

PRECIOUS APPRAISAL



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

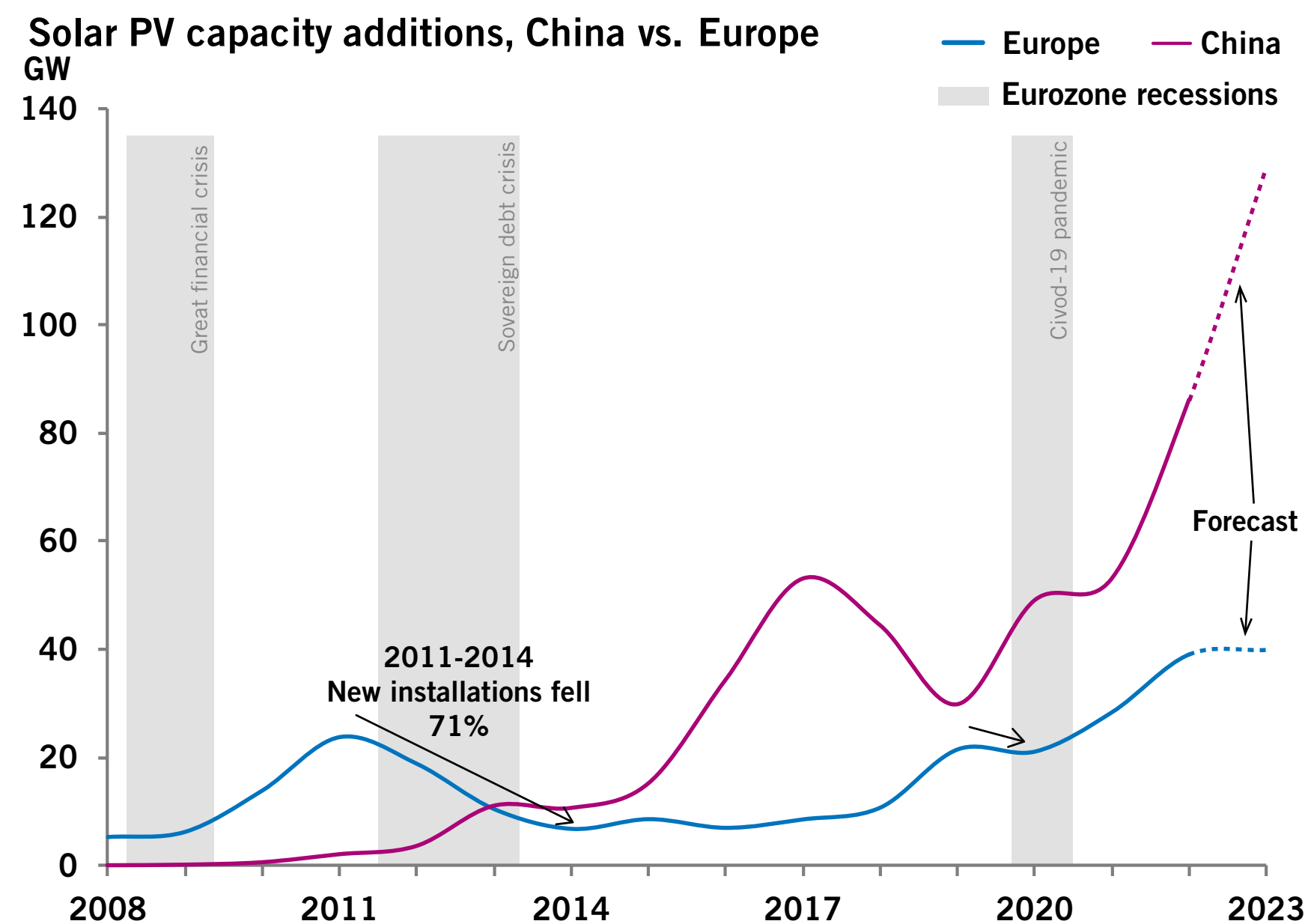
MARKET SPOTLIGHT

Silver solar demand could be clouded by recession in the EU

China’s photovoltaic installations are steaming ahead. Installations of solar photovoltaic (PV) systems in China have reached 129 GW in the first nine months of this year, exceeding the forecast of 95-120 GW made at the start of the year by the China Photovoltaic Industry Association. This has pushed cumulative domestic installations to ~525 GW. Module prices have been in free-fall this year owing to large capacity expansions for polysilicon production in China. By year-end, China’s installed capacity is forecast to reach 569 GW. Global demand for silver is estimated to top 160 moz this year (source: The Silver Institute), though if China greatly exceeds the installation forecast, global silver PV demand may be higher. China is by far the largest producer of PV cells, and the rapid growth in PV silver demand indicates PV production outpacing thrifiting of silver in the manufacturing process.

Europe’s installations are growing but so are stockpiles of unused panels. Installed capacity grew by 20% in Europe last year to 234 GW. Germany accounted for 28% of the installed capacity in 2022 and has the fourth-largest solar capacity of any country. Ambitious decarbonisation targets were catalysed by the invasion of Ukraine and are fuelling a rapid transition to renewables. Counter to this are reports that unsold stocks of solar panels are accumulating in Europe as demand appears to be outstripped by supply.

China and EU installations are up despite weakness in their economies. Europe’s manufacturing index has been in contraction for 16 months now and is still trending lower. ECB staff members forecast a sluggish outlook for Eurozone GDP growth in 2024 of +1%, though this is slightly higher than +0.8% for this year. The risk to GDP growth is skewed to the downside, however. The Chinese economy has also been underperforming this year, dragged down by the construction and real-estate sector.



Source: SFA (Oxford), Energy Institute Statistical Review of World Energy 2023, IEA

EU solar demand may not be resilient to a recession. The probability of a Eurozone recession in 2024 and the elevated cost of capital have added execution risk to large solar projects, and could discourage household installations as upfront costs are significantly higher than operating costs. The sovereign debt crisis (2011-2013) and pandemic (2020) recessions both accompanied a fall in the rate of new EU solar capacity growth. If a recession materialises in 2024 for the Eurozone, there may be a drop in the number of new installations, and consequently silver PV demand in Europe. This effect could be partially offset by the EU front-loading plans for new installations through the REPowerEU programme between now and 2025, though this could be restricted by the appetite for national budget deficits of EU member nations in a recession.

The silver price normally follows gold’s direction in recessions, though traders usually favour gold when balancing safe-haven gold and more industrial silver in periods of lower growth. **As a result, the silver price is expected to underperform gold.**

PRECIOUS APPRAISAL

30th October 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

Gold



	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	1,980	-0.58%	1,993	26/10/2023	1,954	24/10/2023
€/oz	1,870	-0.59%	1,890	26/10/2023	1,836	24/10/2023

Chinese gold demand is up 7.3% so far this year despite the high price, as total demand in the first three quarters of the year was 835 tonnes. Chinese consumers bought 552 tonnes of gold jewellery in the first nine months of the year (source: China Gold Association), a 5.7% increase. Bar and coin purchases jumped 16% to 222 tonnes, whereas industrial demand fell 5.5% to 61 tonnes.

In the fourth quarter, jewellery demand is likely to have started strongly. The National Day holiday in China coincided with a sharp drop in the gold price at the start of October so sales may well have been good, although the subsequent rebound in price would have been less helpful.

The gold price has been consolidating below \$2,000/oz after its sharp rally. Gold is overbought and the price has reached an area of resistance around \$1,980/oz, so further consolidation is possible in the near term. Safe-haven buying has helped the gold price to hold up despite the scale of the ongoing rally in bond yields. If yields start to drop, that could also help to lift the price.

PRECIOUS APPRAISAL

30th October 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

Silver



	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	22.69	-3.74%	23.29	23/10/2023	22.44	26/10/2023
€/oz	21.42	-3.72%	21.99	23/10/2023	21.31	26/10/2023

Fresnillo has completed the ramp-up of the Juanicipio mine in Mexico, boosting its annual silver supply as the mine reached its nameplate ore milling capacity of 4 ktpd. The mine had been intended to enter production earlier but delays in electricity supply connection led to a postponement. The mine produced 9.3 moz of silver in 2022, and year-to-date output is ~12.3 moz. By year-end, the mine is on track to yield more than 16 moz of silver. Having produced 42.1 moz of silver year-to-date (+2.2% year-on-year), Fresnillo expects output of 57-64 moz this year from all its operations, up from 51 moz last year. Mexico is the largest silver-producing nation and produced 199 moz in 2022, of which Fresnillo contributes ~25%.

The silver price slipped last week, underperforming gold. By Friday's close it was 3.74% lower week-on-week.

PRECIOUS APPRAISAL

30th October 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

Platinum

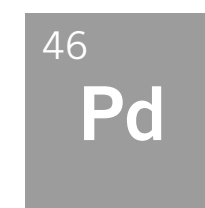
⁷⁸ Pt	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	902	-0.20%	914	26/10/2023	882	25/10/2023
€/oz	851	-0.18%	867	26/10/2023	833	24/10/2023

Anglo American Platinum's refined platinum production has fallen 15% year-on-year to 1.18 moz year-to-date. Third-quarter production totalled 429 koz of refined platinum versus 490 koz in Q2'23. The decline in refined supply was attributed to unplanned water outages at the company's PGM refinery. Improved electricity grid stability meant that only minimal production (~2.4 koz of platinum) was deferred as a result of load-shedding. Output is usually ramped up in Q4 as producers push to process metal before the Christmas holidays, and the company remains on track to achieve production guidance of ~1.7-1.9 moz of refined platinum this year. South African platinum supply is forecast to expand by 3% this year to 4.2 moz, approximately 75% of global primary supply. However, that is reliant on processing of stockpiled material and is therefore at risk if there is further significant load-shedding.

The platinum slipped slightly lower last week to \$902/oz.

PRECIOUS METALS REVIEW

Palladium



	CLOSE	WEEKLY CHANGE	HIGH	DATE	LOW	DATE
\$/oz	1,119	1.15%	1,147	27/10/2023	1,088	23/10/2023
€/oz	1,056	1.13%	1,085	27/10/2023	1,027	23/10/2023

Automakers' results put a question mark over BEV roadmap. General Motors scrapped its 100,000 BEV production guidance for H2'23 last week, and no longer anticipates achieving its goal of reaching 400,000 BEV units by the middle of next year. This is not simply a result of foregone production due to labour union strikes but rather an effort to better balance BEV production to demand, and may reflect a broader softening in BEV demand. This is despite US BEV sales reaching record levels in Q3. BEV sales reached 873,000 units by the end of September, of which GM's brands had a 6.4% market share (source: Kelley Blue Book), while Tesla sold nearly 500,000 units. GM's partnership with Honda to develop BEVs with a price tag below \$30,000 has also been scrapped in the last week. This is a setback for the drive towards mass sales of BEVs which will require cheaper vehicles. In the near term, global sales growth of BEVs is occurring while overall vehicle sales are also rising, so the impact on palladium demand is limited.

Russian palladium supply is expected to dip this year owing to processing plant maintenance. Nornickel, the world's largest palladium producer, at 40% of global supply, maintained stable palladium production at 2.15 moz in the first nine months of the year. However, production fell 13% quarter-on-quarter in Q3'23 to 663 koz. The company has scheduled smelter maintenance for the fourth quarter which will impact refined output. Nornickel has maintained its production guidance for 2023 at 2,407-2,562 koz after reaching 2.8 moz last year. The top end of the guidance would represent an 8% decline in palladium output year-on-year. It is possible that actual production will exceed this level though, as Nornickel's supply has often surpassed its production guidance.

The palladium price rebounded somewhat last week but after providing support earlier in the year, now that \$1,200/oz has been broken it could prove to be a resistance level.

PRECIOUS APPRAISAL

30th October 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	\$4,650/oz	\$475/oz	\$5,450/oz
Previous Week	\$6,050/oz	\$475/oz	\$5,450/oz

Fuel cell mobility has yet to reach a critical mass. Oil company Shell has announced it is reorganising its Low-Carbon Solutions division and is scaling back its hydrogen-related business. It is moving away from light passenger vehicles to focus on heavy-duty vehicles and industry. Shell was an early supporter of fuel cell cars but has also closed its hydrogen fuelling stations in the UK where there are very few hydrogen-powered vehicles. Only around 15,000 fuel cell cars were sold globally in 2022, of which about two-thirds were in South Korea. Hydrogen-powered commercial vehicles are generally seen as a better fit for fuel cells than light vehicles where battery power is already helping to reduce emissions. Demand for ruthenium in fuel cells is rising from a relatively small base.

Rhodium's rally proved to be short-lived and the price is back down at \$4,650/oz, a level at which it started October. Meanwhile, the iridium and ruthenium prices held steady last week.

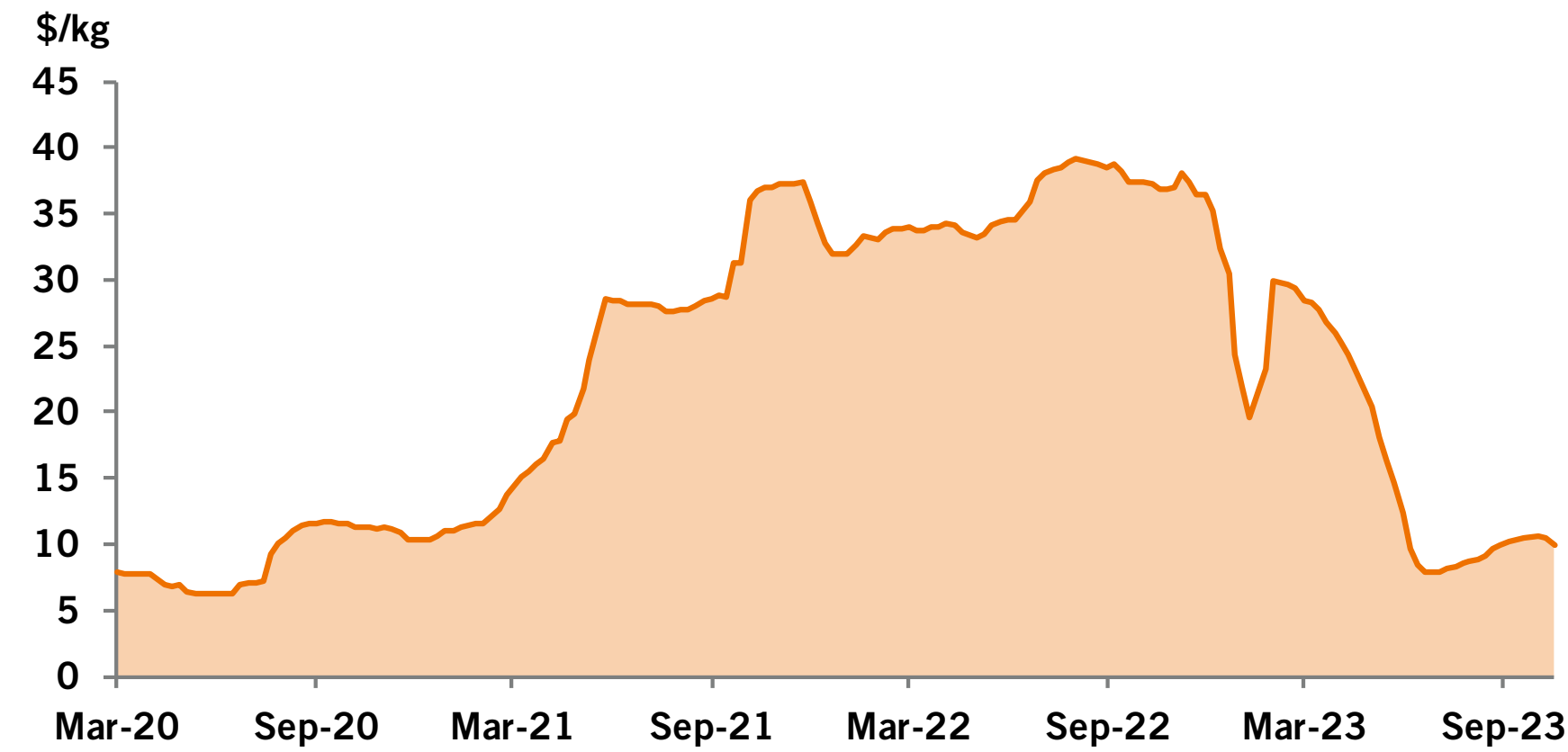
PRECIOUS APPRAISAL

30th October 2023

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

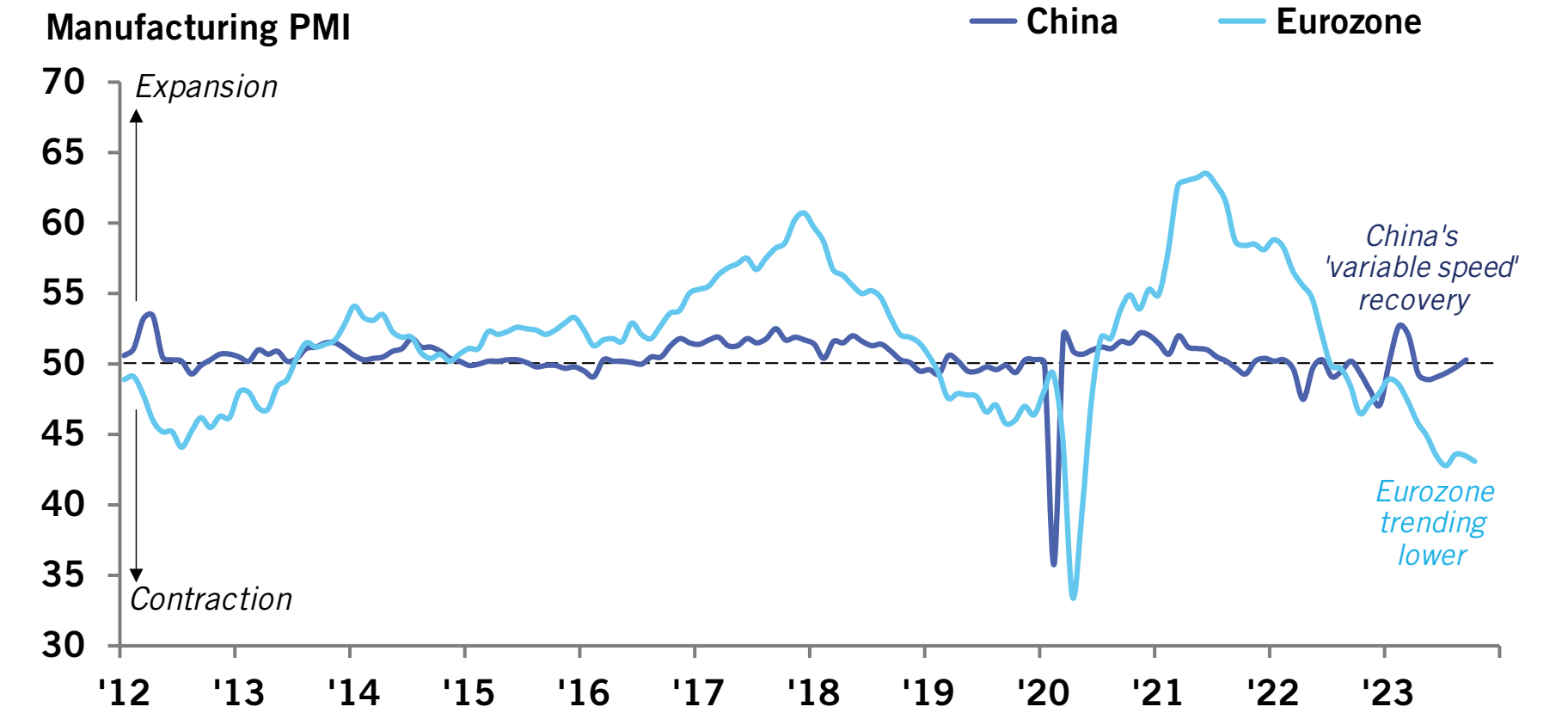
TRENDS AND INVESTMENTS

China polysilicon price



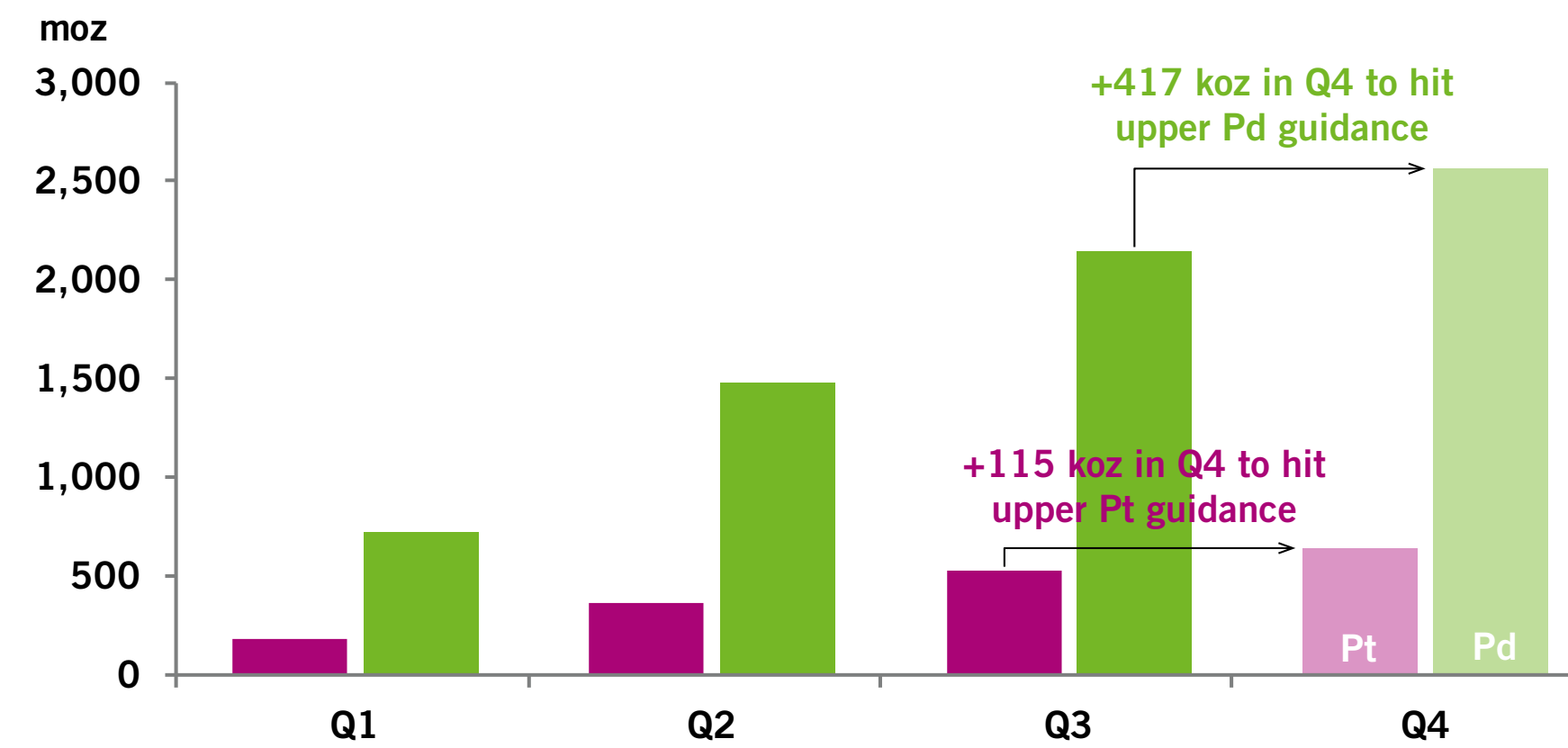
Source: SFA (Oxford), Bloomberg

China and Eurozone manufacturing PMIs



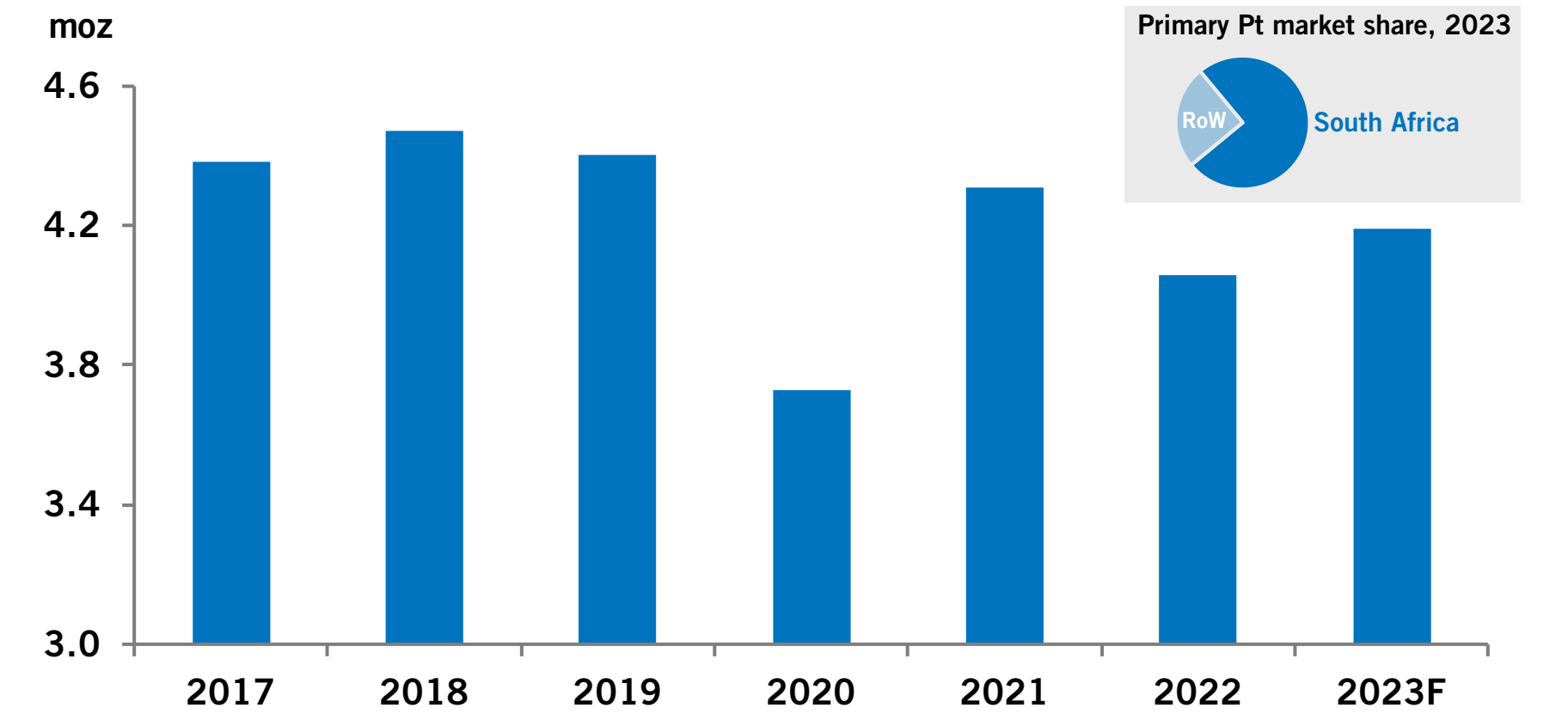
Source: SFA (Oxford), Bloomberg

Nornickel 2023 cumulative production & guidance



Source: SFA (Oxford), Nornickel

South Africa platinum production



Source: SFA (Oxford)

PRECIOUS APPRAISAL

30th October 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, 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.