**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
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 253,000 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 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 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 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 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.

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.

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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 feel.

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.
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.

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.