

HERAEUS PRECIOUS APPRAISAL

Heraeus

Ed. 22
23rd July 2018



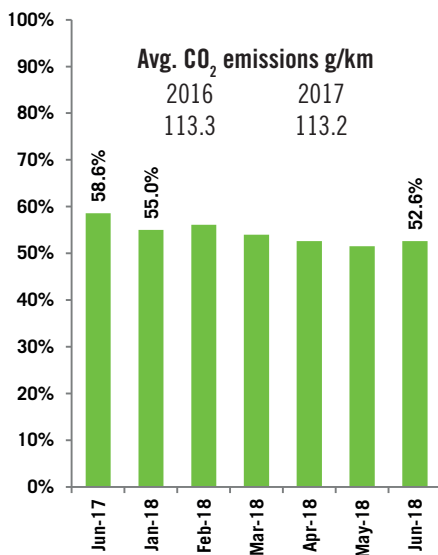
MARKET SPOTLIGHT

Platinum demand falling, CO₂ emissions rising

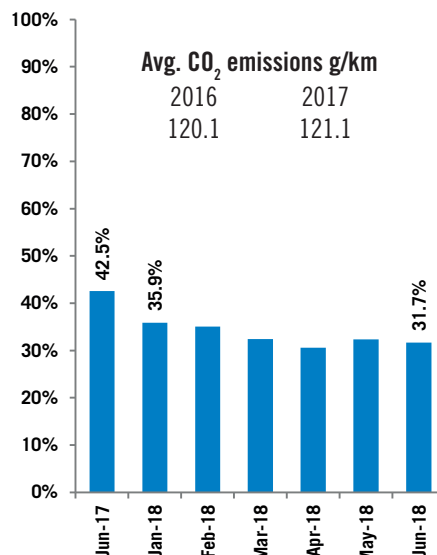
Passenger car sales in Western Europe rose by 4.6% year-on-year in June to 1.48 million, lifted by stronger gasoline vehicle sales.

The declining sales of diesel cars in 2017 led to an increase in the average CO₂ emissions of new cars (source: European Environment Agency), since diesels have lower CO₂ emissions compared to a similar gasoline car. With diesel sales falling further in 2018, the situation has not improved. The challenge is how manufacturers can meet the EU emissions target of 95g CO₂/km in 2021 and avoid large fines. Hybrids and electric vehicles (EVs) are too small a part of the market to have much impact. Increasing sales of EVs will require a significant investment in subsidies and charging infrastructure. Diesel has had a bad press over NO_x emissions, which can be dealt with, and **if CO₂ targets are to be met diesel will be needed to play a larger part in the vehicle mix.**

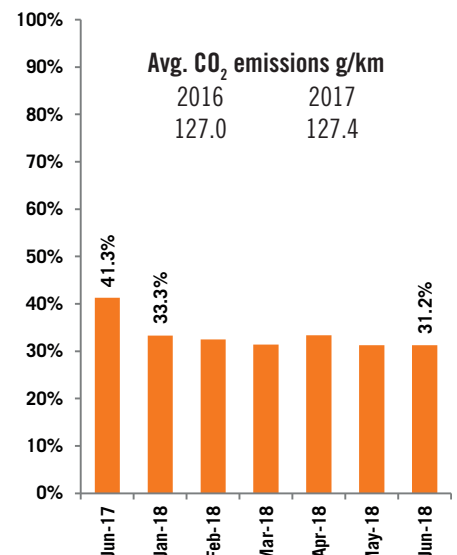
Italy diesel market share



UK diesel market share



Germany diesel market share



Source: SFA (Oxford), EEA, ANFIA, SMMT, KBA

Diesel market shares are down significantly in the first half of 2018 compared to 2017, by over 10 percentage points in the UK and Germany. However, the rate of decline is expected to slow and in June the market share of diesel cars in Germany, the UK, France, Italy and Spain, the five largest European markets, was fairly stable compared to May. Italy had the highest diesel market share at 52.6%, an improvement on May, but down from 58.6% in June 2017. Germany had the lowest diesel share at 31.2% in June, down from 41.3% a year ago. However, there are some tentative signs that the low point may have been reached in Germany with VW's new orders for diesels reportedly picking up in the second quarter.

The growth in gasoline vehicle sales supports palladium and rhodium demand, while the contraction in diesel sales is a drag on platinum demand which is projected to fall by 150 koz for Western European cars this year.



PRECIOUS METALS REVIEW

79 Au Gold

	Close	Weekly change	High	Date	Low	Date
\$/oz	1,229	-1.05%	1,245	17/07/2018	1,212	19/07/2018
€/oz	1,050	-1.40%	1,064	16/07/2018	1,045	20/07/2018

The dollar continued its strong run for most of last week (DXY +0.5% Mon-Thu), pushing down gold and the precious metals, as Jerome Powell gave a positive view of the US economy. In the biannual testimony of the Federal Reserve Chair to the US government, Powell said, "The job market will remain strong and inflation will stay near 2 percent over the next several years". Additionally, he stated that "the best way forward is to keep gradually raising the federal funds rate". This increases expectations that US Treasury yields will continue to rise and that the dollar will remain strong. Powell also took an optimistic tone on the trade disputes and was of the opinion that the overall downside risks to the economy were matched by the upside risks. If the dollar continues to stay strong then gold will continue to suffer. However, towards the end of the week President Trump directly

criticised the Federal Reserve for raising rates, said the dollar was too strong, and indicated he was willing to put tariffs on all Chinese imports even if it resulted in equities entering a bear market. The dollar index weakened 0.6% on Friday and precious metals recovered.

The wreckage of a Russian warship, the Dmitrii Donskoi, which was carrying 200 tonnes (6.4 moz) of gold coins and 5,500 boxes of bars, has been discovered off the coast of a South Korean island. The gold coins are worth about \$7 billion at today's prices. The ship was intentionally sunk in 1905 during the Russo-Japanese war in order to prevent the cargo from falling into Japanese hands. Half of the gold found on board will be returned to Russia and another portion will be dedicated to development projects in Korea.

47 Ag Silver

	Close	Weekly change	High	Date	Low	Date
\$/oz	15.49	-2.26%	15.87	17/07/2018	15.18	19/07/2018
€/oz	13.23	-2.59%	13.55	16/07/2018	13.11	19/07/2018

The broad-based retreat of both precious and base metals could put pressure on production of silver, as a large proportion of supply comes from the by-products of base metals mining. Lead and zinc mining accounts for 36% of total silver mine supply and copper constitutes another 23%, according to the World Silver Survey 2018. Copper, zinc and lead three-month forward prices have declined by 16%, 23% and 15%, respectively, since the beginning of the year. Zinc has performed particularly poorly recently: the forward price has dropped 20% in the last six weeks. This is a result of new zinc production

being introduced in response to the price rally in 2016 and 2017 while the demand side has dropped due to trade tensions. Zinc and copper prices are still elevated at \$2,545/tonne and \$6,065/tonne respectively, and would need to fall further for mine closures. In 2015 Glencore announced plans for a reduction in zinc and copper production when the prices were near \$1,700/tonne and \$5,100/tonne respectively. If this bear market continues there could be a risk to silver supply, which should be supportive to the silver price.

78 Pt Platinum

	Close	Weekly change	High	Date	Low	Date
\$/oz	830	0.32%	833	16/07/2018	793	19/07/2018
€/oz	709	-0.01%	712	16/07/2018	686	19/07/2018

The platinum price reach a 10 year low last Thursday as it temporarily broke below support before Trump's comments drove the price back up on Friday. Additionally, South African PGM miners face additional pressure as the platinum price in rand reached an eight-year low, dipping below ZAR11,000/oz. If the platinum price falls below support again it is more likely to continue lower.

\$200 million is to be invested in a fund focused on increasing PGM demand. The fund, AP Ventures, will

receive \$100 million from each of Anglo American Platinum (AAP) and the South African Government Employees Pension Fund. Their strategy is to invest in companies developing new technologies that utilise the unique properties of PGMs. This has led them to sectors such as fuel cells, the hydrogen economy, electronics, and filtration. The investment is being made to improve the long-term sustainability of the PGM mining industry which is important to both AAP and the South African economy.



PRECIOUS METALS REVIEW

⁴⁶ Pd **Palladium**

	Close	Weekly change	High	Date	Low	Date
\$/oz	898	-4.48%	944	16/07/2018	861	19/07/2018
€/oz	766	-4.88%	808	16/07/2018	743	19/07/2018

The first streaming agreement in the PGM sector has been agreed between Sibanye-Stillwater and Wheaton Precious Metals. Wheaton will pay \$500 million up-front and receive a heavy discount on all the gold and a portion of the palladium produced by the US-based Stillwater and East Boulder mines for the remainder of their life. The agreement helps Sibanye-Stillwater to deleverage and improve its financial position. This potentially increases the options available to Sibanye-Stillwater as it pursues the takeover of Lonmin. Sibanye-Stillwater's palladium production from the US is expected to ramp up to 660 koz per year by 2022, from 423 koz estimated in 2018, as the Blitz Project reaches steady-state production. Current guidance suggests Sibanye-Stillwater will produce approximately 800 koz of palladium in 2018, 11% of anticipated global supply.

Palladium lost 3.9% in one day last Thursday as it reached a 12-month low of \$861/oz. However, it recovered on Friday with the other precious metals but underperformed platinum to finish the week close to the \$900/oz level.

The saga of US tariffs continues as European Commission President Jean-Claude Juncker is to meet with Donald Trump this week in an effort to avert tariffs on European cars. Expectations are not high as previous attempts have been fruitless and there are limited options available if the EU is to remain compliant with WTO rules.

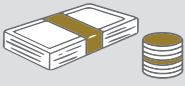
⁴⁵ Rh ⁴⁴ Ru ⁷⁷ Ir **Rhodium, Ruthenium, Iridium**

	Rhodium	Ruthenium	Iridium
Reporting week	\$2,325/oz	\$270/oz	\$1,415/oz
Previous week	\$2,265/oz	\$270/oz	\$1,415/oz

Western Digital has announced it will close one of its hard-disk drive (HDD) factories in response to decreasing hard-drive demand. Ruthenium is used in hard drives but demand for the metal from this sector has been eroded in recent years as both sales figures and loadings have declined. The factory, based in Malaysia, will be repurposed for solid-state drive production by the end of next year as the newer technology becomes increasingly favoured by consumers, supplanting HDDs. Western Digital was estimated as having a 40% market share of the HDD market in 2017 by Coughlin Associates. HDD production is now only a small part of global ruthenium demand and other demand sectors remain robust and continue to support the price.

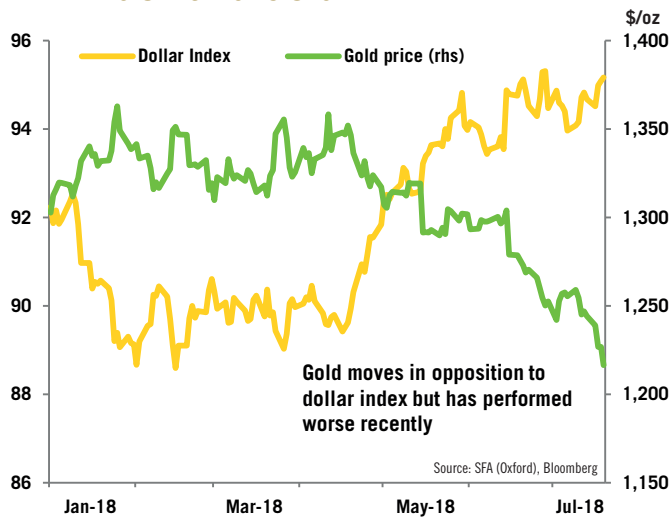
A process for using ruthenium as wires in semiconductor chips at a 5 nanometre (nm) scale has been demonstrated by Imec, a Belgium-based R&D company. Manufacturers of computer chips are constantly trying to reduce the size of the components but are approaching a point at which copper is no longer a suitable material for the interconnecting wires. The current technology in graphics cards is based on a 14 nm scale with 7 nm chips coming to market in 2019, so widespread use of technology for the production of chips of <5 nm is still some years away.

The rhodium price increased by \$60/oz to \$2,325/oz last week. Historically the metal has largely moved in the same direction as platinum and palladium, but in 2018 it has decoupled and moved in the opposite direction.

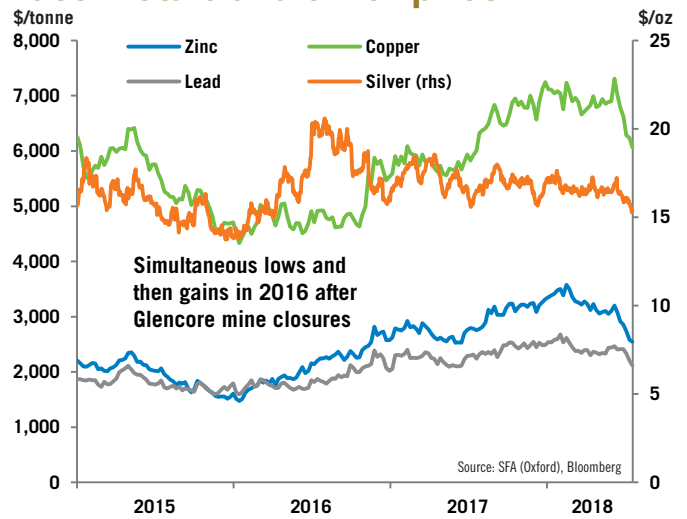


TRENDS AND INVESTMENTS

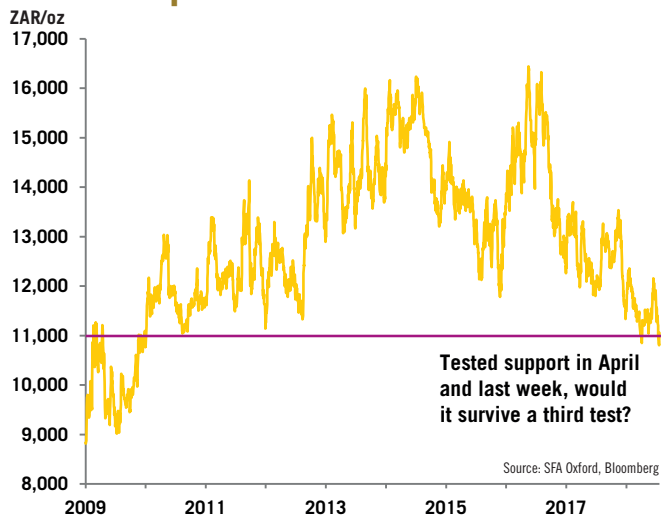
DXY Index and Gold



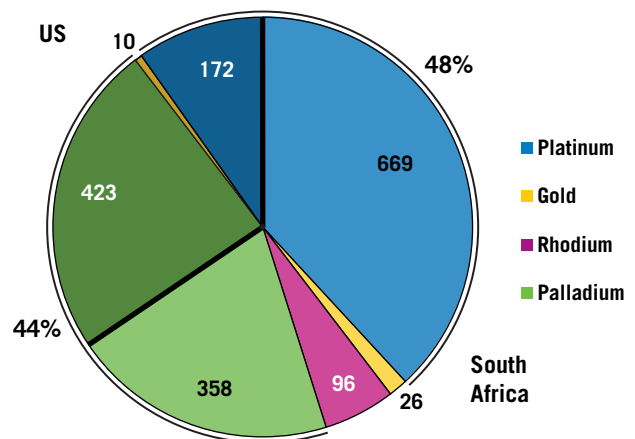
Base metals and silver price



Platinum price in rand



Sibanye-Stillwater PGM production



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

www.herae.us/trading-market-report

United States of America
Phone: +1 212 752 2180
tradingny@heraeus.com

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

The HERAEUS PRECIOUS APPRAISAL produced in collaboration with:

SFA (Oxford) Ltd
United Kingdom
Phone: +44 1865 784374
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. Prices quoted are interbank (offer) prices for gold, silver, platinum and palladium. Rhodium, ruthenium and iridium quotes reflect the Heraeus offer price at the time of writing.