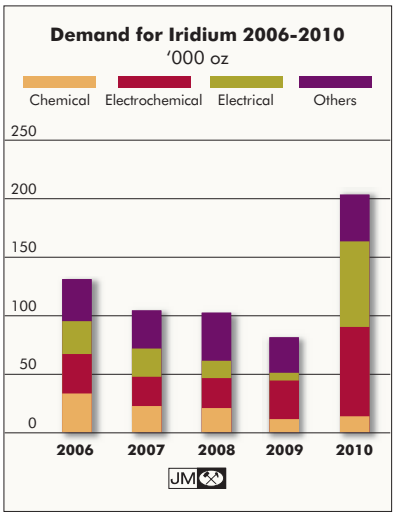


Iridium

Demand for iridium is expected to rise in 2010 to 204,000 oz, an increase of 123,000 oz compared with 2009. Rising demand for iridium crucibles for the growth of single crystals of sapphire, used as a substrate in the production of light emitting diodes (LEDs), as well as the upgrading of the Chinese chlor-alkali industry is responsible for much of this growth.

Iridium demand is set to benefit from the current focus on highly efficient lighting systems using LED technology. Demand for iridium crucibles, used in single crystal growing for LED manufacture, is forecast to increase by 55,000 oz in 2010. The switch to ruthenium-iridium technology in the Chinese chlor-alkali industry is also set to benefit iridium. The upswing in the global automotive industry should also benefit demand for iridium in spark plugs.

The outlook for iridium is positive as LED lighting technology grows in popularity, although much of the new growth in this and the electrical sector is predicated on continuing consumer demand, which may reduce somewhat in 2011.



SUPPLIES, MINING & EXPLORATION

- **Supplies of platinum group metals (pgm) are forecast to be stable in 2010, with platinum supplies almost unchanged at 6.01 million ounces.**
- **Palladium production is expected to remain almost flat, at 7.14 million ounces.**
- **Due to supply interruptions, rhodium supplies are expected to fall by 7% to 716,000 oz in 2010.**
- **Higher shipments of pgm from Zimbabwe and Russia are expected to be partly offset by lower sales from North America.**

SOUTH AFRICA

Supplies of platinum and rhodium from South Africa are expected to decline slightly in 2010, as the industry feels the effects of a series of shaft closures, safety stoppages and strikes. In contrast, palladium supplies will rise slightly in comparison with 2009, when sales were below the level of refined output.

Anglo Platinum

In the first half of 2010, the platinum content of concentrates delivered to Anglo Platinum's smelters totalled 1.20 million ounces, a fall of 4 per cent. This was due to three shaft closures in 2009 (estimated by Anglo to have cut output by 58,000 oz) and lower ore grades during 2010. Meanwhile, furnace maintenance at both the Polokwane and Waterval smelters caused a build-up in stocks of unprocessed concentrate, with the result that refined output declined by 5 per cent to 1.01 million ounces. Most of this backlog should be refined before year-end, and the company's forecast for refined output has remained at 2.50 million ounces of platinum, around 50,000 oz higher than in 2009.

Results for the first half showed a 2 per cent decline in mill throughput across the group's operations, combined with a 9 per cent fall in the pgm content of the ore processed. The decrease in grade was particularly marked at the Mogalakwena open pit, as mining moved from the deeper, higher grade Sandsloot pit to shallow, lower grade areas of the new North pit. Grades also declined at some of the western Bushveld mines (formerly known as Rustenburg and Amandelbult sections), particularly at Khomanani, where five major potholes were intersected, and at Tumela, where lower grade surface ore sources were exploited.

Reductions at these operations were partly offset by improved production from some of the other mines, in particular the Bafokeng-Rasimone and Mototolo joint ventures, both of which recorded improvements in mill throughput.

PGM Supplies: South Africa
'000 oz

Supply	2008	2009	2010
Platinum	4,515	4,635	4,585
Palladium	2,430	2,370	2,485
Rhodium	574	663	612

Impala Platinum

Refined platinum production from Impala's Rustenburg lease area rose marginally to 439,000 oz between January and June. We believe that this figure probably includes some metal released from the processing pipeline, given that mill throughput declined by 6 per cent in the same period. Underground production volumes at Impala have been affected by the decision, following the fatal accident in July 2009, to reconfigure all mechanised sections to minimise the risk of falls of ground. The company estimates that this will reduce output by approximately 20,000 oz of platinum per annum.

Impala forecasts increased platinum production, with annual output from the lease area predicted to recover to around 1 million ounces annually within the next five years.

The Two Rivers joint venture (with ARM) continues to perform well, with production of platinum in concentrate rising 15 per cent to 69,000 oz in the first six months of 2010. Milling capacity has been increased slightly following plant optimisation, and steady-state production is now forecast to be 150,000 oz of platinum annually.

Lonmin

Lonmin's Marikana mines produced 318,000 oz of platinum in concentrate in the January to June period, up 9 per cent on the first half of 2009, largely due to improved recoveries. The total quantity of ore processed was unchanged, as the ramp-up in production at the new Hossy and Saffy shafts balanced losses due to shaft closures in 2009. Output should improve again in the second half, with further contributions from the new shafts

Platinum production in South Africa is expected to decline by 50,000 oz in 2010 as shaft closures, safety stoppages and strikes dent output.

and additional production coming from the recently reopened Merensky open pit.

The company's Number One furnace suffered another matte run-out in late March 2010. It was initially expected to be off-line for just over a month, but another leak was detected during recommissioning in May and the furnace did not return to normal operations for a further month. In total, we estimate that stocks of untreated platinum in the processing pipeline increased by 57,000 oz in the six months to June 2010.

Despite its smelter problems, Lonmin maintained its platinum sales forecast for the financial year to September 2010 at 700,000 oz, stating that some concentrate would be toll-treated in order to reach this target.

Northam

Northam's Zondereinde mine had a steady first half of 2010, with the quantity of ore processed edging up 2 per cent to 960,000 tonnes and grades also improving slightly. The company's own production of pgm in concentrate improved by 9 per cent to 147,000 oz, while the amount of pgm in concentrate purchased from other mines more than doubled to 35,000 oz.

Northam's platinum sales (including metal from purchased concentrate) totalled 121,000 oz during the January to June period in 2010, up 7 per cent on the first half of 2009. Although shipments of metal from Zondereinde will fall in the second half, this should be partly offset by increased sales of metal purchased from other mines, principally Platmin's Pilanesberg mine.

In February 2010, Northam's board approved capital expenditure of R340 million to fund the establishment of infrastructure at the future Booysendal mine.

Other Producers

A number of other companies operate platinum mines in South Africa, selling concentrate to Impala Refining Services (IRS), Anglo Platinum or Northam. Output of pgm from these operations, most of which are in the ramp-up phase, should rise modestly in 2010.

Aquarius Platinum's Everest concentrator, operated by IRS, was recommissioned ahead of schedule in May and by the end of June had processed over 150,000 tonnes of ore, yielding some 8,000 oz of pgm.

For Aquarius' Blue Ridge mine, 2010 has been a difficult year, with high labour turnover and a series of section 54 safety stoppages impacting production. In addition, Aquarius halted all operations for a two-week retraining period following two fatal accidents in June. As a result, output of platinum in concentrate in the first half was just 15,000 oz – 22 per cent lower than in the six months to December 2009.

Eastern Platinum's Crocodile River mine supplies concentrate to IRS. Output of platinum in concentrate from this operation fell slightly to 32,000 oz in the first six months of 2010, following the dismissal in May of some contractor crews.

The ramp-up of production at Platinum Australia's Smokey Hills mine was interrupted during the first quarter of 2010 by a combination of industrial action, geological difficulties and power cuts. Output of pgm in concentrate during the January to June period totalled only 17,000 oz. This material was processed by IRS.

At Platmin's Pilanesberg mine during the first half of 2010, around 25,000 oz of pgm were dispatched to Northam, which is contracted to treat the mine's concentrate. Platmin expects output this calendar year to be around 80,000 oz of pgm.

We estimate that in the first half of 2010 Xstrata's Eland Platinum mine sent some 35,000 oz of platinum in concentrate for refining at Anglo Platinum, down slightly on the previous year. Xstrata is currently developing two underground mining sections to replace the existing open-cast operation; this is projected to lift ore production to 250,000 tonnes per month by 2013.

Platinum and palladium are produced as by-products of nickel mining at the Nkomati mine, a joint venture between ARM and Norilsk Nickel. A new processing plant capable of treating 375,000 tonnes of ore per month was commissioned in September 2009. As a result, pgm production more than tripled to 34,000 oz in the first half of this year.

RUSSIA

During the first half of 2010, Norilsk Nickel reported an increase in pgm output from its Taimyr and Kola Peninsula operations, which together produced 1.41 million ounces of palladium (an increase of 10 per cent compared to the first six months of 2009) and 340,000 oz of platinum.

Over the last three years, the quantity of ore mined at the Taimyr mines has been relatively stable at around 15 million tonnes per annum, while pgm grades have decreased significantly (down from an average of 8.92 grams per tonne in 2007 to 8.06 grams per tonne in 2009). We believe that recent production levels are due to increased exploitation of surface materials such as stored pyrrhotite concentrate and tailings.

Norilsk Nickel has been investing in capacity to treat stored pyrrhotite concentrate and has also been reprocessing old flotation tailings from the Norilsk concentrator, along with a variety of pgm-bearing materials from the smelters.

PGM Supplies: Russia
'000 oz

Supply	2008	2009	2010
Platinum	805	785	810
Palladium			
Primary Production	2,700	2,675	2,700
State Sales	960	960	1,010
Rhodium	85	70	70

As discussed previously, we anticipate that the remaining third of the palladium stocks shipped from Russia to Switzerland in 2007 and 2008 will be priced and sold in 2010.

NORTH AMERICA

Mine production of platinum in North America is forecast to decrease to 210,000 oz in 2010, a fall of 50,000 oz compared with last year. Palladium production is set to decrease by 195,000 oz to 560,000 oz.

Output from the Stillwater mine in Montana, USA, fell sharply in the April to June quarter, due to difficult geological conditions in the stoping areas with the highest grades. Total production of platinum and palladium fell by 8 per cent in the first half, to 56,000 oz and 186,000 oz respectively.

At Xstrata's operations in Sudbury, Canada, the ramp-up at Nickel Rim South boosted nickel production by 77 per cent in the first half of 2010. Although Xstrata does not publish figures for its Canadian pgm output, this mine is believed to have unusually high pgm grades, at around 3 to 4 grams per tonne.

PGM Supplies: North America
'000 oz

Supply	2008	2009	2010
Platinum	325	260	210
Palladium	910	755	560
Rhodium	18	15	11

A year-long strike at Vale's Sudbury operations ended in July 2010, although it will take time for pgm production to return to normal. In the first half of 2010, output totalled 7,000 oz of platinum and 18,000 oz of palladium, which we believe came principally from ore purchased from QuadraFNX Mining.

ZIMBABWE

Zimplats had an exceptionally strong start to 2010, as the Phase 1 expansion project achieved steady-state levels less than a year after commissioning. This expansion involved the development of two new underground mines, known as Ngwarati and Bimha, plus a new 2 million tonne per annum concentrator plant at Ngezi. In the January to June period, production of platinum in matte rose by 88 per cent to 92,000 oz.

A second round of expansion at Zimplats was approved in May 2010. The $450 million Phase 2 project will involve the development of a third 2 million tonne per annum underground mine and a new concentrator module at Ngezi. At full production, expected in 2014, this expansion will lift platinum production at Zimplats to around 270,000 oz annually.

The Mimosa platinum mine also performed well during the first half of 2010, and is now operating at full capacity following the implementation of several incremental expansion projects over the last few years.

Commissioning of the concentrator plant at Zimbabwe's third platinum producer, Unki (Anglo Platinum), commenced in September 2010. However, the first refined pgm production from this mine is not expected to be sold until next year.

PGM Supplies: Zimbabwe and Others
'000 oz

Supply	2008	2009	2010
Platinum	295	345	405
Palladium	310	340	385
Rhodium	18	22	23

RECYCLING

- **Recovery of platinum group metals from scrapped end-of-life automotive catalysts is forecast to increase in 2010. Recovery of platinum is set to rise by 32% to 1.10 million ounces, while palladium recovery is expected to increase by 37% to 1.32 million ounces.**
- **Recovery of rhodium is set to increase by 28% to 239,000 oz.**
- **Recycling of electronic scrap is forecast to increase in 2010. Recovery of palladium from end-of-life electronics is forecast to rise from 395,000 oz in 2009 to 440,000 oz in 2010.**
- **Recovery of platinum from the jewellery sector is expected to increase in 2010 to 735,000 oz, while recycling of palladium is set to increase to 85,000 oz.**

In line with Platinum 2010, our previous review of the market for platinum group metals, we quantify the recycling of pgm in three major applications – autocatalysts, electronics and jewellery. These 'open loop' applications are ones in which the pgm is contained in a product which is sold to an end consumer and therefore control and ownership of the metal changes hands. This is in contrast to applications where the metal is bought, reclaimed and recycled by the same organisation that initially purchased it. Platinum and palladium gauze in the nitric acid industry is one such 'closed loop' application in which the metal does not change hands. Recycling in such applications is reported as net figures.

AUTOCATALYST RECOVERY

Recovery of platinum group metals from autocatalysts is expected to be substantially higher in 2010 than in 2009 as improved economic conditions help lift new vehicle sales and promote scrapping of older vehicles. Higher prices of platinum and palladium have also increased throughput of stocks of spent autocatalysts, particularly those arising from national car scrappage schemes. The weight of platinum recovered is expected to increase by 32 per cent to 1.10 million ounces; palladium recycling is expected to increase by 37 per cent to 1.32 million ounces; and rhodium recycling is expected to increase by 28 per cent to 239,000 oz.

High levels of autocatalyst recycling in some regions reduce our net demand figures substantially. For example, platinum recovery from spent autocatalysts in North America amounts to 590,000 oz, which reduces net demand to negative 160,000 oz (see page 17). However, since the automotive industry does not receive this metal from recycling directly, gross demand for new metal remains strong. Recycled metal is returned to the market and used in a variety of applications.

High platinum and palladium prices have generally encouraged the collection and processing of stocks of spent autocatalysts. Metal which was collected in 2009 while pgm prices were lower was stockpiled then reprocessed in 2010. The upward trend of platinum and palladium prices in the second half suggests that recycling levels will remain high throughout the remainder of the year.

An increase in new car sales in 2010 is also responsible for the year-on-year increase in recycling of pgm. As car sales have picked up in 2010, there has been a corresponding increase in used vehicles being scrapped. This has driven the number of end-of-life catalysts available for recycling higher in all regions. The increase has been particularly marked for recycling of platinum from autocatalysts on European vehicles, where recycling weights from vehicles originally registered in Europe are set to increase by around 29 per cent to 375,000 oz in 2010. Palladium recycling weights in Europe are set to grow by 21 per cent to 340,000 oz. The faster growth rate of platinum recycling relative to palladium in Europe reflects both the higher proportion of end-of-life diesel vehicles now being scrapped and that older gasoline vehicles, with higher platinum loadings than today, are also being scrapped in the region.

National scrappage incentives in Europe, many of which expired in 2010, tended to drive the scrapping of newer vehicles, thus raising the proportion of palladium being recycled. Although schemes were independent of car size, buyers taking advantage of them tended to replace smaller cars on a like-for-like basis, resulting in mostly smaller catalysts being recycled. The end of these schemes is expected to result in more usual patterns of recycling, with an increase in the number of diesel vehicles scrapped in Europe. Recycled autocatalysts are expected to be progressively more platinum-rich. The lag time between a vehicle being scrapped and the catalyst being recovered is often several months, meaning that the effects of expired national scrappage schemes may continue to be felt.

Rhodium recovery was also a beneficiary of higher overall rates of car scrappage, with palladium-rhodium three way catalysts being returned from traded-in gasoline vehicles.

ELECTRICAL RECOVERY

Recovery of palladium from recycling of electrical components is set to rise to 440,000 oz in 2010, an increase of 45,000 oz compared with 2009. Platinum recovery is forecast to remain constant at 10,000 oz in 2010.

Electrical recycling in Europe and North America lowers our net demand figures considerably. Taking into account recycled palladium components in Europe lowers our net demand figure to 15,000 oz compared with 190,000 oz gross.

The weight of palladium recycled from electronic equipment is expected to increase throughout 2010 as consumer sales of new electronic equipment continue to recover and customers scrap older goods. National regulations on electronic waste and high palladium prices have driven recovery of passive components such as multi-layer ceramic capacitors (MLCCs) in particular. These components are ubiquitous in printed circuit boards in virtually all consumer electronic devices and, along with copper and gold, represent the most valuable components for recovery.

Europe remains the largest market for recovery of platinum and palladium from scrap electronic and electrical goods, with legislation on the recycling of electronic equipment helping to drive recovery rates. Recovery of palladium from MLCCs and resistors is expected to increase strongly in Europe in 2010 as older consumer products are traded in. China also has a large electronics recycling sector that is strongly driven by metal prices. High pgm, gold and copper prices in 2010 have promoted recycling of electronic scrap, maintaining the high rates of platinum and palladium recovery seen in 2010. The Rest of the World region is expected to see an increase in the weight of palladium recovered from scrap. Recovery of ruthenium and other platinum group metals from electronic waste is expected to remain minimal in 2010.

JEWELLERY RECOVERY

Open loop recycling of platinum from the global jewellery sector is forecast to increase by 170,000 oz to 735,000 oz in 2010. Recovery of palladium from jewellery scrap is set to increase by 15,000 oz to 85,000 oz. Recycling figures include unsold retail and wholesale stocks which have been returned for remanufacture but do not include production scrap.

Relatively little metal is forecast to be recovered from the jewellery sector in Europe, North America and the Rest of the World region. Despite high metal prices during 2010, consumers in these regions seem relatively unwilling to return platinum and palladium jewellery for recycling. This is partly due to the fact that platinum demand in these regions is mostly in the bridal segment and pieces have more sentimental value. Jewellery recycling in China and Japan, on the other hand, remained buoyant in 2010 as consumers returned platinum and palladium jewellery for reprocessing.

The Chinese jewellery sector has a long history of consumers part-exchanging or selling for cash old, broken and inherited jewellery. Platinum and palladium thus collected is recovered through open loop recycling. Some of the metal is then reused in jewellery or it may be sold in other sectors. Chinese platinum jewellery recycling volumes are forecast to be lower in 2010 than in the previous year. Platinum's strong price performance so far in 2010 and the lingering effects of platinum price volatility acted as a disincentive for the purchase of new pieces of platinum jewellery, with consumers tending to prefer gold as a store of value. However, going forward, higher platinum prices may lead consumers to trade in older pieces of jewellery in part-exchange for new platinum jewellery, helping to maintain levels of recycling. As consumer buying has declined, unsold pieces of platinum jewellery have also been returned for recycling by retailers. 450,000 oz of platinum are expected to be returned for recycling in China this year.

The weight of palladium recovered in the Chinese jewellery sector is forecast to increase to 60,000 oz in 2010, lowering our net demand figure to 340,000 oz. There are two main routes for palladium to be recovered from jewellery. The first is metal being returned to jewellers by consumers as part-exchange on new pieces. Consumers wishing to exchange palladium jewellery for other palladium pieces may do so through jewellers but part-exchange of palladium for other jewellery metals is not usually possible. Another option, however, is for them to sell the palladium jewellery at small collection booths and put the proceeds toward the cost of a new gold or platinum piece. These booths sell the jewellery to small refineries from which jewellery manufacturers also source metal. A similar system is operational in Japan.

Recycling
'000 oz

	Platinum		Palladium		Rhodium	
	2009	2010	2009	2010	2009	2010
Autocatalyst	(830)	(1,095)	(965)	(1,320)	(187)	(239)
Electrical	(10)	(10)	(395)	(440)	0	0
Jewellery	(565)	(735)	(70)	(85)	0	0
Total	**(1,405)**	**(1,840)**	**(1,430)**	**(1,845)**	**(187)**	**(239)**

PLATINUM

- **Gross global demand for platinum is forecast to rise by 11% in 2010 to 7.56 million ounces.**
- **Automotive demand is set to increase by 800,000 oz to 2.99 million ounces in 2010.**
- **Following limited economic recovery in 2010, industrial demand is expected to rise by 51% to 1.72 million ounces.**
- **Increased platinum prices in 2010 and continuing recessionary effects and lack of stockbuilding are forecast to suppress jewellery demand, with total gross demand falling by 14% to 2.42 million ounces.**
- **Net identifiable physical investment demand for platinum is expected to soften by 34% in 2010 to an estimated 435,000 oz.**

AUTOCATALYST

Gross demand for platinum from the automotive sector is expected to rise by around 37 per cent to 2.99 million ounces in 2010. This follows the upward trend in global year-on-year automotive sales, however it lags behind pre-2009 automotive demand. Growth in automotive demand was high in the first half of 2010 as economic conditions improved. A return to fleet buying and the ending of incentive schemes generally benefited diesel vehicle sales, and therefore platinum demand, in Europe. Production of vehicles is forecast to exceed sales as a substantial rebuilding of depleted inventories takes place.

Europe

Light duty vehicle production in Europe is expected to increase to 17 million units in 2010, an increase of 1 million vehicles compared with the previous year but still some way behind the 2008 figure of 19.3 million units.

Gross demand for platinum from the European automotive industry is expected to increase by 46 per cent, rising to 1.42 million ounces, following a slump of over 50 per cent in 2009. As manufacturers have rebuilt depleted stocks of vehicles in 2010, platinum demand has increased. Platinum demand has also benefited from two factors: the ending of government scrappage incentives in major European markets such as the UK and Germany, which had skewed demand in favour of smaller gasoline-powered vehicles; and an increase in purchases by fleet operators. As the share of diesel cars sold in Europe rises closer to 50 per cent, we anticipate a corresponding increase in platinum demand.

With improved credit availability for businesses and more positive economic conditions in certain European markets, demand for fleet vehicles is expected to rise sharply in 2010. This trend will favour platinum demand in diesel oxidation catalysts and diesel particulate filters. Aggressive thrifting of platinum and substitution with palladium in diesel aftertreatment formulations is expected to continue, although platinum will remain the dominant component of diesel emissions treatment systems.

Production of new light duty vehicles in Europe this year has exceeded sales, indicating that manufacturers are re-building inventories, following a year of concerted de-stocking. Production of heavy duty vehicles in Europe is forecast to increase to 442,000 units in 2010, a 33 per cent increase on 2009, as economic recovery stimulates demand for medium and large trucks.

Japan

Platinum demand in autocatalysts fitted to Japanese-manufactured vehicles is expected to rise by 35 per cent to 535,000 oz in 2010. This reflects projected growth in Japanese vehicle production to 8.7 million units. Although both car sales and automotive platinum demand are rising in 2010, this is still some way from the demand level seen in 2008. Concerns over the economy still weigh heavily on domestic sales of vehicles, while an uncertain economic climate and the damage to Japanese manufacturers' reputations from recent safety recalls mean export markets have not yet fully recovered.

Platinum Demand: Autocatalyst
'000 oz

	Gross		Recycling		Net	
	2009	2010	2009	2010	2009	2010
Europe	970	1,415	(290)	(375)	680	1,040
Japan	395	535	(50)	(60)	345	475
North America	370	430	(425)	(590)	(55)	(160)
China	85	115	(20)	(20)	65	95
Rest of the World	365	490	(45)	(50)	320	440
Total	**2,185**	**2,985**	**(830)**	**(1,095)**	**1,355**	**1,890**

Sales of larger vehicles produced in Japan for both the domestic and export market increased in 2010 as economic recovery began. Larger vehicles tend to have proportionally higher platinum catalyst loadings than smaller vehicles and therefore are partly responsible for higher platinum demand. The most substantial increase in automotive platinum demand is expected in the heavy duty diesel sector. Production of heavy duty vehicles in Japan is set to increase by over 18 per cent in 2010 to almost 80,000 vehicles. This upswing is in line with better economic conditions, particularly in many export markets, and fleet customers once again purchasing new vehicles in an improved credit environment.

North America

Gross platinum demand in autocatalysts in North America is forecast to increase to 430,000 oz in 2010, as light duty vehicle production recovers. Output of cars and light trucks is expected to reach 9.5 million units, up from 7 million units in 2009 but still short of 2008's level of 10.5 million. Rising manufacturing volumes and new car sales should increase platinum demand, although platinum loadings per vehicle have tended to reduce in line with further autocatalyst thrifting and a trend towards smaller vehicles. For the first half of 2010, year-on-year sales remained strong, however several car manufacturers in the USA reported worse than expected new car sales in the third quarter, emphasising the extent to which economic uncertainty and limited credit continue to affect consumer purchases of vehicles. Automotive platinum demand is expected to be more modest in the final months of 2010 than at the start of the year.

The heavy duty diesel market saw a moderate recovery in the first nine months of 2010, as truck sales increased with improved economic conditions, but fell short of expectations because of the uncertain economic outlook. Platinum demand is benefiting from the introduction of more stringent emissions systems for 2010 model year vehicles. Platinum loadings rose as some manufacturers fitted platinum-containing ammonia slip catalysts in selective catalytic reduction (SCR) systems for NOx aftertreatment, in addition to diesel oxidation catalysts and diesel particulate filters. However truck purchases in the early part of 2010, suppressed last year, tended to be of 2009 model year vehicles which lack SCR technology.

China

Light duty vehicle production in China is forecast to exceed 15.8 million units in 2010, enabling China to maintain its position as the world's largest car manufacturing country by volume. Although new car sales have remained strong in 2010, with year-on-year sales up 23 per cent for the first half, signs of cooling in the automotive sector are expected to appear in the second half. Usage of platinum in gasoline catalysts remains low in China, and is generally restricted to those vehicles made in China at foreign-owned or joint venture implants.

The introduction of China 4 emissions standards in certain cities has tended to increase platinum demand, although compliance outside of those cities is not mandatory. Our forecast for automotive platinum demand in China is 115,000 oz in 2010, with the vast majority of demand coming from platinum in gasoline aftertreatment formulations. Demand for platinum from the diesel sector remains low. In line with the low use of platinum in Chinese autocatalysts, we have revised our 2009 figure to 85,000 oz.

Rest of the World

Demand for platinum in autocatalysts from the Rest of the World region is forecast to rise by 125,000 oz to 490,000 oz in 2010 as vehicle output increases. South Korea's automotive sector recovered strongly in the first half of 2010, with increased production of light duty diesel vehicles for export lifting platinum demand. Light duty vehicle production in Brazil is forecast to reach an all-time high in 2010 of 3.3 million vehicles. Russia's automotive sector is set to recover markedly from 2009 as a scrappage scheme provides a boost to the country's depressed car market. Both of these markets have almost exclusively gasoline light duty fleets, and therefore use relatively low platinum loadings; however platinum should benefit from higher sales volumes. India's light duty vehicle sector is forecast to grow by 780,000 vehicles, a 33 per cent annual increase. The introduction nationwide of Bharat Stage III emissions regulations will benefit platinum demand, while Bharat Stage IV legislation in thirteen major cities is due to give a further fillip to platinum.

JEWELLERY

Relatively high platinum prices are forecast to reduce gross global platinum jewellery demand in 2010 by 390,000 oz to 2.42 million ounces. Gross Chinese jewellery demand, which provided some support to the platinum market in 2009, is forecast to fall by 21 per cent to 1.65 million ounces in 2010. For information on the recycling of platinum from the jewellery sector, please see page 16.

Europe

Gross platinum demand from the European jewellery industry is expected to soften by approximately 10,000 oz to 175,000 oz in 2010.

Continuing economic uncertainty in many European countries has reduced consumer spending in 2010, with a knock-on effect on jewellery purchases. The high platinum price in the first half of the year also lowered jewellery demand, despite European consumers being largely shielded from platinum price volatility by retail margins. The Swiss watch industry continued to suffer declining demand with hallmarking figures showing Swiss platinum watch case production fell by around a third in the first six months of 2010.

However, the platinum bridal jewellery sector in the UK remained fairly resilient, with first-half hallmarking figures for UK-made platinum pieces flat.

Japan

Struggling with economic recession, and relatively high platinum prices, gross demand from the Japanese platinum jewellery market is forecast to soften by a modest 5,000 oz to 330,000 oz in 2010. Note that we have downgraded our figure for platinum jewellery demand in Japan to 335,000 oz in 2009. Recent data suggest that demand in 2009 was softer than previously reported as the recession hit purchases of platinum fashion jewellery. We anticipate that the bridal market will remain strong in 2010, but the fashion jewellery sector could be weak. Purchases of Kihei chain, bought by some consumers as an investment, are expected to hold up well in 2010, as in 2009.

North America

Gross platinum jewellery demand in North America is expected to grow in 2010 as economic recovery and increased consumer confidence increase discretionary spending, with demand for platinum jewellery forecast to grow by 45,000 oz to 180,000 oz.

Medium to high end retailers report increased sales of platinum jewellery this year. Manufacturing of platinum jewellery for export is also set to increase. Higher platinum prices in 2010 have been partly offset by improved economic conditions. There has also been an increase in sales of platinum into the bridal market. Recycling of platinum jewellery in North America remains minimal.

Platinum Demand: Jewellery
'000 oz

	Gross[1]		Recycling[2]		Net[3]	
	2009	2010	2009	2010	2009	2010
Europe	185	175	(5)	(5)	180	170
Japan	335	330	(230)	(280)	105	50
North America	135	180	0	0	135	180
China	2,080	1,650	(330)	(450)	1,750	1,200
Rest of the World	75	85	0	0	75	85
Total	**2,810**	**2,420**	**(565)**	**(735)**	**2,245**	**1,685**

NOTES TO TABLE

[1] Gross demand is equivalent to the sum of platinum jewellery manufacturing volumes and any increases in unfabricated metal stocks within the industry.

[2] 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.

[3] Net demand is the sum of these figures and therefore represents the industry's net requirement for new metal.

China

Following a year of strong platinum demand by the Chinese jewellery industry in 2009, gross demand in 2010 is forecast to fall by 430,000 oz to 1.65 million ounces.

Higher platinum prices in 2010 and full stock levels have reduced purchasing of fresh metal by jewellers. Although heavy buying has re-emerged in the brief periods that platinum's price has dipped below $1,500, evidence suggests that buying has been deferred as stock levels remain relatively healthy as a result of earlier stockbuilding in 2009.

For many Chinese consumers, jewellery has an investment, as well as an aesthetic, value and the significant fall in platinum's price in 2008 is reported to have led some consumers to lose confidence in platinum's ability to hold its value. In contrast, the relatively consistent rise in the gold price in recent years has increased the attraction of gold for certain consumers and purchases of gold jewellery have increased, taking a greater share of consumer spending on jewellery.

The higher price of platinum in 2010 has tended to moderate puchases of new jewellery. It has however increased the trading in of old and broken jewellery, thereby increasing the recycling of platinum jewellery. The recycling of platinum jewellery is discussed on page 16. Net platinum use in jewellery is forecast to decrease to 1.2 million ounces in 2010 as lower demand and higher recycling levels jointly squeeze net demand.

Rest of the World

Gross platinum demand for jewellery in the Rest of the World region is forecast to grow to 85,000 oz in 2010. The growth in the Indian platinum jewellery market is expected to add 10,000 oz to our demand forecasts. This represents both a building of stocks in the still young Indian market and rising consumer sales. Awareness of platinum as a jewellery metal is spreading thanks to concerted marketing efforts across the country.

INDUSTRIAL

Industrial demand for platinum is forecast to rise in 2010 by 51 per cent to 1.72 million ounces as production increases and restocking of inventory takes place in many sectors.

Purchases of platinum by the chemical industry are set to increase to 450,000 oz in 2010 as chemical firms recover from what was a dismal 2009. Demand for platinum gauze in nitric acid production is anticipated to increase by 45,000 oz to 115,000 oz. Similarly, demand for platinum process catalysts is forecast to rise to 315,000 oz this year as restocking of catalyst takes place and plants are run at higher capacity. Demand for platinum for petroleum refining is forecast to soften by 35,000 oz to 175,000 oz as little new capacity is being built in 2010.

Electrical demand for platinum is expected to pick up in 2010 as sales of electronic devices benefit from improved economic conditions. Consumers and businesses who perhaps delayed purchases of electrical items such as PCs in 2009 have now helped push up demand for platinum in hard disk drives by a forecast 30,000 oz, bringing our total electrical demand forecast to 225,000 oz.

The industrial sector forecast to see the largest growth in platinum demand in 2010 is the glass sector. Net platinum use in glass manufacturing is forecast to soar from 10,000 oz in 2009 to 365,000 oz in 2010. This increase is mainly driven by the opening of new LCD glass manufacturing facilities in China, Japan and the Rest of the World region. A substantial restocking of platinum for glass production is occurring in existing facilities where new production lines are being commissioned, requiring platinum linings in melting tanks. This in turn is driven by sales of flat screen televisions, which rose in the first nine months of 2010 with improved consumer confidence. A restocking of platinum has also been apparent in fibre glass production facilities as factories are upgraded and expanded, particularly in China. We expect further growth in these sectors as the global economy improves and manufacturing facilities expand. Demand in all other industrial applications is expected to rise in 2010, with platinum purchases for automotive oxygen sensors and automotive spark plugs expected to see particular increases in line with the recovery of vehicle production. Platinum demand in non-road vehicles is also expected to increase.

INVESTMENT

Net identifiable physical investment demand for platinum is forecast to fall to 435,000 oz in 2010, a 34 per cent drop compared with 2009.

Investment flows into a new US-based platinum ETF, launched in January 2010, saw net platinum ETF holdings soar during the first quarter of 2010. High platinum prices and economic uncertainty mean that investor appetite for physically-backed ETFs has remained strong. Some of the purchasing of new ETF positions has been offset by closing of existing ones. New demand for metal has therefore been relatively subdued, with net new demand for platinum from ETF investments expected to be 360,000 oz in 2010, some 20,000 oz lower than 2009. Our forecast for platinum investment demand therefore includes some new ETF investment, especially in North America.

Demand for large platinum bars for the retail physical investment market in Japan is expected to be around 50,000 oz in 2010, a reduction in demand of around 110,000 oz compared with 2009. Higher platinum prices this year have affected new buying in Japan, the principal market for large bar trading. New demand for large bar investments has been met to a certain degree by holdings being liquidated in the higher price environment of 2010, so that total new demand has been relatively subdued.

Demand for coins and small bars is anticipated to fall to 15,000 oz in 2010. The US Mint has not offered any Platinum Eagle coins for sale so far in 2010, but has produced proof coins, as has the Perth mint in Australia. Demand for both has been relatively light due to high prices.

Platinum Demand: Industrial
'000 oz

	2008	2009	2010
Chemical	400	290	450
Electrical	230	190	225
Glass	315	10	365
Petroleum	240	210	175
Other	535	440	505
Total	**1,720**	**1,140**	**1,720**

Platinum Demand: Investment
'000 oz

	2008	2009	2010
Europe	105	385	10
Japan	385	160	55
North America	60	105	365
China	0	0	0
Rest of the World	5	10	5
Total	**555**	**660**	**435**

PLATINUM IN MEDICAL APPLICATIONS

Platinum is used in a variety of medical devices to treat heart disease, stroke, neurological disorders, chronic pain, and other life threatening conditions. With an ageing and increasing world population, there is growing demand for healthcare products and services that use components made from platinum group metals and their alloys. This special feature considers platinum in anti-cancer drugs and biomedical devices.

Medical applications for platinum include anti-cancer drugs and implanted biomedical devices such as pacemakers and catheters. Demand for platinum in medical applications, including the dental industry, is forecast to be 255,000 oz in 2010. Demand for platinum in medical applications has grown steadily over the past decade, and currently represents one of the largest demand sectors for platinum.

ANTI-CANCER DRUGS

One of platinum's most remarkable qualities is its ability, in certain chemical forms, to inhibit the division of living cells. The discovery of this property in the 1960s led to the development of platinum-based drugs, which first became available in the 1970s and are now used to treat a wide range of cancers. The advent of the platinum anti-cancer drugs cisplatin and its successor carboplatin has contributed to substantial improvements in the survival rates of cancer patients suffering from a range of common tumours, including ovarian, breast, and lung cancer. Development of platinum anti-cancer treatments has continued – the drug oxaliplatin, which became available in the 1990s, is now used to treat a range of colorectal cancers. Other drugs are being subjected to clinical trials, including the compounds picoplatin and satraplatin.

Use of all three currently available compounds is expected to rise in future, mainly because more cases of cancer will be diagnosed: according to the World Health Organization, new cases of cancer will increase from 11.3 million in 2007 to 15.5 million in 2030. This is largely due to the rising incidence of cancer in the developing world, reflecting longer life expectancies, the adoption of Western diets, and the widespread use of tobacco. This is leading to much higher rates of lung, breast, and colorectal cancers in particular. Over 25,000 oz of platinum are now used annually in anti-cancer drugs, contributing to the treatment of thousands of patients.

BIOMEDICAL DEVICES AND COMPONENTS

Platinum and platinum alloys are used in a range of devices including pacemakers and catheters which can be inserted inside the body. Key properties that make platinum and its alloys uniquely suitable for biomedical applications are its inertness and biocompatibility; its high mechanical strength, meaning it can be fabricated into extremely small, complex shapes; its electrical conductivity, meaning that it is suitable as an electrode for use in minimally invasive biomedical techniques; and also its radiopacity, which makes it clearly visible in X-ray images, enabling doctors to monitor the position of devices inside the body during treatment.

Platinum's unique properties have been exploited in neuromodulation devices (including 'brain pacemakers', used, for example, to treat Parkinson's disease, and cochlear implants to restore hearing), and in coils and catheters for the treatment of brain aneurysms. The fact that platinum does not corrode and rarely causes allergic reactions makes it ideal for these applications.

CARDIAC RHYTHM DEVICES

Abnormalities of the heart's rhythm are common, often debilitating, and sometimes fatal. Cardiac rhythm disorders can be managed very successfully using implanted devices such as pacemakers, which ensure the heart beats regularly, and implantable cardioverter defibrillators (ICDs), which

deliver a strong electrical impulse to the heart if an irregular heartbeat is detected. Each ICD typically has two or more electrodes made of platinum-iridium alloy, while platinum components are also used to connect the pulse generator to the lead which goes to the heart.

In the developed world, the majority of patients who require a pacemaker now receive one, and consequently, growth in implantation rates is relatively modest (typically less than 5 per cent per annum). However, there remains much potential for growth in the developing world. In the USA and many European countries, the rate of pacemaker implantation is over 1,000 devices per million people. In most developing countries, the rate is no higher than 50 per million and often much lower. As GDP increases and medical coverage improves, this figure is likely to grow substantially over time.

There has been rapid uptake of ICDs in the USA and in some European countries; however, only a fraction of potentially eligible patients worldwide receive a device. There is therefore significant scope for growth going forward, particularly in the developing world.

CATHETERS AND STENTS

Catheters are flexible tubes which are introduced into the body to help diagnose or treat illnesses such as heart disease. The surgeon can perform delicate procedures without requiring the patient to undergo extensive surgery, improving recovery time and minimising the risk of complications. Many catheters incorporate platinum components: marker bands and guidewires, which help the surgeon guide the catheter to the treatment site; or electrodes, which are used to diagnose and treat some cardiac rhythm disorders (arrhythmias).

One of the most common coronary complaints in the developed world is atherosclerosis, the furring of the artery walls with fatty deposits, which can lead to angina and heart attack. Blockages in the coronary arteries are often treated using a procedure commonly known as balloon angioplasty. This treatment uses a catheter with a tiny balloon attached to its end, which is guided to the treatment site then inflated, crushing the fatty deposits and clearing the artery. Afterwards, a small tubular device called a stent is usually inserted in order to keep the newly-cleared artery open. Platinum guidewires help ensure that the balloon is correctly located. This guidewire, made of base metal for most of its length, has a coiled platinum-tungsten wire at its tip, which makes it easier to steer and ensures that it is visible under X-ray. Platinum is also used in marker bands, tiny metal rings which are placed either side of the balloon in order to keep track of its position.

Around 2 million angioplasty procedures are undertaken in the USA and Europe each year. With the ageing of the population and rising rates of obesity, these numbers are likely to grow globally, particularly in developing nations.

NEUROMODULATION DEVICES

One new and rapidly expanding application for platinum is in the neuromodulation or neurostimulation sector. Neuromodulation devices deliver electrical impulses to nerves and even directly to the brain, treating disorders as varied as deafness, incontinence, chronic pain and Parkinson's disease. Many of these devices are based on an extension of heart pacemaker technology, and they are sometimes referred to as 'brain pacemakers'. Like heart pacemakers, they have platinum-iridium electrodes and may also incorporate platinum components in pulse generators.

At present, neuromodulation is expensive and is available only in a small number of specialist centres; even in developed countries only a small proportion of potentially eligible patients receive this treatment. However, neuromodulation can be used to help patients with common and sometimes difficult to treat conditions (such as chronic pain, epilepsy and migraine). This market therefore has substantial potential for expansion in both developed and developing countries.

OTHER IMPLANTS

A more recent development is the use of coils made of platinum wire to treat aneurysms, balloonings in blood vessels caused by weaknesses in the vessel walls. If the blood pressure rises, the vessel may rupture, causing a haemorrhage. Although this can occur anywhere in the body, platinum is mainly used to treat aneurysms in the brain, where surgery is difficult and fraught with risk. In the procedure, a platinum coil is used to fill the aneurysm to stop it rupturing. It is estimated that approximately 200,000 patients have received platinum coils in this way, and further growth is likely as this treatment becomes standard.

SUMMARY

Platinum is being increasingly used in a broad range of medical applications such as catheters, heart pacemakers and defibrillators. In 2010, some 175,000 oz of platinum are forecast to be used in biomedical devices, of which around 80 per cent is for established technologies, such as guidewires, and cardiac rhythm devices. The remaining 20 per cent will be used in newer technologies, such as neuromodulation devices and stents. These applications represent the largest potential for future growth.

PALLADIUM

- **Gross demand for palladium is forecast to increase by 15% to 8.94 million ounces in 2010.**
- **Recycling is anticipated to return 1.85 million ounces of palladium to the market, an increase of 29% from 2009, bringing total net demand to 7.10 million ounces.**
- **Gross autocatalyst demand for palladium is set to increase by 1.10 million ounces in 2010 as new car sales rise substantially, particularly in China.**
- **Gross industrial demand for palladium is anticipated to rise by 8% to 2.49 million ounces, principally driven by growth in the electrical sector.**
- **Gross palladium demand from the jewellery sector is expected to decline by around 19% to 630,000 oz in 2010.**
- **Net identifiable physical investment demand for palladium is forecast to rise by 45,000 oz to 670,000 oz.**

AUTOCATALYST

Gross demand for palladium from the automotive sector is forecast to rise by 27 per cent to 5.15 million ounces globally in 2010 as the industry recovers. Improved economic conditions are expected to lift vehicle sales in all the major regions, with palladium demand being particularly strong in China and the Rest of the World region. Although diesel car sales are set to recover a good deal of their market share in 2010, palladium demand was temporarily boosted by national car scrappage schemes in the early part of the year, which tended to increase sales of small gasoline vehicles.

Europe

Gross automotive demand for palladium in Europe recovered well in the first half of 2010 as light duty vehicle production in this region grew by 6 per cent to 17 million units. A more mixed second half is expected with weaker consumer credit and uncertain economic conditions as well as limited restocking. Nonetheless, 1.22 million ounces of palladium are forecast to be purchased by the European automotive sector in 2010, an increase of 23 per cent compared with 2009. Much of this growth has been in the diesel sector, due to both greater use of palladium in diesel aftertreatment and an increase in diesel vehicle production relative to 2009.

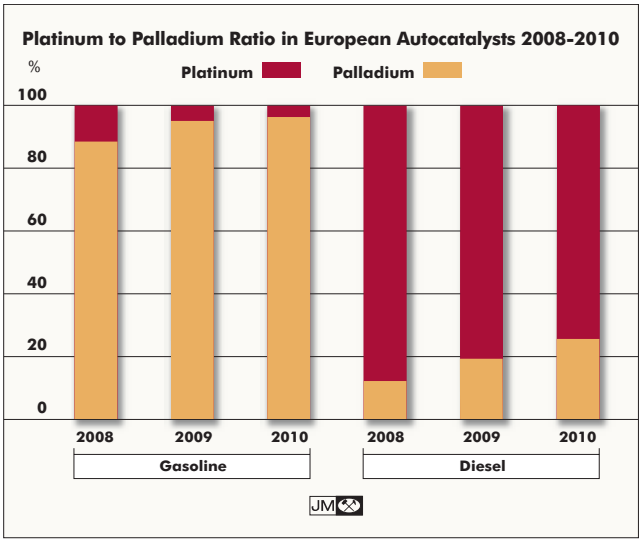
Last year's fillip to palladium demand from national scrappage incentives, which tended to favour small gasoline passenger cars, continued to a limited extent into 2010. As many schemes have expired this year, the mix of diesel vehicles in European fleets is expected to rise, meaning that demand for palladium will increase at a slower rate than under the rather artificial conditions of the scrappage schemes. Recycling of palladium from scrap autocatalysts is discussed on page 15.

The phase-in of Euro 5 emissions rules in late 2009 and into 2010 has accelerated the adoption of palladium in both gasoline and diesel catalyst formulations. European gasoline catalysts now typically contain around 97 per cent palladium, while diesel formulations have around 25 per cent palladium content, on average.

Japan

The Japanese automotive sector bounced back strongly in 2010, with an increase in light duty vehicle production of 20 per cent. Demand for palladium in catalytic converters is expected to increase by 175,000 oz to 765,000 oz, in line with increased sales of gasoline cars.

Although exports of Japanese-manufactured vehicles were healthy, in line with economic recovery in many export markets, the biggest growth in vehicle sales was in the domestic Japanese market. Palladium demand in Japan was stimulated by the introduction of tighter emissions standards



The proportion of palladium in both gasoline and diesel autocatalysts in Europe is set to increase again in 2010.

across light and heavy duty vehicle sectors. Greater use of palladium has also been apparent in vehicles intended for export markets where improved fuel quality allows increased use of palladium-based catalyst formulations.

North America

Gross demand for palladium in autocatalysts in North America is forecast to increase by 250,000 oz to 1.27 million ounces in 2010. North American light duty vehicle production is set to increase by 2.5 million vehicles to 9.5 million units, yet still some way from its pre-2009 peak.

As North America remains primarily a gasoline car market, recovery of this market has benefited palladium demand. Increased use of palladium in aftertreatment formulations for light and heavy duty trucks has also helped demand, as have better market conditions for businesses investing in vehicle fleets.

China

The Chinese car industry is set to be the world's largest in 2010, with 15.8 million cars forecast to be produced and sold. Demand for palladium in Chinese autocatalysts in 2010 is set to rise by 36 per cent to 930,000 oz. The majority of this demand is for palladium-rhodium catalysts in gasoline vehicles produced by domestic Chinese companies. A supportive credit environment for consumers, particularly those buying small cars, together with more stringent China 4 emissions legislation being introduced in 2010, is expected to continue to underpin demand for palladium in Chinese autocatalysts.

Rest of the World

Gross demand for palladium in autocatalysts manufactured in the Rest of the World region is expected to rise by 27 per cent in 2010 to 965,000 oz. The extension of the Russian car scrappage scheme until 2011 is expected to provide a further boost to the Russian domestic car industry, where sales dropped precipitously in 2008-9. As Russia is almost exclusively a gasoline market, we anticipate further new demand for palladium from domestic manufacturers.

South Korean manufacturers have been gaining market share, especially in export markets, for their small, inexpensive gasoline vehicles. This has helped boost demand for palladium in autocatalyst formulations.

India's car market continues to expand in line with the country's rapid GDP growth. Palladium demand in India is also expected to be boosted by the introduction of Bharat Stage IV emissions legislation in thirteen cities, and the rolling out of Bharat Stage III legislation across the rest of the country. The increased use of palladium in the two- and three-wheeled vehicle market, a sector with sales of some 13 million vehicles per year, is also expected to boost palladium demand in India.

In Brazil, a market which was barely touched by the drop in automotive sales in 2009, production of light duty vehicles is forecast to reach an all-time high of 3.3 million units in 2010 – an increase of 7.5 per cent compared with last year. Since most vehicles use either gasoline or ethanol fuel, and palladium-based exhaust aftertreatment, growth in car sales should continue to strongly favour palladium demand.

Palladium Demand: Autocatalyst
'000 oz

	Gross		Recycling		Net	
	2009	2010	2009	2010	2009	2010
Europe	995	1,220	(280)	(340)	715	880
Japan	590	765	(50)	(75)	540	690
North America	1,020	1,270	(540)	(780)	480	490
China	685	930	(35)	(50)	650	880
Rest of the World	760	965	(60)	(75)	700	890
Total	**4,050**	**5,150**	**(965)**	**(1,320)**	**3,085**	**3,830**

JEWELLERY

Gross demand for palladium in the jewellery sector is forecast to contract by 145,000 oz to 630,000 oz in 2010. Reduced demand for Chinese jewellery is largely responsible for this fall. Demand for palladium jewellery is expected to be higher in Europe, as consumer awareness of the metal grows, but will remain flat in other regions.

Palladium Demand: Jewellery
'000 oz

	Gross		Recycling		Net	
	2009	2010	2009	2010	2009	2010
Europe	50	70	0	0	50	70
Japan	80	75	(20)	(25)	60	50
North America	60	60	0	0	60	60
China	560	400	(50)	(60)	510	340
Rest of the World	25	25	0	0	25	25
Total	**775**	**630**	**(70)**	**(85)**	**705**	**545**

China

Demand from the jewellery sector in China is expected to fall from a gross figure of 560,000 oz to 400,000 oz in 2010. Uptake of palladium jewellery has been limited outside certain second and third tier Chinese cities in provinces such as Henan, Shandong and Sichuan. While palladium continues to be popular in those areas, elsewhere it has struggled to maintain consumer interest. High retail margins appear to have detracted from palladium's perceived 'value' in the eyes of consumers. With retailers becoming disenchanted with sales levels, several manufacturers have stopped producing palladium jewellery in 2010, while those still active are using increased quantities of recycled old jewellery. Higher palladium prices in 2010 are also expected to negatively affect sales.

Other Regions

Palladium demand in the European jewellery sector is expected to continue to increase in 2010, albeit from a low base. As the popularity of palladium jewellery grows, assisted by the granting of a UK hallmark in 2009, demand is forecast to increase by 20,000 oz this year.

The impact of the 2009 recession on the platinum fashion jewellery market in Japan also affected palladium demand, since palladium is used as an alloying agent in platinum alloys. Use of palladium in white gold alloys was also affected by the recession and a higher gold price, both of which accelerated the move away from gold to cheaper alternatives. We have therefore revised our 2009 Japanese demand figure downwards to 80,000 oz to reflect lower use of palladium in platinum and white gold alloys. We expect that in line with flat platinum jewellery demand in Japan, palladium consumption will also remain level, while use of the metal in white gold is expected to decline slightly.

Similarly, demand in the North American and Rest of the World regions is expected to remain flat in 2010 as the general malaise in the luxury goods market offsets growth in palladium's popularity.

ELECTRICAL

Gross demand for palladium in the electrical sector is forecast to be 1.41 million ounces in 2010, an increase of 11 per cent. Economic recovery is largely responsible for the increased demand, with consumer purchases and stock levels both set to increase this year.

Palladium Demand: Electrical
'000 oz

	Gross		Recycling		Net	
	2009	2010	2009	2010	2009	2010
Europe	175	190	(160)	(175)	15	15
Japan	305	295	(55)	(55)	250	240
North America	155	160	(70)	(80)	85	80
China	235	360	(25)	(35)	210	325
Rest of the World	400	400	(85)	(95)	315	305
Total	**1,270**	**1,405**	**(395)**	**(440)**	**875**	**965**

Purchases of palladium for use in multi-layer ceramic capacitors (MLCCs) are expected to rise as sales of consumer electronic devices increase and retailers rebuild depleted stock levels. Purchases of computers and electronic items by businesses are also expected to recover during 2010 as credit conditions improve. Demand for palladium in MLCCs is expected to be highest in China and Japan, where manufacturing of consumer electronic components is recovering strongly and sales are increasing both in the domestic market and for export.

Despite palladium and gold both trading at record high prices during 2010, the sustained high price differential between the two metals means that palladium is anticipated to capture some market share from gold in applications such as plating where the two metals compete.

DENTAL

Purchases of palladium by the dental sector are forecast to decrease slightly to 620,000 oz in 2010. Despite the high price of gold, which has encouraged substitution of gold-rich dental alloys with palladium-based alloys, palladium in dental applications is losing overall market share to all-ceramic and base metal dental treatments.

Net demand for palladium in dental applications, such as crowns and bridgework, in Japan is expected to decline by

Palladium Demand: Dental
'000 oz

	2008	2009	2010
Europe	65	65	60
Japan	275	295	290
North America	270	260	255
China	0	0	0
Rest of the World	15	15	15
Total	**625**	**635**	**620**

5,000 oz this year. The government reduced subsidies for the palladium-containing Kinpala alloy in 2009 and the longer-term trends of a declining population and improved dental health are beginning to be felt. In line with revised figures on the number of dental treatments in Japan in 2009, we have raised our figure for palladium dental purchases in Japan for that year to 295,000 oz, increasing the overall dental demand figure for last year.

Demand for dental treatments in North America is also expected to decline in 2010 as part of longer-term dental health trends. Once again, we anticipate that a substitution of gold alloys with palladium-containing alloys will be largely overshadowed by the wider shift to ceramic and base metal dental treatments.

CHEMICAL

Demand for palladium from the chemical industry is expected to increase by 60,000 oz in 2010, lifting our total to 385,000 oz. Consumer demand is expected to drive higher rates of factory utilisation, particularly in Europe, therefore increasing process catalyst requirements.

Purchases of palladium for the manufacture of purified terephthalic acid and vinyl acetate monomer, used in polymer production, are expected to increase in 2010. As economic recovery occurs in many regions, sales of plastics and paints are set to increase, stimulating demand for process catalysts. Europe and North America are expected to see the largest growth in this category as production facilities expand and new plants are constructed. China and the Rest of the World region are expected to see more modest growth after several years of rapid expansion.

Palladium demand for nitric acid manufacture is expected to increase in 2010, with growth concentrated in North America and China. As demand has increased for nitrogen-based fertilisers and explosives in these regions, nitric acid plants have been run at higher throughput and have been expanded. This has increased demand for palladium catchment gauzes.

INVESTMENT

Net identifiable physical investment for palladium in 2010 is forecast to increase by 45,000 oz in 2010 to 670,000 oz, largely driven by heavy investment in the US-based palladium ETF. More mature European ETFs are expected to see a good deal of redemption, reducing net investment demand.

Palladium Demand: Chemical
'000 oz

	2008	2009	2010
Europe	100	85	105
Japan	20	20	20
North America	55	50	65
China	55	75	110
Rest of the World	120	95	85
Total	**350**	**325**	**385**

The launch of a US-based palladium ETF at the beginning of 2010 is anticipated to increase palladium demand in North America. Investors appear to be taking positions on the appreciating palladium price and relatively little liquidation of ETF positions has occurred during price dips in 2010. Many investors seem to believe that palladium is still undervalued and continue to invest. Two new physically backed funds, launched in Germany and Japan in 2010, have seen limited investment thus far, a feature we expect to continue throughout the remainder of the year.

Redemption of European-held ETF positions is expected to return 120,000 oz of palladium to the market in 2010. The largest of the European-held ETFs, based in London, saw heavy buying in 2009 when the palladium price was in the $300-$400 range. Steady redemption of these positions under the considerably higher prices of 2010 has been taking place.

Demand for palladium coins and small bars in North America is expected to be relatively subdued in 2010, with demand falling to 25,000 oz.

OTHER

Palladium demand in other applications is anticipated to increase by 10,000 oz to 80,000 oz in 2010. Palladium demand in pollution control devices for small engines and off-road diesel engines has seen the greatest growth, particularly in Europe where such devices have begun to be sold.

Palladium Demand: Investment
'000 oz

	2008	2009	2010
Europe	370	525	(120)
Japan	0	0	10
North America	50	95	775
China	0	0	0
Rest of the World	0	5	5
Total	**420**	**625**	**670**

OTHER PLATINUM GROUP METALS

- **Gross demand for rhodium is forecast to climb by 22% in 2010 to 876,000 oz. Net rhodium demand is expected to increase to 637,000 oz.**
- **Recovery of rhodium from autocatalyst recycling is set to increase to 239,000 oz in 2010, reflecting higher rates of vehicle scrapping.**
- **Ruthenium demand is set to increase by 83% to 1.05 million ounces. This level of demand is expected to be met by a combination of newly mined metal, existing stocks and release of speculative holdings.**
- **Iridium demand is forecast to increase to 204,000 oz in 2010, more than double the 2009 demand level.**

RHODIUM

Demand for rhodium from the automotive, chemical and glass sectors is forecast to increase substantially in 2010. With a tighter rhodium supply, the market is expected to be in surplus by 79,000 oz in 2010, compared with 241,000 oz last year.

Autocatalyst

The recovery of the global automotive industry during 2010 has stimulated demand for rhodium in autocatalysts, which is due to increase from 619,000 oz in 2009 to 727,000 oz this year. Global light duty vehicle production is expected to be around 70 million units in 2010, with vehicle demand higher in all regions compared with 2009.

Gross autocatalyst demand for rhodium in Japan, which is set to rise from 164,000 oz in 2009 to 204,000 oz in 2010, is responsible for much of the increased automotive demand this year. The recovery of the Japanese domestic and export auto industries has led to an increase in passenger car production, with 8.7 million cars forecast to be manufactured in 2010, a year-on-year increase of 21 per cent. In Japan as elsewhere, rhodium is widely used in gasoline autocatalysts but is also finding a market in NOx treatment of diesel emissions, expected to be a potentially large future market. Demand in China, an almost exclusively gasoline car market using palladium-rhodium three way catalysts (TWCs), is due to rise to 140,000 oz in 2010, compared with 117,000 oz last year. China's car market has performed strongly in 2010, with domestic car production set to climb to 15.8 million units, an increase of 23 per cent compared with 2009. North America is expected to see an increase in rhodium demand to 138,000 oz as automotive production recovers.

The switchover to Euro 5 emissions standards occurring in Europe this year is expected to accelerate the fitment of lower average rhodium content TWCs, a trend which began when rhodium prices were at much higher levels. In line with this, we anticipate rhodium demand for autocatalysts in Europe flatlining at some 108,000 oz, despite the growth in vehicle production in that region.

With higher metal prices and higher levels of new car sales, we expect to see recovery of rhodium from recycled autocatalysts rise to 239,000 oz, an increase of 52,000 oz compared with 2009. The influence of car scrappage schemes has also raised recycling levels above the norm – the stock of palladium-rhodium catalysts taken from scrapped gasoline cars under the incentives will be making its way through the recycling pipeline for some time to come.

Other Demand

The chemical industry is forecast to use 67,000 oz of rhodium in 2010, an increase of 13,000 oz compared with 2009. New oxo-alcohol manufacturing plants were constructed in Asia in 2010, pushing up demand for rhodium process catalysts. Rhodium demand from electrical and other applications is forecast to grow by 1,000 oz to 25,000 oz in 2010. An increase in demand for rhodium as an alloy in white gold jewellery is expected to lift demand somewhat. A modest rise in demand for rhodium in thermocouple wire and in auto spark plugs is also forecast, in line with increased vehicle sales and restocking of industrial inventories.

Glass manufacturing has helped lift demand for rhodium in

Rhodium Demand by Application
'000 oz

	2008	2009	2010
Autocatalyst	768	619	727
Chemical	68	54	67
Electrical	3	3	4
Glass	34	19	57
Other	24	21	21
Total Gross Demand	**897**	**716**	**876**
Autocatalyst Recycling	**(227)**	**(187)**	**(239)**
Total Net Demand	**670**	**529**	**637**

2010. Expansion of LCD glass manufacturing facilities in China and Japan in particular has provided a boost, following a year in which rhodium was returned from both CRT glass factories and inefficient fibre glass manufacturing in China. As a number of new LCD and fibre glass manufacturing lines have been built in Japan, China and the Rest of the World region in 2010, we anticipate rhodium demand in glass manufacture will increase to 57,000 oz in 2010.

Supplies

Supplies of rhodium are forecast to fall in 2010 by 7 per cent to 716,000 oz. Underlying mine output, sales of refined metal and pipeline stocks are expected to decline in South Africa and North America as strikes and safety stoppages affect rhodium pipeline movements. Supplies from Russia are expected to be flat at 70,000 oz. We anticipate mine production of rhodium from other regions to be negligible in 2010.

RUTHENIUM & IRIDIUM

Ruthenium demand is forecast to rise sharply to 1.05 million ounces in 2010. Purchases by the electrical sector are expected to more than double to 795,000 oz, while demand for ruthenium in electrochemical applications is set to strengthen. Similarly, total iridium demand is forecast to increase to 204,000 oz on the back of strong demand from the electrical and electrochemical sectors.

Demand

Total ruthenium demand is expected to increase substantially from 574,000 oz last year to 1.05 million ounces in 2010. Much of this growth is expected to be driven by renewed demand for ruthenium in hard disk drive manufacture, which is set to grow from 53,000 oz to 480,000 oz. Use of ruthenium is ubiquitous in perpendicular magnetic recording (PMR) hard disk drives. The hard disk drive market is experiencing an upswing with increased consumer and business purchasing of computer devices in 2010. The industry has also been increasing production and refining efficiency, which led to a contraction of the ruthenium pipeline in 2009. With increased orders, a restocking of this pipeline is now taking place. Purchases of ruthenium for hard disk manufacture will be concentrated in Asia, the location of many of the principal manufacturers.

Electrochemical demand for ruthenium is set to rise this year to 123,000 oz. This is largely in response to upgrading

Ruthenium Demand by Application
'000 oz

	2008	2009	2010
Chemical	139	89	90
Electrical	410	336	795
Electrochemical	95	95	123
Other	55	54	43
Total Demand	**699**	**574**	**1,051**

of the Chinese chlor-alkali industry to membrane cell technology. Chemical demand for ruthenium in process catalysts is expected to grow modestly in line with higher factory throughput. Use of ruthenium in other applications is expected to fall. A widespread restocking of ruthenium by the automotive mirror coatings sector last year is expected to have the effect of substantially lowering demand in this application in 2010.

Iridium demand is set to rise from 81,000 oz to 204,000 oz this year. Strong demand from the electrical sector has accounted for much of this growth, particularly for iridium crucibles. The recovery of the automotive industry also helped boost demand for iridium-tipped spark plugs. Demand from the electrochemical industry is set to climb to 75,000 oz from 33,000 oz last year as the Chinese chor-alkali sector continues to replace older mercury based technology with iridium and ruthenium. Demand from the chemical sector is set to rise to 14,000 oz, from a revised figure of 11,000 oz in 2009, as increased plant utilisation, particularly in China, stimulates demand for top-up catalyst.

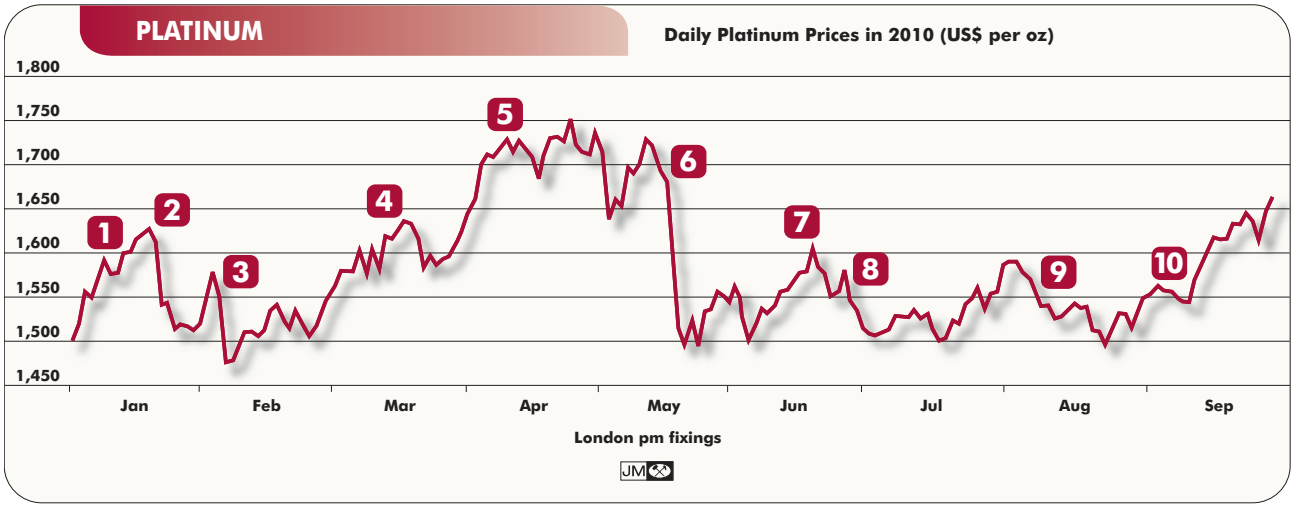
Supplies

Levels of demand for ruthenium in 2010 are forecast to exceed expected underlying mine output. However, we anticipate that any shortfall can be met from above-ground stocks and some release of speculative holdings. Production of iridium is expected to comfortably exceed demand in 2010, despite its increased use in industrial applications.

Iridium Demand by Application
'000 oz

	2008	2009	2010
Chemical	21	11	14
Electrical	15	7	75
Electrochemical	25	33	75
Other	41	30	40
Total Demand	**102**	**81**	**204**

PRICES



After rising steadily throughout 2009, the price of platinum continued to make gains in the first four months of 2010 driven by strong investment demand, particularly for ETFs, a weakening US Dollar and signs of a recovering global economy. From an opening fix of $1,500, the price peaked at $1,752 in late April. As fears of sovereign debt and its contagion in the Euro economies surfaced in May, platinum softened and for the following few months traded between $1,500 and $1,600 with the lower level being the trigger for strong physical demand in Asia. Platinum's price appeared to follow gold's steady price rise through September as part of a general commodities rally. The platinum price also benefited from strong underlying industrial demand and South African supply-side concerns.

1 Platinum began 2010 at $1,500 following a strong recovery in 2009. The launch of a US-based ETF and a second Swiss-based ETF led to significant buying through the first half of **January**. Physical demand helped push the platinum price up to $1,600 on 12th January, its highest level for eighteen months.

Average PGM Prices
in $ per oz (Jan-Sep)

	2009	2010	Change
Platinum	1,143	1,581	(38%)
Palladium	236	477	(102%)
Rhodium	1,397	2,494	(79%)
Ruthenium	87	204	(134%)
Iridium	426	606	(42%)

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

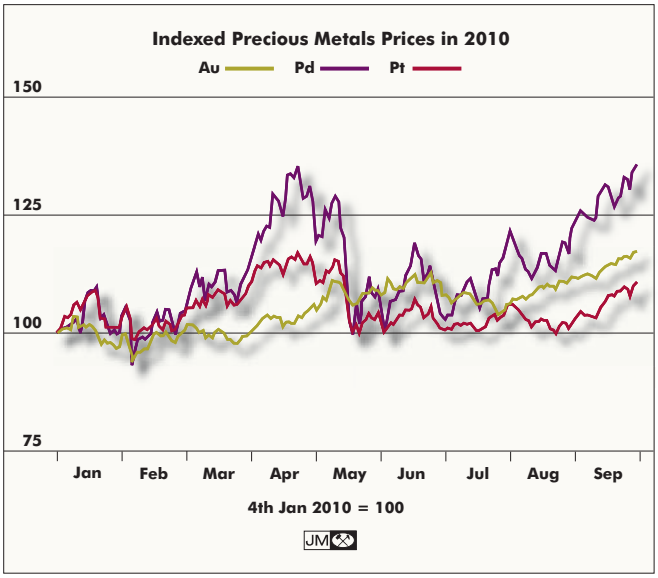
2 Negative market sentiment prevailed in the latter part of January after the US government announced plans to limit bank trading activity and worries emerged that the Chinese authorities would move to tighten monetary policy in order to slow domestic economic growth. The prospect of weak Chinese demand depressed a range of commodity prices, with platinum slumping to $1,512 on 29th January.

3 Worries over Greek sovereign debt in the first week of **February** led investors to move to 'safe havens' such as the US Dollar, sparking a major sell-off in the commodity markets. Platinum reached a low for the nine-month period of $1,475 before recovering in the wake of German government support for heavily indebted Euro economies. A strengthening of the dollar saw the platinum price fall again, without physical demand from China during the Chinese New Year holiday week to bolster the price.

4 Platinum exceeded $1,600 on 8th **March** for the first time since January, as a weaker dollar, better sales figures for the auto industry and a positive response to Greece's Eurobond offer combined to push commodities higher. Volatility during the second week of March, when the price twice dipped below $1,600, was largely a response to fluctuations in the dollar rather than supply and demand fundamentals.

5 Strong physical demand, particularly from the Shanghai Gold Exchange (SGE), re-emerged towards the end of March to push the price higher, a trend that continued into **April**. The $1,700 level was exceeded on 6th April, for the first time since July 2008. Mounting concerns over the Greek debt crisis, the downgrading of Portugal's credit rating, and fear of 'contagion'

Platinum and palladium largely tracked the gold price in 2010, with gold reaching record high prices in September 2010.



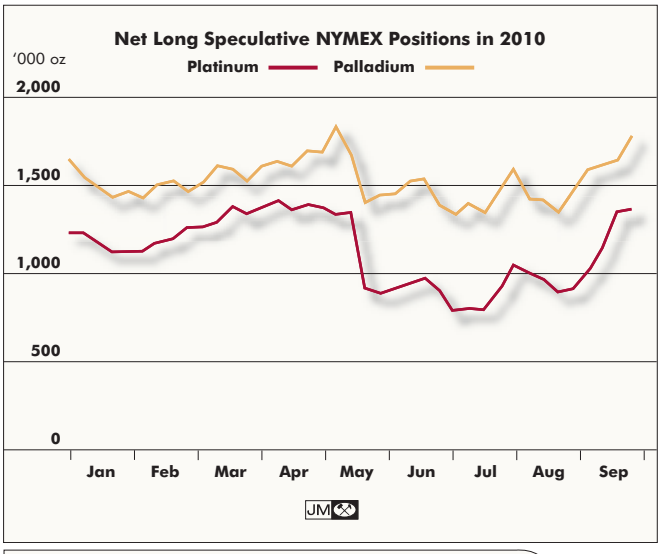
to other Euro economies led platinum to falter briefly, dipping to $1,683 on 19th April. However the upward trend continued, reaching a peak of $1,752 on 26th April. This came amid positive news from the automotive industry, with General Motors' announcement that it had repaid its US and Canadian debts, and markets reacting strongly to signs of economic recovery.

6 Late April and early **May** saw a softening of the price with a stronger dollar, weak stock markets and limited physical demand. However, with gold trading high during the week of 10th May, support was given to the precious metals complex and platinum reached $1,728 on 13th May. The following week, as European Union support for Greece's finances and austerity measures by the Spanish government did little to assuage investors' renewed fears over sovereign debt, platinum plunged to a three-month low of $1,492 on 21st May. This, the most significant downward correction since 2008, was exacerbated by nervousness created by the German ban on 'naked' short selling of financial products and government bonds, which triggered substantial liquidation by investors. Net long futures positions on NYMEX reduced by a third during the week of 18th to 25th May, while TOCOM registered a 16 per cent fall. With the fall in price, strong physical demand emerged from China. With news of another furnace run-out at Lonmin, platinum recovered some of the losses sustained in the previous week.

7 With a generally discouraging outlook for global economic growth, platinum fell, touching $1,500 on 7th **June**. At this level, strong physical buying from Asia once again emerged. Buoyed by this and reports of increasing car sales, especially in BRIC countries, platinum staged a modest recovery. Supply concerns became widely expressed, though ultimately overstated, as the Football World Cup began in South Africa and attention turned to a possible strike by workers at the state electrical utility Eskom. Increased demand helped push platinum above $1,600 by 21st June.

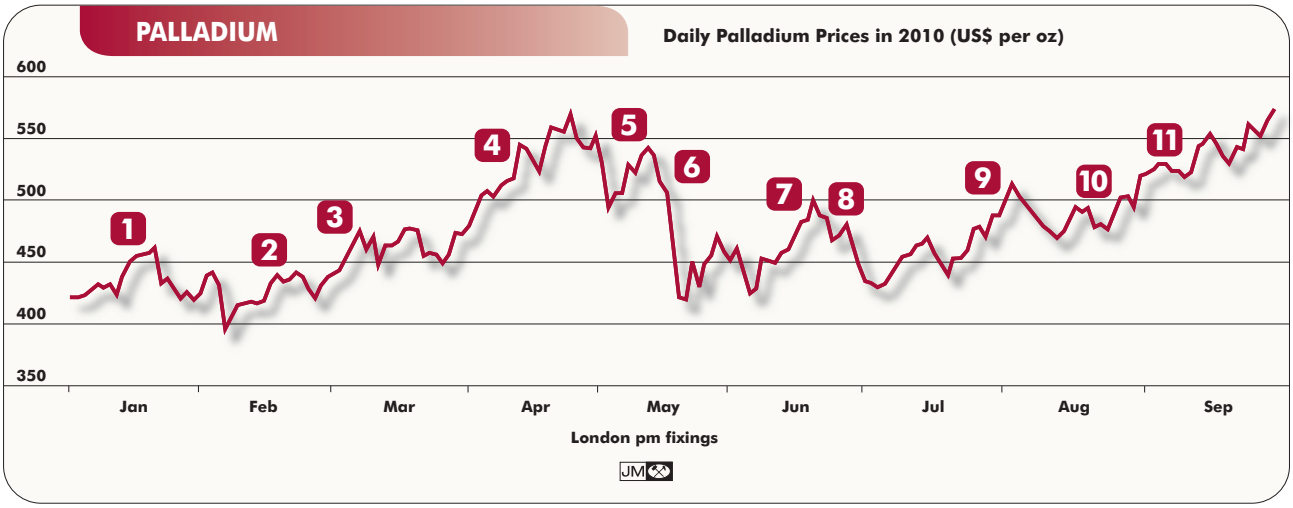
8 Undermining of all commodity prices continued throughout late June and into **July** as speculative futures positions were liquidated. Weak Chinese economic data and US manufacturing data revealed slower than expected growth, further weakening commodities. Platinum continued to drift, touching $1,499 on 19th July with weak demand. The platinum price rose again, following news from Lonmin of a drop in pgm production during Quarter 3 due to the closure and repair of its main furnace, touching $1,590 on 3rd **August**.

9 Relatively thin trading persisted throughout August, with platinum on a downward trend for most of the month as continuing concerns over economic recovery dogged the commodities sector. Platinum's price was propped up to an extent by news of supply problems from the South African mining industry. Lonmin was temporarily banned from selling its by-product base metals by the Department of Mineral Resources following the award of prospecting rights on part of its lease area to a third party, while wage disputes and the threat of strike action continued at Impala. Platinum dipped beneath the $1,500 'floor' established since May, fixing at $1,494 on 24th August. As strong physical buying emerged on the SGE, platinum reached $1,531 on 26th August, recovering some of its losses.



Net long speculative positions on NYMEX increased through much of 2010, but there was substantial liquidation in May.

10 Platinum began **September** strongly, reaching $1,555 on 3rd September, and followed a rising trend throughout the month. A rising gold price and a generally weaker dollar helped push up platinum despite mixed news from the car industry, with reports of increased sales in Asia but much weaker European sales. Despite a strengthening dollar, the platinum price remained firm into mid-September as a wage dispute at Northam Platinum escalated to a strike. The gold price reached all-time record nominal levels in the second half of September, helping to push platinum through the $1,600 level on 16th September for the first time since May. Following a short-lived dip, platinum closed on a month high of $1,662 as the dollar gave up recent gains and the gold price hit a new record.



In the first nine months of 2010, palladium traded at an average price of $477, double its price in the equivalent period in 2009. It performed strongly in the first half of 2010, reflecting solid demand from a recovering automotive sector and considerable investment inflows to the US-based palladium ETF. From an opening fix of $420, palladium breached the $500 level in early April, peaking at $571 later that month as industrial and investment demand continued to rise. As concerns over the global economic recovery resurfaced in May, palladium lost most of its gains for 2010. It recovered in the following four months, aided by investment inflows and a rise in the gold price, to which palladium's movements remained strongly coupled. By September, palladium was reaching new highs for the year, peaking at $573 on the last day of September.

1 Palladium's price moved steadily higher in the opening days of 2010, driven by ETF and other investor purchasing following the launch of the US-based palladium ETF at the beginning of **January**. On the back of strong Chinese and German automotive data, palladium strengthened to an eighteen-month high of $462 on 21st January before succumbing to downward pressure from tighter Chinese monetary policy and comments from the Obama administration in the US aimed at restricting proprietary bank trading.

2 For the first time since December 2009, palladium's price dipped below the $400 level on 5th **February**, fixing at $391 as positions were closed. This was largely driven by negative sentiment surrounding Greece's sovereign debt and fears of contagion to other weak Eurozone economies. Following this low point palladium prices were somewhat more robust, fixing above $400 for the remainder of the nine-month period.

3 Throughout February and **March**, physical demand for palladium was subdued and there was a slowing of the earlier rapid pace of additions to ETF funds. Palladium's price continued on a generally upward trend, albeit with some brief dips as uncertainty continued over Greece's credit rating. A modest recovery in automotive demand, particularly in China which logged a 55 per cent increase in new car sales in February, helped hold up palladium's price.

4 Comments that US interest rates would remain unchanged looked set to create something of a bull market in commodities in late March and so it was, with palladium gaining $123, or 27 per cent, between the 25th of March and 26th **April**. After passing the $500 mark on 6th April, palladium continued its upward trend, fixing at $571 on 26th April, a level not seen since March 2008 at the height of the South African power crisis.

5 A steep decline in price in late April and early **May**, with palladium dipping below the $500 mark on 5th May, was accompanied by liquidation of positions on the London-based ETF. A broader low-risk mentality continued in the first and second week of May as China reported a slowing of manufacturing activity. With investor-driven liquidation, industrial buying picked up, and the price was further strengthened by positive automotive news – in particular in Japan which reported a year-on-year sales increase of 34 per cent for April. Palladium reached a month high for May of $543 on the 13th as the dollar weakened against other major currencies following a well received deficit reduction plan for the Spanish economy and the formation of a new UK government.

6 In relatively thin trading conditions, a major correction occurred in mid-May with palladium losing almost a quarter of its value in a little over a week, reaching $419 on 21st May. The major sell-off included rapid liquidations of net long positions on NYMEX and TOCOM as well as some modest closing of ETF positions. This was mirrored by other industrial metals and was a reflection of investors' nervousness regarding the fragile global economic recovery and uncertainty surrounding Germany's restrictions on short selling.

7 Late May saw palladium make gains once again as industrial customers began to support the price. Positive news from the US came in early **June**, where increased new home and new car sales were reported. Overall, new car sales were up almost 20 per cent year-on-year for May. This helped strengthen palladium. However, poor data on new jobs created in May in the US reduced investor confidence. Concerns surrounding the health of European economies re-surfaced as Hungary's currency fell 5 per cent against the Euro. With these negative factors affecting both the platinum and palladium price, palladium softened to a two-week low of $423 on 7th June.

8 Palladium edged higher as little fresh negative news on the state of Europe's economies was reported through the middle part of June and a tentative recovery of Sterling and the Euro took place. However, comments from the new Prime Minister of Japan on the need for financial restructuring to prevent economic collapse in Japan were a reminder of the parlous state of the economic recovery. The $500 mark was briefly exceeded on 21st June when palladium fixed at $502, part of a wider rally of the precious metals complex.

9 Speculative positions continued to be liquidated in early **July**, and total ETF holdings of palladium fell to a two-month low, while net long positions on NYMEX continued to fall at a rate similar to that during the May correction. Palladium fixed at $429 on 5th July, after which positive announcements on Chinese and South American car manufacturing output helped strengthen palladium and led to investor confidence retuning. Palladium trended steadily upwards, generally outperforming other precious metals as solid investment demand re-emerged and the price looked like breaching the $500 level once again, which it duly did on 2nd **August**.

10 Palladium's price softened from 3rd August, bottoming out at $465 on the 12th and wiping out the gains seen since mid-July. In particular, a negative outlook from the US and concerns that China's economy may be slowing caused palladium to slide alongside other industrial metals. From 12th to 19th August, palladium was on an upward trend as South African supply issues came to the fore and US manufacturing data suggested improved industrial output. A 'risk on' mentality returned as August gave way to **September** and a more bullish outlook emerged, pushing palladium over $500.

11 Following disappointing new car sales figures in the USA and a stronger US Dollar, palladium seemed on a downward trajectory in the early part of the month, but recovered on more positive automotive data from Asia. As Russian sources reiterated their diminishing stocks of palladium, the price reached a five-month high of $554 on 16th September. The final week of September saw commodities rally, with palladium mirroring gold's rise and reaching a high for the first nine months of the year of $573 on 30th September.

OTHER PGM

Rhodium prices softened during the first nine months of 2010, from an initial Johnson Matthey base price of $2,550 in January to $2,300 at the end of September, although the metal traded as high as $2,975 in April as automotive demand picked up. The average price of $2,494 was considerably higher than in the same period in 2009.

Strong buying demand for rhodium continued from late 2009 into **January** 2010. The price reached $2,775 on 18th of January. Offers then began to dominate the market with the price sliding to close the month at $2,450. Steady industrial demand continued throughout **February**, although the price was not immune to sliding during the general commodity

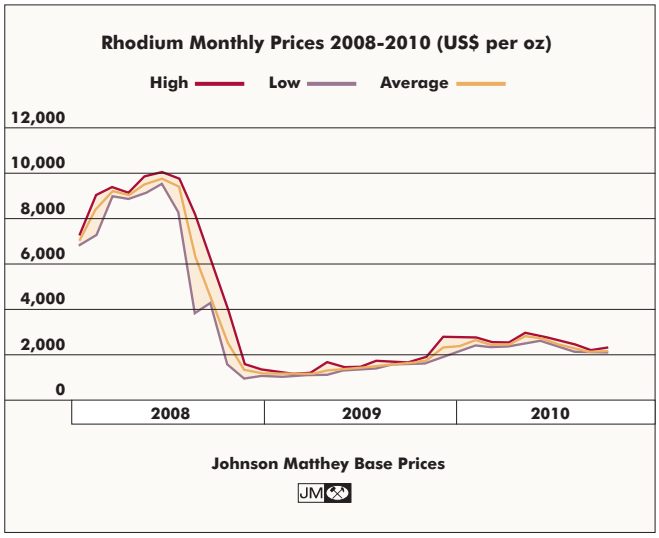
sell-off that affected pgms in early February. Physical demand pushed the price slowly but steadily up to $2,575 by 27th February. As the price slid to $2,525 on 8th **March**, buying interest returned, pushing the price up to $2,550, before it succumbed to downward pressure as fears around sovereign debt in Europe affected industrial commodities. The price reached $2,425 on 24th March.

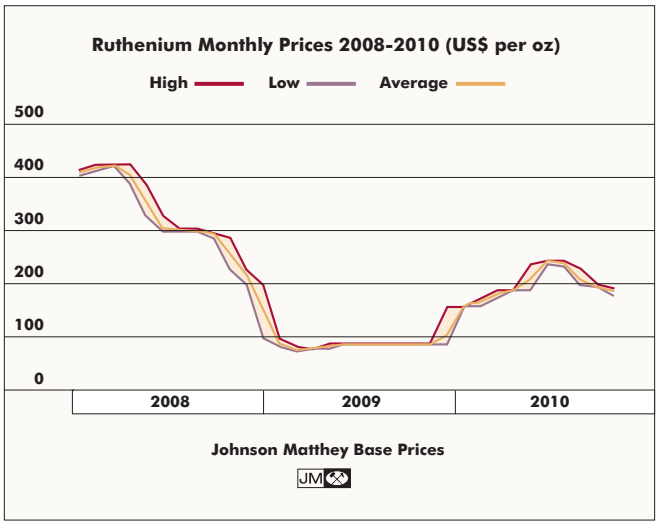
Demand increased throughout the first half of **April** as buying interest continued, some positive automotive news was reported and pgm supply concerns became apparent. The rhodium price moved higher, reaching a high for the first nine months of 2010 of $2,975 on 16th April. It could not break through the $3,000 level, however, and fell back to close the month at $2,850. Rhodium demand softened during **May**, with the price losing $175 during that month.

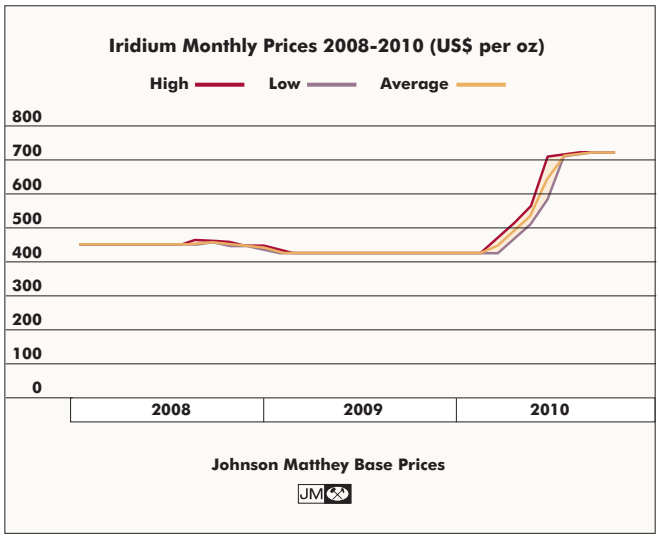
Steady selling pressure continued for rhodium with the price softening to $2,425 by 11th **June**. Rhodium remained at this level until 23rd June when buying demand from Asia picked up, pushing the price to $2,500 by the end of that month. Sustained selling pressure and a lack of buying interest thereafter drove down the price, which reached $2,150 on 21st **July**. Under downward pressure on commodities, rhodium slid further, and the price reached a low for the first nine months of 2010 of $2,125 on 13th **August**. With an uncertain outlook for the automotive sector the price remained at this level, despite solid trading, through the remainder of August and into **September**. Solid buying in Asia helped push the price to $2,300 by the end of September.

Ruthenium began 2010 at the Johnson Matthey base price of $160, unchanged from November 2009. Buying pressure from a recovering electronics sector pushed the price up through **January** and **February**, reaching $190 on 23rd February. With solid demand, this price was maintained into mid-**April** when it began to appreciate further, reaching $245 on 11th **May** and remaining at this level into early **June**, helped by additional demand from the Chinese chlor-alkali industry. As demand softened, the price gradually slid, reaching $200 on 29th **July** and losing a further $5 in thin trading during **August** and into **September**, ending the nine-month period at $180.

The **iridium** price strengthened considerably in the first nine months of 2010, from a Johnson Matthey Base Price of $425 in **January** to $720 in **September**, the highest in almost 30 years. Strong physical demand helped drive the price up in the first half of 2010. Purchases by the Chinese chlor-alkali industry and the electronics sector, mainly for crucibles for crystal growing used in LED manufacture, helped keep it at this level.







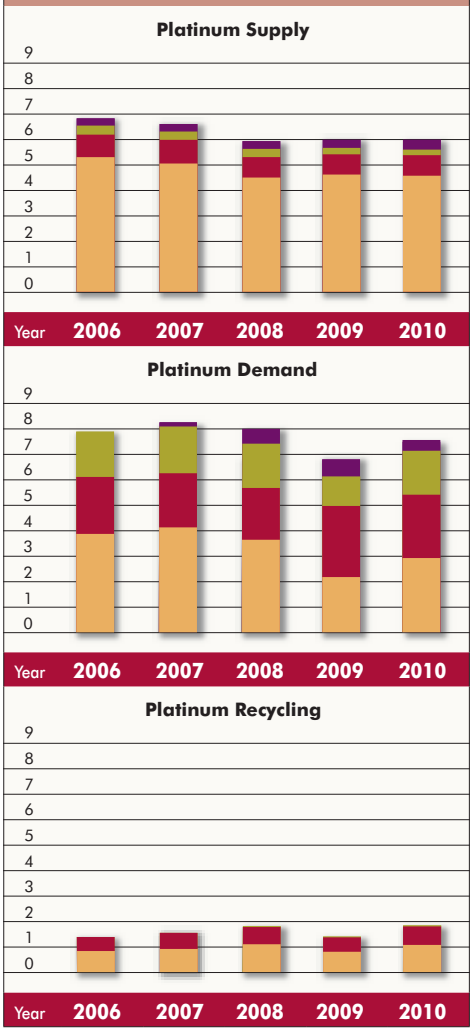
SUPPLY AND DEMAND TABLES

Platinum Supply and Demand

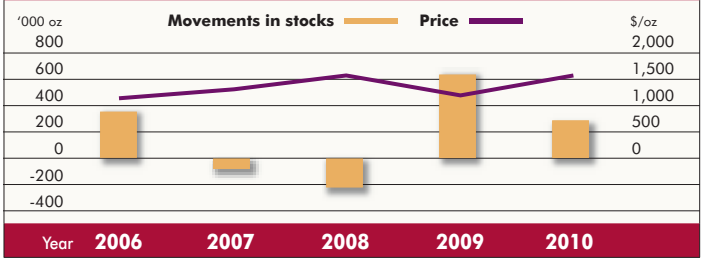
	'000 oz	2006	2007	2008	2009	2010
Supply[1]	South Africa	5,295	5,070	4,515	4,635	4,585
	Russia[3]	920	915	805	785	810
	North America	345	325	325	260	210
	Zimbabwe[2]	165	170	180	230	280
	Others[2]	105	120	115	115	125
	Total Supply	**6,830**	**6,600**	**5,940**	**6,025**	**6,010**
Gross Demand by Application[4]	Autocatalyst[4]	3,905	4,145	3,655	2,185	2,985
	Chemical	395	420	400	290	450
	Electrical[4]	360	255	230	190	225
	Glass	405	470	315	10	365
	Investment	(40)	170	555	660	435
	Jewellery[4]	2,195	2,110	2,060	2,810	2,420
	Medical & Biomedical[5]	250	230	245	250	255
	Petroleum	180	205	240	210	175
	Other[5]	240	265	290	190	250
	Total Gross Demand	**7,890**	**8,270**	**7,990**	**6,795**	**7,560**
Recycling[6]	Autocatalyst	(860)	(935)	(1,130)	(830)	(1,095)
	Electrical	0	0	(5)	(10)	(10)
	Jewellery	(555)	(655)	(695)	(565)	(735)
	Total Recycling	**(1,415)**	**(1,590)**	**(1,830)**	**(1,405)**	**(1,840)**
	Total Net Demand[7]	**6,475**	**6,680**	**6,160**	**5,390**	**5,720**
	Movements in Stocks[8]	**355**	**(80)**	**(220)**	**635**	**290**

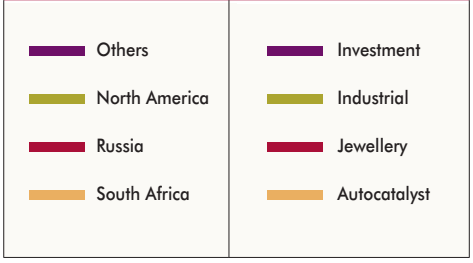
At a glance

million oz



Prices and Movements in Stocks





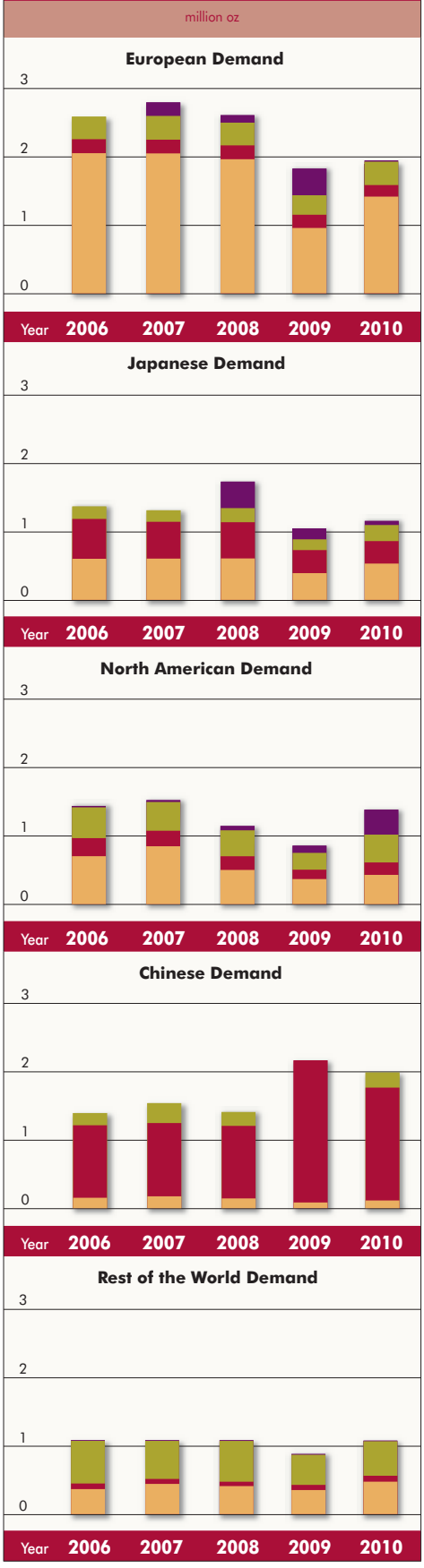
Average Price (US$ per oz)[9]

2006	2007	2008	2009	2010
1,143	1,304	1,576	1,205	1,581

Gross Platinum Demand by Region

	'000 oz	2006	2007	2008	2009	2010
Europe	Autocatalyst	2,060	2,055	1,970	970	1,415
	Chemical	100	110	105	70	110
	Electrical	25	15	20	20	20
	Glass	10	15	(25)	5	10
	Investment	0	195	105	385	10
	Jewellery	200	200	205	185	175
	Medical & Biomedical	110	110	115	115	115
	Petroleum	20	25	30	25	20
	Other	65	75	85	55	80
	Total	**2,590**	**2,800**	**2,610**	**1,830**	**1,955**
Japan	Autocatalyst	605	610	610	395	535
	Chemical	50	55	55	45	50
	Electrical	55	35	35	30	30
	Glass	100	85	65	40	105
	Investment	(65)	(60)	385	160	55
	Jewellery	585	540	530	335	330
	Medical & Biomedical	20	15	20	20	20
	Petroleum	5	5	10	10	5
	Other	20	30	25	15	25
	Total	**1,375**	**1,315**	**1,735**	**1,050**	**1,155**
North America	Autocatalyst	705	850	505	370	430
	Chemical	100	95	95	65	100
	Electrical	75	55	30	25	30
	Glass	10	25	(5)	(35)	40
	Investment	20	30	60	105	365
	Jewellery	270	225	200	135	180
	Medical & Biomedical	105	80	85	90	95
	Petroleum	35	30	25	15	35
	Other	120	135	150	90	110
	Total	**1,440**	**1,525**	**1,145**	**860**	**1,385**
China	Autocatalyst	155	175	145	85	115
	Chemical	65	70	60	40	80
	Electrical	45	20	30	20	25
	Glass	50	180	85	(90)	75
	Investment	0	0	0	0	0
	Jewellery	1,060	1,070	1,060	2,080	1,650
	Medical & Biomedical	0	10	10	10	10
	Petroleum	10	10	10	10	15
	Other	10	5	10	10	15
	Total	**1,395**	**1,540**	**1,410**	**2,165**	**1,985**
Rest of the World	Autocatalyst	380	455	425	365	490
	Chemical	80	90	85	70	110
	Electrical	160	130	115	95	120
	Glass	235	165	195	90	135
	Investment	5	5	5	10	5
	Jewellery	80	75	65	75	85
	Medical & Biomedical	15	15	15	15	15
	Petroleum	110	135	165	150	100
	Other	25	20	20	20	20
	Total	**1,090**	**1,090**	**1,090**	**890**	**1,080**
	Total Gross Demand	**7,890**	**8,270**	**7,990**	**6,795**	**7,560**

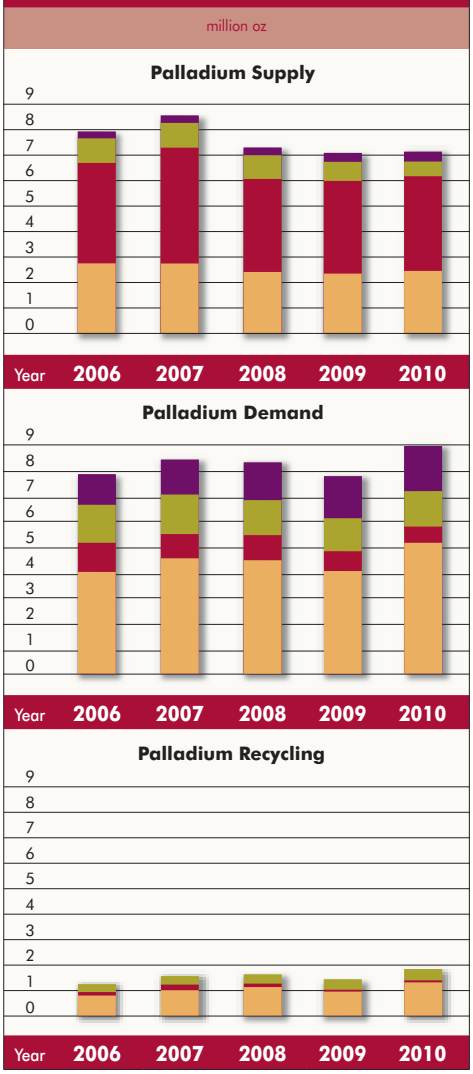
At a glance



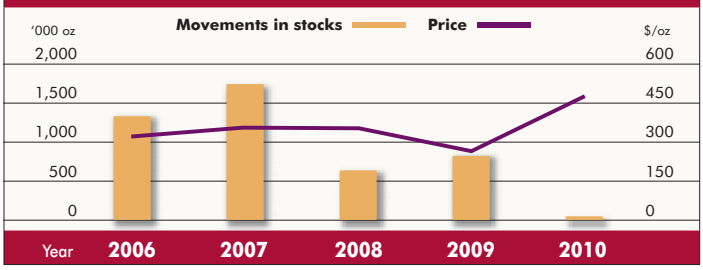
Palladium Supply and Demand

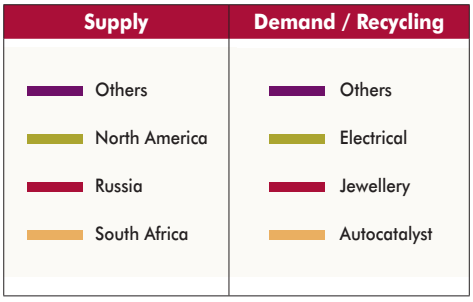
	'000 oz	2006	2007	2008	2009	2010
Supply[1]	South Africa	2,775	2,765	2,430	2,370	2,485
	Russia[3]					
	Primary	3,220	3,050	2,700	2,675	2,700
	Stock Sales	700	1,490	960	960	1,010
	North America	985	990	910	755	560
	Zimbabwe[2]	135	135	140	180	220
	Others[2]	135	150	170	160	165
	Total Supply	**7,950**	**8,580**	**7,310**	**7,100**	**7,140**
Gross Demand by Application[4]	Autocatalyst[4]	4,015	4,545	4,465	4,050	5,150
	Chemical	440	375	350	325	385
	Dental	620	630	625	635	620
	Electrical[4]	1,495	1,550	1,370	1,270	1,405
	Investment	50	260	420	625	670
	Jewellery[4]	1,140	950	985	775	630
	Other	85	85	75	70	80
	Total Gross Demand	**7,845**	**8,395**	**8,290**	**7,750**	**8,940**
Recycling[6]	Autocatalyst	(805)	(1,015)	(1,140)	(965)	(1,320)
	Electrical	(290)	(315)	(345)	(395)	(440)
	Jewellery	(135)	(235)	(130)	(70)	(85)
	Total Recycling	**(1,230)**	**(1,565)**	**(1,615)**	**(1,430)**	**(1,845)**
	Total Net Demand[7]	**6,615**	**6,830**	**6,675**	**6,320**	**7,095**
	Movements in Stocks[8]	**1,335**	**1,750**	**635**	**780**	**45**

At a glance



Prices and Movements in Stocks





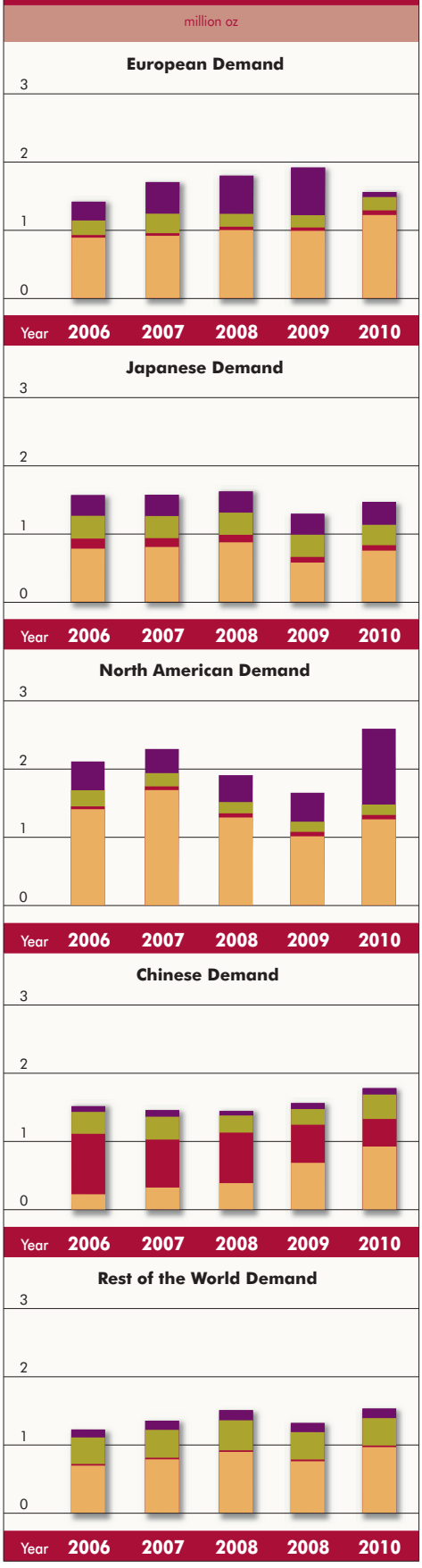
Average Price (US$ per oz)[9]

2006	2007	2008	2009	2010
320	355	352	264	477

Gross Palladium Demand by Region

	'000 oz	2006	2007	2008	2009	2010
Europe	Autocatalyst	890	920	1,005	995	1,220
	Chemical	175	95	100	85	105
	Dental	75	70	65	65	60
	Electrical	210	280	190	175	190
	Investment	0	280	370	525	(120)
	Jewellery	40	40	45	50	70
	Other	25	20	20	20	25
	Total	**1,415**	**1,705**	**1,795**	**1,915**	**1,550**
Japan	Autocatalyst	795	820	885	590	765
	Chemical	25	25	20	20	20
	Dental	270	275	275	295	290
	Electrical	330	325	320	305	295
	Investment	0	0	0	0	10
	Jewellery	145	125	115	80	75
	Other	10	10	10	10	10
	Total	**1,575**	**1,580**	**1,625**	**1,300**	**1,465**
North America	Autocatalyst	1,415	1,695	1,290	1,020	1,270
	Chemical	80	75	55	50	65
	Dental	260	265	270	260	255
	Electrical	240	195	170	155	160
	Investment	50	(20)	50	95	775
	Jewellery	40	55	60	60	60
	Other	30	30	20	15	20
	Total	**2,115**	**2,295**	**1,915**	**1,655**	**2,605**
China	Autocatalyst	220	325	390	685	930
	Chemical	65	80	55	75	110
	Dental	5	5	0	0	0
	Electrical	330	340	255	235	360
	Investment	0	0	0	0	0
	Jewellery	890	705	740	560	400
	Other	10	10	10	10	10
	Total	**1,520**	**1,465**	**1,450**	**1,565**	**1,810**
Rest of the World	Autocatalyst	695	785	895	760	965
	Chemical	95	100	120	95	85
	Dental	10	15	15	15	15
	Electrical	385	410	435	400	400
	Investment	0	0	0	5	5
	Jewellery	25	25	25	25	25
	Other	10	15	15	15	15
	Total	**1,220**	**1,350**	**1,505**	**1,315**	**1,510**
	Total Gross Demand	**7,845**	**8,395**	**8,290**	**7,750**	**8,940**

At a glance

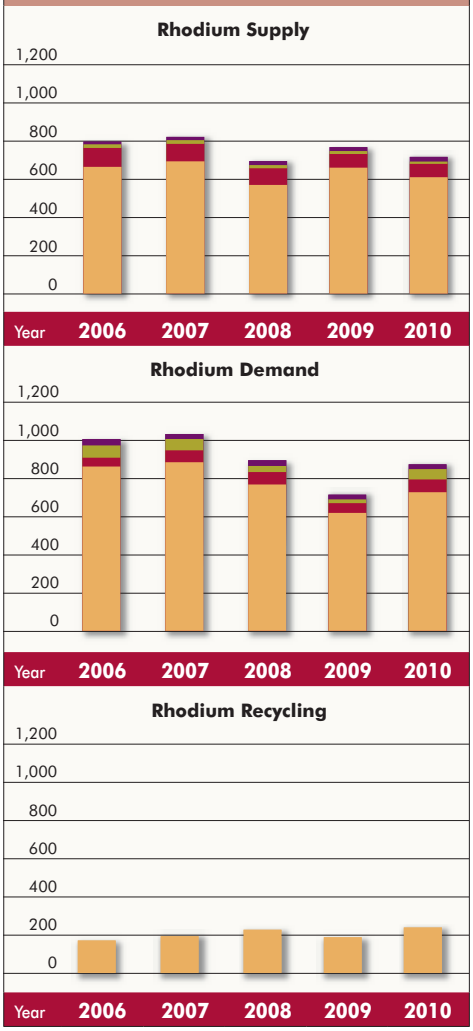


Rhodium Supply and Demand

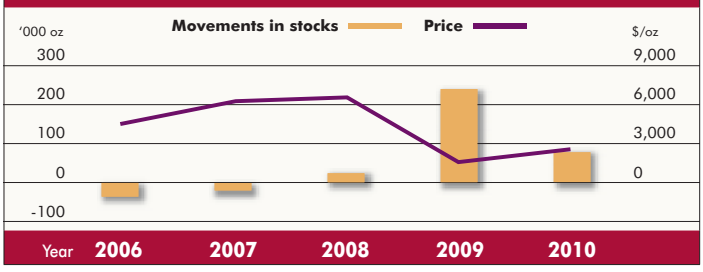
	'000 oz	2006	2007	2008	2009	2010
Supply[1]	South Africa	666	696	574	663	612
	Russia[3]	100	90	85	70	70
	North America	17	20	18	15	11
	Zimbabwe[2]	14	14	15	19	23
	Others[2]	5	4	3	3	0
	Total Supply	**802**	**824**	**695**	**770**	**716**
Gross Demand by Application[4]	Autocatalyst[4]	863	887	768	619	727
	Chemical	49	63	68	54	67
	Electrical[4]	9	3	3	3	4
	Glass	65	59	34	19	57
	Other	23	24	24	21	21
	Total Gross Demand	**1,009**	**1,036**	**897**	**716**	**876**
Recycling[6]	Autocatalyst	(171)	(192)	(227)	(187)	(239)
	Total Recycling	**(171)**	**(192)**	**(227)**	**(187)**	**(239)**
	Total Net Demand[7]	**838**	**844**	**670**	**529**	**637**
	Movements in Stocks[8]	**(36)**	**(20)**	**25**	**241**	**79**

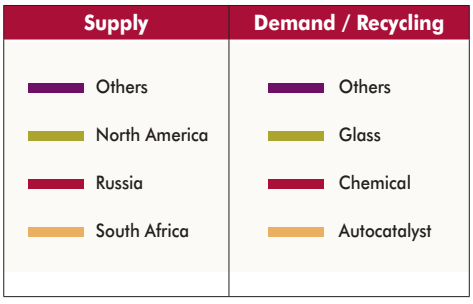
At a glance

'000 oz



Prices and Movements in Stocks





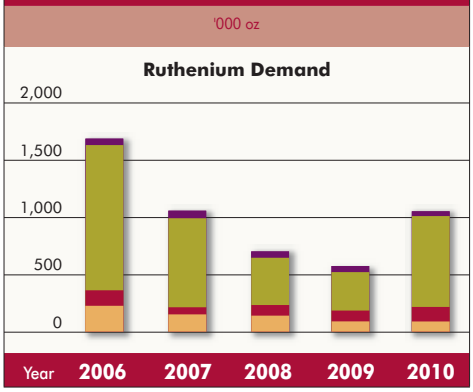
Average Price (US$ per oz)[9]

2006	2007	2008	2009	2010
4,552	6,191	6,564	1,592	2,494

Ruthenium Demand

	'000 oz	2006	2007	2008	2009	2010
Gross Demand by Application	Chemical	223	151	139	89	90
	Electrical	1,272	776	410	336	795
	Electrochemical	137	62	95	95	123
	Other	54	69	55	54	43
	Total Gross Demand	**1,686**	**1,058**	**699**	**574**	**1,051**

At a glance



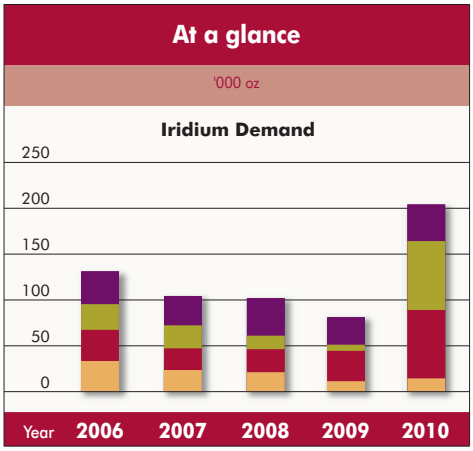
Average Price (US$ per oz)[9]

2006	2007	2008	2009	2010
192	580	323	95	204

Iridium Demand

	'000 oz	2006	2007	2008	2009	2010
Gross Demand by Application	Chemical	33	23	21	11	14
	Electrical	28	25	15	7	75
	Electrochemical	34	24	25	33	75
	Other	36	32	41	30	40
	Total Gross Demand	**131**	**104**	**102**	**81**	**204**

At a glance



Average Price (US$ per oz)[9]

2006	2007	2008	2009	2010
350	447	450	425	606

NOTES TO TABLES

[1]**Supply** figures represent estimates of sales by the mines of primary pgm and are allocated to where the initial mining took place rather than the location of refining. Additionally, we continue to report sales of metal which we believe has not previously been priced, principally sales of Russian state stocks, as supplies.

[2]Supplies from **Zimbabwe** have been split from **Other supplies** throughout the 2006-2010 period. Platinum group metals mined in Zimbabwe are currently refined in South Africa, and our supply figures represent shipments of pgm in concentrate or matte, adjusted for typical refining recoveries.

[3]From 2006 onwards, **Russian supply** figures are net of Russian and ex-CIS demand and represent the total pgm sold in all regions, including Russia and the ex-CIS. Demand in Russia and the ex-CIS is included in the Rest of the World region from 2006 onwards. **Russian supply** figures for palladium have been split into sales from primary mining and sales of stocks.

[4]**Gross demand** figures for any given application represent the sum of manufacturer demand for metal in that application and any changes in unrefined metal stocks in that sector. Increases in unrefined stocks lead to additional demand, reductions in stock lead to a lower demand figure.

[5]Demand for our new category, **Medical and Biomedical** has now been separated from our **Other demand** category for platinum. This represents combined metal demand in the medical, biomedical and dental sectors.

[6]**Recycling** figures represent estimates of the quantity of metal recovered from open loop recycling (i.e. where the original purchaser does not retain control of the metal throughout). For instance, autocatalyst recycling represents the weight of metal recovered from end-of-life vehicles and aftermarket scrap in an individual region, allocated to where the car is scrapped rather than where the metal is finally recovered. These figures do not include warranty scrap or production scrap. Where no recycling figures are given, open loop recycling is negligible. In our platinum recycling chart, we label recovery of electrical scrap as 'industrial' recycling.

[7]**Net demand** figures are equivalent to the sum of gross demand in an application less any metal recovery from open loop scrap in that application, whether the recycled metal is re-used in that industry or sold into another application. Where no recycling figure is given for an application, gross and net demand are identical.

[8]**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.

[9]**Average price** figures for platinum and palladium are the mean of all daily fixing values in a given year except for 2010 which cover the period January to September inclusive. Average price figures for rhodium, ruthenium and iridium are based on Johnson Matthey European Base Prices.

GLOSSARY

BEE	*Black Economic Empowerment*
CIS	*Commonwealth of Independent States*
CO	*Carbon Monoxide*
CRT	*Cathode Ray Tube*
CSF	*Catalysed Soot Filter*
DMFC	*Direct Methanol Fuel Cell*
DOC	*Diesel Oxidation Catalyst*
DPF	*Diesel Particulate Filter*
ETF	*Exchange Traded Fund*
ETN	*Exchange Traded Note*
g	*Gram*
HC	*HydroCarbons*
HDD	*Heavy Duty Diesel*
HIC	*Hybrid Integrated Circuit*
jv	*Joint Venture*
kg	*Kilograms*
LCD	*Liquid Crystal Display*
LED	*Light Emitting Diode*
Merensky	*A platiniferous ore body in South Africa*
MLCC	*Multi-Layer Ceramic Capacitor*
NOx	*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)*
Platreef	*A platiniferous ore body in South Africa*
PM	*Particulate Matter*
PMR	*Perpendicular Magnetic Recording*
ppm	*Parts Per Million*
ppt	*Parts Per Thousand*
PTA	*Purified Terephthalic Acid*
SCR	*Selective Catalytic Reduction*
SGE	*Shanghai Gold Exchange*
SUV	*Sports Utility Vehicle*
TOCOM	*Tokyo Commodity Exchange*
ton	*Short ton (2,000 pounds or 907 kg)*
tonne	*1,000 kg*
TWC	*Three Way Catalyst*
UG2	*A platiniferous ore body in South Africa*
ULEV	*Ultra Low Emissions Vehicle*
VAM	*Vinyl Acetate Monomer*

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*

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