

PRECIOUS APPRAISAL



MARKET SPOTLIGHT

Platinum investors are finally taking note of South Africa’s power problems

Platinum ETFs saw heavy buying at the end of April from South Africa-based funds. Year-to-date regional inflows into platinum funds in South Africa (+333 koz) are the standout when compared to the US (-107 koz), the UK (-18 koz) and Switzerland (-17 koz). Net flows have been positive every month this year so far, as South African investors are more acutely aware of the electricity supply issues being faced by PGM producers. Total global holdings stand at 3.3 moz, up from 3.0 moz at the beginning of the year, although that was down 1 moz from the peak level of holdings in July 2021.

These investors bought into the recent price rally and hope for more. The platinum price had risen more than 20% since late February before the recent correction. Supply issues in South Africa (~75% of mined supply) are well documented. The regularity and severity of load-shedding in 2022 was unparalleled, with the situation unlikely to improve significantly during 2023. Load-shedding resulted in the build-up of above-ground stocks of unrefined PGMs last year and could lead to an estimated loss of ~250 koz of platinum production this year as the Southern Hemisphere winter begins to bite. Available first-quarter results of major South African PGM miners all cite load-shedding as impacting refined output to some degree.

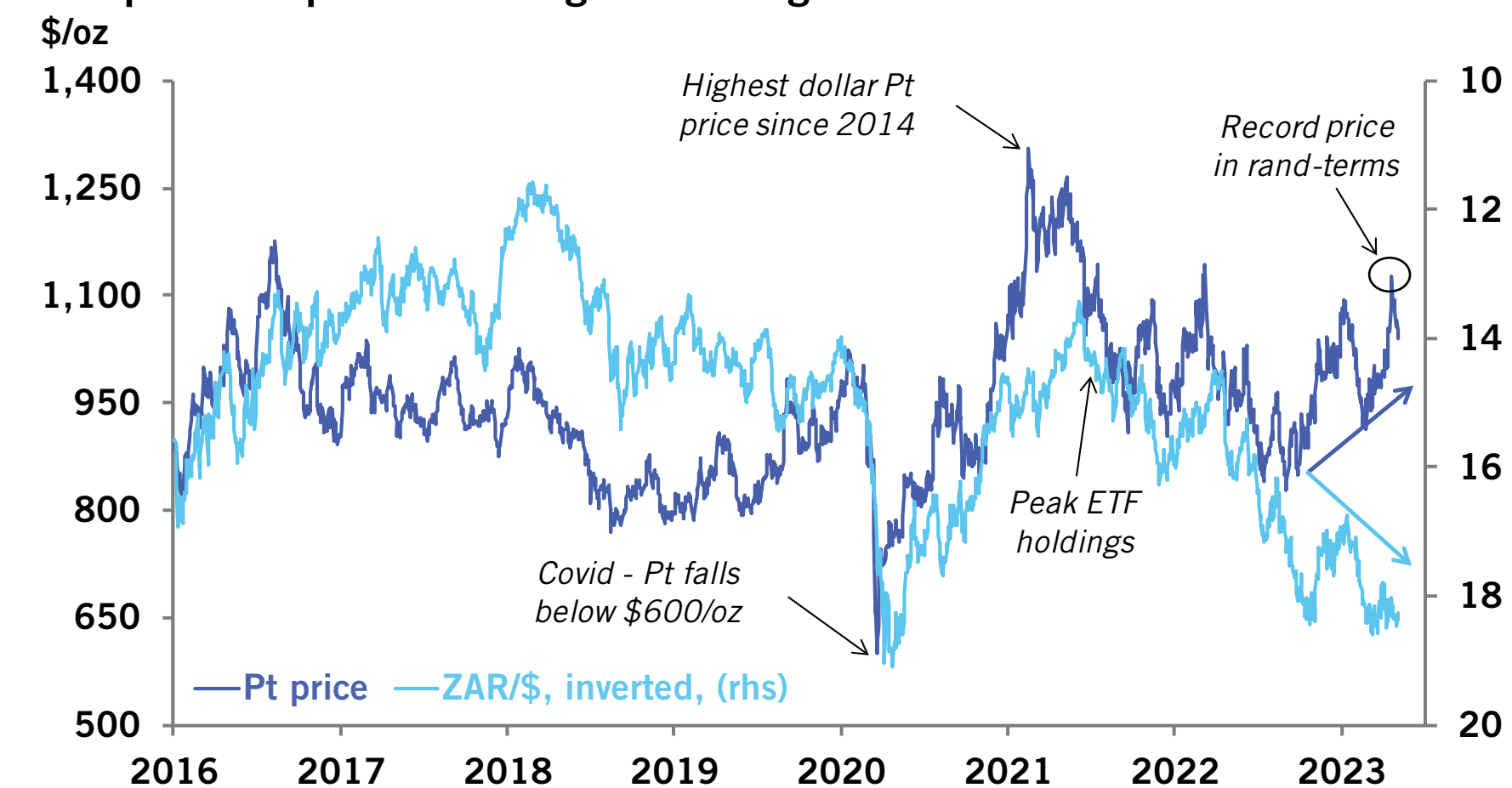
Market fundamentals look solid. Global autocatalyst demand for platinum is forecast to grow by 14% this year to a six-year high of 3.2 moz. Recovering light-vehicle production, coupled with wider use of gasoline catalytic converters in Europe and China with platinum substituted for some palladium, moves the platinum market into deficit.

Other metrics suggest the top may be in for now. The net long position of non-commercial specs more than doubled to 1.5 moz in the last two weeks of March. Previous rallies in platinum have stalled with positioning at around this level. Also weighing on platinum is the dollar-rand exchange rate, with which the metal has a good negative correlation (rand weakens, platinum price falls). Since 2022, there has been a dislocation between

the two. To resume the historical relationship could require a correction in the platinum price, given that the weakness in the South African economy makes a rand rally look less plausible. Lastly, and probably the least convincing argument for a lower platinum price, is that seasonality in the white metal suggests that the first six months of the year see the highest prices. Relative underperformance follows, on average.

Although a short-term correction is underway, overall price risk is to the upside. With automotive demand showing strength, the risk of supply underperformance underpins a tight market throughout this year. The price could still have some upside, particularly if the power supply situation worsens in South Africa.

The platinum price is too high according to the rand



Source: SFA (Oxford), Bloomberg

- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 PLATINUM
- 05 PALLADIUM
- 06 RHODIUM, RUTHENIUM, IRIDIUM
- 07 TRENDS AND INVESTMENTS
- 08 ABOUT HERAEUS

PRECIOUS METALS REVIEW

Gold



	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	2,015	1.17%	2,063	03/05/2023	1,977	01/05/2023
€/oz	1,828	1.30%	1,870	04/05/2023	1,798	01/05/2023

The Fed may have raised rates for the last time, but gold couldn't hold on to its gains. While COMEX gold futures hit a record level at \$2,085/oz after the Fed's latest announcement, the spot price did not quite manage to exceed the record \$2,075/oz from August 2020, rising to \$2,063/oz. The Fed did not include the phrase that additional policy increases might be appropriate in its statement, though comments from Chairman Powell indicated that the Fed was not expecting to cut rates this year. However, while the market is assuming that there will be no change to rates in July, an increasing chance of rate cuts from September is now being priced in. Lower bond yields would be supportive of higher gold prices. Technically, the gold price is showing a divergence from the relative strength index which suggests the pull back could continue in the short term.

The ECB also held a meeting last week and raised its interest rates by 25 bp. The gold price rallied more on the ECB news than after the Fed's announcement, but it did not reach a new record in euros. The record high spot price was €1,902/oz intraday on 8 March 2022 following the Russian invasion of Ukraine, and the price in euros was also higher earlier this year.

- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 PLATINUM
- 05 PALLADIUM
- 06 RHODIUM, RUTHENIUM, IRIDIUM
- 07 TRENDS AND INVESTMENTS
- 08 ABOUT HERAEUS

PRECIOUS METALS REVIEW

Silver



	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	25.61	2.22%	26.14	05/05/2023	24.58	02/05/2023
€/oz	23.23	2.37%	23.68	05/05/2023	22.45	02/05/2023

A strong start to photovoltaic (PV) installations in China bodes well for silver demand. The National Energy Administration reported that China added 33.66 GW of new solar power capacity in Q1'23. This is robust demand in the winter which was probably helped by the removal of Covid restrictions late last year. The sharp drop in the silicon price may also have helped. Earlier this year the China Photovoltaic Industry Association predicted that installations could accelerate to 95-120 GW in 2023 from 87.4 GW last year. If the current pace is maintained then China could beat that top end. Globally, PV installations could exceed 300 GW which would lift silver demand to over 160 moz from 140 moz (source: The Silver Institute), about 14% of total silver demand.

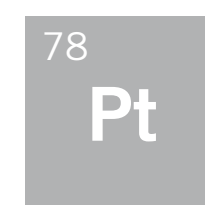
Investor interest in silver remains solid. The Perth Mint reported its highest monthly level of silver bullion sales so far this year at 1,947,743 oz in April. Year-to-date sales totalled 6.5 moz, down from 7.8 moz in the first four months of 2022. However, this year's sales have been the second-highest after 2022 when precious metals were purchased as safe havens, prompted by the Russian invasion of Ukraine. Global silver ETF holdings increased by 1.5 moz in April, taking the year-to-date gain to 1.8 moz.

The silver price also rallied last week, but failed to hold above \$26/oz. The gold:silver ratio held at around 79, but silver has been outperforming gold since March as the ratio has fallen from 91.

- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 **PLATINUM**
- 05 PALLADIUM
- 06 RHODIUM, RUTHENIUM, IRIDIUM
- 07 TRENDS AND INVESTMENTS
- 08 ABOUT HERAEUS

PRECIOUS METALS REVIEW

Platinum



	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	1,062	-1.48%	1,093	01/05/2023	1,036	04/05/2023
€/oz	963	-1.34%	991	01/05/2023	943	04/05/2023

South African platinum production could struggle to hit 4.1 moz this year.

Output of 4.1 moz was estimated including some disruption due to the difficulties caused by the power curtailments. This included processing of some of the stocks that have been built up. However, there is a risk that more severe power cuts during the Southern Hemisphere winter will reduce productivity, and refined output could fall short as the stocks are not able to be processed.

Platinum output from South Africa hit by unreliable power supply in Q1'23.

Eskom has struggled to provide sufficient electricity to meet demand as breakdowns reduced the available power plants. PGM mining companies are now reporting the impacts on their Q1'23 production. The lack of reliable power has compounded other operational problems and caused a build-up of part-processed material.

Impala Platinum reported that about 16 koz 6E (platinum, palladium, rhodium, iridium, ruthenium, gold) was unable to be refined and increased excess inventory to 190 koz 6E (~100 koz Pt) during the first quarter. Total PGM production was down 10% at 662 koz 6E (299 koz Pt). Anglo American Platinum reported total 6E production fell by 6% to 901 koz in Q1'23, with a 6% drop in platinum output to 417 koz. Anglo also noted an increase in work-in-progress inventory of 26.5 koz 6E owing to the impact of power outages, taking estimated excess inventory to close to 300 koz 6E,

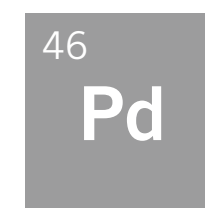
of which ~125 koz is platinum. However, Anglo has maintained its refined PGM production guidance of 3.6-4.0 moz with 1.65-1.85 moz of platinum, although this is subject to sufficient power supplies enabling some of the stock to be processed.

California now planning to ban diesel trucks, putting long-term platinum demand at risk, after banning combustion engine cars. California's Governor has already signed an executive order to ban the sales of new passenger vehicles with internal combustion engines from 2035. The California Air Resources Board has now voted to ban the sale of some categories of new medium-size diesel trucks by 2036, some larger trucks by 2039 and the remaining large trucks by 2042. Some government and private truck fleets are required to start the transition to zero emissions next year. The Environmental Protection Agency will need to approve this ban as it has for cars. Several other states typically follow California's lead, so this could ultimately cut US platinum demand for commercial vehicles by 20% or ~40 koz. This is not a huge amount of platinum but is indicative of the direction of travel in the US and Europe as transportation is targeted to do a lot of the work in cutting carbon emissions. There could be an offset if diesel trucks are replaced with fuel cell vehicles rather than BEVs. Investment in both charging infrastructure and hydrogen fuel stations will be needed and is part of the plan. Fuel cells are currently considered more suitable than batteries for large trucks owing to the weight of the batteries cutting down the payload.

- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 PLATINUM
- 05 **PALLADIUM**
- 06 RHODIUM, RUTHENIUM, IRIDIUM
- 07 TRENDS AND INVESTMENTS
- 08 ABOUT HERAEUS

PRECIOUS METALS REVIEW

Palladium



	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	1,487	-1.29%	1,522	01/05/2023	1,419	03/05/2023
€/oz	1,349	-1.17%	1,379	01/05/2023	1,284	03/05/2023

Primary palladium production is forecast to fall by 3% to 6.3 moz this year. Most of the decrease is due to reduced output from Nornickel, where scheduled smelter maintenance has resulted in annual production guidance of 2.4-2.7 moz of palladium compared to 2.8 moz last year. Offsetting that to some extent is an expectation that South African palladium output will be boosted by stocks being processed. However, as already noted for platinum, the power supply problems make that look increasingly problematic.

Russian palladium production got off to a good start in Q1'23. Nornickel reported a 2% rise in palladium output to 721 koz in the first quarter, with platinum output up 11% at 180 koz, as some stockpiled material was processed.

US light-vehicle sales are improving as the impact of the chip shortage wanes and vehicle availability improves as dealer inventories are rebuilt. US auto sales increased to 15.9 million units in April, on a seasonally adjusted annual basis, from 15.3 million units in March. Light-vehicle sales were 4.9 million in the first four months, up from 4.5 million in the same period last year, although January 2022 was the low point for sales as the impact of the chip shortage was at its worst. Over 80% of new light-vehicle sales are financed, but higher interest rates for loans and leases and record average prices for new cars and light trucks do not seem to be deterring consumers.

Palladium demand could be little changed this year. BEV market share gains and more widespread use of catalysts on gasoline vehicles with platinum substituted to replace some palladium could offset any gains from the higher light-vehicle production that is anticipated. The palladium market could be in deficit this year as supply is constrained. Even so, the price is still trending lower, after reaching a record high last year, as the economic outlook remains poor. The economy has yet to fully adjust to one of the fastest interest rate hiking cycles, and a recession in the US and Europe is still possible later in the year.

PRECIOUS APPRAISAL

8th May 2023

01 MARKET SPOTLIGHT

02 GOLD

03 SILVER

04 PLATINUM

05 PALLADIUM

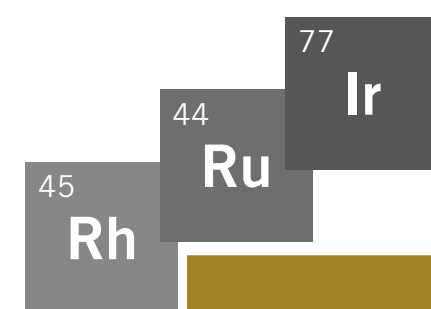
06 **RHODIUM, RUTHENIUM, IRIDIUM**

07 TRENDS AND INVESTMENTS

08 ABOUT HERAEUS

PRECIOUS METALS REVIEW

Rhodium, Ruthenium, Iridium



	RHODIUM	RUTHENIUM	IRIDIUM
Reporting Week	\$8,800/oz	\$525/oz	\$5,150/oz
Previous Week	\$8,950/oz	\$525/oz	\$5,150/oz

A hydrogen-powered car fleet is being expanded in Berlin. The H2 Moves Berlin project is increasing the number of Toyota Mirai cars from 50 to 200. The project is set to run for two years and aims to demonstrate the potential of hydrogen-powered vehicles. Germany also has one of the more well-developed networks of hydrogen refuelling stations in Europe, making long distance use of fuel cell cars feasible. Acceptance by the public of fuel cell cars as a zero-emission alternative to BEVs would support ruthenium demand, but further investment in the infrastructure will also be necessary.

Small PGM output in South Africa was hit in Q1'23. Intermittent electricity supplies affected processing plants and cut refined output, leading to a build-up of work-in-progress stock. This includes the small PGMs, with approximately 30 koz of rhodium as well as some iridium and ruthenium held up in stocks. The majority of the stockpile could be processed this year but that is dependent on the power supply situation not deteriorating.

The ruthenium and iridium prices remained flat last week, while the rhodium price slipped back to \$8,800/oz.

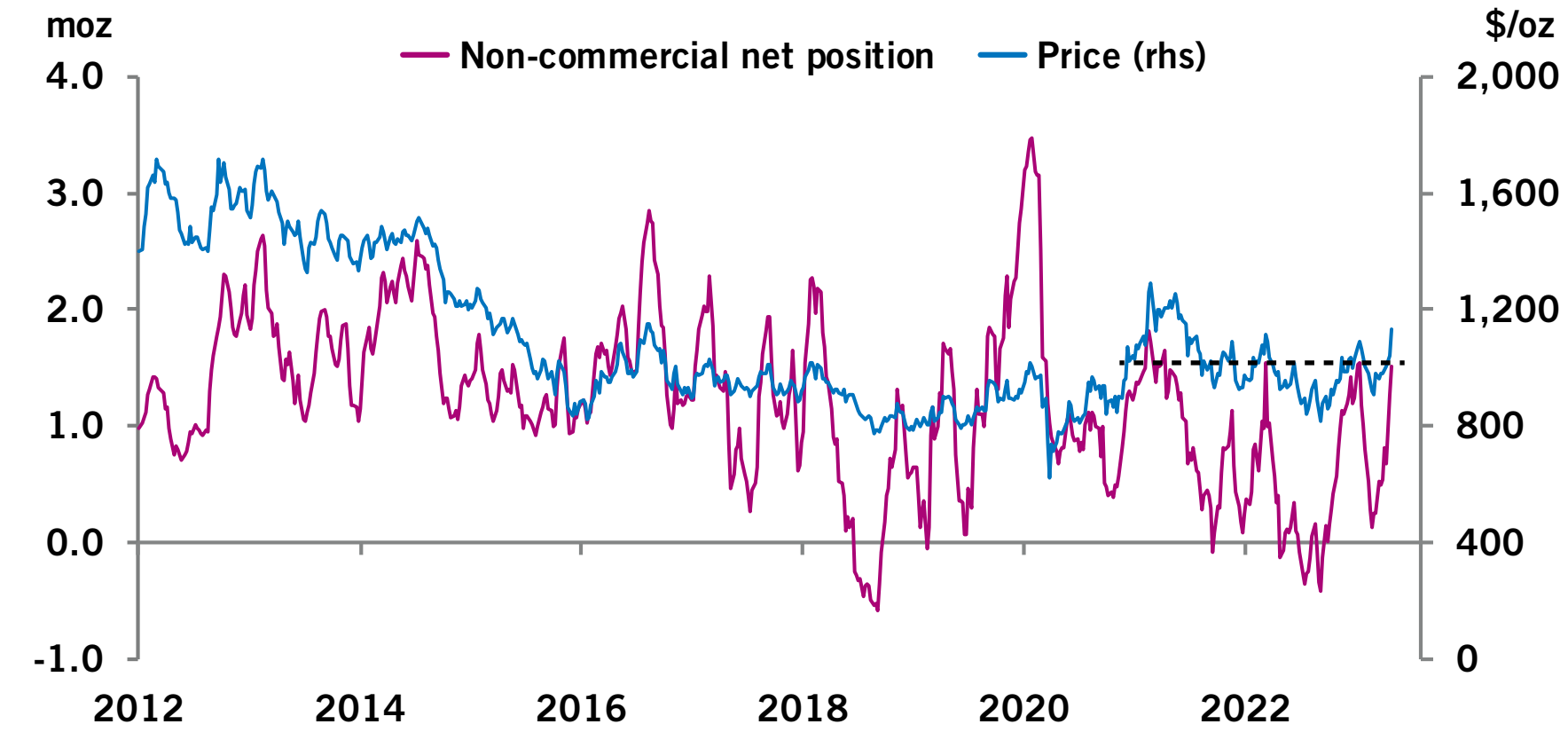
PRECIOUS APPRAISAL

8th May 2023

- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 PLATINUM
- 05 PALLADIUM
- 06 RHODIUM, RUTHENIUM, IRIIDIUM
- 07 TRENDS AND INVESTMENTS
- 08 ABOUT HERAEUS

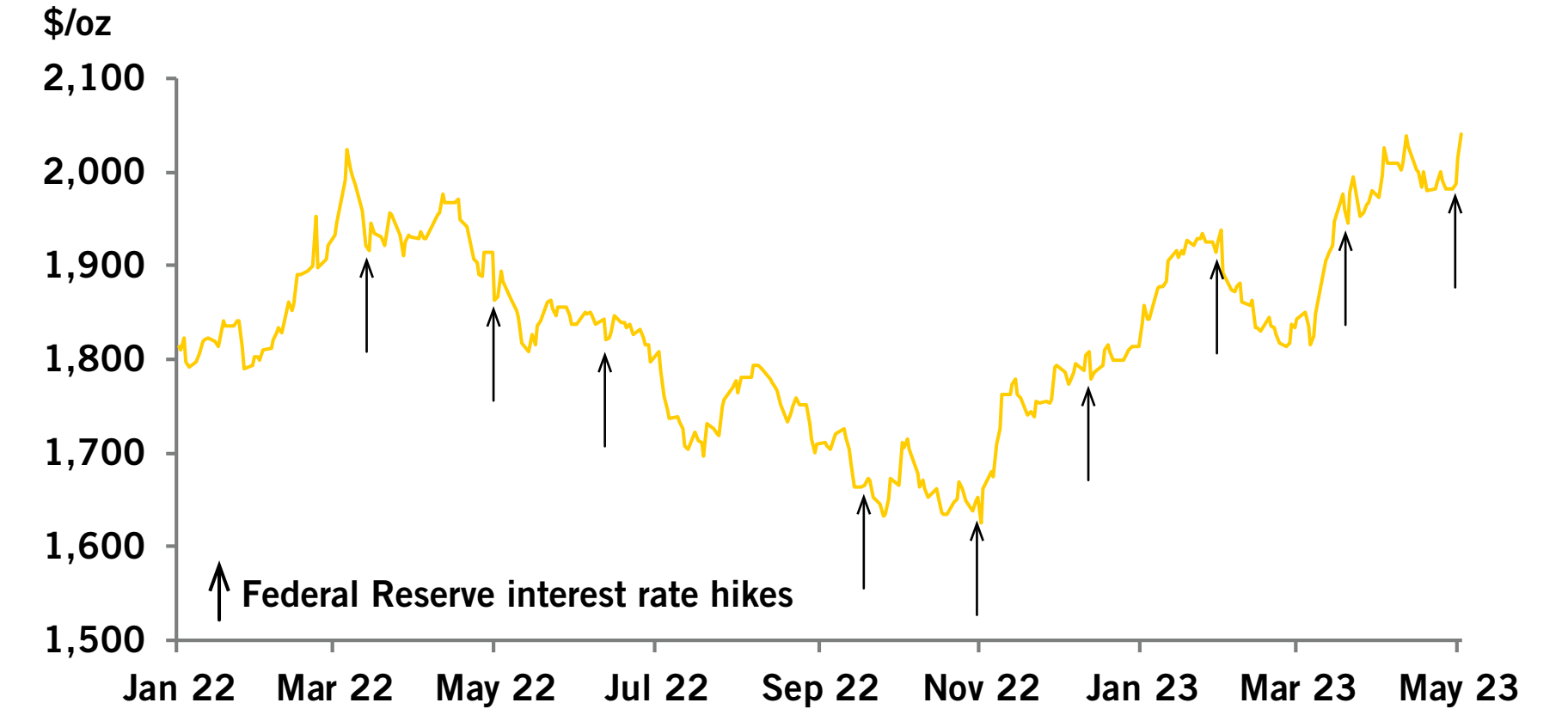
TRENDS AND INVESTMENTS

Platinum price vs net spec's position



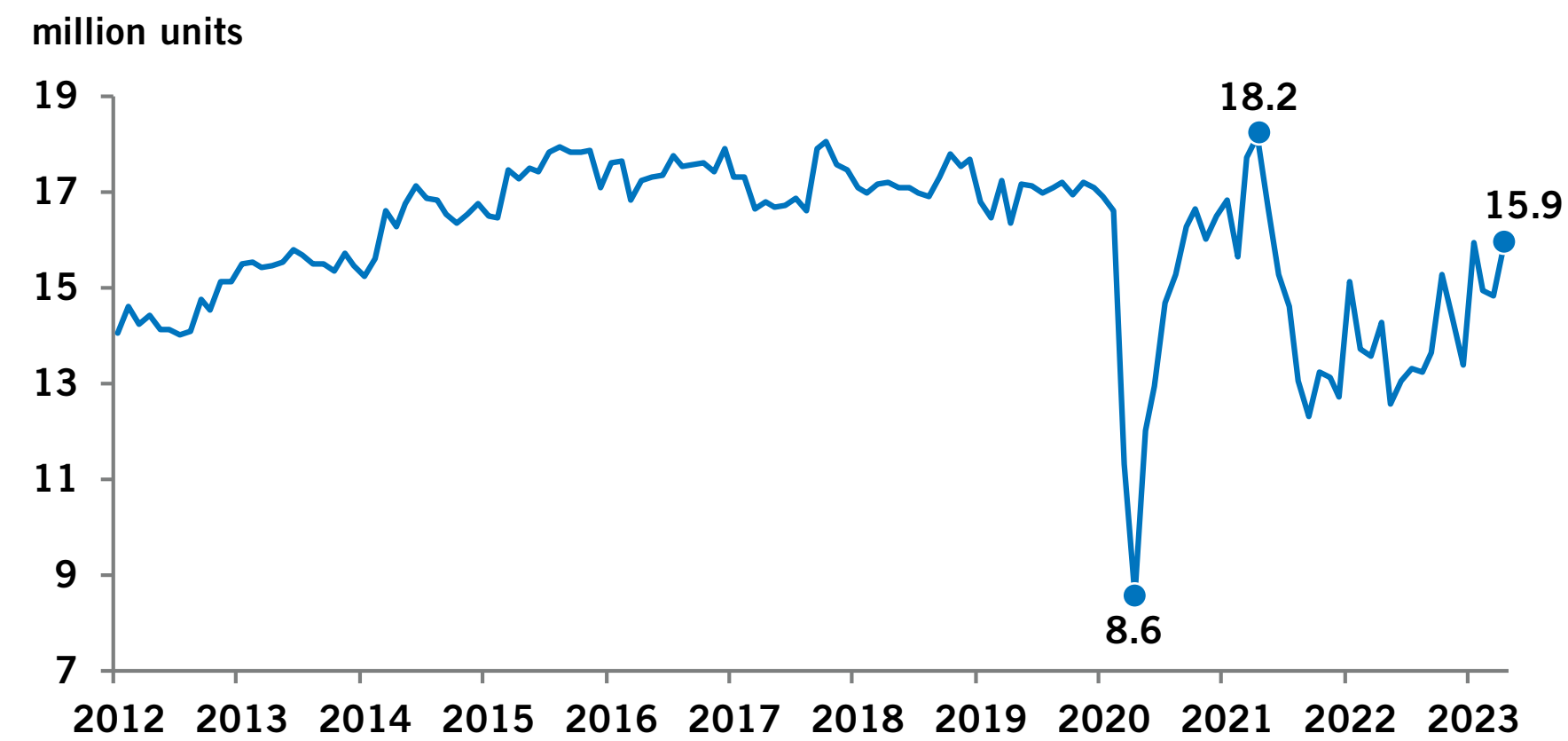
Source: SFA (Oxford), Bloomberg

Gold price



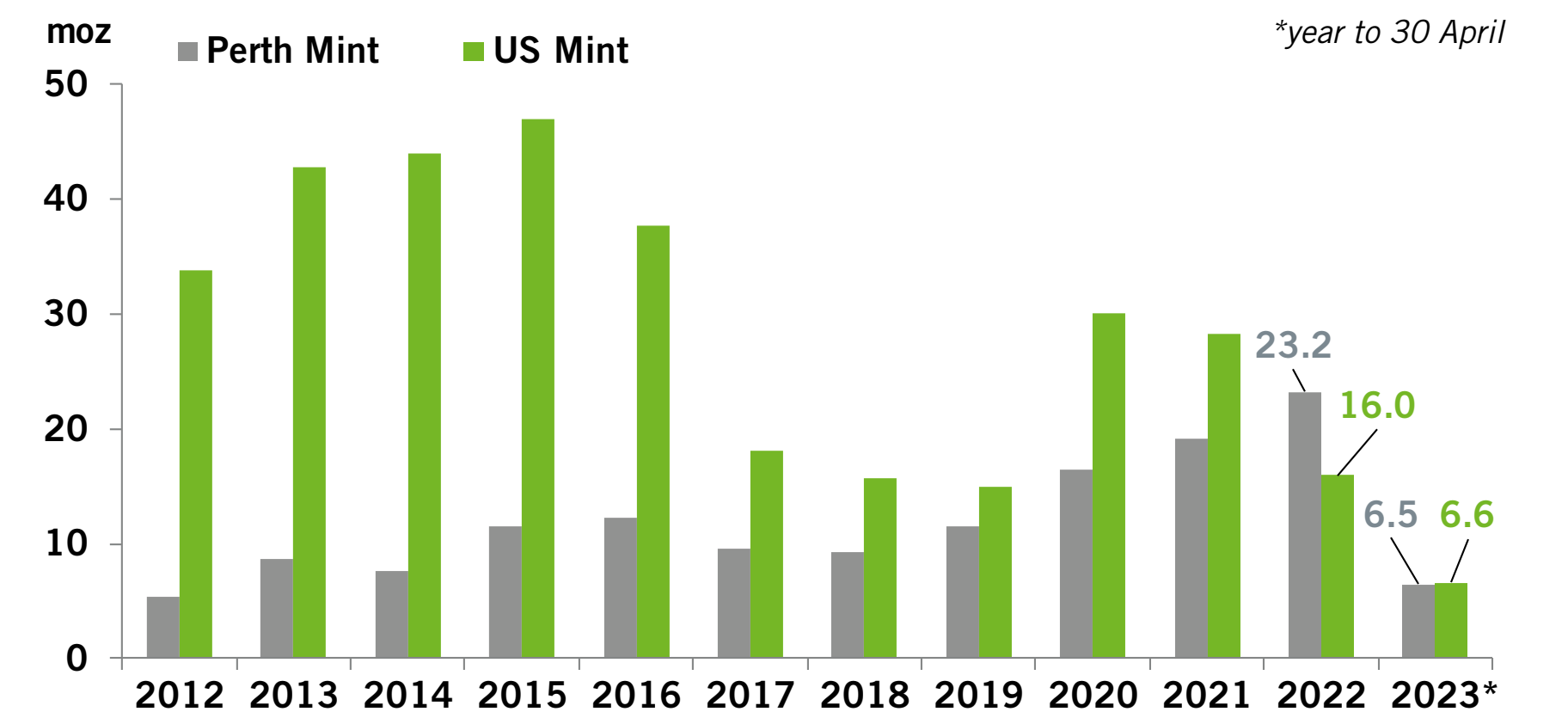
Source: SFA (Oxford), Bloomberg

US light vehicle sales, seasonally adjusted



Source: SFA (Oxford), BEA

Retail investor silver demand



Source: SFA (Oxford), US Mint, Perth Mint

PRECIOUS APPRAISAL

8th May 2023

- 01 MARKET SPOTLIGHT
- 02 GOLD
- 03 SILVER
- 04 PLATINUM
- 05 PALLADIUM
- 06 RHODIUM, RUTHENIUM, IRIIDIUM
- 07 TRENDS AND INVESTMENTS
- 08 **ABOUT HERAEUS**

ABOUT HERAEUS

Learn more about important trends in the precious metals markets on a weekly basis with our Heraeus Precious Appraisal. **Please subscribe: www.herae.us/trading-market-report.**

Heraeus Precious Metals

Europe, Middle East, Africa & other regions

Phone: +49 6181 35 2750
edelmetallhandel@heraeus.com

South East Asia

Phone: +852 2773 1733
tradinghk@heraeus.com

USA

Phone: +1 212 752 2180
tradingny@heraeus.com

China

Phone: +86 21 3357 5658
tradingsh@heraeus.com



The Heraeus Group is a broadly diversified and globally leading family-owned technology company, headquartered in Hanau, Germany. The company's roots go back to a family pharmacy started in 1660. Today, the Heraeus group includes businesses in the environmental, electronics, health and industrial applications sectors. Customers benefit from innovative technologies and solutions based on broad materials expertise and technological leadership.

Heraeus Precious Metals is globally leading in the precious metals industry. The company is part of the Heraeus Group and covers the value chain from trading to precious metals products to recycling. In addition to gold and silver, it also has extensive expertise in all platinum group metals.

The Heraeus Precious Appraisal is produced in collaboration with:

SFA (Oxford) Ltd

United Kingdom
Phone: +44 1865 784366
www.sfa-oxford.com
The Oxford Science Park,
Oxford, United Kingdom, OX4 4GA



Disclaimer

This document is being supplied to the recipient only, on the basis that the recipient is reasonably believed to be a professional market participant in the precious metals market. It is directed exclusively at entrepreneurs and especially not intended for the use of consumers.

The material contained in this document has no regard to the specific investment objectives, financial situation or particular need of any specific recipient or organisation. It is not provided as part of a contractual relationship. It is not and should not be construed as an offer to sell or the solicitation of an offer to purchase or subscribe for any investment or as advice on the merits of making any investment.

This report has been compiled using information obtained from sources that Heraeus and SFA (Oxford) Ltd ("SFA") believe to be reliable but which they have not independently verified. Further, the analysis and opinions set out in this document, including any forward-looking statements, constitute a judgment as of the date of the document and are subject to change without notice.

There is no assurance that any forward-looking statements will materialize. Therefore, neither SFA nor Heraeus warrants the accuracy and completeness of the data and analysis contained in this document.

Heraeus and SFA assume no liability for any losses or damages of whatsoever kind, resulting from whatever cause, through the use of or reliance on any information contained in this document. However, in so far as a liability claim exists under German law, Heraeus and SFA shall have unlimited liability for willful or grossly negligent breach of duty.

Unless expressly permitted by law, no part of this document may be reproduced or distributed in any manner without written permission of Heraeus. Heraeus specifically prohibits the redistribution of this document, via the internet or otherwise, to non-professional or private investors and neither Heraeus nor SFA accepts any liability whatsoever for the actions of third parties in reliance on this document.