Heraeus

HERAEUS PRECIOUS FORECAST

25th January **2018**

2018 OUTLOOK

€/$ | 79 Au | 47 Ag | 78 Pt | 46 Pd | 45 Rh | 44 Ru | 77 Ir

Near-term strength in the euro relative to the US$ should favour precious metal outperformance, benefitting gold, platinum and silver. However, the US$ is oversold and three potential interest rate rises by the Federal Reserve could boost the US$ relative to the euro in the second half of the year and impact the suite of precious metals.

Despite an expected improvement in demand in 2018, the industrial influence is unlikely to impact platinum's precious status and sympathy to gold. However, cuts to supply establish a strong price floor at above $860/oz. Palladium was the outperformer in 2017, with prices rising by 59% last year, and market tightness continues into 2018 with lease rates remaining relatively elevated. Prices could be lifted to $1,170/oz but less favourable news, particularly from the auto sector, could induce profit taking.

There is limited downside for the small PGMs with demand drivers continuing to lift prices. Rhodium demand is likely to continue to increase, but stocks built up in China last year could dampen further price appreciation. Ruthenium prices are rising from a low base and carry momentum from multiple end-uses, while iridium is likely to benefit from further plant capacity increases.

FORECAST EUR/USD

€/$

Average 2017: **1.13**	High 2017: **1.20**	Low 2017: **1.04**	Price variation 2017: **14%**
Forecast 2018	High 2018: **1.27**	Low 2018: **1.15**	

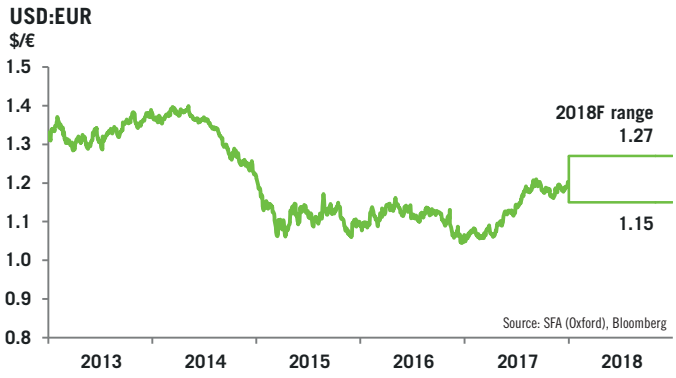
Near-term euro strength to give way as dollar gains later in the year

The euro began 2017 by slipping to a low of 1.04 $/€ in early January, its lowest level since 2002. From that point, however, it staged a strong rally, strengthening by almost 15% to 1.20 $/€, first reaching that level in September and, after a pull-back in the fourth quarter, hitting it again at the end of the year.

The year 2017 was one of monetary policy normalisation and even though the Federal Reserve did more to normalise policy than the ECB, the euro strengthened against the dollar. As the year progressed economic growth in the Eurozone improved, beating forecasts, sentiment about the outlook became more positive and so the euro was favoured over the dollar. In addition, much of the positive news was already priced into the US$ at the start of the year, including expectations of fiscal stimulus and tax cuts following the election of President Trump, and the Tax Reform bill took longer to arrive than initially assumed.

In the US, the mid-term elections for Congress later this year could make passing further legislation difficult, so the Trump administration might focus more on renegotiating trade deals and the trade balance with China. **In Europe, political uncertainty has not disappeared**. Negotiations to form a coalition between the Christian Democrats and Social Democrats are difficult and forming a new German government will thus remain challenging. Italy has a general election scheduled for March and opinion polls suggest that the Five Star Movement now has the most support, ahead of the ruling Democratic Party. Meanwhile, Brexit negotiations are ongoing and a smooth transition to a new trading arrangement between the UK and the EU is far from assured.

Monetary policy plans have been clearly laid out by the Federal Reserve and the ECB, and economic growth forecasts have been raised and presumably **these have been priced in**. The Eurozone outperformed expectations in 2017 to the benefit of the euro but this will be much harder to achieve in 2018.



This year the Federal Reserve is expected to raise rates a further three times and it will also be stepping up the amount by which it is reducing the size of its balance sheet each quarter, while the ECB is slowing its asset purchases to €30 billion per month until September at least, but has no plans to change interest rates. If the Federal Reserve continues to tighten monetary conditions faster than the ECB in 2018, this would favour the US$ over the euro. Economic growth is also expected to accelerate in the US compared to 2017, while it is projected to slow slightly in Europe, a reversal of the trend in 2017.

In the short term, momentum is with the euro and further euro strength and dollar weakness are likely. However, in the futures market the non-commercial traders have built up a record long position in the euro against the dollar. This suggests the trend is near to ending since there cannot be many more euro buyers left. The exchange rate was driven more by the performance of economic growth in the Eurozone beating expectations than by the relative balance sheets of the respective central banks in 2017. Should growth in the US increase this year the focus could shift back to the Federal Reserve's tightening of monetary policy and it will need only a small shift in traders' outlooks to start to favour the dollar. **Near term, the euro could advance to 1.27 $/€, but the US$ is expected to strengthen later in the year** and the exchange rate could fall back to 1.15 $/€.

79
Au

Gold

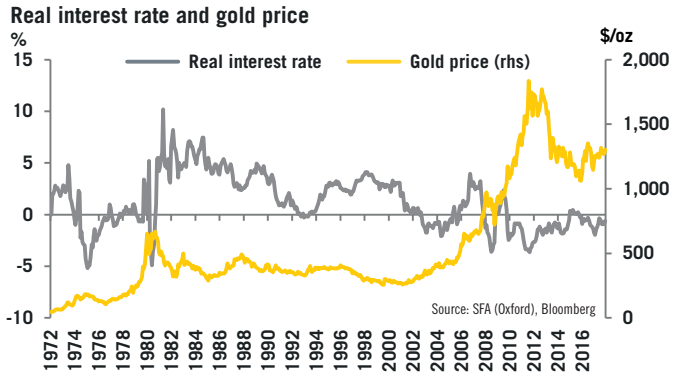
Average 2017: **$1,261/oz**	High 2017: **$1,355/oz**	Low 2017: **$1,149/oz**	Price variation 2017: **12%**
Forecast 2018	High 2018: **$1,375/oz**	Low 2018: **$1,175/oz**	

Rising real interest rates dampen gold's outlook

Geopolitical issues are by their very nature often impossible to forecast, but **should tensions intensify in regions such as North Korea or the Middle East this would keep gold in the spotlight** as a safe haven. However, reduced central bank liquidity and rising bond yields, along with the flattening US Treasury yield curve and potential for a rebound in the dollar, all suggest **gold price upside is limited**.

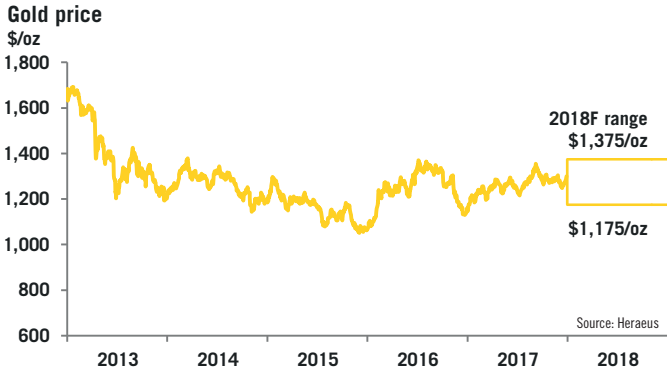
This year the Federal Reserve is expected to continue raising interest rates and it will also be increasing the amount by which it is reducing the size of its balance sheet each quarter, reaching $50 billion per month by the fourth quarter, for a total reduction of $420 billion this year. Meanwhile, the ECB is slowing its asset purchases to €30 billion per month from €60 billion until September at least, which would amount to purchases of around a third of the amount in 2017. The Bank of Japan also appears to be making some modest downward adjustments to its asset purchases, so central bank liquidity is being reined in.

If quantitative easing depressed bond yields then its gradual reversal can be expected to see them rise. The Federal Reserve is further down this path than the ECB, but bond yields in the Eurozone are exceedingly low by historical standards so they could rise more rapidly. Rising nominal interest rates with subdued inflation mean that real interest rates are rising, which is a less favourable environment for gold.



The US Treasury yield curve is flattening as rates increase at the short end while the long end is declining, implying no bond market worries about a pick-up in inflation or expectations of any improvement in the growth outlook either, which is also unfavourable for gold.

The gold price gained over 12% in 2017 and this was certainly helped by the US$ weakening. In the short term, momentum is against the dollar and further weakness is likely. However, sentiment swung strongly against the dollar in 2017 and this looks overdone, so a return to **a somewhat stronger dollar in the second half of the year is anticipated and this will restrict gold's upside**.



Equity markets continue to hit record highs and the spectacular rises in cryptocurrencies have attracted speculative money, leaving gold somewhat on the sidelines. The gold price is expected to trade between $1,375/oz and $1,175/oz, with the **price strength seen in the first part of the year giving way to lower prices in the second half** as seasonal strength in the first half fades and the dollar gains ground later in the year.

47
Ag

Silver

Average 2017: **$17.08/oz**	High 2017: **$18.56/oz**	Low 2017: **$15.40/oz**	Price variation 2017: **4%**
Forecast 2018	High 2018: **$18.00/oz**	Low 2018: **$15.25/oz**	

Investment needed to drive the silver price

Although the industrial demand outlook is somewhat better in 2018 as global growth is expected to improve, a significant jump in industrial demand is not anticipated, which suggests that **investment demand will be a more significant driver for the silver price this year**. However, this leaves silver at the mercy of the same trends as gold where upside appears limited by less central bank liquidity, rising real interest rates and the potential for a rebound in the US dollar.

Mine output is estimated to have dipped in 2017, but is not far below the record level seen in 2015, while scrap supply improved, keeping **total supply roughly stable**.

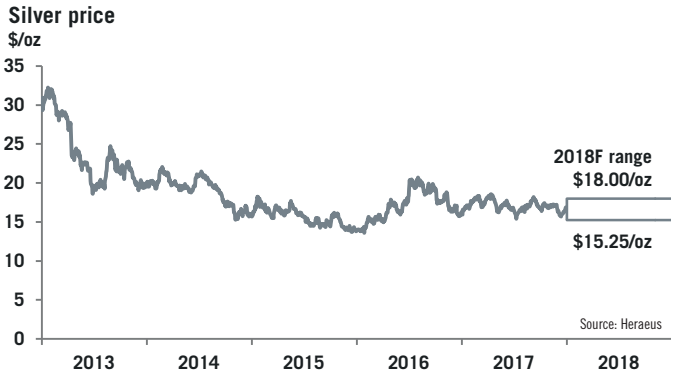
If, as anticipated, silver averages a slightly lower price in 2018 **then scrap supply could dip slightly**, but with base metals prices having rallied strongly in 2017 (silver is produced as a by-product) an increase in mine production is possible, leaving total supply at a similar level to last year.

A slight improvement in demand was seen in 2017. Silver's industrial demand has been trending flat to lower over the last few years, although it is expected to have increased in 2017 as improved economic growth boosted its use in electronics and brazing alloys and solders, and photovoltaic demand continued to grow strongly.

Use of silver in photovoltaic devices has been the main bright spot for silver's industrial demand over the last few years, but growth here has merely been offsetting stagnant or declining demand in other industrial uses. **Good growth is expected in solar cell silver demand in 2018, although the rate of growth is slowing** as annual installations approach 100 GW and thrifting continues to gradually reduce the amount of silver used per cell.

Physical investment demand was disappointing last year, as bar and coin sales were very weak, with coin demand, particularly in the US, significantly lower than in 2016, and global ETF holdings only gained just over 6 moz.

Silver perhaps lost out to equities, which performed strongly, and other speculative assets. While the bitcoin bubble may have burst, equity markets continue to advance and with no really strong price drivers for silver this year, physical demand could remain lacklustre.



Silver is forecast to trade in a range between $18.00/oz and $15.25/oz, and **to mirror gold with price strength in the first half of the year, giving way to lower prices in the second half** as the US$ is expected to strengthen.

78

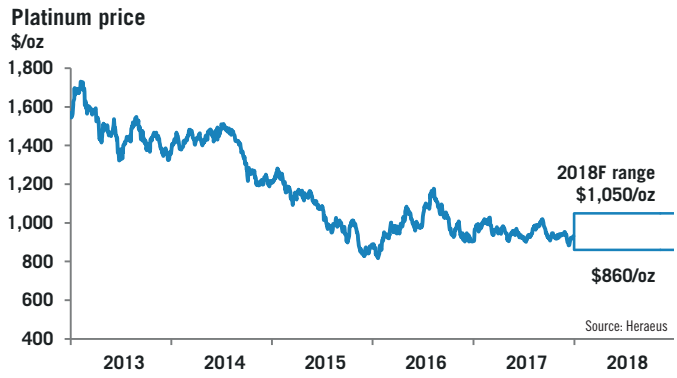
Pt

Platinum

Average 2017: **$953/oz**	High 2017: **$1,027/oz**	Low 2017: **$884/oz**	Price variation 2017: **3%**
Forecast 2018	High 2018: **$1,050/oz**	Low 2018: **$860/oz**	

Fundamentals improving, further supply cuts are now an upside price risk

The platinum market's fundamentals should improve in 2018 as it moves into a small deficit. Total supply is expected to decline moderately this year as growth in recycling fails to make up for production cuts in South Africa that will reduce mine supply. **Demand for platinum is projected to expand** as industrial demand recovers ground lost in 2017 and jewellery requirements look set for a modest rise, while automotive consumption is forecast to drop only slightly. Autocatalysis is still the largest end-use segment for platinum despite the decline in sales of diesel passenger cars. The drop in diesel market share in Western Europe resulted in a fall in diesel car sales in 2017, even as overall car sales reached a 10-year high, which pulled down platinum demand. This **reduction in diesel car sales in Western Europe is likely to continue** in 2018, but the rate of decline is expected to slow. However, this is mostly being **offset by the increasing numbers of light- and heavy-duty commercial vehicles** being produced globally, so global automotive demand is expected to suffer only a slight fall.



Jewellery is the second-largest end-use segment for platinum and the outlook for **jewellery demand is broadly positive in 2018**. Following a good year for developed market jewellery demand in 2017, continued economic expansion this year should support consumer spending, lifting jewellery sales. China remains the largest market for platinum jewellery and here demand is expected to stabilise in 2018 after several years of declining sales. India is a crucial market as it is growing strongly, albeit from a relatively low base, and growth here is a major contributor to increasing global jewellery demand.

Industrial demand is likely to rebound in 2018, because the glass, petroleum and chemical sectors are estimated to see a return to growth after usage dipped in 2017 when the rate of capacity expansion eased. Oil refinery closures in Japan last year that reduced platinum requirements in the petroleum sector will not be repeated this year, leading to a rebound in demand.

Mine supply is expected to fall by 1% in 2018 as South African production is projected to contract by 2%, and minor gains in output from Zimbabwe and North America are offset by declines in Russia and elsewhere. Recycling is anticipated to rise modestly this year as platinum recovered from spent autocatalysts continues to grow owing to greater numbers of vehicles being scrapped, while recycled jewellery is little changed.

The chart of the Southern African producer cost curve shows the average platinum price for 2017 in rand (red line) plotted on top of the production costs for each of the Southern African mines. In 2017 the market was in surplus (orange vertical line), but it is moving into deficit (green vertical line) in 2018. **The platinum price was below the cost of production for many of the mines in 2017** and the financial pressure on the mining companies eventually resulted in the closure of some unprofitable mines and shafts. The full impact of mine closures will be felt in 2018 when the platinum market is projected to move into a small deficit.

The blue horizontal lines on the chart show the upper and lower prices of the forecast range for platinum in 2018 converted into rand. The rand is forecast to weaken during 2018, but even with a weaker rand and stronger platinum price the basket price could still be below the top end of the cost curve and put more production at risk of closure which would tighten the market further.

78

Pt

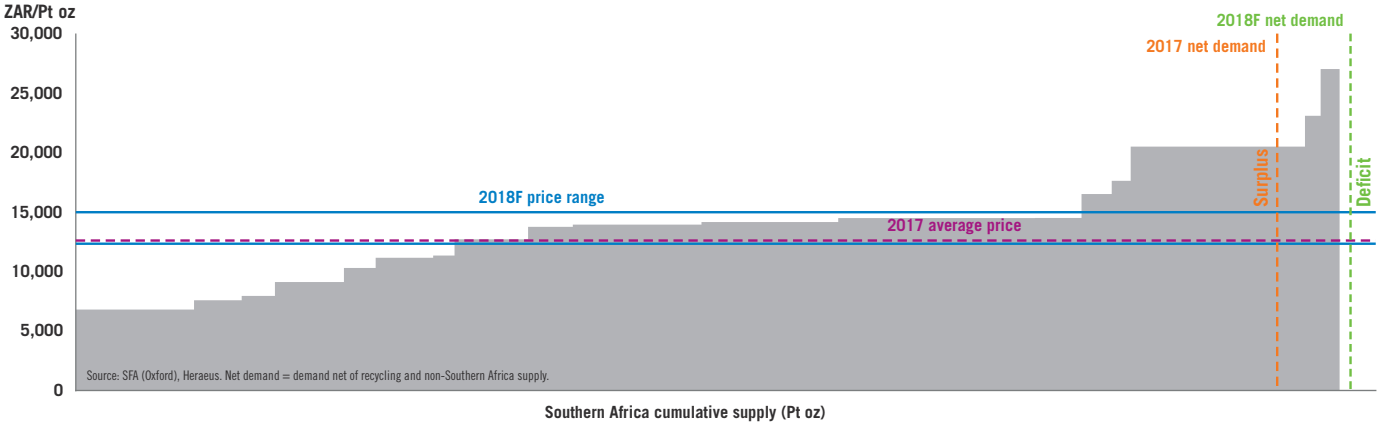
Platinum

Average 2017: **$953/oz**	High 2017: **$1,027/oz**	Low 2017: **$884/oz**	Price variation 2017: **3%**
Forecast 2018	High 2018: **$1,050/oz**	Low 2018: **$860/oz**	

However, **the risks for platinum demand are that jewellery purchases fail to live up to expectations** in China and India and that the decline in diesel car sales in Western Europe does not slow down as much as expected.

Supply cuts could put a floor under the price, but demand growth is not seen as being strong enough to drive significant price appreciation. The platinum price is therefore estimated to trade between $860/oz and $1,050/oz.

Southern Africa producer cost curve, 2017



46

Pd

Palladium

Average 2017: **$874/oz**	High 2017: **$1,073/oz**	Low 2017: **$684/oz**	Price variation 2017: **59%**
Forecast 2018	High 2018: **$1,170/oz**	Low 2018: **$900/oz**	

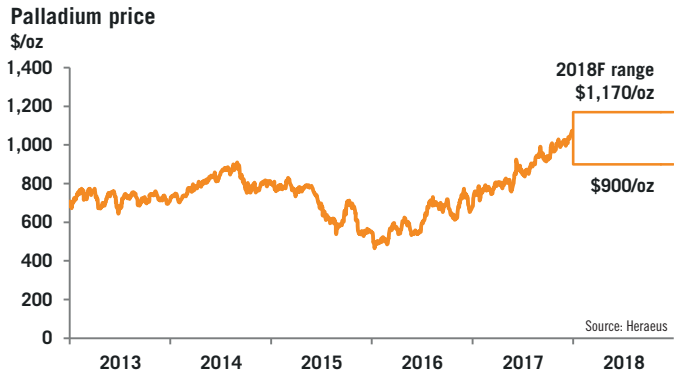
The physical market is tight

The palladium market has been in a deficit for several years and this is not expected to change in 2018 with a deficit of 1 moz forecast, so stocks, which are still available, will continue to be drawn down to satisfy end-users' requirements.

The market has been tight since June 2017 when a shortage of ingot resulted in lease rates spiking to well over 10% from around 3% the previous month and saw the price push up to around $900/oz. Lease rates eased somewhat subsequently but remained high for the rest of the year and the **price pushed through $1,000/oz later in the year for the first time since 2001**.

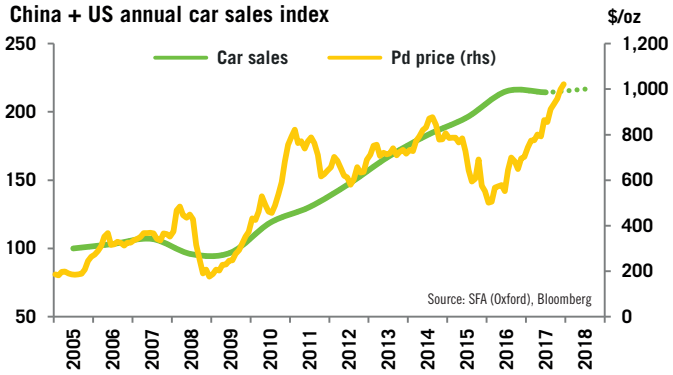
Lease rates are still elevated and the futures market is in backwardation, demonstrating continued tightness in the market for ingot, which could persist as the majority of suppliers provide the metal in sponge form, which is preferred by end-users for manufacturing purposes.

While the market remains tight, prices could be pushed higher to $1,170/oz, but a great deal of positive news is already in the palladium price and has lifted it to a record high, so **it may only need some slightly less favourable news to induce profit taking and a pull-back in the price**. Given the rapid ascent, a pull-back to $1,000/oz is possible and potentially to nearer $900/oz if market conditions ease significantly.



Palladium supply is expected to be little changed in 2018 because a dip in primary supply from South Africa is offset by increased recycling, as more cars are reaching the end of their life and the high palladium price should encourage collection and processing of spent autocatalysts from those scrapped cars.

Palladium demand is becoming increasingly dominated by the automotive sector, which is close to 80% of total demand. China has seen rapid growth in auto sales and is the largest auto market. A tax incentive on purchases of small cars was removed at the end of 2017 and may have pulled forward some purchases which could result in a subdued start to vehicle sales in 2018, although sales are expected to grow modestly for the year as a whole. However, in the US, the second-largest auto market, light vehicle sales appear to have peaked and are expected to drop further in 2018, so the strong automotive demand growth for palladium of recent years is projected to ease considerably this year. Reliance on the automotive market for such a high proportion of demand is a weak point for the price should vehicle sales disappoint.



Industrial demand is forecast to drop slightly this year as thrifting in electrical applications continues to cut the amount of palladium used, while other areas see flat or marginal growth. Palladium jewellery demand has fallen significantly over the last few years as the palladium price has risen, and the high price is likely to further restrict purchases this year.

45
Rh

Rhodium

Average 2017: **$1,106/oz**	High 2017: **$1,715/oz**	Low 2017: **$770/oz**	Price variation 2017: **123%**
Forecast 2018	High 2018: **$2,100/oz**	Low 2018: **$1,400/oz**	

Risk of supply cuts could mean more price volatility in 2018

The rhodium market is expected to tighten in 2018. The supply-demand balance showed a small surplus market during 2017 and the market is projected to be in equilibrium this year. Lease rates are high, indicating tight physical supply which is supportive of higher prices; however, stocks built up in China last year could limit demand in that region, so the price is projected to trade in a range between $2,100/oz and $1,400/oz.

Rhodium demand is dominated by the automotive industry and use in autocatalysis represents over 80% of total demand. Developed markets are forecast to have lower automotive rhodium usage in 2018 because weaker car sales are anticipated in some countries, while China and other emerging markets have higher requirements.

The China 5 emissions standard is being extended nationwide in China this year, resulting in higher metal loadings on autocatalysts and greater rhodium demand. **However, overall global automotive demand is expected to dip slightly in 2018**. Reliance on the auto sector is a potential weak point for the price as any disappointment in vehicle sales would hit demand.

Rhodium's industrial usage is likely to increase in 2018 as more metal is required for glass manufacturing, and use in the chemical industry is also set to rise modestly.

Mine supply of rhodium is dominated by South Africa and as it is a by-product of platinum mining, the **production cuts made in South Africa in 2017 will result in a drop in rhodium yield** this year. Other regions that produce rhodium, including North America, Russia and Zimbabwe, are expected to see flat rhodium output this year. An upside price risk for rhodium is the potential for further supply cuts in South Africa if some platinum mines remain loss making, which would reduce rhodium output.

Growing numbers of cars that were bought in the mid-2000s, a period when rhodium loadings were relatively high, are reaching the end of their life, **so rhodium recovered from spent autocatalysts is projected to increase in 2018**.

44
Ru

Ruthenium

Average 2017: **$78/oz**	High 2017: **$200/oz**	Low 2017: **$40/oz**	Price variation 2017: **400%**
Forecast 2018	High 2018: **$275/oz**	Low 2018: **$165/oz**	

Robust demand sustains ruthenium prices

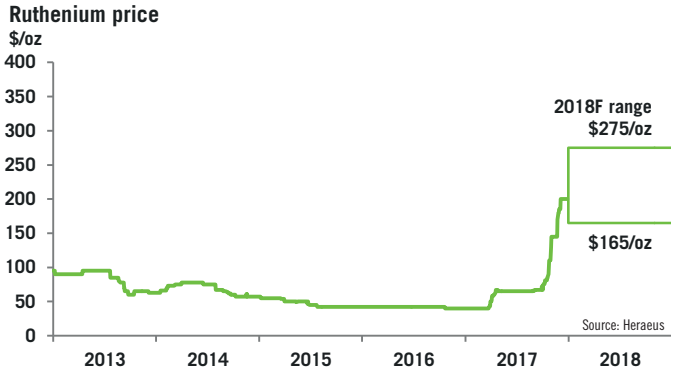
Ruthenium saw little price action in the first quarter of 2017 but this was followed by **a price rise of just over 60% through April**. The price rally was believed to be influenced by the announcement from a South Korean university of a ruthenium-based catalyst that can split water into hydrogen almost as well as much costlier platinum. Commercial interest in the catalyst was announced in late August 2017 from the US.

Ruthenium has proved to be very cost-effective and efficient as a catalyst in several fuel cell and electrolysis applications. The wider exploitation of renewable energy in this way is an important global trend, and likely to be supportive of ruthenium use.

Hard disk drives have long been an important market for ruthenium and retain a compelling $/GB advantage over solid-state devices. Microwave-assisted magnetic recording, announced by Western Digital in October, appeared to **confirm the role of ruthenium in future higher storage density hard drives**; a price run from $78/oz to $200/oz by early December followed.

Chip resistors, now ubiquitous in electronic products, are expected to remain **an important market for ruthenium and are price supportive**. The market for chip resistors is somewhat volatile, with current shortages likely to be eased by new capacity, but with a corresponding short-term fall in demand for materials. Demand growth for chip resistors and related components is led by the computer market and also the automotive market where the component content per vehicle is rising faster than vehicle production.

Rising demand and continued use in one of the main markets is expected to be supportive of prices in 2018. Ruthenium is predicted to trade in a price range of $165/oz to $275/oz.



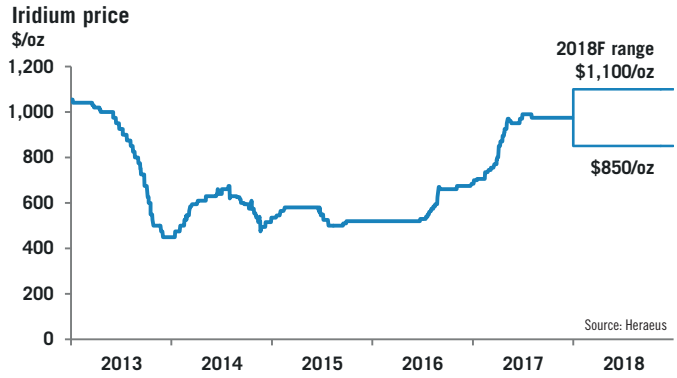
77
Ir

Iridium

Average 2017: **$903/oz**	High 2017: **$990/oz**	Low 2017: **$685/oz**	Price variation 2017: **42%**
Forecast 2018	High 2018: **$1,100/oz**	Low 2018: **$850/oz**	

Cyclical industrial capacity additions support demand

The iridium price rose by 45% through the first half of 2017, from $685/oz to $990/oz by mid-July 2017.



Iridium remains an important component of electrode coatings for industrial electrolysis applications, including the inevitably cyclical global chloralkali process. During the last couple of years plants have been converted from an older, less environmentally benign (diaphragm) process to the newer iridium-containing (membrane) process, supporting capacity addition and driving iridium demand. Several old plants were closed in the latter part of 2017; if their capacity is replaced, it will be with the new membrane process, leading to some additional iridium demand during 2018.

Iridium crucible orders for the manufacture of single crystals (particularly lithium tantalate for surface acoustic wave (SAW) filters for smartphones and similar) declined in the first quarter of 2017 due to inventory corrections for Chinese smartphones, but **returned to growth in the second quarter**. Some of the major producers of crystal materials plan to add crystal material manufacturing capacity in 2018, which should lead to a modest increase in demand for iridium crucibles. This is driven by growing SAW filter demand which is expected to continue rising through 2018 as the SAW filter content in all levels of phone increases.

Capacity growth in some of the key markets using iridium is likely to be supportive of prices in 2018, with prices trading in a range from $850/oz to $1,100/oz.

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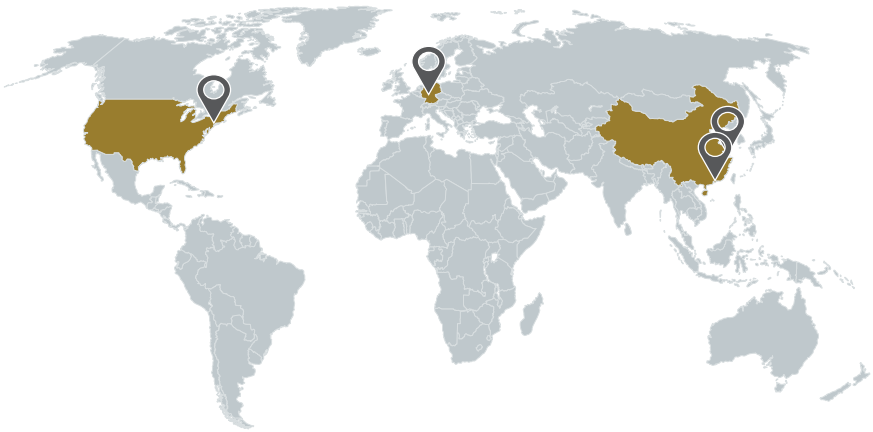

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Heraeus Precious Metals (HPM) – a global business unit within the Heraeus group – is a world-wide leading provider of precious metals services and products. We combine all activities related to our comprehensive expertise in the precious metals loop – from trading to precious metals products to recycling. HPM is among the world's largest refiners of platinum-group metals (PGMs) and an authority in industrial precious metals trading.

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