



Johnson Matthey

# Platinum 2007 Interim Review



13<sup>th</sup> November 2007



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# Platinum



I will start with a review of platinum supply and demand in 2007 before turning to the outlook for platinum and our price forecast for the next six months.

I will then do the same for palladium before closing with some remarks about rhodium and ruthenium.

## Platinum: Key features

- Platinum market to return to deficit in 2007
- Autocatalyst demand growth outweighs effects of thrifting and substitution
- Jewellery demand not significantly affected by price
- South African supply well below expectations
- Limited impact of ETFs
- Record price due to weak dollar and supply shortfall

In 2007 the platinum market will return to deficit after the modest surplus seen in 2006.

On the demand side, autocatalysts remain the key driver as market growth has outweighed the effect of thrifting and substitution.

In the jewellery sector, demand has held up quite well in spite of high metal prices.

On the supply side, South African production has been well below expectations.

A year ago, the possibility of Exchange Traded Funds or ETFs in platinum and palladium was a major issue for the market, but their launch in Europe earlier this year has not had the impact that many people expected.

Nonetheless, the weak dollar and supply shortfalls have combined to push the platinum price to record levels.

## Platinum Supply and Demand

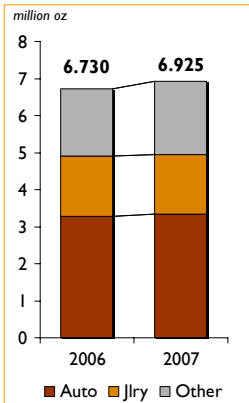
'000 oz	2006	2007	%
<b>Demand</b>	<b>6,730</b>	<b>6,925</b>	<b>+2.9</b>
<b>Supply</b>	<b>6,795</b>	<b>6,660</b>	<b>-2.0</b>
<b>Movements in stocks</b>	<b>65</b>	<b>(265)</b>	

In summary, we have seen a 2.9% increase in platinum demand to 6.925m ozs

An a 2.0% reduction in supply to 6.660m ozs.


This will result in a deficit of 265,000ozs.

# Platinum Demand Rises 195,000 oz



- Total demand climbs 2.9% to 6.93 million oz
- Autocatalyst demand (net of recovery) rises by 65,000 oz
- Jewellery demand falls by only 25,000 oz to 1.60 million oz
- Growth in other sectors including investment

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Looking at platinum demand in more detail ...

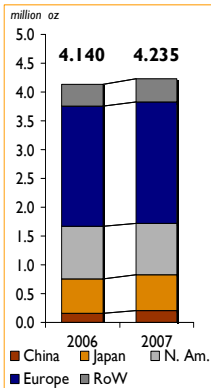
There has been an increase in autocatalyst demand – the brown bar in this chart - of 65,000ozs net of recovery from spent catalyts

Jewellery demand has fallen by only 25,000ozs to 1.60m ozs, perhaps less than might have been expected given the high price of platinum.

There has been growth in demand in industrial sectors including hard disks and petroleum refining.

Although not having a spectacular effect, ETFs have become a new of investment demand, which will increase by 115,000 ozs in 2007.

# Platinum Demand: Autocatalyst



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- Auto industry purchases increase by 2.3% to 4.24 million oz
- Increasing fitment of DPFs
- Further growth in heavy duty diesel aftertreatment
- Strong demand for platinum from rising Asian vehicle production
- Thrifting and substitution of platinum

Breaking down autocatalyst demand a little further ....

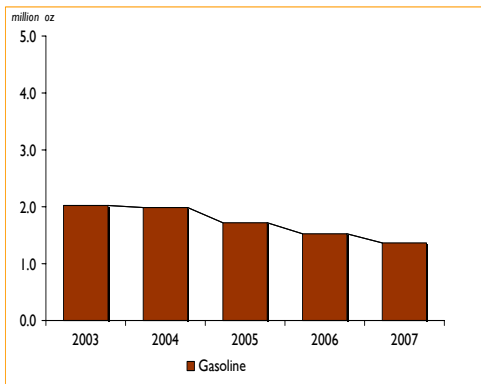
In the last year auto industry purchases have increased by 2.3% to 4.24m ozs.

The diesel sector has been once again the key driver, with increasing fitment of catalysed Diesel Particulate Filters or DPFs, as well as increasing use of platinum in heavy duty diesel aftertreatment.

Regionally, the rise of car production in Asia has had a positive affect on platinum demand.

This increase in consumption has been balanced to an extent by continued thrifting of the platinum content of autocatalysts and its continuing substitution by palladium.

## Platinum Demand: Autocatalyst



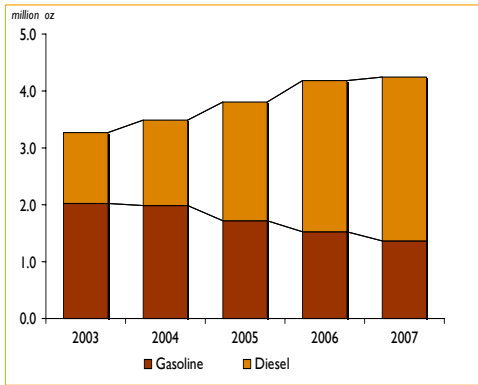
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We can see from this chart that consumption of platinum for gasoline engines has declined in the last few years.

This is due in part to the substitution of platinum by palladium in three way gasoline catalysts, countered by an increase in gasoline-engined vehicle production outside Europe.

## Platinum Demand: Autocatalyst



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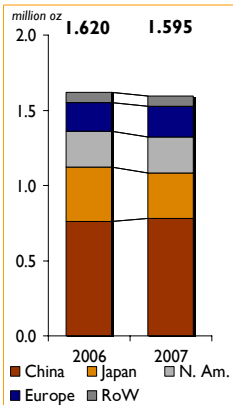
But we can see that the decline in platinum consumption for gasoline engines has been more than offset by the increase in its use in cleaning up the emissions from diesel engines.

In Europe, although sales of passenger cars fell slightly in the first half of 2007, the market share of diesels continued to grow to 52% of sales. This has reached almost three in every four vehicles sold in some countries.

In the US, growth is coming from the medium and heavy duty diesel engine sectors.

The rate of growth of the US light duty diesel sector remains a potentially very important factor in the platinum market, but is unlikely to have a major impact in the near term.

## Platinum Demand: Jewellery



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- Jewellery demand steady, despite high prices
- Global demand for new metal falls by 1.5% to 1.595 million oz
- Demand expected to grow in China and Europe
- Recycled metal again a significant input to Asian manufacturing levels

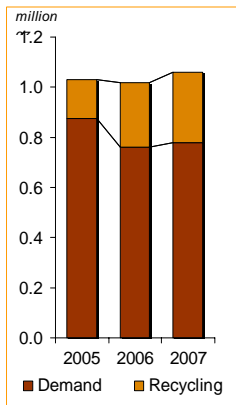
Turning to jewellery, we have seen relatively steady demand in spite of rising and often volatile platinum prices.

Global demand for new metal will fall by just 1.5% to 1.595m ozs.

It's important to emphasise that our measurement of demand is for new metal for manufacturing and not retail sales.

The fact that demand has held up in spite of high metal prices suggests a surprisingly robust retail market, particularly in China and Europe.

## Platinum: Chinese Jewellery Manufacture



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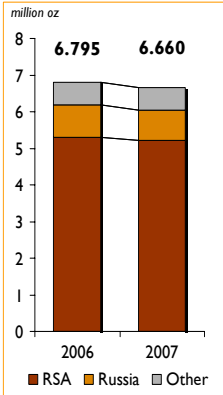
- Chinese demand for new metal climbs 20,000 oz to 780,000 oz
- Strong consumer purchasing helped by economic growth
- High prices have little further effect on recycling rates

Looking at the numbers specifically for China, we can see that new metal demand has risen by 20,000ozs to 780,000ozs.

The Chinese consumer still has strong appetite for platinum jewellery, reflecting stellar economic growth.

Our visits to the Chinese jewellery manufacturers suggest that the high platinum price has not increased significantly the rate of recycling above that seen last year.

## Platinum Supply



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- 2007 South African output falls to 5.22 million oz due to strikes, safety issues and processing problems
- Challenges of finding and retaining staff remain key
- Russian primary production to fall but export licence issues will have no effect across 2007 as a whole

Turning to the supply side, we can see that total platinum supply will fall in 2007 to 6.66m ozs, down 2% on 2006.

In South Africa, output will fall to 5.22m ozs as a consequence of strikes, safety issues and processing problems.

The three major platinum producers, Anglo Platinum, Impala and Lonmin all suffered temporary disruptions of one sort or another and will produce less platinum in 2007 than 2006. The contribution from the smaller producers such as Aquarius and ARM continues to grow.

There remain numerous challenges for the South African industry to trying to meet its expansion targets in the coming years, not least of which is the recruiting and training of new staff.

In Russia, primary platinum production will fall at both Norilsk Nickel and at the alluvial producers in Eastern Russia. However, the export licence problems experienced early in 2007 will have no affect on supply for the year as a whole.

## Platinum Outlook

- Increasing use of light duty diesel filters and heavy duty catalysts to support demand growth
- Consumer interest in Pt jewellery still strong but effects of high price uncertain
- Limited price sensitivity in industrial sectors
- Supply to grow but challenges remain
- Market likely to remain tight

I would now like to turn to our outlook for the coming year.

We expect to see demand continue to grow, with the increasing use of platinum in light duty diesel filters and catalysts for heavy duty diesel engines. The next phase of heavy duty diesel legislation comes into force in Europe towards the end of 2008.

We are encouraged that consumer interest in platinum jewellery remains strong but assessing the true level of price elasticity in this market remains challenging. The effects of platinum prices in excess of \$1,400/oz are yet to be seen.

In other markets, particularly in industrial applications, demand seems little affected by the high prices emphasising the unique value of platinum in modern technology.

On the supply side we expect a resumption of growth, but it is difficult to predict when the corner will be turned in South Africa given intractable nature of some of the challenges faced.

We therefore expect the market to remain tight in the coming year.

## Forecast Platinum Price for the Next 6 Months



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Looking at the platinum price in 2007 we can see that the strong fundamentals we have reported and the rising gold price have supported a very significant rise in the platinum price, particularly in the second half of the year.

The correlation between the gold and platinum prices has been particularly strong, with the weakening dollar driving prices up across the hard commodity sector.

## Forecast Platinum Price for the Next 6 Months



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In the next six months we anticipate that platinum's stronger than expected fundamentals will continue to support the price. With a weak dollar and a buoyant gold price, we forecast that platinum will break through the \$1,500 level and trade as high as \$1,575 per oz.

However, if investment sentiment was to falter and a widespread sell-off of hard commodities followed, we could see some softening of the price. We expect that strong physical demand from Asia will prevent the price falling below the \$1,350 level.



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# Palladium



I would now like to turn to palladium

## Palladium: Key features

- Palladium market to be in fundamental surplus
- Substitution for platinum in gasoline catalysts and further use in diesel catalysts
- Chinese jewellery demand drops – manufacturing levels down and recycling up
- Supplies rise, boosted by Russian stock sales
- Price supported by investor demand

In 2007 the palladium market will continue in a state of significant fundamental surplus.

In the autocatalyst sector, we have seen continuing substitution of platinum by palladium in gasoline catalysts and increasing use in diesel catalysts.

In the Chinese jewellery market – which is by far the most significant for palladium – manufacturing levels will fall and recycling will increase.

Supplies of palladium are expected to increase in 2007, boosted by sales of metal from Russian state stock.

The price of palladium has been supported by the continuing transfer of liquidity of market stocks into the hands of funds and other investors.

## Palladium Supply and Demand

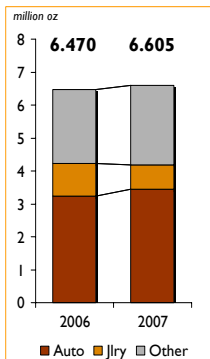
'000 oz	2006	2007	%
<b>Demand</b>	<b>6,470</b>	<b>6,605</b>	<b>+2.1</b>
<b>Supply</b>	<b>8,060</b>	<b>8,320</b>	<b>+3.2</b>
<b>Movements in stocks</b>	<b>1,590</b>	<b>1,715</b>	

Palladium demand will increase by just over 2% to 6.605m ozs.

And palladium supply will increase by just over 3% to 8.320m ozs.

The results is an increased surplus of 1.715m ozs

## Palladium Demand Climbs 135,000 oz



- Total demand grows by 2.1% to 6.605 million oz
- Rising Asian car production and substitution for platinum drive autocatalyst growth
- Decline in demand for new palladium for jewellery to 745,000 oz
- ETFs boost other demand by 270,000 oz

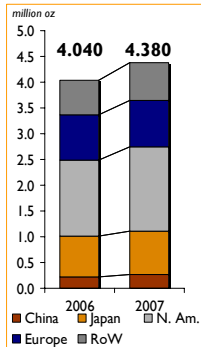
Looking at palladium demand in a little more detail ...

Net demand from the autocatalyst sector has increased with rising Asian car production and substitution of platinum driving growth.

Demand for new metal for jewellery manufacturing has fallen to 745,000 ozs.

Demand from the Industrial sector has been robust, and investment in the new palladium ETFs will add 270,000 ozs to demand in 2007.

# Palladium Demand: Autocatalyst



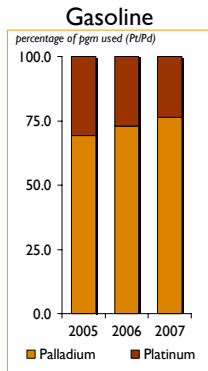
- Asian palladium demand grows due to rising vehicle production
- Palladium continues to replace platinum
  - Approaching limit in gasoline sector
  - Still potential growth in diesel

Turning to the detail for autocatalysts, this chart shows that gross demand before the deduction of recycled metal from spent autocatalysts has increased by just over 8%.

Palladium continues to replace platinum in autocatalyst formulations, although it should be noted that in gasoline catalysts that process is approaching a limit.

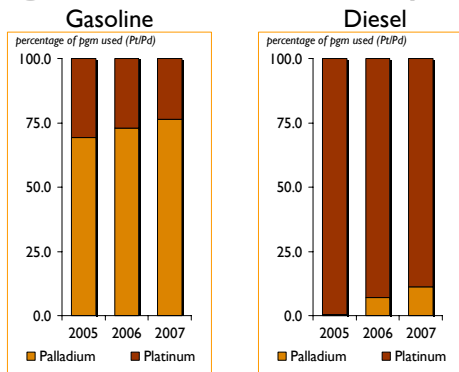
There is still potential for the increasing use of palladium in diesel catalysts.

# Pgm choice in Autocatalysts



You can see clearly from this chart that the proportion of palladium used in gasoline catalysts now exceeds 75%.

# Pgm choice in Autocatalysts



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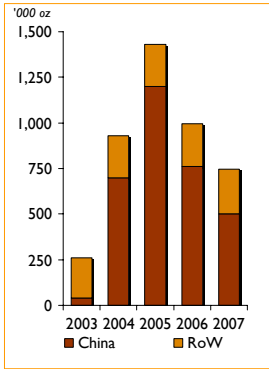
This contrasts sharply with diesel, where palladium finds limited albeit growing use.

Palladium is used to replace between a fifth and a third of the platinum in newer diesel catalyst formulations where it enhances thermal stability as well as reducing costs.

It is being used in diesel oxidation catalysts and in catalysed Diesel Particulate Filters.

The proportion of palladium that can be used is limited by durability issues such as residual sulphur in diesel fuel, but naturally is the subject of vigorous and continuing development efforts by catalyst manufacturers.

## Palladium Demand: Jewellery



- Chinese new metal purchases drop 260,000 oz to 500,000 oz
- Manufacturing demand falls
- Significant use of recycled palladium
- Retail sales picture mixed

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Looking at jewellery, we can see that global demand is set to fall in 2007 by 250,000 ozs to 745,000 ozs.

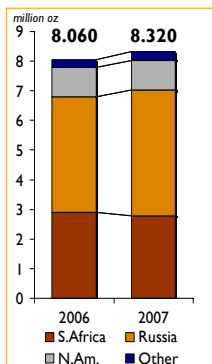
European and North American demand will rise slightly, reflecting the launch of test ranges of palladium jewellery in these regions.

However, in the more established China market demand will drop by 260,000 ozs to 500,000 ozs.

Manufacturing levels have fallen and demand for new metal has again been offset by the use of recycled jewellery and the purchase of palladium refined from industrial scrap.

The retail sales picture remains mixed, with significant variations between cities and still no obvious breakthrough in the key markets of Beijing and Shanghai.

## Palladium Supply



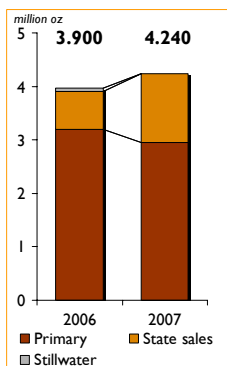
- Supply grows 260,000 oz to 8.32 million oz
- Russian supplies boosted by sales of Dec. 2006 shipments
- South African production falls to 2.795 million oz

Turning now to the supply side, we can see that total supply has increased by 260,000 ozs to 8.32m ozs.

Supplies from Russia are forecast to rise in 2007 with significant sales of state stock shipped in December 2006.

As for platinum, South African palladium production will fall this year.

## Palladium Supply: Russia



- Norilsk primary production from Russia expected to fall
- All Stillwater/Norilsk metal now sold
- Forecast does not include any potential 2007 shipments of state stocks

Looking at the Russian figures in a little more detail, we can see that primary production at Norilsk Nickel will be down to around 3m ozs, although it's possible that the final reported numbers for 2007 will be a little better than that.

Our forecast for 2007 does not include any further sales of Russian state stocks, although it is conceivable that that could happen before the end of the year.

## Palladium Outlook

- Palladium to continue to take share from platinum in autocatalysts
- Growth in Chinese jewellery demand possible if recycling slows and marketing is extended
- Timing of Russian stock sales unknown
- Market to remain in surplus - fund and investor interest remain vital to the price performance

Turning to the outlook for palladium...

We expect palladium to continue to take share from platinum in autocatalysts, but at a diminishing rate in the gasoline sector.

Growth in consumption for jewellery in China is possible, particularly if recycling slows and concerted marketing of palladium jewellery is extended.

As usual, the timing of Russian stock sales is unpredictable, but we do expect that the steady diminution of state holdings will continue.

We anticipate that the market will remain in significant fundamental surplus and the key determining factor for the palladium price will continue to be fund and other investor interest.

## Forecast Palladium Price for the Next 6 Months



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Turning to our six month price forecast. . .

We can see that palladium has been largely untroubled by the weak supply and demand fundamentals which have persisted in our analysis since 2001.

Palladium has continued to shadow platinum in the first half of 2007, albeit in a rather muted way at times.

## Forecast Palladium Price for the Next 6 Months



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In the coming six months we expect the sentiment of investors will continue to determine the direction of the palladium price.

Many investors continue to regard palladium as undervalued or simply cheap compared to its historical peak.

We think that it is likely that investment activity will prevent the price from falling below \$320/oz in the next six months.

Renewed fund buying in the same period could see the price rise as high as \$420, particularly if the gold and platinum prices rise.



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## Other pgm



I'd like to add some comments about the rhodium and ruthenium markets

# Rhodium



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- Market to be in small deficit again in 2007
- Supplies to fall 20,000 oz to 804,000 oz due to lower Russian shipments
- Demand falls to 808,000 oz on lower glass sector demand
- Price supported by tightness and likely to remain at elevated levels

We expect the rhodium market to show a small deficit in 2007.

Supplies will fall by 20,000 ozs to 804,000 ozs. South African production will rise, but only marginally and not by the amount expected.

Russian supplies will actually be lower as we believe shipments from stock have been lower this year.

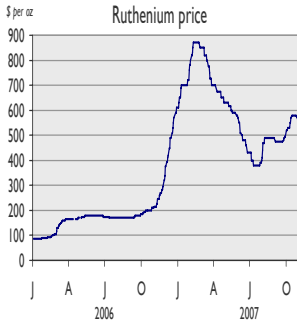
Rhodium demand will fall by 4% to 808,000 ozs.

Autocatalyst demand will be slightly lower than in 2006 with thrifting of rhodium and the increase in the market share of diesels having an impact.

The use of rhodium in the construction of furnaces for LCD glass will fall by 40% in 2007 as the rate of capacity expansion has slowed, if only temporarily.

With the market remaining close to balance, we anticipate continuing tightness in the market and prices to remain at elevated levels.

# Ruthenium



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- Demand to rise 53,000 oz to record 1.344 million oz
- PMR hard disk market share increases
- Expansion of refining capacity and concentration on reduction of inventory limits increase in demand

Ruthenium demand is expected to rise by just over 4% to a new record level of 1.344m ozs.

The market share of perpendicular magnetic storage in hard disks, the major new application for ruthenium, will reach 40% in 2007, up from 15% in 2006.

However, expansion of refining capacity for spent ruthenium targets and a focus on inventory reduction eased the pressure on supply earlier in 2007, causing the price to fall back from record levels.

Strong seasonal demand for hard disks has seen renewed pressure on the price in the last 2 months, but a return to the price levels seen earlier this year looks unlikely in the short term.

In the longer term the price of ruthenium will be affected by the degree to which rising share of PMR storage technology is balanced by increasing primary production and secondary recycling.



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