

Summary & Outlook

Platinum

- Demand for platinum rose by 8 per cent in 2001 to 6.15 million oz, exceeding the 6 million oz level for the first time.
- Auto industry purchases of platinum were up by a third as diesel cars gained market share in Europe and platinum was substituted for palladium in some gasoline autocatalysts.
- Jewellery demand fell by 10 per cent as another record year in China was outweighed by sharp declines in Japan and the USA.
- Growth in industrial demand for platinum slowed to 2 per cent as increased use in glass production, petroleum refining and dental alloys was partly offset by lower demand from the electronics sector.
- There was a return to positive investment demand last year, although net sales were small.
- Supplies rose by 11 per cent with increases from all mining regions.
- Despite the generally positive statistics, the average price for platinum fell by 3 per cent compared to 2000 as negative sentiment about the world economy gathered strength in the second half of the year.

Platinum Supply and Demand '000 oz		
	2000	2001
Supply		
South Africa	3,800	4,100
Russia	1,100	1,300
North America	285	350
Others	105	110
Total Supply	5,290	5,860
Demand		
Autocatalyst: gross	1,890	2,520
recovery	(470)	(520)
Jewellery	2,830	2,550
Industrial	1,490	1,520
Investment	(60)	80
Total Demand	5,680	6,150
Movements in Stocks	(390)	(290)

Overview

Demand for platinum exceeded 6 million oz for the first time in 2001, rising by 470,000 oz to 6.15 million oz. Although supplies also increased, by 570,000 oz to 5.86 million oz, the market remained in deficit. However, the difference between supplies and demand of 290,000 oz represented the nearest to a balanced market since 1998.

The largest growth sector was the auto industry, where demand for platinum in **autocatalysts** increased by a third to reach 2.52 million oz. In the European car market, the share taken by diesel engines rose to 36 per cent and this, coupled with the imposition of Euro Stage III emissions regulations on all vehicles from January 2001, boosted

platinum use. There was also an increase in demand worldwide as a result of substitution of platinum for palladium in some catalysts and, in North America, further stock building by auto companies that expect to increase their use of platinum in future.

Demand for platinum in **jewellery** fabrication fell for the second successive year, dropping by 280,000 oz to 2.55 million oz, its lowest level since 1998. China consolidated its position as the world's largest platinum jewellery market as demand rose by 18 per cent to a record 1.3 million oz. However, lower retail sales and a further rundown of stocks of platinum jewellery led to a 33 per cent fall in Japanese demand. There

was also a 26 per cent decline in consumption by the jewellery trade in North America as sales fell back in response to the weaker US economy.

Industrial demand rose by 2 per cent to 1.52 million oz. There was more investment in Asia in new plants to produce fibreglass and glass for liquid crystal displays. This, and increased use of platinum in dental alloys and biomedical applications, outweighed a fall in the use of the metal in computer hard disks caused by declining sales of computers as consumers reduced expenditure on electronic goods.

Investment demand remained relatively weak, although sales of American Eagle bullion coins in the

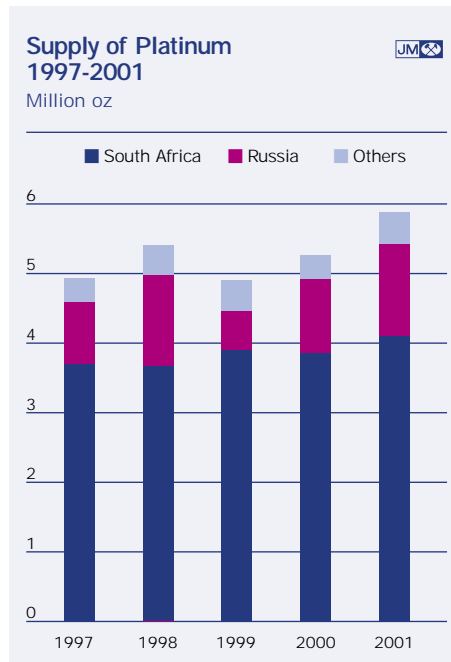
fourth quarter of the year were the highest since mid 1999. Demand for large investment bars in Japan improved in the second half of 2001 as the price fell, helping to bring total investment demand to 80,000 oz.

Supplies of platinum rose by 570,000 oz to 5.86 million oz. South African supplies topped 4 million oz for the first time as metal began to flow from the various expansions and new projects that have been started in recent years. Shipments from Russia increased in the second half of 2001; over the whole year, Russian supplies of platinum rose by 200,000 oz to 1.3 million oz.

Buoyed by the cumulative supply deficit that has built up over the past four years, the platinum **price** rose to a peak of \$645 in mid January 2001, its highest level since April 1987. For the first six months of 2001 the price remained firm, averaging almost \$600 throughout the period. Thereafter, sentiment turned against the metal as concern about the world economy deepened. Long positions on TOCOM and NYMEX were liquidated and short positions were opened. The weight of this selling in the futures markets drove the price down to a low of \$406 in early October. Solid industrial and jewellery demand and the usual end of year concerns about Russian export quotas for the following year then firmed the price, which ended 2001 at \$477.

Supply

Sales of platinum from **South Africa** rose by 8 per cent to 4.1 million oz in 2001, as metal became available from several new projects. Most of the existing producers expanded their output, although Northam was hit by industrial action in August and September and produced less than in 2000. The South African mining industry was sheltered from the decline in the dollar price of platinum by substantial depreciation of the rand: on 20 December the price of platinum in rand reached an all time



high of over R6,000 per oz. Output from the South African platinum mines should increase by close to 10 per cent in 2002, with growth accelerating over the next few years as more projects are brought on stream.

The largest increase in production of refined platinum in 2001 came from Anglo Platinum, up 13 per cent at 2.11 million oz. During the year Anglo announced three further projects that will enable it to reach its target output of 3.5 million oz by 2006. These were an extension of the Bafokeng Rasimone mine onto the adjacent farm of Styldrift, a new mine at Twickenham on the Eastern Bushveld, and a joint venture with Lonmin down dip of the latter's Eastern Platinum mine.

Output from Impala Platinum's original mining lease area on the Western Bushveld remains about 1 million oz. However, sinking of the first decline shaft at its new Eastern Bushveld mine at Marula Platinum (formerly known as Winnaarshoek) is scheduled to begin this year. The company is also continuing to progress its plans to increase throughput at its refinery by taking metal from the reopened Crocodile River mine, operated by its

subsidiary Barplats, and from other producers such as Aquarius and SouthernEra in South Africa, and Zimplats and Mimosa in Zimbabwe. Impala holds an equity stake in all of these companies except SouthernEra.

Following the launch of its Pandora joint venture with Anglo Platinum in April last year, the third largest South African producer, Lonmin, announced in November an acceleration of its existing expansion plans. The company now intends to produce 870,000 oz of platinum a year by 2003, rather than in 2008 as previously planned.

Feasibility studies for several other new projects were either begun or announced during 2001 by various mining companies. Some relate to potential expansions of existing operations and others to possible new mines. It is clear that the continued depreciation of the rand and the relative strength of the platinum market compared with those for many other metals, have combined to make the development of platinum mining in South Africa an attractive proposition.

Russian sales of platinum rose by 200,000 oz last year to 1.3 million oz. The familiar delays in presidential approval of export quotas and licences limited sales in the first quarter of the year and it was not until April that significant amounts of metal began to flow to the West. Shipments of platinum by Almaz accelerated in the second half of the year, perhaps to maintain revenues from sales of pgn in the face of sharply declining prices for, and reduced shipments of, palladium.

In June 2001 Vladimir Putin signed a decree that transferred responsibility for granting export quotas from the President to the Russian Government. This was expected to simplify and speed up the annual quota approvals, but in the early part of 2002 there was little sign that such a result had been achieved. Once

again, it was not until March that quotas were approved, and in early April Almaz still appeared to be awaiting the granting of the necessary export licence from the Ministry of Economic Development and Trade in order to commence shipments.

Although Almaz remains the sole exporter of pgm from Russia, export quotas for platinum have been granted to a wider group of organisations in 2002. Norilsk has a five year quota, the alluvial platinum producers of the Far East of Russia have their own, single-year quotas for the first time, and several domestic banks have also been granted quotas. With a limited internal market for platinum, these banks do not have much access to metal, but the new arrangements will give secondary producers an alternative option to the State Treasury, Gokhran, when selling the metal they recover. However, the impact of the change on total Russian exports in 2002 is likely to be small.

Supplies from **other western** mines increased by 18 per cent in 2001. Sales of platinum by Stillwater were up by 21 per cent to 121,000 oz, reflecting a significant improvement in mining and milling rates at its Nye mine and a small contribution from its new East Boulder operation. In Canada, output increased at Inco, Falconbridge and North American Palladium.

Demand

Purchases of platinum by the auto industry rose sharply in 2001. A burgeoning diesel car market in Europe was the main cause, but substitution of palladium by platinum in some **autocatalysts** fitted to gasoline vehicles also added to demand, which was up by a third to 2.52 million oz.

The use of platinum in autocatalysts soared by 55 per cent in Europe, despite production of cars increasing by only 1 per cent in 2001. Sales of diesel cars continued to grow and last year

comprised 36 per cent of all new car sales in Western Europe. This growth in market share was accompanied by a significant increase in platinum loadings on diesel catalysts to meet the new Euro III regulations. To ensure compliance with these tough standards some companies initially employed heavy loadings of platinum; these may be thrifted in future as catalyst technology improves. Diesels now account for about 70 per cent of platinum demand in the auto sector in Europe, which last year surpassed 1 million oz for the first time.

Despite their success in Europe, diesels have yet to make significant inroads into the auto markets of most other regions of the world. In particular, the relatively low cost of fuel in North America renders the superior fuel efficiency of diesels less important. Increased demand for platinum in the auto sector outside Europe last year was, therefore, mainly due to changes in the pgm mix used on gasoline autocatalysts. Some auto makers also added to their platinum inventories, in the expectation

of using more of the metal in future.

The dramatic increase in the price of palladium in 1999-2000 caused many automakers to set in place programmes aimed at reducing their palladium consumption. Last year saw the beginning of changes arising from these developments, with many companies increasing the proportion of platinum in some of their catalyst systems in order to reduce the palladium content. This was particularly pronounced amongst US owned auto companies, which had moved most heavily towards palladium. With the palladium price now beneath that of platinum, it is uncertain as to what degree these changes will be sustained or advanced in future.

A second consecutive year of decline in world **jewellery** demand occurred in 2001, with consumption falling by 10 per cent to 2.55 million oz. In addition to continued weakness in Japan, demand fell in North America as consumers cut back on purchases of luxury goods in the face of the declining US economy. In contrast, demand for platinum in China rose to 1.3 million oz, firmly establishing the country as the world's leading consumer of platinum for jewellery.

In contrast to most countries in the world, the Chinese economy continued to grow strongly last year. This provided a sound foundation for further growth in purchases of platinum jewellery, but the year was not without difficulties. As in late 2000, during the first half of last year the price of platinum was around \$600 and most Chinese jewellery manufacturers found their profit margins on platinum items had been severely eroded. Unable to pass higher costs on to retailers, some decided to switch to making white gold products. However, the Chinese public remained enthusiastic about platinum jewellery and, as the metal's price dropped in the second half of the year, jewellery makers were able to return to platinum to satisfy this.





The latest generation of diesel cars is proving to be very popular in Western Europe, driving demand for platinum

Retail sales of platinum jewellery fell again in Japan last year. Reduced consumer spending had a substantial effect on sales of platinum fashion jewellery, with the numbers of necklaces, bracelets and earrings sold all sharply down. Sales of engagement and wedding rings also fell as the number of marriages dropped compared with the prior, millennium year. Just as in 2000, manufacturers, wholesalers and retailers responded to the continuing difficulties in the Japanese economy by cutting back inventories. The combined effect of lower retail sales and reductions in stocks was a 33 per cent fall in demand for platinum in Japan to 710,000 oz in 2001.

The US economy was already in noticeable decline long before the tragic events of 11 September last year. For example, jewellery sales over the Christmas 2000 period were lower than had been expected, and the US jewellery trade began 2001 with high stocks of finished goods: this resulted in reduced demand for platinum by jewellery fabricators in early 2001. With consumer spending on luxury items dampened by a slide in US equities and increasingly weak economic prospects the trade remained gloomy until the Christmas

2001 season, when retail sales improved significantly. For the year as a whole, demand dropped by 26 per cent to 280,000 oz.

The jewellery markets in Europe were mixed in 2001. Demand in Germany was depressed, reflecting a weak economy. In Italy, which is heavily influenced by its reliance on export markets, consumption fell in response to lower orders from the USA and Japan. Demand continued to grow in the UK, where the weight of platinum jewellery submitted for hallmarking increased by close to 10 per cent. In Switzerland too, platinum use increased, for both watch making and the manufacture of other jewellery items.

Industrial demand for platinum rose again in 2001, but by just 2 per cent to 1.52 million oz. Chemical and electrical industry demand fell, but there were increases elsewhere, especially in the glass and petroleum sectors and for use in dental alloys.

The largest decrease in platinum use in the industrial sector last year was in the manufacture of computer hard disks. With magnetic layers made from alloys containing platinum used in virtually all

hard disks now manufactured, demand was directly influenced by the fall in purchases of computers last year.

There was significant investment in new plants employing platinum in the manufacture of various glass products in 2001. Much of the investment occurred in China and other parts of the Far East; in Europe and North America demand was weak. Investment in equipment to manufacture high purity glass for liquid crystal displays (LCDs) continued in Japan and South Korea. Demand in China came from capacity additions for cathode ray tube (CRT) manufacture for televisions and desktop computers, as well as an increase in fibreglass production.

Demand for platinum in the petroleum sector increased by 15,000 oz as incremental additions to existing refining capacity were made in North America and Asia. In other applications, a move from palladium to gold dental alloys in several regions added to platinum demand since this metal is present at levels of up to 10 per cent in some high-gold alloys.

Once again, sales of small **investment** products were dominated by the US Mint's platinum Eagle. Sales of bullion coins totalled 34,400 oz in 2001 and were particularly strong in the fourth quarter. Sales have remained firm in the early part of 2002, and in the first quarter were up by 14 per cent on the same period in 2001. There was also continued interest in platinum last year from numismatists in the USA who purchased 19,244 oz of proof platinum Eagles. Although some bullion coins and bars were sold back to the market by investors who took the opportunity afforded by high prices to realise profits, net sales of coins and small investment bars in 2001 are estimated to have been 50,000 oz, up slightly on the previous year.

In the first half of 2001 holders of large platinum bars in Japan continued

to sell back to the market, just as they had done in the previous year. But, as the price fell from July onwards, purchases began to outweigh sellbacks. For the year as a whole, we estimate that demand was a net positive 30,000 oz.

Outlook

After two years of deficits, the platinum market moved closer to balance in 2001 as demand increased at a slower rate than supplies. Demand for platinum is expected to rise once again this year. The main driver is likely to be the auto industry, as sales of diesel-powered vehicles in Europe increase and more manufacturers worldwide add platinum to gasoline vehicle autocatalysts to reduce their dependence on palladium. These two positive factors will, at least partly, be counterbalanced by an expected decline in auto sales. Although they have remained relatively strong in historical terms, often supported by financial incentives to buyers, sales are currently expected to be around 5 per cent lower in 2002 than those of last year.

Growth in the demand for platinum in industrial applications flattened in 2001, as the effects of a slowdown in

world economic activity became more pronounced. Substantial stimuli by governments, especially in the USA after the events of 11th September 2001, may well reduce the length and intensity of the current dip in the economic cycle. However, although economic indicators in the first quarter of 2002 have been positive in most regions (with the notable exception of Japan) it is too early to be sure if the recovery is firmly based.

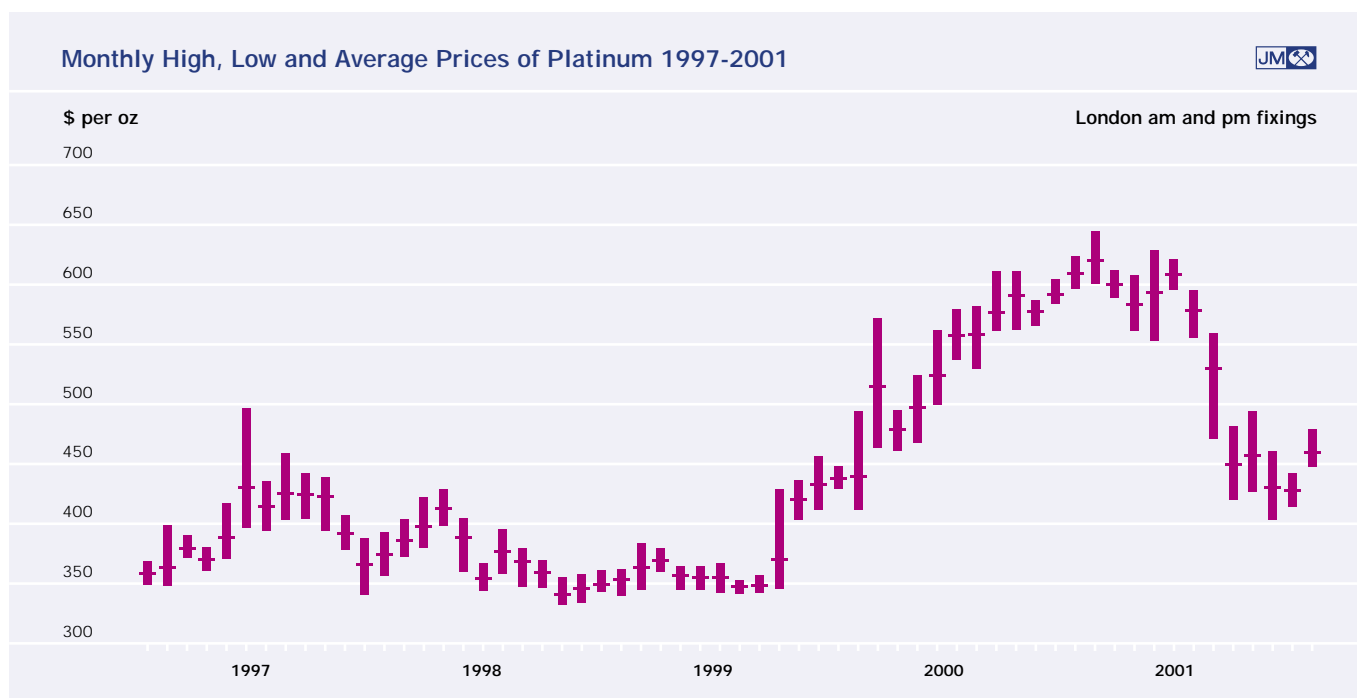
Jewellery demand in China was remarkably robust in 2001, despite the high price of platinum during the first half of the year. With lower prices ruling, demand increased during the second half of the year, and has continued to be strong in the first quarter of 2002. There is therefore a good chance that Chinese demand will increase again this year.

The prospects in Japan are less auspicious, with the country still struggling to escape the economic problems that have plagued it for much of the last decade. Other jewellery markets may recover in 2002: for example, following a better than expected Christmas 2001 sales season, US jewellers appear to be rebuilding stocks of finished platinum jewellery.

Western supplies of platinum should increase by up to 10 per cent as expansions in South African mining capacity come on stream. Assuming they keep up with their planned schedules of development, South African mines should produce around 350,000 oz more than in 2001, with Anglo Platinum being the main contributor to the increase.

Delays in the granting of export quotas again held back Russian sales of platinum in the first quarter of this year. However, quotas were authorised in March and, at the time of writing, supplies were expected to start flowing during April. The full year level of Russian sales is, as always, difficult to forecast but, with government stocks now thought to be low, it is likely to be similar to current production.

With both supply and demand predicted to be moderately higher in 2002, the market is expected to remain tight and, therefore, the price of platinum should remain firm. The price sensitivity of jewellery demand is expected to set limits on both the upper and lower levels of the platinum price, which for the next six months we expect to remain in the range \$480 to \$580.



Palladium

- Demand for palladium fell by 25 per cent as users responded negatively to the high prices of recent years.
- Auto industry purchases of palladium declined by 9 per cent as some auto makers used metal from inventories.
- Demand from the electronics industry collapsed to just under a third of its previous level as component manufacturers used metal from stocks to meet much of their sharply reduced requirements.
- Substitution of palladium in dental alloys continued and demand in this sector fell by a further 18 per cent.
- Demand for other applications of palladium fell by 5 per cent in 2001.
- Total supplies declined by 6 per cent as a 17 per cent fall in Russian sales was partly offset by increases from western mines.
- The price of palladium hit an all time high of \$1,094 in January but then fell steadily to a low of \$315 in October before recovering to \$440 at the year end.

Palladium Supply and Demand '000 oz		
	2000	2001
Supply		
South Africa	1,860	2,010
Russia	5,200	4,340
North America	635	850
Others	105	120
Total Supply	7,800	7,320
Demand		
Autocatalyst: gross	5,640	5,110
recovery	(230)	(290)
Dental	820	670
Electronics	2,160	700
Other	570	540
Total Demand	8,960	6,730
Movements in Stocks	(1,160)	590

Overview

The dramatic rise in the price of palladium came to an end in 2001.

Demand for palladium almost doubled from 1994 to 1999, but the increase in the price was even sharper, climbing from \$284 as recently as May 1999 to a peak of \$1,094 in January last year. Price-induced substitution of palladium by other metals began to take its toll in 2001 and was exacerbated by a severe slump in the electronics market. As a result, the market switched from the deficits of recent years to a surplus of 590,000 oz.

The most significant decline in palladium demand occurred in the **electronics** industry. Manufacturers of components began 2001 with high stocks of products and a subsequent reduction in consumer purchasing of finished goods in the first quarter of the year led to a severe slowdown in manufacturing. Makers of multi-layer ceramic capacitors were hit hard by the slump and purchased very little palladium in the second and third quarters of the year,

deciding to make use of stocks of metal built up in earlier years, and only returning to the market to a limited degree in the final quarter. Other users in the electronics sector suffered similarly with the result that demand for palladium by the industry fell by over two thirds to just 700,000 oz.

Demand for palladium from the auto industry was down by 530,000 oz to 5.11 million oz. The use of the metal in **autocatalysts** fell for the first time since 1988, mainly due to substitution by platinum based catalysts. In addition, some auto companies are believed to have used metal from stocks to mitigate financial pressures arising from reduced profit margins in many of their retail markets for light-duty vehicles.

Despite the fall in the price during the year, demand for **other applications** continued to weaken as more users switched from palladium to other metals in the chemical, dental and petrochemical sectors.

Supplies of palladium from Russia in 2001 fell to 4.34 million oz, the lowest level since 1995. The early months of the year saw large shipments of Russian palladium into Switzerland, although it is doubtful whether all the metal was sold to consumers. In August, as the price continued to weaken, Norilsk Nickel, the only primary producer in Russia, ceased spot sales of the metal in order to halt the slide. At the end of October it was reported that Almaz had recommended to all Russian holders of palladium that they should stay out of the market until prices recovered to higher levels.

Sales of palladium by South Africa rose by 150,000 oz to 2.01 million oz, mainly due to increased output at Anglo Platinum as its expansion plans began to bear fruit. North American supplies rose by 215,000 oz to 850,000 oz as output at Stillwater and North American Palladium increased sharply and Falconbridge recovered from a seven month strike.

Sales from the US Defense Stockpile were again significant in 2001, with the Defense Logistics Agency (DLA) selling 194,185 oz of palladium. The majority of this metal was sold in the first quarter of the year. The weakening of the market by the time the agency's new fiscal year commenced in October caused the DLA to adopt a more cautious sales policy, with the result that only 14,100 oz were sold in the last quarter of 2001.

Delays in Russian exports and an illiquid market drove the palladium price to a record London fix of \$1,094 in January 2001. However, as supplies increased and demand weakened the price tumbled to \$750 by early March. After a brief rally it then fell steadily to a low of \$315 in early October. Reduced selling then helped to firm the market, and during the last two months palladium staged a moderate recovery to end the year at \$440.

Supply

Russian sales of palladium in 2001 are estimated to have fallen by 17 per cent to 4.34 million oz, the lowest level since 1995. Norilsk Nickel, which in 1999 received a ten-year export quota for palladium, continued to sell the metal

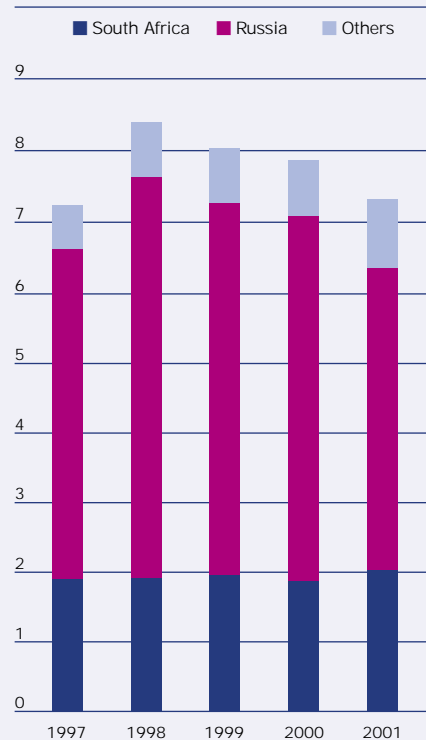
through a mix of contract and spot sales during the first half of the year. However, in August, with the price falling in the face of weak demand, the company announced its intention to cease spot sales and it seems likely that only contract material was shipped for the rest of the year.

Uncertainty surrounds the shipments of Russian palladium into Switzerland in February and March last year. Initially, it was reported that Swiss customs officials had said that the 1.91 million oz of metal imported in February had come from a toll free storage in Zurich where it had been stored for a long time. Although this statement was subsequently withdrawn, it seems likely that the metal had been held outside Russia for sale or loan purposes by either the Ministry of Finance or the Central Bank. Although offerings of palladium on the London fix increased noticeably at around this time causing a decline in the palladium price, we do not believe that all of the metal imported into Switzerland was sold into the market. Had this been so, the fall in the price would have been much greater.

Supplies from **western mines** grew by 15 per cent to 2.98 million oz in 2001 as

Supply of Palladium 1997-2001

Million oz



South African and North American miners made progress with their expansion plans. An 8 per cent increase from South Africa was due largely to increased output by Anglo Platinum, while a 34 per cent rise in North American supplies was mainly shared between Stillwater and North American Palladium.

Western supplies should rise by a similar amount this year with all the major primary producers scheduled to increase their output through expansions set in motion in recent years. The largest improvements in output are again likely to come from Anglo Platinum, Stillwater and North American Palladium.

Demand

For the first time since 1988 the use of palladium in **autocatalysts** fell last year. There were also some reductions in stocks; as a result, purchases by the auto industry fell by 530,000 oz to 5.11 million oz. Many companies that had turned to



The main sources of South African pgm – UG2 ore (foreground) and Merensky Reef (behind)

palladium based catalysts to meet increasingly stringent limits on hydrocarbon emissions responded to the increasing price of the metal by thriftifying their catalyst systems. This was achieved by improved catalyst technology, often involving the addition of platinum or, in some cases, rhodium.

Despite the fall in palladium use in autocatalysts in 2001, demand was the third highest on record and the metal seems certain to remain an important component of catalyst systems. Tighter regulations introduced in Europe, Japan and the USA in recent years severely restrict emissions of hydrocarbons and most auto makers are likely to continue to use catalysts containing palladium to meet these standards.

What is less clear is whether the auto industry's attitude to the long term use of palladium has been permanently affected by the extreme volatility in the price experienced over the last few years. In addition, the problems of export quota and licence approvals in Russia, the principal supplier of palladium, have contributed to perceived instability in supply, even though Norilsk Nickel has long term agreements to export its output.

Many auto companies, especially in the USA and Japan, responded to these considerations, and to their own expectations of higher usage of palladium, by building strategic stocks of the metal. We believe that some auto makers used metal from these inventories last year, although not to the degree we forecast in the Platinum 2001 Interim Review. The level of stocks still held in the industry is uncertain.

In the **electronics** industry, demand fell by 68 per cent to 700,000 oz in 2001. Production of multi-layer ceramic capacitors (MLCC) fell by 27 per cent, while the amount of palladium used in producing these MLCC fell even further, by 45 per cent. With the future use of

palladium continuing on a downward track, manufacturers of MLCC are also believed to have run down their stocks of palladium substantially last year.

In other sectors of the electronics industry such as hybrid integrated circuits and plating, demand for palladium also fell last year. The high price of the metal may also have stimulated enhanced recovery of palladium from electronics scrap, but this was offset by a fall in overall scrap availability as businesses and consumers deferred replacement of existing products to conserve cash.

The **dental** sector experienced an 18 per cent decline in palladium consumption in 2001 to 670,000 oz. Further substitution of palladium in dental alloys by either gold or base metals occurred, especially in Europe. A decline was also seen in the USA, although in the second half of the year, as the palladium and gold prices began to converge, some US alloy makers stabilised or even increased their use of palladium.

Demand in Japan, where a government-backed health insurance scheme supports the use of a dental alloy containing 20 per cent palladium, was less damaged by the high price of palladium. But here, the general economic malaise, and cutbacks by the government in healthcare funding, led to a lower level of dental treatment and demand for palladium fell accordingly.

Demand for palladium in **other industrial** applications and in **jewellery** fell by 5 and 6 per cent respectively in 2001. The decline in the jewellery sector arose as manufacturers strove to reduce the palladium content of both platinum and white gold alloys. In the petroleum industry the substitution of palladium in hydrocracking catalysts by base metal alternatives advanced, although the amounts of metal released were smaller than in 2000. Demand from the chemical

Demand for Palladium 1997-2001

Million oz



industry for palladium catalysts used to make vinyl acetate monomer also fell as investment in new plants slowed.

Outlook

Demand for palladium fell by almost a quarter in 2001 as substitution with other metals advanced in the auto, electronics and dental sectors. The degree to which such substitution proceeds further will have a major impact on the long term outlook for the palladium market.

Many auto companies that had moved strongly into palladium based catalysts over recent years responded to the increasing price of the metal by undertaking research and development programmes to reduce their dependence on it. These are now beginning to bear fruit and demand is likely to fall again in 2002 by at least as much as last year. However, with palladium now trading below platinum there may be an

incentive for some companies to return to using palladium, especially if future supplies of the metal have been secured through contractual arrangements.

The long term impact of a dramatic \$1 billion write-down of its pgm stock by Ford in January 2002 is still difficult to determine. In March, the company disclosed that its usage of palladium in 2002 would be less than half that of 2000 and that it is in the process of reducing its stocks. Ford stated that it planned to reduce its holdings by making sales to the market, to the extent that the market can absorb the metal in an orderly fashion. With total demand falling, this will be a difficult process.

Demand for palladium in the electronics sector in 2001 fell below 1 million oz for the first time since 1982. The electronics industry has shown some signs of recovery in early 2002 but activity is still well below the levels of 1999 and 2000. With manufacturers' strategic stocks having been depleted in 2001 there appears to be scope for increased demand for palladium from the electronics industry this year. It seems probable that demand will again

exceed 1 million oz, but the prospects for consumption much above this level in future seem slim.

Last year saw a 13 per cent fall in the use of palladium in other non-automotive applications. Demand is unlikely to fall much further as those uses that are most price sensitive have already seen significant substitution of palladium, and current lower prices may help stabilise consumption in the chemical, dental, jewellery and petrochemical sectors.

Supplies from western mines grew by 380,000 oz last year and are expected to rise by a similar amount in 2002, as expansions at mines in South Africa and North America come on stream.

This year's Annual Materials Plan for the DLA could enable the agency to sell all the remaining palladium in the US Strategic Stockpile (528,000 oz at the beginning of 2002). However, only 57,000 oz were sold in the first three months of the year and it seems unlikely that the DLA will sell the full amount if the palladium market continues to be weak.

At the time of writing this review, negotiations between Almaz and western

buyers of palladium for new contracts in 2002 were reported to be at an early stage, and Russian sales to date appeared to have been minimal. Although representatives of Norilsk Nickel have stated that sales in 2002 will be tailored to a level likely to maintain the price in a range of between \$400 and \$600, it is unclear whether any contracts have been signed at this level.

With demand for palladium almost certain to fall again in 2002, the gap between consumption and mine production that has existed since the mid 1990s may virtually disappear. Consequently, unless the Russians restrict their sales of metal for the rest of the year to the level of Norilsk's production, another significant surplus is likely. The Russians may have the power to keep the price in their desired corridor by limiting sales but, after a prolonged absence from the market, their eventual return will be likely, initially at least, to exert downward pressure on the price. Assuming this will happen during our forecast period, we predict that palladium will trade in a range of \$250 to \$400 for the next six months.

Monthly High, Low and Average Prices of Palladium 1997-2001



\$ per oz

London am and pm fixings

1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0

1997

1998

1999

2000

2001