

## PRECIOUS FORECAST



2023

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# OUTLOOK 2023

## Downside price risks from slower growth, but a weak dollar would help

The war in Ukraine was the catalyst for precious metal price rallies in Q1'2022. Gold and silver reaped the benefits of their status as safe havens as the geopolitical tensions escalated, and concerns over the availability of Russian metal pushed the palladium price to a new all-time high in March. However, with the conflict rumbling on and Russian PGMs still reaching the market, the gold, silver and PGM prices have spent the rest of the year returning to lower levels.

Slower economic growth is predicted in many regions next year, and Europe and the US may be facing recessions which would weigh on metal demand. Covid is a diminishing concern in most countries. However, China is still enforcing restrictions, despite recent policy softening after the Communist Party Congress, resulting in some unrest. This could constrain economic growth and metal demand until there is a clearer move away from restrictions.

Despite multi-decade-high inflation, gold and silver prices have not made gains this year thanks to persistent strength in the US dollar as the Federal Reserve (Fed) has aggressively hiked interest rates. With interest rate hikes likely to continue into 2023, dollar strength could persist. However, a weakening economy may lead the Fed to change course, resulting in a weaker dollar and potential upside for gold and silver. The platinum price has also

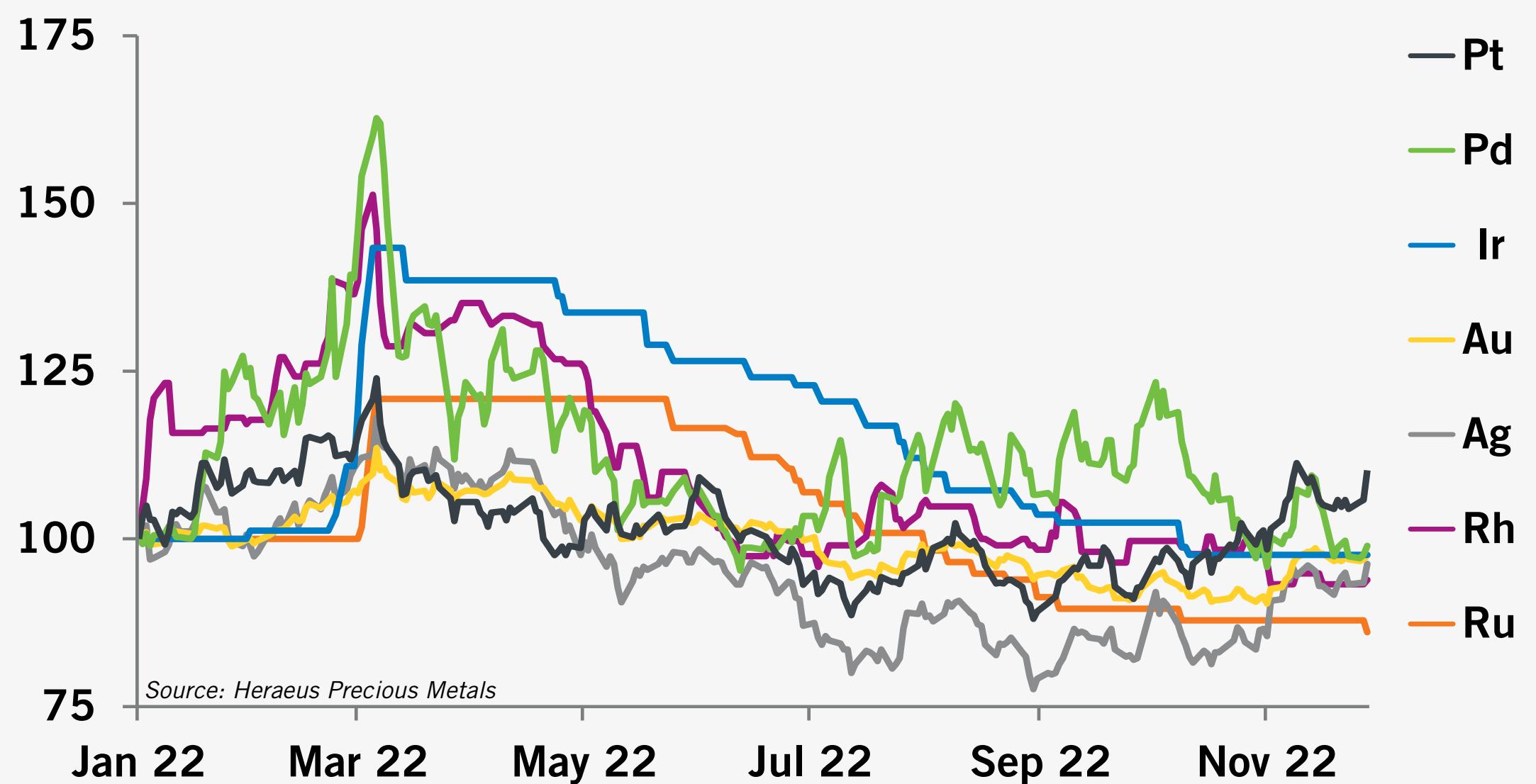
been depressed by the strength of the dollar against the rand and would benefit as the dollar weakens, even though the platinum market is predicted to remain oversupplied in 2023.

Next year the palladium market is forecast to swing into surplus, providing downside price risk. Supply picks up, partly owing to stock being processed in South Africa, and automotive demand could be lacklustre as Western economies slow and battery electric vehicles (BEVs) continue to take market share

from gasoline internal combustion engine (ICE) vehicles. Rhodium is similarly exposed to automotive demand and higher supply also moves the rhodium market into surplus.

Release of work-in-progress stock also helps to push the small PGMs into surpluses in 2023. The ruthenium price is expected to continue its downward trend but the iridium price could find some support as demand from the hydrogen economy ramps up.

### Prices indexed to 100 1 Jan 2022



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2022*		2023
Avg. 1.06		Forecast:
High 1.15		High 1.12
Low 0.97		Low 0.92
Change -8%		

### 03 GOLD

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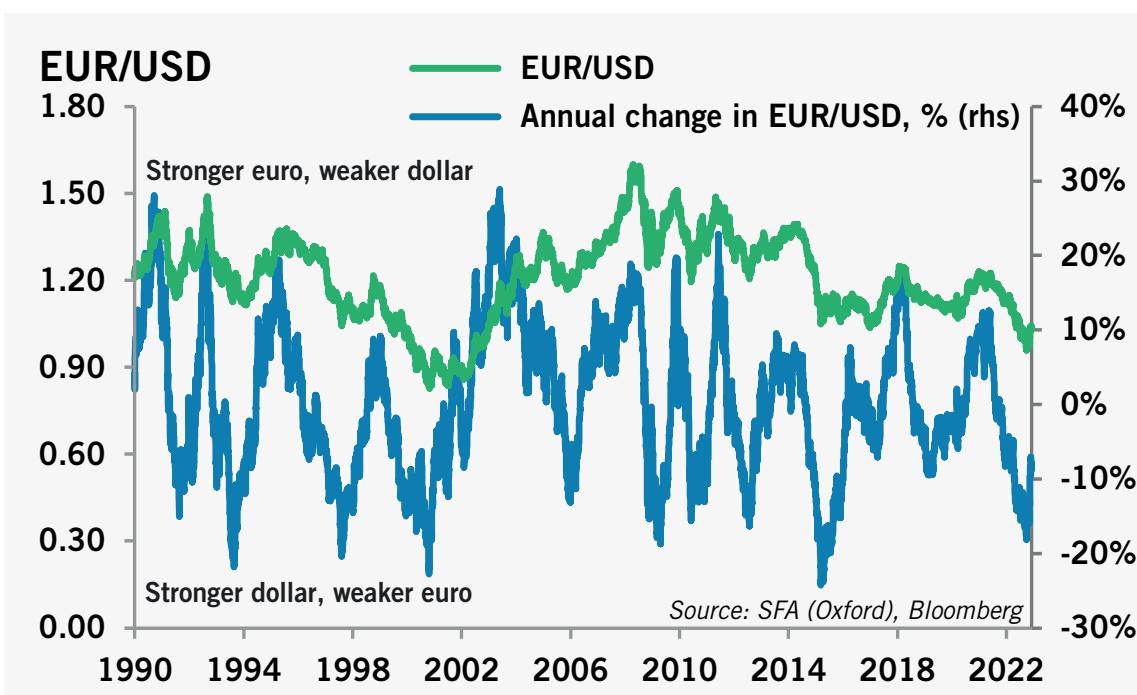
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# FORECAST – EUR/USD

## Euro to rebound in 2023

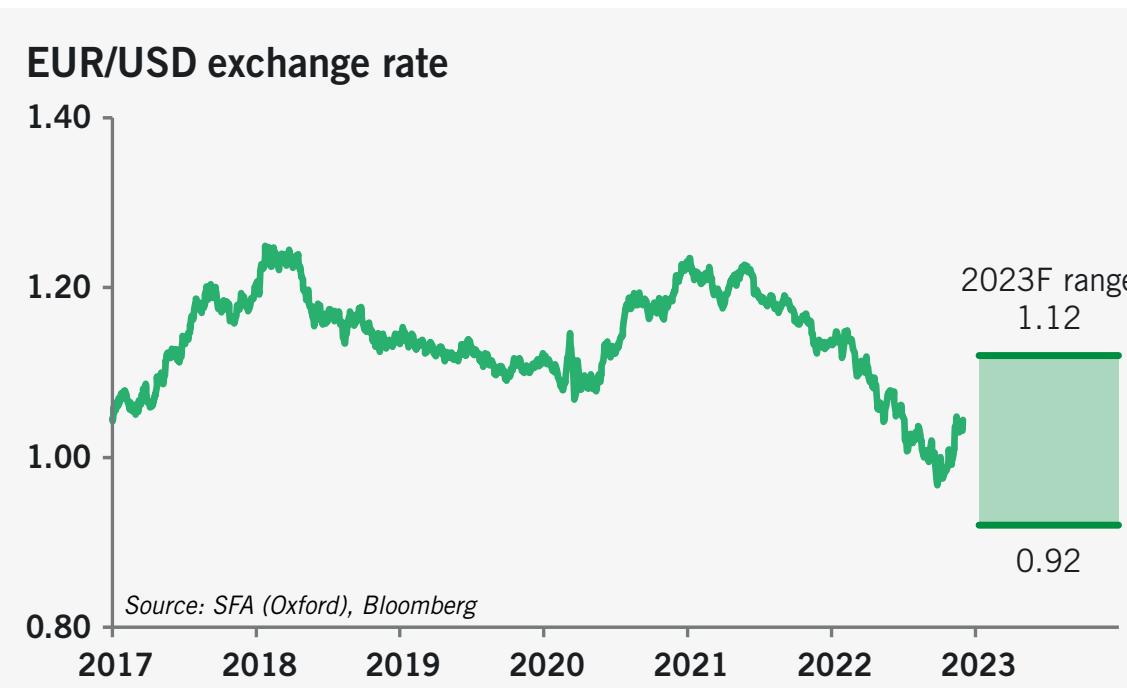
**The period of dollar strength may be nearing an end.** The US dollar strengthened significantly during 2022, but historically the dollar has not sustained such large gains. After the euro strengthened slightly to 1.15 in early 2022, the dollar gained the upper hand, with the euro first falling below parity in July and reaching a low of 0.97 in September.



**The Fed has led the way with rate rises.** The Fed was slow to recognise that inflation was not transitory, but with the Russian invasion of Ukraine adding to inflationary pressures, the Fed was quicker than the European Central Bank (ECB) to start raising interest rates. The Fed has been aggressively doing so in the second half of the year, with four consecutive 75 bp increases. This and the more favourable economic situation in the US compared to the Eurozone have helped to support a strong dollar. The ECB is still lagging the Fed but

is raising interest rates despite the weaker economic situation as inflation in the Eurozone has reached double digits.

**The key question could be, when will the Fed stop raising rates and start cutting them?** The Fed is likely to lift rates in smaller increments going forward. The futures market is projecting a peak rate of 5.25% next year, compared to the current 4.0% upper bound. While the employment situation in the US appears to be robust and inflation is high, the Fed can justify further rate increases. However, job creation and inflation are lagging economic indicators and other economic data show that the US economy is slowing, such as the easing in the manufacturing and services PMIs (Purchasing Managers Index). Higher interest rates are also causing a serious slowdown in the US housing market as mortgage rates rise. Consequently, the Fed may have to reverse course sooner than anticipated.



**The euro usually rebounds after falling by around 20% against the dollar.** The surge in the dollar has seen the euro drop by more than 10% in 2022. On a 12-month basis, the euro's lowest point in September was a fall of 18.1%. In previous years, a decline of around 20% in the euro was as much strength as the dollar could sustain before the euro rebounded. Historically, the recoveries in the euro have been gains between 7.6% and 28.9% over the next 12 months, with the majority falling in the range between 10% and 25%.

**Next year, the euro is expected to strengthen and trade between 1.12 and 0.92.** Near term, the euro could depreciate a bit more as the Fed is likely to raise rates further. However, considering the historical tendency for the euro to rebound after rapid and significant depreciations against the dollar, the euro is likely to appreciate against the dollar next year.

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2022*		2023
Avg. \$1,806/oz		Forecast:
High \$2,055/oz		High \$1,920/oz
Low \$1,635/oz		Low \$1,620/oz
Change -2%		

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## FORECAST – GOLD

### Persist, pause or pivot? Fed timing could be key for the gold price in 2023

**Rising real interest rates have been a headwind for gold.** Central banks were behind the curve in accepting that action was needed to curb rising inflation. The Fed first raised interest rates in Q1'2022, subsequently hiking them by 75 bp four times consecutively. Interest rates are likely to continue to rise in 2023, but in smaller steps as inflation cools and the US economy shows signs of slowing. Higher real interest rates pressured the gold price in 2022, despite 40-year high inflation. Fed rate rises (even if at a slower pace) and falling inflation are an unfavourable combination for gold.

**A shift in the Fed's monetary policy could help gold.** Inflation peaked in June this year – in the US at least – at 9.1%, and is now easing, which, along with the worsening economic outlook, suggests that a pivot from the Fed from hiking to maintaining (or even cutting) rates is on the horizon. A Fed pivot would be an acknowledgement of a deteriorating US economy and, as a result, the dollar could weaken and bond yields fall which should support a higher gold price. However, the futures market's current projected terminal interest rate is 5.25%, 125 bp above the current upper bound, meaning more short-term price pressure for gold is likely.

**Central bank buying is expected to remain strong.** Gold buying by central banks reached nearly 700 tonnes by the end of Q3'2022, primarily driven by significant purchases in that quarter. This was a significant increase compared with the previous year, and the highest since 1967. Purchases in 2023 may not match the levels seen in 2022, but several countries have been consistent gold buyers and that should help to keep purchases elevated versus the pandemic-affected years.



**Mine supply may creep up next year.** Gold production could reach record levels this year, if fourth-quarter production is particularly strong. Output reached 2,682 tonnes in the first three quarters, 1% lower than the record set in 2018. Industry-wide cost inflation will continue to squeeze the margins of operations, but primary supply should hold up and higher by-product supply from copper mines is expected in 2023.

**Jewellery demand could struggle to match 2022's level in 2023,** but the regional outlook is mixed. Gold jewellery demand has recovered to pre-pandemic levels in 2022, helped in the second half of 2022 by the falling gold price and a strong festive season in India. Demand in India is expected to hold up next year. Lower growth in Europe and the US is likely to crimp regional demand in 2023. China took its first step towards rolling back zero-Covid measures recently. However, public discontent has increased and with little improvement in economic growth expected next year Chinese jewellery demand may not improve.

**Investment into ETFs may pick up again.** Exchange-traded fund investment for gold has been lacklustre in 2022 with significant outflows, even though bar and coin demand has remained robust. This could reverse in 2023 if the gold price begins to trend higher.

**The direction of the dollar will determine any potential gold price gains.** It is anticipated that the Fed will change policy direction at some point in 2023, as inflation continues to ease and a weakening US economy becomes a more pressing concern. That could lead to a change in direction for the dollar, and hence potential price upside for gold. **Gold is forecast to trade in a range between \$1,920/oz and \$1,620/oz.**

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2022*		2023
Avg. \$21.63/oz		Forecast:
High \$26.85/oz		High \$25.00/oz
Low \$17.65/oz		Low \$17.00/oz
Change -4%		

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## FORECAST – SILVER

### Demand continues to rise

**Electrical and electronic demand is expected to grow modestly.** The smartphone market outlook is clouded for 2023, as many consumers may be reluctant to upgrade devices as costs rise and their disposable income shrinks. The economic outlook in Europe and the US has deteriorated, although the outlook for consumer electronic sales in China could improve if Covid restrictions become less onerous and the economy recovers.

Smartphone shipments are predicted to rise by 5% next year from 2022's low base to 1.3 billion units. However, given downgraded growth forecasts for advanced economies, that may be optimistic. Shipments of 5G-enabled devices reached 146 million units in Q2'2022, representing 51% of the global market share and surpassing 4G devices for the first time.

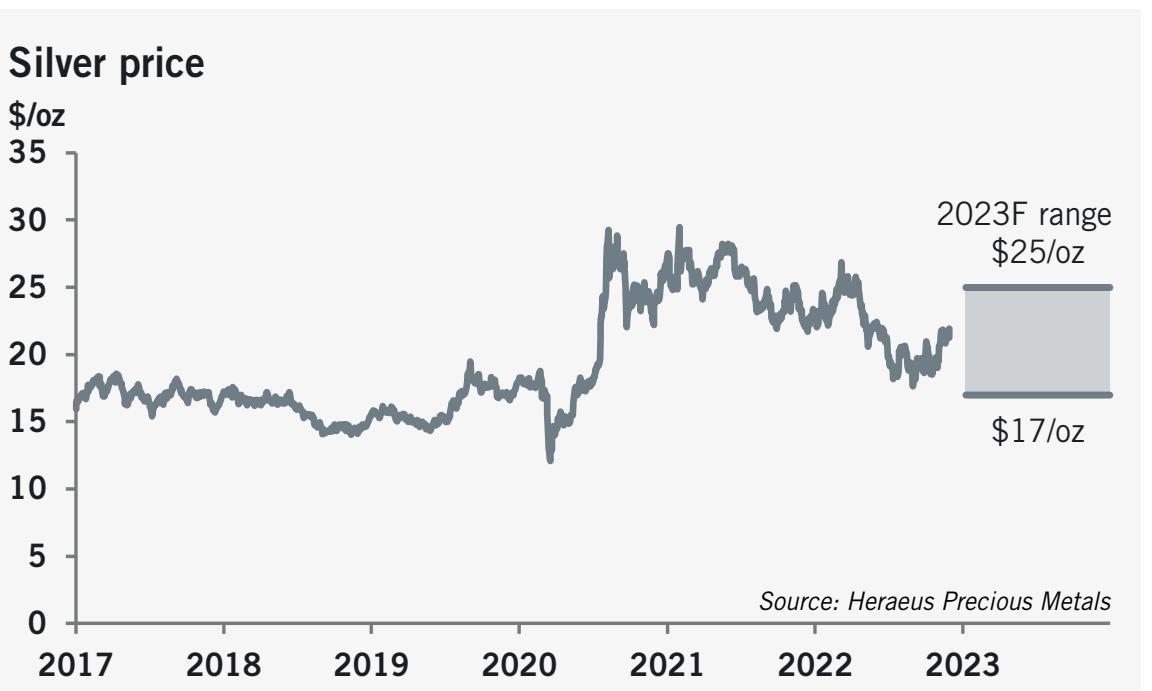
This trend is expected to continue in 2023. As 5G devices capture more of the market, average silver content per device should rise. Rollout of a nationwide 5G network in India began in Q4'2022 and is expected to cover the entirety of India by Q1'2024. Consequently, a wave of sales of 5G-enabled devices is expected in 2023 as consumers begin to take advantage of the new network, boosting silver demand.

**Photovoltaic demand is forecast to grow as unit costs fall.** Photovoltaic (PV) demand for silver could reach a record 150 moz in 2022 and continue to show strong growth in the next 12 months. The polysilicon price, a large influence on the cost of solar cells, is forecast to fall ~50% in 2023, as new production capacity comes online in China following record high prices this year. This should reduce costs, despite other inflationary pressures, helping to support demand for PV cells. European Commission policy has also become more favourable to solar since the invasion of Ukraine. Thrifting of silver may offset some of the gains from PV installation volumes, but overall PV silver demand is expected to rise.

**Silver jewellery demand may slip year-on-year.** India's annualised silver imports are likely to reach 10,000 tonnes this year, far higher than the 10-year average of 5,700 tonnes, as demand rebounds following severe market disruption from Covid in 2020-2021. India is the largest silverware and jewellery fabrication hub. Although India's economy is expected to maintain strong growth next year, the added rebound from pent-up demand in 2022 means silver jewellery demand will likely fall year-on-year in 2023 whilst staying roughly on par with pre-pandemic levels.

**Silver mine supply is predicted to grow incrementally in 2023**, owing mainly to an increase in by-product mine output from both lead-zinc and copper production, which are forecast to grow by 2.7% and 5.3%, respectively, in 2023. Growth in supply in 2023 will follow a year of recovery in 2022, as mines recovered from Covid-related interruptions.

The silver price has been subdued this year, mainly owing to the strength of the US dollar. The greenback is likely to remain strong and keep pressure on the silver price until the Fed pivots its monetary policy. The speculative futures position in silver is hovering at a very low level, which has historically coincided with price lows. A rally in the silver price could spur a return of investors to ETFs in 2023, adding further support to the price. **The silver price is forecast to trade in a range between \$25/oz and \$17/oz in 2023.**



## FORECAST – PLATINUM

### Price upside if rand strengthens

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2022*		2023
Avg. \$965/oz	Forecast:	High \$1,150/oz
High \$1,175/oz		Low \$800/oz
Low \$835/oz		
Change 10%		

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**The industrial platinum market is estimated to be oversupplied by over 400 koz in 2023.** This is partly a result of stock built up in 2022 being processed. Gross demand is set to rise as gains from platinum substitution into gasoline autocatalysts outweigh anticipated declines in jewellery and industrial uses. Investment demand has been lacklustre in 2022, with a large drop in ETF holdings. Investment could improve next year if platinum's price volatility gives way to a clearer uptrend.

**Primary platinum supply is projected to grow by 6% in 2023 to 6.0 moz.** Output is boosted by the release of the built-up in-process stock resulting from delayed smelter maintenance in South Africa in 2022. This is expected to lift South African output to pre-pandemic levels. There is a risk that output will underperform expectations if Eskom, the power utility, continues to have problems producing enough power. The acquisition of Royal Bafokeng Platinum has not been finalised but a change in ownership is unlikely to impact production in 2023. Production should also be higher in Zimbabwe on incremental production gains at Zimplats. North American output is predicted to edge up in 2023 after production stoppages in the US and Canada cut output earlier this year.

Platinum output in Russia is forecast to dip next year, as sanctions prevent Western equipment and replacement parts being imported and mine productivity suffers. PGMs from Russia are expected to continue to reach the market, but there is a remote risk that sanctions could be imposed.

**Secondary supply is predicted to dip slightly next year.** Weaker jewellery demand is expected to result in lower jewellery recycling as fewer old pieces are traded in. Platinum recovered from spent autocatalysts is also estimated to be little changed next year. The semiconductor chip shortage that constrained new light-vehicle production this year resulted in higher demand for second-hand cars and fewer were scrapped than would typically have been the case. The chip shortage is likely to be a diminishing influence next year and light vehicle sales are predicted to rise, which should result in more older vehicles being scrapped. Offsetting that to some extent, the US and Europe are expected to slip into recession, which could also extend the life of older vehicles.

**Global automotive platinum demand is projected to increase by 14% to over 3.3 moz in 2023.** Light-vehicle production is forecast

to rise modestly next year as the various supply chain constraints that have held back production this year are overcome. However, the increase in platinum requirements is mostly owing to the much more widespread use of gasoline catalysts, into which some platinum has been substituted. The diesel passenger car market share in Europe continues to contract, shrinking demand. However, global heavy-duty vehicle production is forecast to increase next year, and this will help to lift platinum consumption.

**Industrial platinum usage is expected to drop by 3% next year,** mainly owing to glass requirements returning to more typical levels after a very strong year in 2022. Fewer new glass manufacturing facilities are projected to be constructed next year. Petroleum demand is also set to fall next year, owing to some refinery closures. Medical requirements and other demand are anticipated to change little, but chemical demand is estimated to rise modestly, mostly owing to new chemical plant construction in China. Electrical demand is also expected to be lifted by ongoing expansion in the enterprise market, supporting hard disk demand. Platinum use in the hydrogen economy is predicted to expand as the number of PEM electrolyser installations is rising.

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2022*		2023
Avg. \$965/oz		Forecast:
High \$1,175/oz		High \$1,150/oz
Low \$835/oz		Low \$800/oz
Change 10%		

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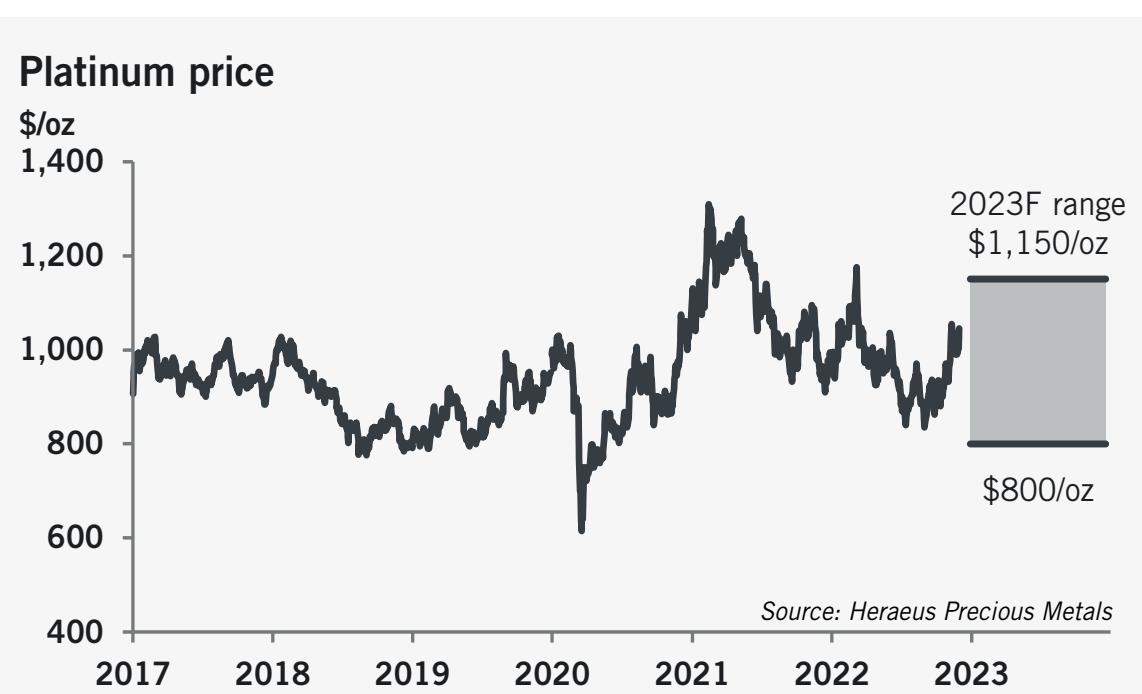
## FORECAST – PLATINUM

### Price upside if rand strengthens

**Jewellery demand is predicted to fall by 7% in 2023.** China's Covid restrictions and a weak economic outlook weighed on demand in 2022 and that is likely to remain the case in 2023. In addition, the US and Europe are expected to experience recessions next year and jewellery demand is anticipated to be lower as a result.

**Overall investment demand has been weak in 2022** and may end up being a source of supply. Coin demand has been solid, but bar demand in Japan, the largest market, has been weak as the local price has periodically exceeded ¥4,000/g and investors have sold some of their bars and taken profits. ETFs have shed more than 500 koz so far in 2022, leaving total global holdings just above 3.0 moz. Selling from ETFs occurred in all regions, with the largest decline being in UK funds.

**The platinum price is forecast to trade between \$1,150/oz and \$800/oz next year.** The US dollar has been strong in 2022 as the Fed has rapidly lifted interest rates. However, inflation will come down and a weakening economic outlook next year may cause the Fed to change course and the dollar to weaken. An appreciating rand would support a higher platinum price.



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2022*		2023
Avg. \$2,147/oz		Forecast:
High \$3,100/oz		High \$2,250/oz
Low \$1,815/oz		Low \$1,300/oz
Change -1%		

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# FORECAST – PALLADIUM

## Market moving into surplus

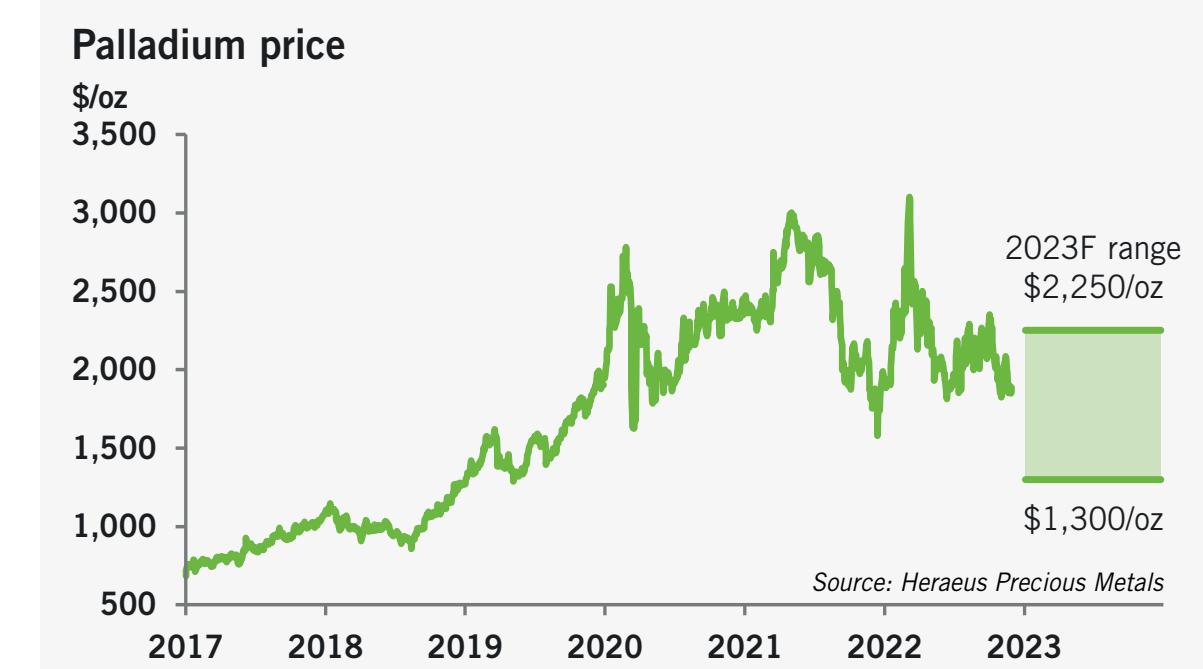
**The palladium market is expected to move into a small surplus next year.** Automotive palladium demand is likely to be little changed as improved light-vehicle production is offset by internal combustion engine (ICE) market share loss to battery electric vehicles (BEVs), and there is a more widespread use of gasoline autocatalysts with some platinum substituted in at the expense of some palladium. Primary palladium supply is projected to rebound as mines affected by weather-related incidents this year will be back to normal output and the stock built up by a delayed smelter rebuild in South Africa should be processed in 2023. Secondary supply is expected to be marginally higher, but if economic conditions deteriorate further, automotive recycling could disappoint.

**Automotive demand is estimated to be slightly lower at 7.7 moz in 2023.** Light-vehicle production is expected to improve somewhat as supply chain issues that have dogged production are overcome. However, ongoing market share gains by BEVs and a recession in Europe and the US could limit the uplift in ICE light-vehicle production, and substitution of platinum into gasoline three-way catalysts at the expense of some palladium also constrains the demand upside.

**Industrial palladium requirements are forecast to slip by 1% next year,** as demand falls again in the electrical and dental sectors, outweighing a modest gain in the chemical sector. Further substitution away from expensive palladium in various electrical components is anticipated. High prices could again exacerbate substitution to cheaper, non-palladium alternatives in dentistry.

**Primary palladium supply is predicted to climb by 3% to 6.7 moz next year.** The delay to the Polokwane smelter rebuild has resulted in a build-up of palladium-rich material, which should be processed in 2023 and boost South African production. However, Eskom's ability to provide consistent power is likely to remain constrained which means South African production is at risk of underperforming expectations in 2023. It is assumed that Russian production continues to reach the market and Nornickel and PGMs are not sanctioned. Nornickel should also complete its smelter maintenance, allowing it to increase output. However, production is predicted to be somewhat lower than this year, owing to mine productivity being impaired as Western parts and equipment can no longer be imported.

**Secondary supply is projected to be slightly higher next year,** with some growth in China and other emerging markets. The Chinese automotive market has remained relatively robust despite the difficult economic conditions, and the number of end-of-life vehicles is expected to rise. The lingering effects of the lack of new vehicles on the second-hand market and the impact of a recession in the US and Europe are expected to constrain scrappage rates and autocatalyst recycling. The risk is that secondary supply could fall if economic conditions deteriorate more than forecast.



**The palladium price is predicted to trade in a range between \$2,250/oz and \$1,300/oz,** as the market is moving into surplus which weighs on the price. With a slight reduction in demand and an increase in primary supply, the market is likely to be in surplus even if secondary supply underperforms expectations.

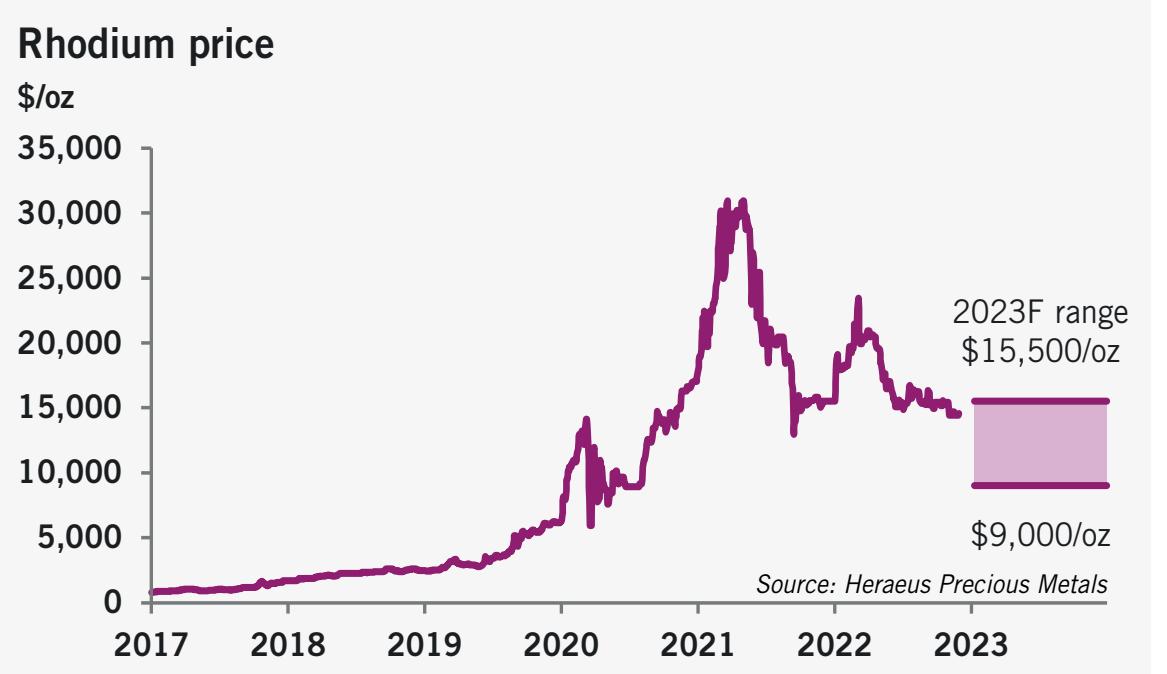
# FORECAST – RHODIUM

## Supply recovery pushes rhodium market into surplus

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2022*		2023
Avg. \$17,130/oz	Forecast:	
High \$23,450/oz	High \$15,500/oz	
Low \$14,450/oz	Low \$9,000/oz	
Change -6%		

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**The rhodium market is predicted to have a small surplus in 2023.** With little change anticipated in global demand, the recovery in primary supply next year should be sufficient to swing the market into surplus from a slight deficit this year.

**Primary rhodium supply is projected to increase by 4% in 2023.** This is mostly owing to higher production in South Africa which is boosted by the processing of stockpiled material. Anglo American Platinum is expected to process the stock that built up from the delay to the rebuild of the Polokwane smelter in 2022. Power availability is likely to remain a downside risk to South African production in 2023 as Eskom may need to implement further power cuts. Russian production is forecast to be slightly lower next year as mine productivity is impacted by Western sanctions. Zimbabwean output is expected to be modestly higher.

**Secondary supply is forecast to be little changed next year.** An increase in China and the Rest of the World (RoW) is likely to be offset by a decline in supply from the developed markets. Autocatalyst recycling has been constrained in the US, Europe and Japan as the lack of new cars has kept older vehicles from being scrapped and scrappage rates also tend to be lower during recessions. If the recession in Europe or the US proves to be more severe or longer-lasting than forecast, the amount of recycled rhodium could be lower than predicted.

**Automotive rhodium demand is estimated to slip slightly next year.** Light-vehicle production is expected to increase as supply chain constraints ease. However, with recessions expected in the US and Eurozone, the rise in production could be modest. BEVs are predicted to continue to take market share from ICE vehicles, crimping the expansion of ICE vehicle production, and additionally some thrifting of rhodium is likely in gasoline autocatalysts in China.

**Industrial rhodium requirements are expected to rebound by 10% in 2023** as growth in the chemical sector outweighs a slight decline in glass requirements. Rhodium use in nitric acid production is predicted to pick up in most regions, but remain subdued in Europe, owing to the exceptionally high natural gas price crimping ammonia output. Glass demand slips as fewer new fabrication facilities are anticipated to be built in China and the RoW countries. Significant substitution to platinum in glass applications has already occurred and should not be an influence on demand.

The rhodium price reached a record high of \$30,000/oz in early 2021, owing to the temporary halt to some refined output while Anglo Platinum's converter plant was undergoing maintenance. The rhodium price is still normalising from that record level, but remains very high by historical standards. With supply improving in 2023 and the market moving into surplus, **the price is estimated to range between \$15,500/oz and \$9,000/oz.**

## FORECAST – RUTHENIUM

### Supply recovers, improving liquidity

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2022*		2023
Avg. \$593/oz	Forecast:	High \$650/oz
High \$695/oz		Low \$400/oz
Low \$495/oz		
Change -14%		

09 IRIDIUM

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**The ruthenium market is forecast to move into a slight surplus in 2023.** Supply is predicted to rise by 5% next year, partly owing to some stock being processed that had built up this year in South Africa, while demand is expected to be slightly higher.

**Ruthenium production is projected to climb above 1 moz next year.** In South Africa, the delay to the Polokwane smelter rebuild has resulted in some stock being built up which is now likely to be processed in 2023. Elsewhere, production is likely to change little. However, Eskom, the state energy utility, has struggled to provide consistent power and further power cuts are possible. As South Africa provides around 90% of global ruthenium supply, prolonged or severe power cuts could negatively impact production. While not directly targeted by sanctions, Nornickel is being affected by a lack of Western equipment and parts, and productivity could suffer. However, as Nornickel's ruthenium output is modest, the shortfall is likely to be small.

**Ruthenium demand is predicted to edge up slightly next year,** mostly owing to greater demand from fuel cells, although that growth is still from a relatively small base. Support from governments and investment by companies are driving the rapid development of the hydrogen economy. The low ruthenium price compared to iridium has resulted in R&D efforts to see

if ruthenium can be used instead. This can be observed with spark plugs, where ruthenium-tipped plugs are now widely available as an alternative to iridium tipped plugs, but the overall impact on demand is expected to be modest. Electrochemical and chemical demand are both forecast to slip back after a strong year in 2022.

While the market could be tight at the start of the year, the situation should improve once the stock built up in South Africa is processed and the price is estimated to trend lower. **The ruthenium price is forecast to trade between \$650/oz and \$400/oz next year.**



**Electrical demand has been holding up relatively well** as the transition from existing ruthenium-containing hard disk drive technologies to the heat-assisted magnetic recording technology, which does not use ruthenium, is not yet occurring at scale. While the number of hard disk units shipped is declining, the number of platters in each unit is going up, so overall demand for ruthenium is unlikely to change much. If the economic outlook weakens further, then demand could come off more sharply.

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2022*		2023
Avg. \$4,743/oz	Forecast:	High \$6,500/oz
High \$5,950/oz		Low \$3,700/oz
Low \$4,050/oz		
Change -2%		

10 ABOUT HERAEUS

# FORECAST – IRIDIUM

## Price supported as demand improves

The iridium market is predicted to have a small surplus in 2023, as both supply and demand move higher. Supply from South Africa is forecast to climb by 5%. The delay to the Polokwane smelter rebuild has resulted in a small amount of stock being built up in South Africa, which is expected to be processed and reach the market in 2023. Nornickel's productivity could be impacted by sanctions which have cut off the supply of Western equipment and parts, but any dip in output is likely to be small.

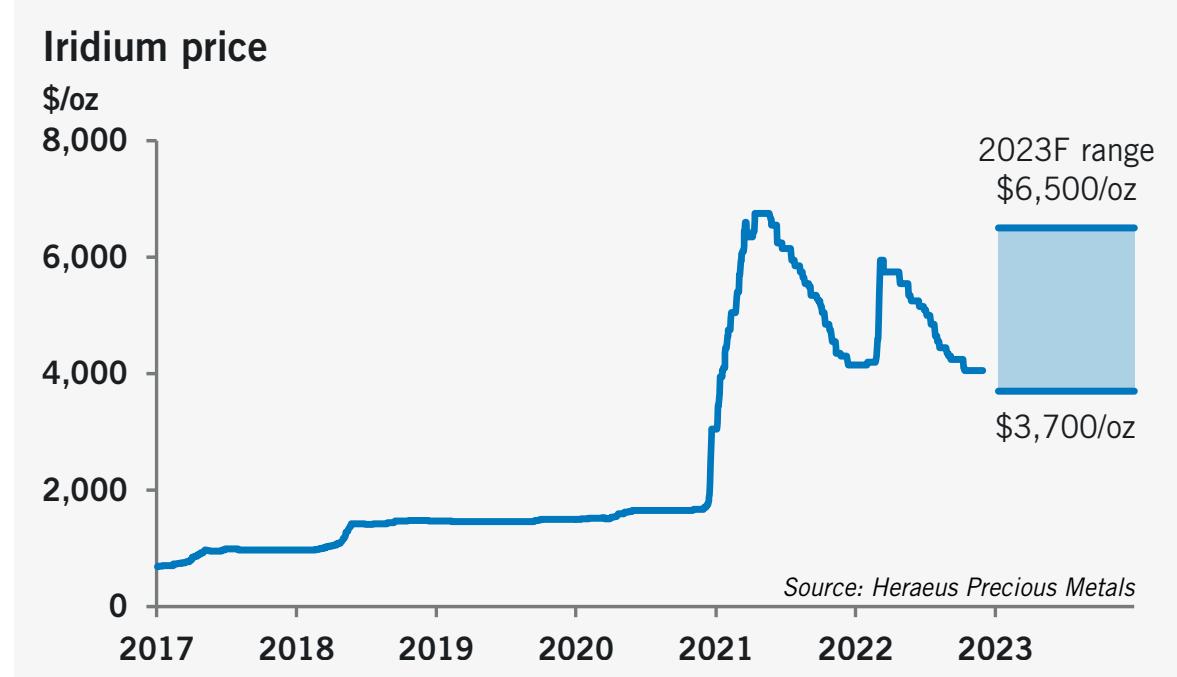
There are potential risks to production next year. The load-shedding (power cuts) that has affected South Africa is likely to continue next year and could result in curtailed production if the outages are sufficiently severe or prolonged.

Iridium demand is forecast to rise sharply in 2023, driven by significant growth in the deployment of proton exchange membrane (PEM) electrolyzers as green hydrogen production is ramped up to enable companies' decarbonisation efforts and to help meet ambitious climate targets.

Other end-uses are expected to see little change or slightly lower demand, but the weakening economic outlook for the US and Europe, in particular, could be a drag on demand.

Consumer electronics demand has eased, including for mobile phones which use surface acoustic wave filters that rely on lithium tantalate made in iridium crucibles. China has been at the centre of the slowdown this year. Globally, smartphone sales are projected to grow in 2023. However, the risk is that, even with a recovery in China, the weaker economic environment globally, high inflation and consumers upgrading less frequently could stunt the rebound.

The price is still trying to find its equilibrium after several supply shocks. Processing problems in South Africa removed a portion of refined metal output, which contributed to the price reaching record levels in early 2021. With production restored, the price was trending lower, but that was interrupted earlier this year amid concerns over supply from Russia, as sanctions were imposed following the invasion of Ukraine. With PGMs not being sanctioned, the price resumed its slide as the market is predicted to be in a slight surplus this year, despite a small build-up of stock in South Africa following the delayed restart of a smelter. That stock is expected to be released in 2023, keeping the market in surplus, and the iridium price is forecast to trade between \$6,500/oz and \$3,700/oz.



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\*All 2022 figures are to the end of November

## ABOUT HERAEUS

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