

PRECIOUS APPRAISAL

MARKET SPOTLIGHT

Solar silver demand growth to moderate this year but still hit a new record

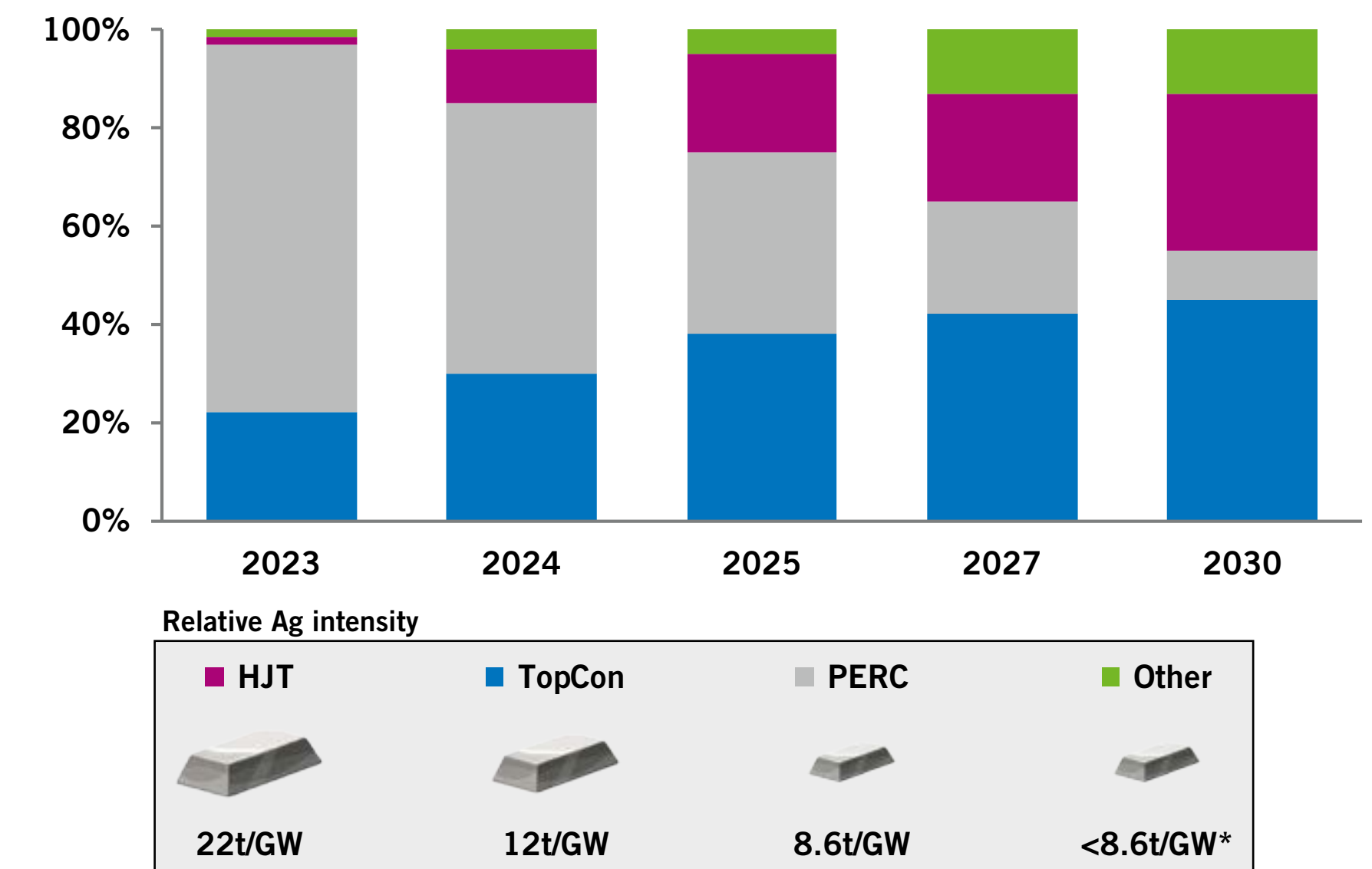
Silver's recent demand expansion comes from spectacular growth in solar installations. Global demand for silver used in photovoltaic (PV) cells is estimated to have reached a record 190 moz last year, up from 100 moz in 2020, and now represents ~30% of industrial silver demand. In 2024, solar silver demand could exceed 200 moz. This growth has been mostly driven by very rapid expansion in both PV manufacturing capacity and PV installations in China. China represents ~85% of global manufacturing capacity, and in 2023 installed nearly as much new solar domestically as the whole world did in 2022.

Power grids could be a bottleneck for new solar installations. This year, the rate of new installation growth in China is forecast to slow from 217 GW to ~190 GW (source: China Photovoltaic Industry Association (CPIA)). Development of solar manufacturing and demand has been much more rapid than upgrades to the electricity grid in China. New Chinese installations are split ~50:50 between industrial scale and residential/rooftop scale. Different grid connections are needed for each side. In some places, the ability to transmit and store renewable power lags behind new installations, which may begin to curb these new solar installations. Chinese solar power integration with the grid is far ahead of that in Europe and the US, therefore this could also become an issue elsewhere.

Idling some installed capacity could allow more installations and maintain silver demand growth. China maintains a floor on capacity utilisation of 95% for solar power stations. Where generation outstrips transmission capacity this cannot be maintained, thus possibly disincentivising new solar installations. A recent report suggests that the government may relax this limit, which should allow growth in both solar installations and silver demand to continue as additions can run at lower utilisation with the same scale and silver demand. Nevertheless, official forecasts for new Chinese installations this year tend towards slower growth.

Higher silver technology could offset demand losses from a slower growth rate. There is a major shift in the type of solar cells being produced. PERC-type cells made up 75% of all solar energy produced last year, but this year this proportion is forecast to fall to 55% (source: CPIA). This is due to a rapid expansion of TopCon-type production capacity. TopCon cells typically contain ~28% more silver per watt than PERC cells. Consequently, a possible slowdown in new installations is not expected to curb solar silver demand this year. Thanks to ongoing efforts to reduce silver usage, per-cell solar silver demand growth should lag behind growth in production and installations worldwide.

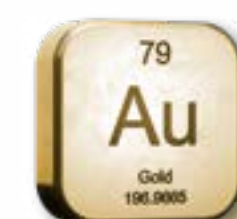
Chinese PV technology makeup forecast



Source: SFA (Oxford), CPIA, BNEF. *Estimate

PRECIOUS METALS REVIEW

Gold



	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	2,395	2.95%	2,432	12/04/2024	2,319	08/04/2024
€/oz	2,249	4.82%	2,287	12/04/2024	2,138	08/04/2024

Geopolitical tensions add fuel to gold's fire. After poking its head above \$2,400/oz on Friday, gold dropped slightly lower to \$2,350/oz by the end of trading – still a record close. The weekly gains continued despite the March US CPI data (3.5% year-on-year compared to February's 3.2%) exceeding expectations, and the market further priced down the Federal Reserve's rate cut to two times in 2024. Cautions against rapid rate cuts were felt across the Atlantic too. The European Central Bank also held its interest rate at 4% on Thursday and implied that rate cuts in June are possible only if inflation closes in on a 2% target in a "sustained manner". At the same time, gold ETFs continued to see net outflows while the dollar continued to strengthen, factors that typically weigh against the gold price. Geopolitical risk may support gold's rally as a safe-haven asset as tensions escalate in the Middle East.

Central bank purchases have been driven by China this year. The People's Bank of China has been an active buyer of gold for more than a year now, averaging 19.3 tonnes of gold purchases each month since November 2022. At last week's closing price, in total this gold carries a value of \$23.7 billion. Amongst all central banks, net gold purchases totaled 19 tonnes in February and have reached 64 tonnes in the first two months of the year, according to the latest data, which although positive is a 43% decline versus the same period in 2023. China has made up a third of all purchases year-to-date. Net additions to central bank gold reserves have been trending lower since the peak in June 2023. It is unlikely that there will be a wholesale reversal to net selling in the near term despite the record gold price, as central bank buying tends to be strategic and insensitive to the price.

PRECIOUS APPRAISAL

15th April 2024

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

PRECIOUS METALS REVIEW

Silver

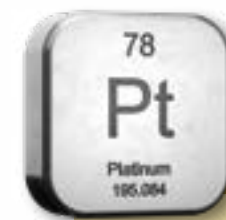


	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	28.97	5.82%	29.80	12/04/2024	27.24	08/04/2024
€/oz	27.21	7.77%	28.02	12/04/2024	25.11	08/04/2024

Silver rises to a new three-year high. Intra-week silver crossed the \$29/oz line, the highest level since 2021. Both industrial demand – mainly from solar PV manufacturing – and institutional investing appear to be supporting the rally. ETFs have witnessed net inflows of 11.06 moz in the last two weeks after several months of net outflows, increasing total holdings by 2% to 722.7 moz. As of Friday, silver closed 5.82% higher than in the previous week, leaving the gold:silver ratio below 83. At the RSI level of 76, silver is already overbought.

PRECIOUS METALS REVIEW

Platinum



	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	996	7.32%	1,008	12/04/2024	931	08/04/2024
€/oz	935	9.23%	947	12/04/2024	860	08/04/2024

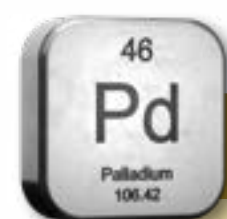
Investor interest is seeping back into platinum, though \$1,000/oz might be needed to trigger bigger flows. Platinum looks like a bargain against gold, having briefly set a new record discount on Monday last week. Platinum ETF holdings have changed little since mid-November, hovering around 3 moz, although they picked up by 50 koz last week to the highest level this year. Most of the inflows went into South African funds, with less interest from other regions. On the futures markets, non-commercial speculators hold a net neutral short-long position, having unwound just under 1 moz of longs in Q1'24. When the net specs' position reaches this level, it is near a turning point in the price. With the platinum market forecast to remain undersupplied this year and sentiment across precious and industrial metals improving, there could be some positive price risk in the short term, though platinum may have to break resistance at \$1,015/oz in order to attract investors back to ETFs.

The platinum price had a very strong start to last week, rising by 5.82% on Monday and Tuesday as the rand temporarily moved out of its weakening trend against the dollar. By the end of the week, the price had moved a little higher, finishing the week just below \$1,000/oz at \$996/oz.

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

PRECIOUS METALS REVIEW

Palladium



	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	1,072	7.30%	1,103	10/04/2024	1,003	08/04/2024
€/oz	1,006	9.25%	1,021	12/04/2024	927	08/04/2024

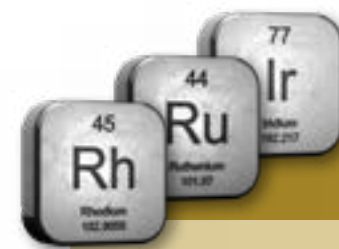
Financing cost headwinds may linger for longer in the second-largest automotive palladium market. US light-vehicle sales hit 15.8 million units on an annualised basis in Q1'24, approximately 2.4% higher year-on-year (source: FRED). Financing costs are a likely contribution to the short-term sluggishness in sales. Average interest rates for a 48-month car loan in the US are at a near 25-year high at just under 8%. Although the average light-vehicle sales price was 2.6% lower year-on-year in January, average monthly payments are still 50% higher than the amount paid in 2019. The Federal Reserve is unlikely to begin cutting interest rates until H2'24, therefore the headwind of lower affordability could continue to impact vehicle sales and add risk to the palladium autocatalyst demand forecast. With interest rates set to begin to fall later this year and into 2025, they should become less of an impediment to sales. The forecast for 2024 is to see more sales year-on-year, although even that will still be below the lower level of the pre-pandemic range, and EVs will capture a larger portion of the market. As a result, North American palladium autocatalyst demand is expected to remain stable, slipping by only 1% to 1.7 moz.

Palladium broke out early last week, in line with the other precious metals. However, it failed to hold above \$1,100/oz and began to trend back towards \$1,000/oz in the second half of the trading week.

- 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	\$5,275/oz	\$435/oz	\$5,300/oz
Previous Edition	\$5,275/oz	\$445/oz	\$5,350/oz

A new 2 GW PEM electrolyser factory has been launched in Australia. The facility, located in Queensland, is expected to be able to produce 2 GW of proton exchange membrane (PEM) electrolysers annually. This will help to meet the needs of Australia’s pipeline of ~95 GW of green hydrogen production projects (source: Rystad Energy). At the current average iridium loading of 400 kg/GW, the factory could consume as much as 26 koz p.a. of iridium if operating at full capacity. The amount of iridium used per GW of electrolysers produced in PEM electrolysers is dropping thanks to thrifting efforts. By the time the factory has ramped up to full capacity, it is likely that the volume of iridium required will be lower.

The ruthenium and iridium prices dropped by 2.3% and 0.9%, respectively, last week. Rhodium stayed firm at \$5,275/oz for another week.

PRECIOUS APPRAISAL

15th April 2024

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

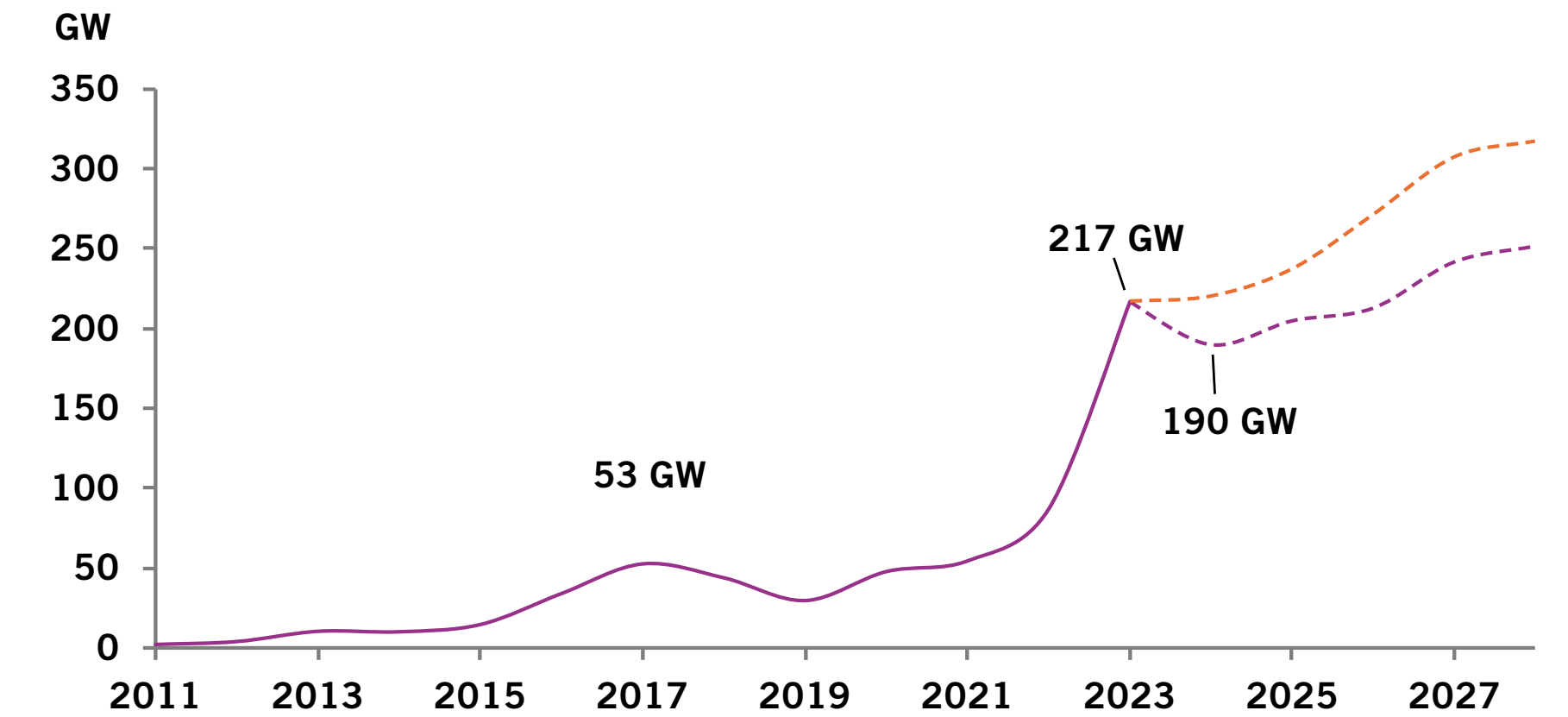
TRENDS AND INVESTMENTS

Gold price



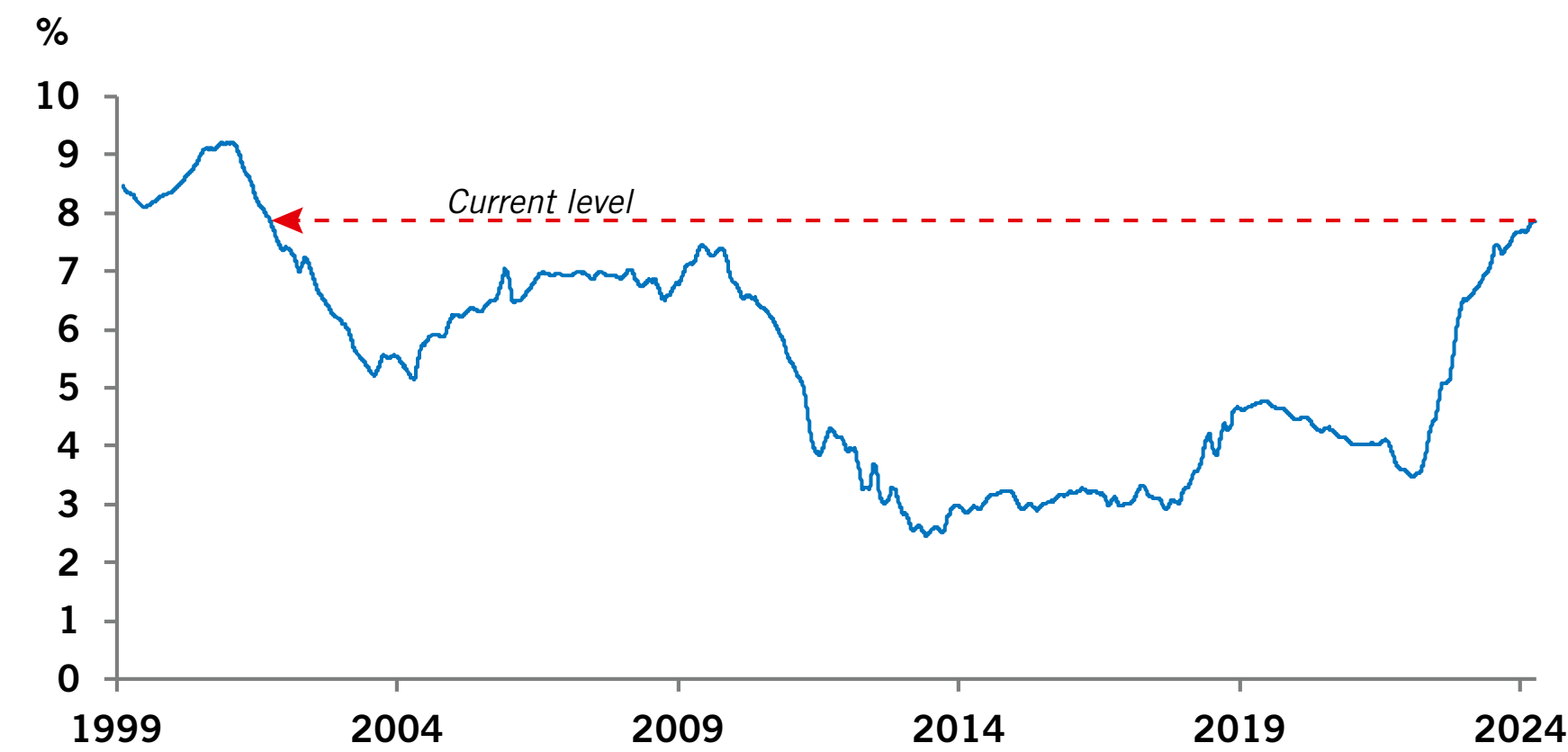
Source: SFA (Oxford), Bloomberg

China PV new installations forecast



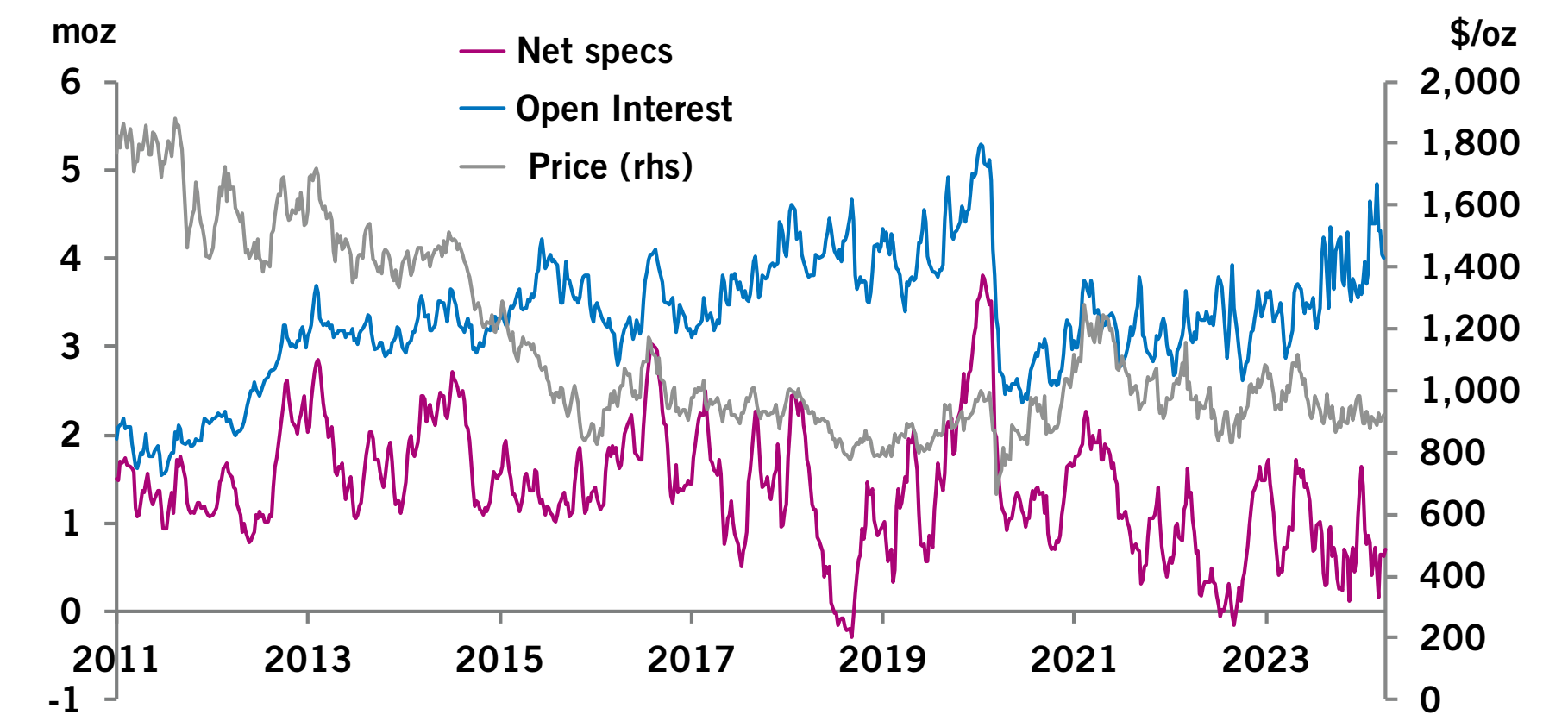
Source: SFA (Oxford), China Photovoltaic Industry Association

Avg. interest rate for new car 48 month loan, US



Source: SFA (Oxford), Bloomberg. Note: 30-day moving average

NYMEX platinum futures



Source: SFA (Oxford), Bloomberg

PRECIOUS APPRAISAL

15th April 2024

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

tradinghu@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, Heraeus bundles diverse activities in the Business Platforms Metals and Recycling, Health, Semiconductor and Electronics as well as Industrials. 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



consulting analysts in tomorrow's commodities and technologies

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.