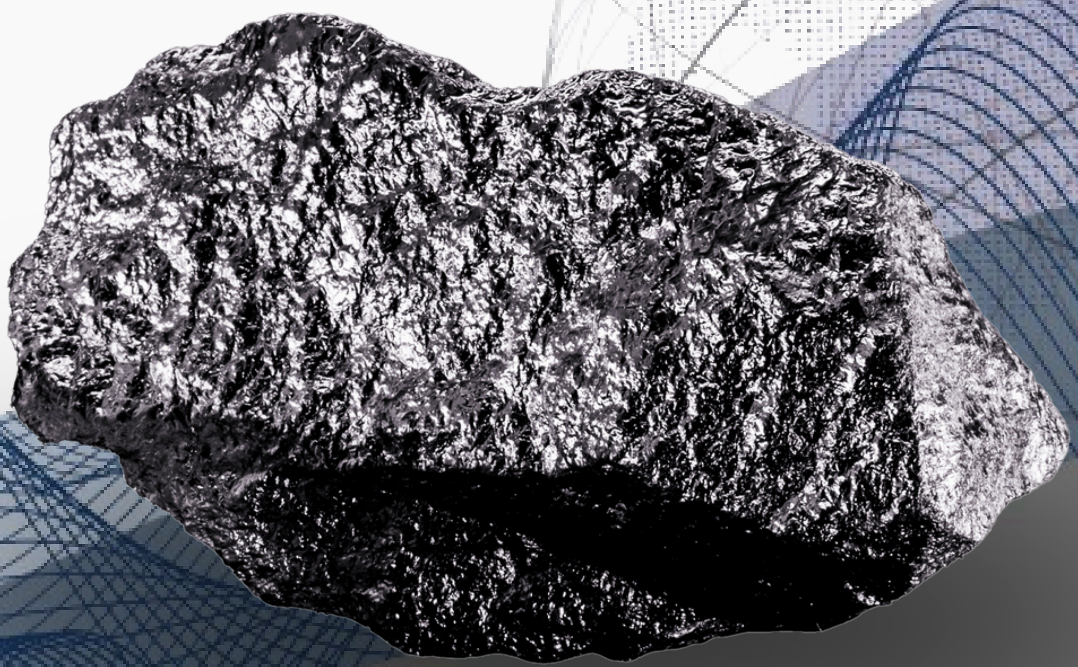
PGM Fact Sheet Rhodium

45

Rh

Rhodium



Supply & Demand

Applications

Trends

Geology

May 2026

www.ipa-news.com

PGM FACTSHEETS 2026 - RHODIUM

Written by SFA (Oxford)

March 19, 2026

DISCLAIMER

This document was researched and authored by SFA (Oxford) Limited ("SFA (Oxford)"), an independent consultancy, on behalf of the International Platinum Group Metals Association ("IPA"). The views, analysis, and conclusions expressed herein are those of SFA (Oxford) and do not necessarily represent the official positions or policies of the IPA or any of its members.

The information, data, analysis, and commentary contained herein are provided for general informational and educational purposes only and do not constitute or should be relied upon as legal, financial, investment, or commercial advice, or else. Any information, market data, statistics, or forecasts, included in this document are derived only from publicly available sources, independent third-party research, and/or aggregated historical market data compiled independently by SFA (Oxford) from publicly available sources.

No Warranty: While reasonable care has been taken in the preparation of this document, neither SFA (Oxford) nor the IPA makes any representation or warranty, express or implied, as to the accuracy, completeness, or fitness for purpose of the information contained herein. Neither SFA (Oxford) nor the IPA assumes any liability for any loss or damage of whatsoever nature arising from reliance on this document or the use of the information contained therein.

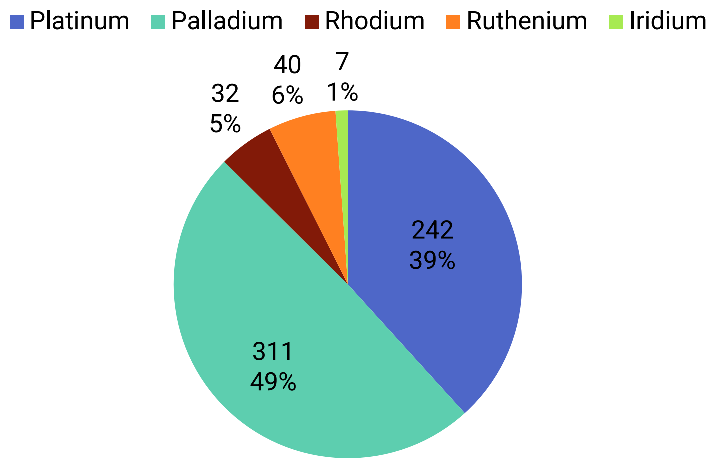
OVERVIEW

Platinum group metals (PGMs) – platinum (Pt), palladium (Pd), iridium (Ir), rhodium (Rh), ruthenium (Ru) and osmium (Os) – k share similar chemical characteristics and are considered precious metals like gold and silver yet are equally widely used and essential for many industrial applications. Their unique properties make them fundamental components in a diverse range of technologies.

PGMs' unique properties enable a wide range of technologies, from long-established chemical processes that make familiar products, through the autocatalysts (catalytic converters) in every gasoline/diesel vehicle tailpipe, which have dramatically improved urban air quality over the past decades, to emerging end uses in the hydrogen economy and other technologies towards net zero. European companies continue to play a leading role in operating processes based on PGMs, with manufacturing plants in Europe and around the globe. These companies, along with an innovative set of Europe-based start-ups and spin-offs, often using computational techniques, are developing new catalysts and novel materials for low-carbon applications.

The current demand split among the five main metals is shown below; palladium accounts for nearly half of demand, followed by platinum at 40%. Together, these two metals comprise almost 90% of demand by mass of metal. Rhodium comprises just 5% of demand.

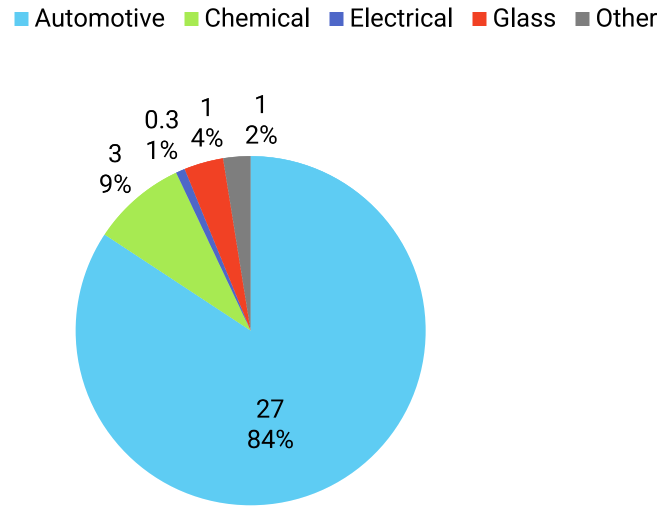
Global PGM demand by metal: 2025
tonnes



Source: Johnson Matthey (January 2026); demand excluding closed loop recycling and reuse

All PGMs, typically in combination with one another or with other metals, can act as highly efficient catalysts, which are exploited in a wide range of applications, including automotive catalysts for emissions control, chemical and petroleum processing and many large-volume industrial reactions. Their catalytic use in automotive exhaust after-treatment alone has enabled very large reductions in pollutants such as carbon monoxide, hydrocarbons and oxides of nitrogen from internal-combustion engines.

Global rhodium demand by sector: 2025
tonnes

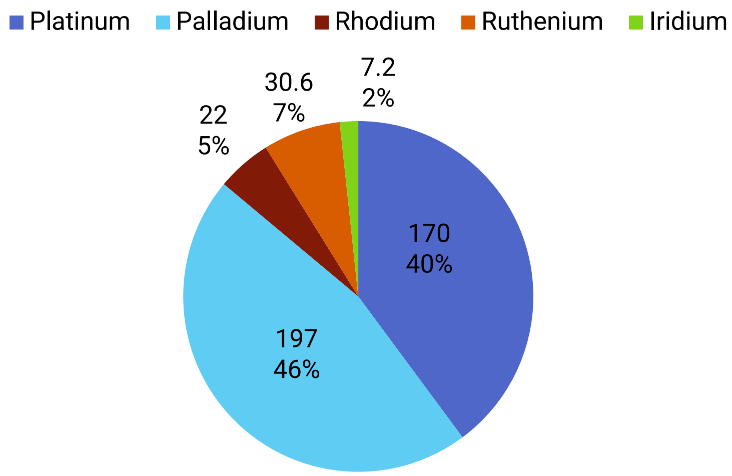


Source: Johnson Matthey (January 2026); demand excluding closed loop recycling and reuse

PGM mine production is highly concentrated in just a few countries. In general, PGMs are always produced together, as they occur together in nature. Platinum and palladium are considered the main metals, with the other PGMs including rhodium (plus ruthenium, iridium and osmium) considered by-products. Most PGM imports from primary sources are in concentrated form after a first refining stage.

Globally, platinum and palladium make up 86% of the PGM basket by mass of metal produced, while rhodium comprises just 5%:

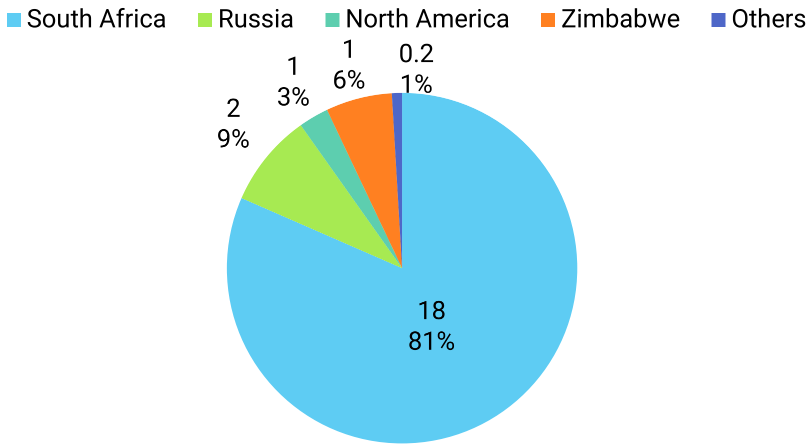
Global PGM primary supply by metal: 2025
tonnes



Source: Johnson Matthey (January 2026)

South Africa dominates PGM primary supply, comprising >80% of rhodium output, with Russia (9%) and Zimbabwe (6%) the other significant producing countries, followed by North America (3%). There is essentially no primary supply from EU27/European countries.

Global rhodium primary supply by origin: 2025 tonnes



Source: Johnson Matthey (January 2026)

MARKET, TRADE & PRICES

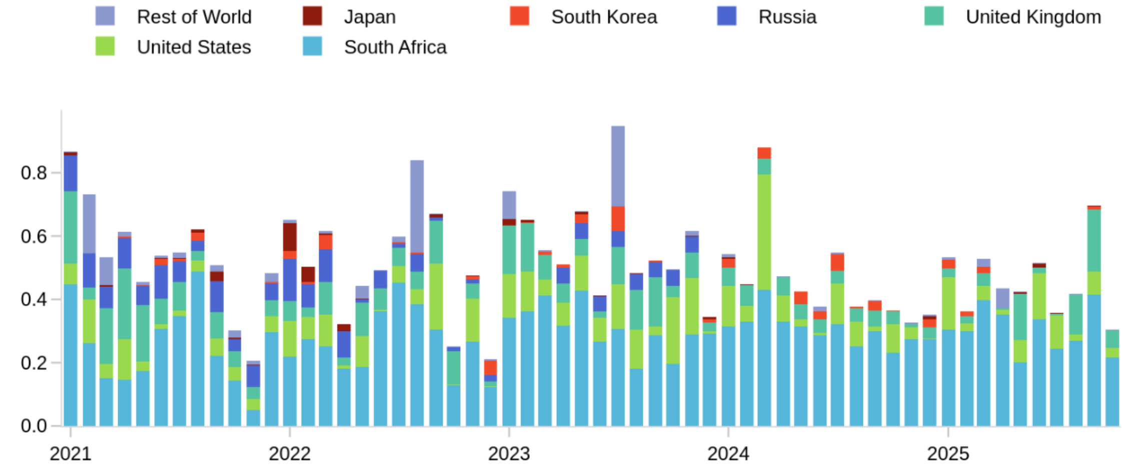
GLOBAL MARKET

In 2025, global primary rhodium mine production is estimated at about 22 tonnes. The principal producing countries are South Africa, Russia, Zimbabwe, Canada and the United States, which together account for roughly almost all global primary supply. South Africa is by far the dominant producer accounting for >80% of global mine output, followed by Russia (9%). Almost no rhodium is recovered by mines in Europe.

EU TRADE

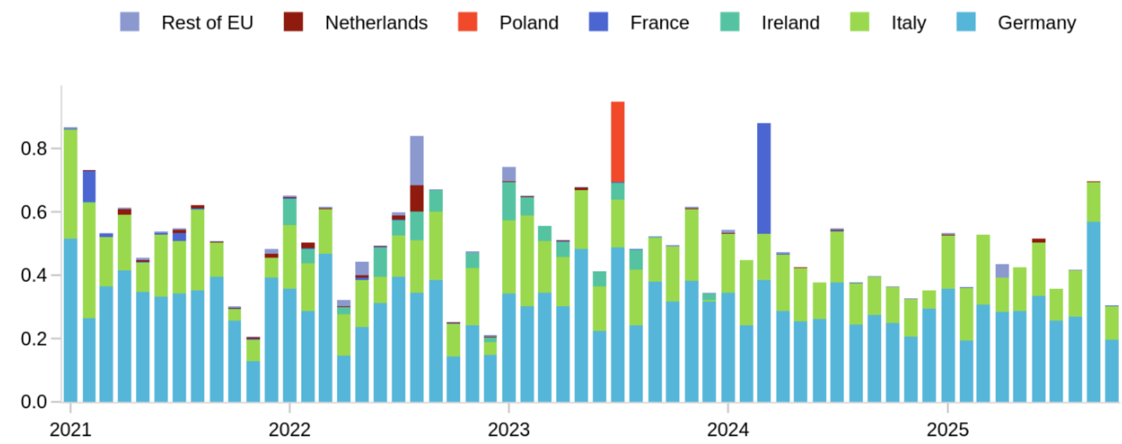
The EU imports and exports rhodium in unwrought or powder-form (HS 711031) and semi manufactured form (HS 711039) but overall is a net importer. South Africa and the U.S. are the largest sources for EU imports of rhodium, with Germany and Italy being the largest recipients.

Rhodium: Largest exporters into the EU market
tonnes



Source: Eurostat

Rhodium: Largest importers into the EU market
tonnes

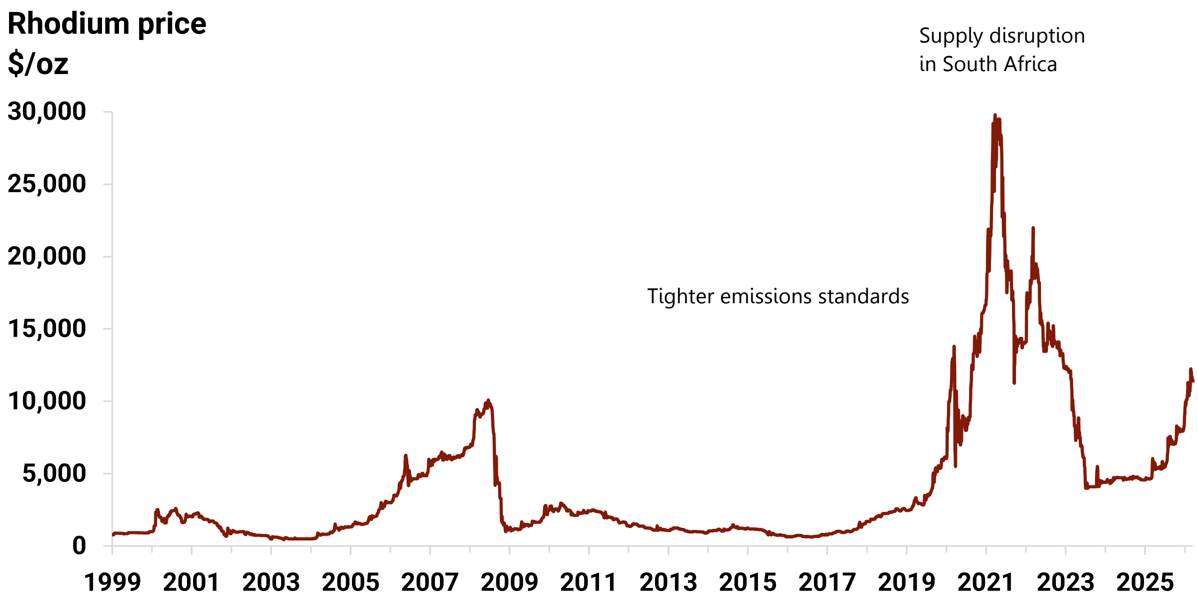


Source: Eurostat

EU IMPORT RELIANCE

The EU is reliant on imports of rhodium to meet its automotive and industrial requirements. The EU's total demand for rhodium (ex. investment) has averaged 5 tonnes per year since 2020. Secondary supply of rhodium from autocatalysts sourced in the EU is around 2 tonnes per year, and with little primary supply or by-product production the EU's import requirement has been around 3 tonnes per year.

PRICE & PRICE VOLATILITY



Source: Bloomberg Finance LP

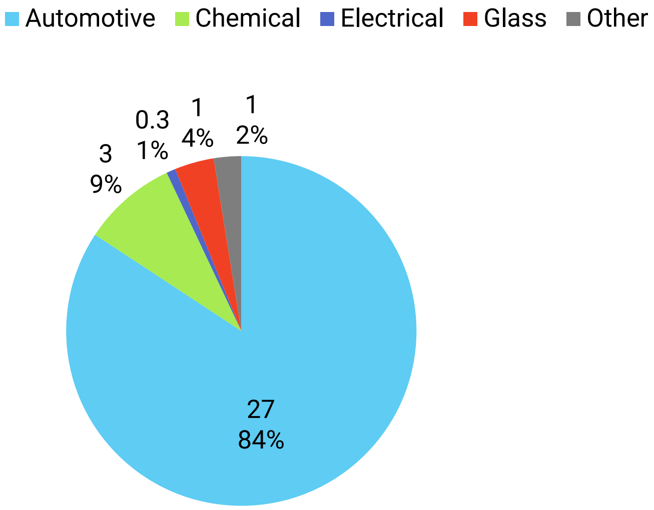
The rhodium price has historically been very volatile. The metal's dominant end use is autocatalysis, driven by increasingly stringent emissions legislation adopted by the EU and other countries. The most extreme price volatility has resulted from supply disruptions, mostly in South Africa, occurring at the same time as robust demand from the automotive industry, driven by tightening emissions standards and rising vehicle production volumes. After the rhodium price exceeded $10,000/oz in 2008, the automotive industry reduced its use as far as possible until the next round of emissions legislation made it necessary to utilise more rhodium.

DEMAND OUTLOOK

GLOBAL AND EUROPE END-USES

Automotive (autocatalyst) dominates demand globally (85%), followed by chemical catalysis (9%) and glass fabrication (4%). All the end uses vary in scale and importance by region.

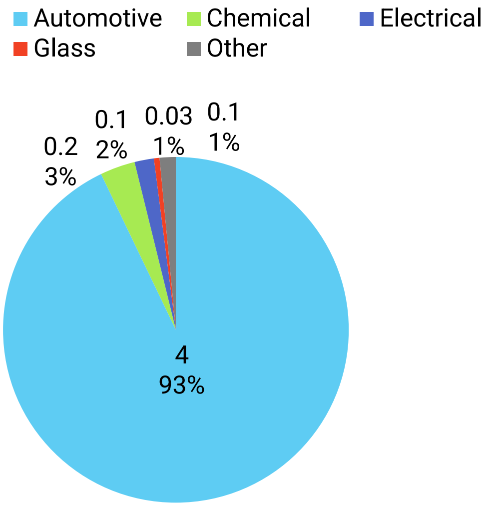
Global rhodium demand by sector: 2025
tonnes



Source: Johnson Matthey (January 2026)

Fabrication of products containing rhodium in Europe is almost entirely (93%) in the production of autocatalysts, mainly for use in gasoline light-duty vehicles. Production of chemical catalysts comprises just 3% of demand.

Europe rhodium demand by sector: 2025
tonnes



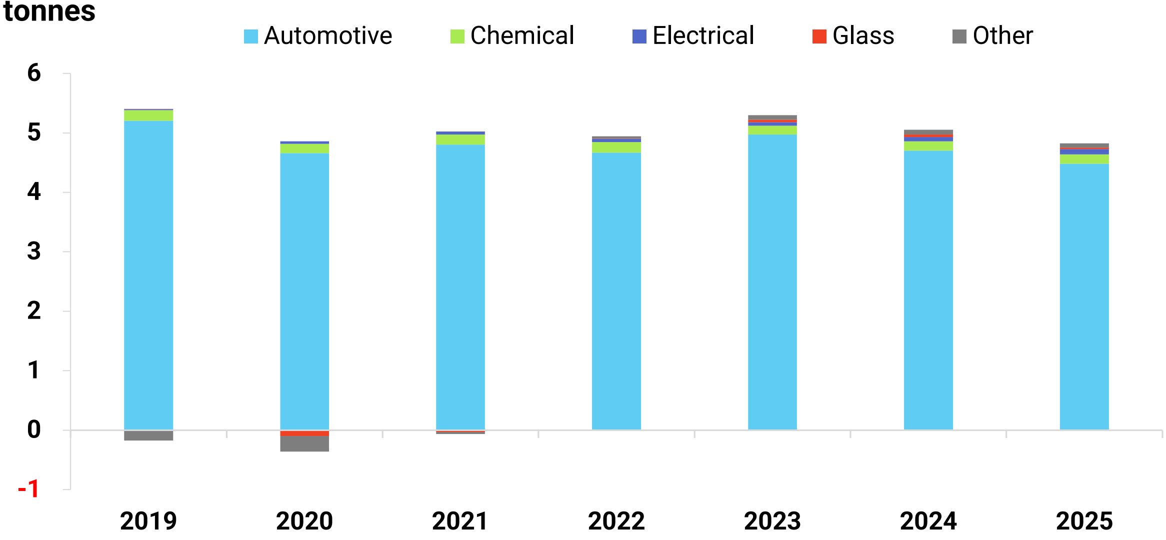
Source: Johnson Matthey (January 2026)

Note: Europe: EU+ (includes UK and Turkey but excludes Russia)

Rhodium demand has decreased slightly, by 4 tonnes from 2019 to 33 tonnes in 2025. High prices have encouraged thrifting, but the catalyst activity must be sufficient to meet emissions standards in all regions for maximum NOx permitted emissions limits and to have the durability to maintain these standards over the legislated lifetime, in years or distance driven terms.

Autocatalyst share has been around 90% of total demand since 2019, but fell to 84% in 2025, as automotive share declined slightly and chemical demand increased. Longer term, automotive share is expected to decline further as internal combustion engine powertrains cede share to battery electric powertrains.

Europe rhodium demand by sector
tonnes

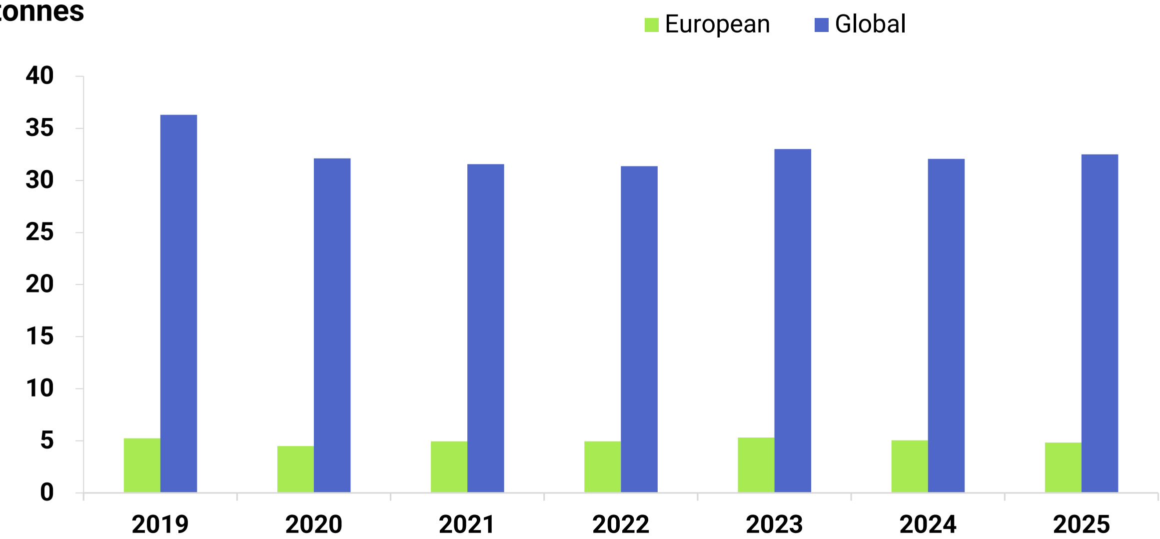


Source: Johnson Matthey (January 2026)

Note: Europe: EU+ (includes UK and Turkey but excludes Russia)

Europe currently comprises around 15% of global rhodium demand, almost exclusively in autocatalyst fabrication.

Rhodium demand: Europe as a share of Global
tonnes



Source: Johnson Matthey (January 2026)

Note: Europe: EU+ (includes UK and Turkey but excludes Russia)

APPLICATIONS & SUBSTITUTION POTENTIAL

AUTOMOTIVE - AUTOCATALYST

Current applications: Rhodium's main automotive role is in autocatalysts / catalytic converters, where it is especially important for reducing NO_x in exhaust. The automotive sector accounts for more than 80% of total demand for rhodium.

Substitution potential: the long-term risk is driven by the powertrain change from internal combustion engines to battery electric powertrains.

CHEMICAL

Current applications: In chemicals, rhodium is used in Pt-Rh catalyst gauzes for ammonia oxidation to make nitric oxide / nitric acid, which feed into fertilisers, explosives, and other downstream chemicals. On an industrial scale, homogeneous rhodium catalysts catalyze hydroformylation and carbonylation reactions for the production of large-scale organics, e.g. "Oxo Synthesis" for aldehydes and "Monsanto Process" for acetic acid.

Substitution potential: In the nitric acid process, Pt-Rh gauzes are still regarded as the optimum solution so the substitution potential is low. The alloy typically contains around 3–10% rhodium.

GLASS PRODUCTION

Current applications: Rhodium is used mainly in platinum-rhodium alloys for glassmaking hardware such as stirrers, plungers, feeder systems, and glass-fiber nozzles/bushings. These components are used in manufacturing optical and technical glass, fiberglass, medical vials, solar panels, and display glass.

Substitution potential: There is flexibility in the Rh content of the platinum-rhodium alloy, which typically ranges from 5–20% rhodium depending on the price differential between Pt and Rh. The potential use of palladium needs to be qualified as the lower melting point of Pd means it will be limited in uptake.

ELECTRICAL

Current applications: Rhodium is used mainly as a coating for contacts and connectors and in platinum-rhodium thermocouple wires for precise high-temperature measurement. Pt/Rh thermocouple wires are used for high-temperature measurement in steel, glass, and ceramics, and are suitable up to about 1700°C (source: Heraeus).

For connectors and charging contacts, rhodium or rhodium-ruthenium coatings are used where corrosion resistance and abrasion resistance are especially important. Rh-Ru coatings are considered superior to gold-plated contacts in some harsh-use consumer electronics applications (source: Umicore).

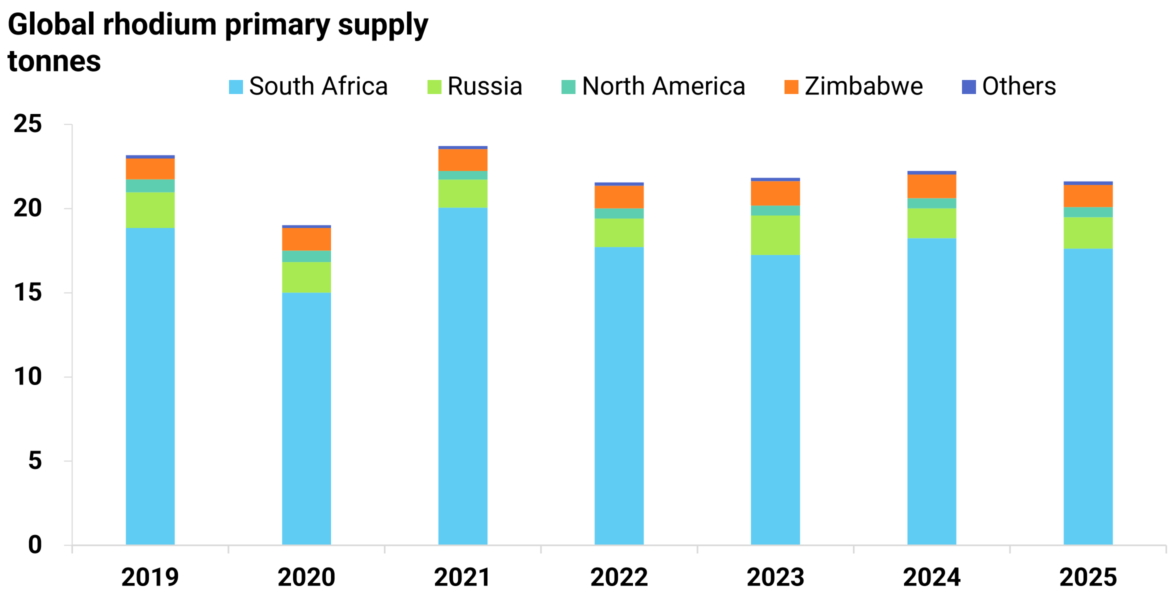
Substitution potential: For contact plating, substitution possibilities are moderate as gold and other precious metal systems are already widely used; rhodium is superior where wear and corrosion are unusually severe, so can be substituted more easily in less harsh environments. For high-temperature thermocouples, the substitution potential is less as the Pt/Rh mix confers a specific combination of temperature capability, corrosion resistance, and measurement accuracy which is difficult to replicate.

SUPPLY OUTLOOK

SUPPLY FROM PRIMARY MATERIALS

GLOBAL & EU MINE PRODUCTION

Global primary rhodium supply shows some variability from year-to-year among each of the producing countries, plus of course significant perturbation through the pandemic years. Production has remained at around 22 tonnes for the past three years.



Source: Johnson Matthey (January 2026)

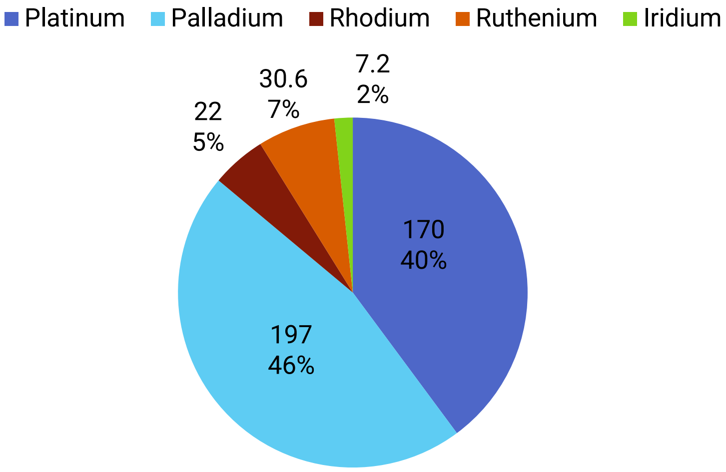
Rhodium is always considered a by-product of mining the PGM basket, which is dominated by platinum and palladium production, though its contribution by value is generally much higher than its contribution by mass.

Globally, platinum and palladium make up 86% of the PGM basket by mass of metal produced, while rhodium comprises just 5%.

The future supply situation, with South Africa and Russia being the main sources, is unlikely to change in the medium to long term, as these countries hold the largest known resources. Primary rhodium supply will therefore remain dependent on known deposits.

Almost all PGMs from mining are marketed as refined metal from integrated mining-metallurgical operations, making producing countries the main exporters. Norilsk Nickel's metal is refined by third parties in Russia (Krastsvetmet), while in South Africa, Valterra Platinum, Sibanye-Stillwater and Impala Platinum have fully integrated mine-to-metal processing infrastructure while Northam sends its high-grade PGM concentrate (after base metal removal) to Europe for final PGM refining.

Global PGM primary supply by metal: 2025 tonnes



Source: Johnson Matthey (January 2026)

PGM production facilities are extensive and complex, with many steps from approval to fully operational. Brownfield restarts and shallower mechanised decline projects with existing infrastructure typically take from 8-18 months, mechanised shallow greenfield projects can take 3-4 years, while large deep level vertical shafts can take around 6–8 years.

PROCESSING

Rhodium is marketed in refined form. Since extracted ores contain very low concentrations of rhodium, several processing stages are needed after mining to concentrate and purify the metal. Refining takes place mainly in producing countries, which are also the principal exporters. Metallurgical processing and refining to produce high-purity PGM products are complex, costly and time-intensive, and the production of refined metal can take up to six months from the extraction of the first PGM-bearing ore [IPA, 2015]. Processing routes vary between companies [Yang, J., 2018], and the specific techniques used are generally not disclosed for commercial reasons [Gunn, G., 2014]. Depending on the mineralogical characteristics of the ore, a range of physical and chemical concentration methods may be used, including crushing and grinding, froth flotation, and in some cases magnetic separation and dense media separation [BGS, 2009].

Rhodium is typically recovered as a minor by-product of platinum-group metal ores, and in some cases from nickel-copper operations, rather than being mined as a stand-alone metal. Its processing is therefore usually integrated into broader PGM refining flowsheets. After mining and concentration, rhodium is reported to be sent with other PGMs to the smelting and base-metal refining stages, after which specialised, hydrometallurgical refining is used to separate it from the other PGMs. Owing to its chemical resistance and the difficulty of its separation, refining commonly involves aggressive chloride-based or other oxidative leach systems, followed by selective precipitation, solvent extraction, ion exchange, or related purification steps to produce high-purity rhodium sponge or rhodium salts for industrial use. In practice, rhodium processing is technically complex, highly specialised, and closely tied to the economics of integrated PGM refining and recycling operations.

Once refined to sponge (or ingot), primary and secondary PGMs are indistinguishable and are traded and used as equivalents.

GEOLOGY, GLOBAL RESOURCES & RESERVES

GEOLOGY

Platinum group metals are among the rarest elements in the Earth’s crust, with an overall abundance of around 1.5 ppb in the upper continental crust and 3.7 ppb in the lower continental crust.

In most deposits, platinum and palladium are the principal products and provide the main economic basis for mining, while the other PGMs are recovered as by-products that make a smaller contribution to revenue. Historically, rhodium has been an important revenue driver for the UG2 Reef in South Africa in particular, which has the highest concentration of rhodium of any PGM-bearing ore globally. In other deposits, PGMs themselves are by-products, for example, in nickel mining, but they still contribute significantly to the economics of the operation [Yang, J., 2018].

Rhodium deposits are relatively rare and confined to a few regions worldwide. Most global rhodium production comes from only a few countries, with the largest reserves and production concentrated in South Africa, Russia and Zimbabwe. PGM enrichment occurs in several deposit types, but only within a narrow range of geological settings. Mineable PGM deposits are geologically rare, and most PGM-bearing ores are very low grade. In the main commercial deposits, ore grades typically range from 1 to 10 grams per tonne for combined PGMs and gold [Zientek, M. et al., 2017].

Substantial PGM deposits are known to exist beyond those already classified as reserves and resources, and these are likely to be sufficient to support mining for many decades. However, the precise composition of these deposits, particularly the relative distribution of individual PGMs and associated elements, is not always well defined.

GLOBAL RESOURCES & RESERVES

South Africa is the world's leading producer of rhodium, accounting for >80% of global supply. The largest rhodium-bearing ore deposits are found in South Africa's Bushveld Complex, which contains extensive reserves of mainly palladium, platinum and other PGMs (including rhodium). The Bushveld Igneous Complex is dominated by two PGE-rich layers, the Merensky Reef and the UG2 Chromitite Reef.

The Merensky Reef consists of extensive, layered mafic-to-ultramafic intrusions in the northern part of the country and contains platinum, palladium, rhodium, and other PGEs. It is made up of laterally continuous but relatively thin mineralised layers, known as reefs, within large, layered intrusions. Current mill-head grades are typically 4 to 7 ppm 6E or 4 to 6 ppm 4E, which include platinum, palladium, rhodium, and gold. At the largest operating mines, the platinum-to-palladium ratio generally ranges between 2.0:1 and 2.5:1 [IPA industrial expert, 2019; Cawthorn, 1999].

The UG2 Chromitite Reef has a similar geometry to the Merensky Reef (sitting above the UG2 in the stratigraphy), but consists of thin, continuous layers of chromite. Typical mined grades are between 2.5 and 4 ppm 4E. The platinum-to-palladium ratio is around 2:1, but in some cases can be closer to 1:1 and UG2 ores also contain significantly higher levels of rhodium, ruthenium and iridium than the Merensky Reef [IPA industrial expert, 2019; Hagelüken, C., 2019]. The UG2 Chromitite of the Bushveld Igneous Complex is widely regarded as the world's largest known repository of PGM resources.

Although the Merensky and UG2 reefs are the most important, the Platreef, which forms the northern outcrop of the Bushveld Complex, is also significant and is currently mined by open-pit methods. The Platreef appears to extend to depths of at least 2 km, suggesting substantial future potential for platinum group metal extraction if suitable underground mining methods are developed. Typically, rhodium is less abundant in Platreef ore than in Merensky and UG2.

South African production dipped slightly in 2024 due to electricity disruptions, higher costs and asset restructuring, but stabilised without major load shedding (load shedding is South Africa's controlled, scheduled power outages to prevent the national grid from collapsing when supply can't meet demand). Load-shedding in South Africa improved dramatically in 2025, with only 26 hours total across four days early in the year and over 231 consecutive days without outages by year-end, driven by Eskom's Generation Recovery Plan. No significant shifts have altered the Bushveld's dominance or the geological details provided. *Source: Semafor*

Russia is the second-largest producer of primary rhodium, but the orebody concentrations are much lower than in South Africa. Consequently, Russia only accounts for 9% of global primary production of rhodium.

Zimbabwe is another major rhodium producer, accounting for 6% of global supply, with deposits located in the Great Dyke, a geological formation that extends from north to south across the country. The Great Dyke is a layered mafic-to-ultramafic complex that contains platinum, palladium, and other valuable minerals. As a major PGM deposit, it is broadly comparable to the Merensky Reef, although the extent of the intrusion is much smaller.

Concentrations of rhodium in other orebodies around the world are very low.

EU RESOURCES & RESERVES

Europe produces almost no rhodium from primary mining sources.

SUPPLY FROM SECONDARY MATERIALS/PRODUCTION

RECYCLING

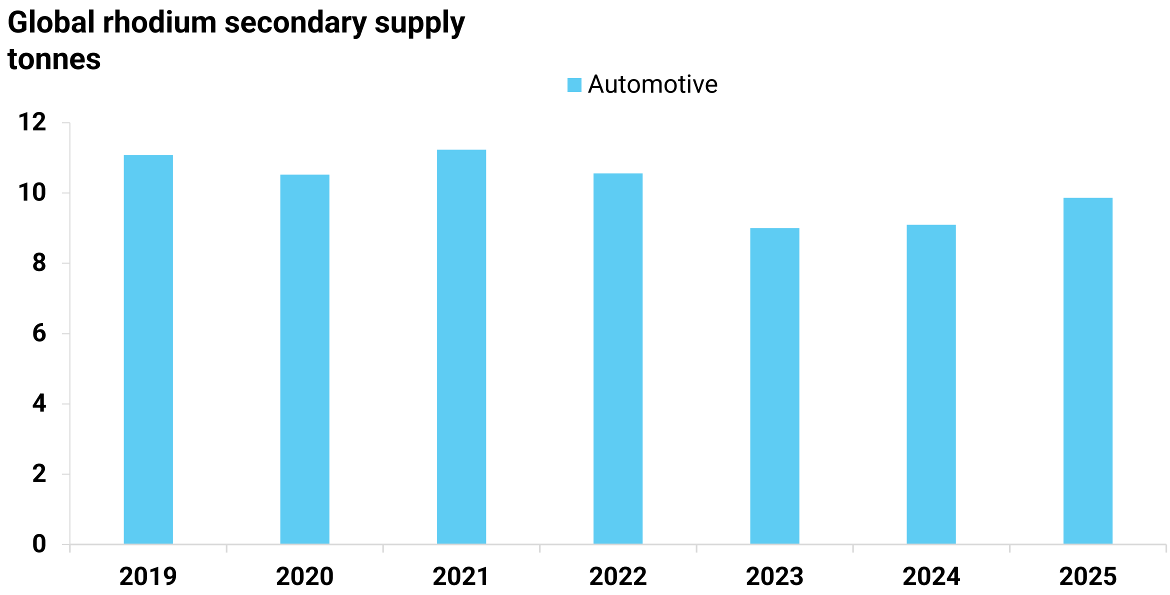
Secondary supply refers to rhodium recovered from scrap and end-of-life products rather than from newly mined ore. Spent autocatalysts from vehicles are by far the most important source. This stream is strategically significant because recycled rhodium can reach the market more quickly than new primary mine supply and generally has a much lower environmental footprint.

The availability of secondary rhodium is shaped by several factors, including collection rates, scrap prices, vehicle scrappage patterns, the technology mix of the vehicle fleet, recycling capacity, and the economics of recovery. It is therefore a critical component of the rhodium market, especially given rhodium’s high value and geological rarity. Secondary production also tends to have lower environmental impacts than primary production, as rhodium concentrations in end-of-life materials, particularly autocatalysts, are often far higher than in mined ore.

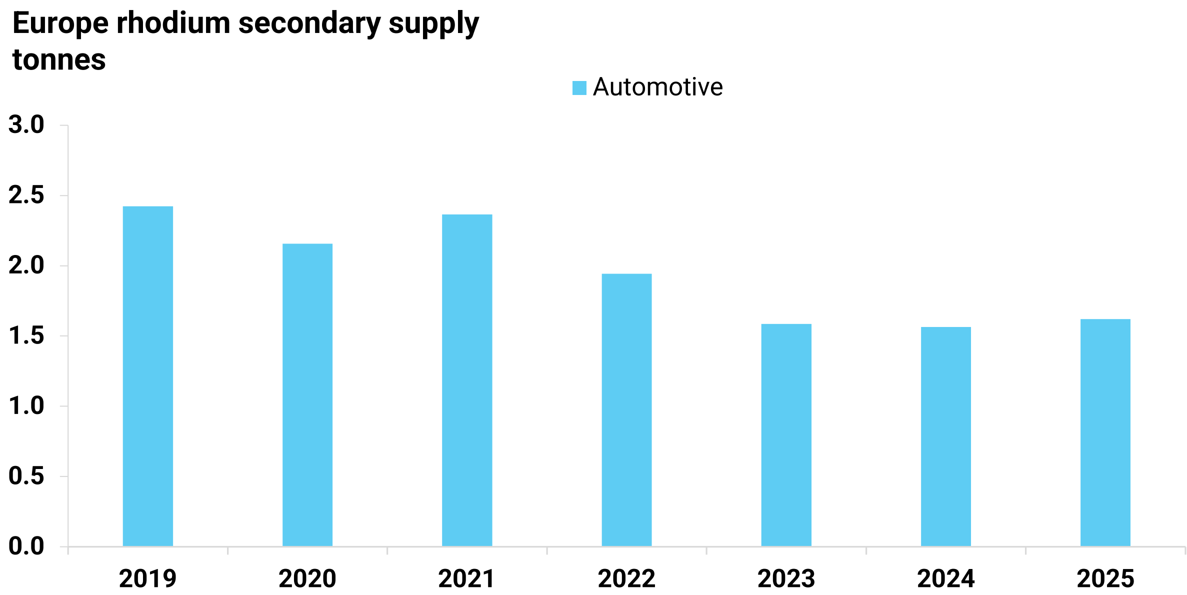
Advanced recycling technologies have been developed to recover rhodium efficiently from a range of waste streams, making recycling an important and growing source of supply. The secondary supply shown in the global and European charts below reflects open-loop recycling only and excludes closed-loop recycling, as this is typically not visible to the market. In this context, automotive recycling includes only rhodium recovered from vehicles first sold in Europe. Consequently, the actual quantity of rhodium processed by European refiners may differ owing to imports and exports of scrap and end-of-life vehicles.

Autocatalyst material dominates global secondary rhodium supply, supported by a well-established value chain of dismantlers, collectors, and refiners. Recycling of automotive catalysts remains the single most important source of secondary rhodium. Current recycling technologies can recover around 95% of the PGM content of spent autocatalysts during refining, including rhodium.

Autocatalyst recycling is generally more attractive when rhodium prices are high, as the greater metal value improves margins across the value chain. Recycling volumes may be lower when consumers keep vehicles for longer, or when replacement demand is constrained by supply chain disruption, limited vehicle availability, or weaker economic conditions that reduce willingness or ability to finance a new purchase.



Source: Johnson Matthey (January 2026)

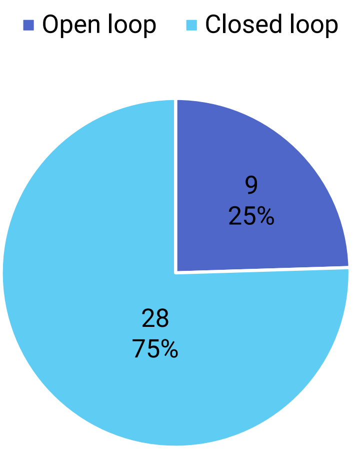


Source: Johnson Matthey (January 2026)

Note: Europe defined here as EU+ (includes UK and Turkey but excludes Russia)

Closed-loop recycling volumes have not been very visible historically. In its 2024 Circularity Whitepaper, Johnson Matthey has provided estimates for the total (open + closed loop) global recycling volumes, shown below. The closed-loop comprises 75% of rhodium recycling, despite the substantial open-loop volumes shown above from autocatalyst recycling.

Global rhodium total (open + closed loop) recycling: 2024 tonnes



Source: Johnson Matthey (January 2026)

OTHER CONSIDERATIONS

HEALTH AND SAFETY ISSUES

Rhodium metal and its simple insoluble trioxide and trihydroxide compounds are not classified for any health hazard under the EU CLP Regulation. Neither has regulatory toxicity testing of the complex triphenyl-phosphine rhodium compounds resulted in health hazard classifications.

Simple soluble inorganic rhodium(III) compounds commonly form acidic or basic solutions with the potential for skin and eye irritation or corrosion. Where testing has been possible, it has also confirmed sensitisation potential, and cases of sensitisation to rhodium amongst PGM refinery workers have been documented although respiratory sensitisation to rhodium is notably less common than to platinum (chloroplatinates). Soluble rhodium(III) compounds have demonstrated genotoxic potential in some in-vitro and in-vivo studies. Some of these substances have therefore been classified as Mutagen category 2 under the CLP Regulation as a precaution while more definitive testing is conducted. The complex halogenated triammonium hexachlororhodate(III) has similarly shown evidence of eye damage and possible genotoxic potential, also being classified as Mutagen category 2 based on limited data and the current evidence for soluble rhodium(III) compounds.

The International Platinum Group Metals Association (IPA) has developed comprehensive guidance on the safe use of PGMs in the workplace, including recommendations on exposure monitoring, medical surveillance and best practices for controlling occupational exposures to certain soluble PGM compounds that can cause respiratory sensitisation. This guidance is used by PGM producers and downstream users to design and continually improve occupational health and safety programmes, helping to ensure that the benefits of PGM-containing technologies are delivered while protecting workers along the supply chain. *Source: IPA*

ENVIRONMENTAL ISSUES

Available information from EU REACH dossiers, environmental assessments, and industry practice indicates that elemental rhodium has low environmental toxicity and limited bioavailability. Metallic rhodium is poorly soluble, environmentally immobile, and not readily taken up by aquatic or terrestrial organisms. Consequently, environmental concerns are associated primarily with certain soluble or chemically reactive rhodium compounds, rather than with the elemental metal itself. More broadly, the environmental hazard profile of rhodium substances depends largely on their solubility, oxidation state, and chemical form.

Current assessments do not indicate that rhodium or the commonly registered rhodium compounds meet the criteria for persistence, bioaccumulation, or very high persistence and very high bioaccumulation.

Overall, the identified environmental risks are limited to specific soluble or reactive rhodium compounds. Standard environmental controls, regulatory compliance, and appropriate handling and disposal practices are considered sufficient to ensure environmental protection.

The IPA routinely conducts Life Cycle Assessments of the PGMs to assess the potential environmental impacts of their production and makes the results for key impact categories available on its website.

In 2025, the IPA has published a CO_2 scenario for primary production in 2030, based on investments by South African producers and the South African government into renewable energy, which shows a potential decrease in the CO_2 footprint of mining of between 35% and 61%, depending on the metal (Bossi/Gediga, Decarbonisation in the Mining of Platinum Group Metals – A CO2 Outlook to 2030 | Johnson Matthey Technology Review).

The results for the key impact categories of the primary production of PGMs, as assessed in IPA's last LCA on production year 2022, can be found below:

Summary of primary production results per kg of metal					
Impact Category	**Pt**	**Pd**	**Rh**	**Ir**	**Ru**
Global Warming Potential [kg CO_2 eq.]	36,828	28,094	38,027	42,096	42,000
Primary Energy Demand [MJ]	494,563	425,546	508,222	548,987	547,114
Acidification Potential [Mole of H+ eq.]	1,687	4,507	1,446	887	926
Eutrophication Potential [Mole of N eq.]	687	450	715	812	811
Photochemical Ozone Creation Potential [kg NMVOC eq.]	258	380	249	236	238
Blue Water Consumption [kg]	297,006	243,960	305,879	335,220	329,931

For the secondary production route (recycling), the IPA has published the following values for Pt, Pd, and Rh (results for Ir and Ru could not be published as the minimum requirement of three contributing companies could not be met):

Summary of secondary production results per kg of metal			
Impact category	**Pt**	**Pd**	**Rh**
Global Warming Potential [kg CO_2 eq.]	477	497	497
Primary Energy Demand [MJ]	9,976	10,370	10,402
Acidification Potential [Mole of H+ eq.]	1.26	1.29	1.30
Eutrophication Potential [Mole of N eq.]	3.68	3.70	3.77
Photochemical Ozone Creation Potential [kg NMVOC eq.]	0.95	0.95	0.97
Blue Water Consumption [kg]	2,419	3,654	3,458

NORMATIVE REQUIREMENTS

Rhodium production and trade are subject to a combination of regulatory and market-based requirements relating to product quality, responsible sourcing, and supply chain assurance. In particular, the London Platinum and Palladium Market has established a Rhodium Sponge Accreditation framework, introduced in January 2023, to facilitate and streamline trade in rhodium sponge and to increase confidence among market participants. Under this framework, eligible refiners must complete accreditation and proactive monitoring processes, including periodic sample testing against LPPM standards. More broadly, rhodium producers and refiners are also subject to applicable national and international requirements concerning environmental protection, occupational health and safety, and responsible business conduct.

SOCIOECONOMIC AND ETHICAL ISSUES

Platinum and PGM supply are highly geographically concentrated, so social and governance issues in producer countries are more focused than for many other commodities. These include worker safety, wage bargaining, electricity reliability, water stress, community relations, local economic dependence on mining, and the distribution of value along the chain. Governments in the major producing countries in Southern Africa expect companies mining there to increase the amount of beneficiation and value-adding processes performed in-country, rather than exporting for these processes. PGM mining companies operate under comprehensive mining legislation, environmental regulation, and binding social and labour obligations. Mining companies adhere to rigorous sustainability reporting, environmental permitting and labour compliance requirements.

All IPA PGM mining companies are publicly listed (LSE, JSE, NSE) companies which routinely report about their environmental, social and governance performance and abide by the regulations set out by national/local authorities and the respective stock exchanges.

IPA members apply sustainability reporting principles to ensure organizations communicate and demonstrate accountability for their environmental, economic, and social impacts, in line with global best practices such as the UN Sustainable Development Goals (UN SDGs), the Global Reporting Initiative (GRI), and the UN Global Compact.

Ethical sourcing issues in platinum and the PGMs are therefore less about artisanal-mining narratives common in some other minerals and more about industrial-scale mining conditions, labour relations, community impacts, and geopolitical exposure. Customers increasingly expect assurance not only on origin but also on processing integrity, responsible sourcing, and sanction screening.

The extraction and refining of PGMs can place significant pressure on local environments; however, industry takes the environmental and social impacts of PGM extraction very seriously and has focused on substantial improvements in recent years, particularly in water stewardship, air emissions control, and waste management. Water remains a critical input to flotation and processing, but major PGM mines in South Africa and elsewhere now operate closed-loop systems that recycle a large share of process water, supported by site-specific water balances and dedicated treatment plants that repurpose mine water for cooling and other uses. Recent case studies from deep-level PGM operations in Limpopo show that membrane-based treatment and reuse can replace a significant portion of potable “board” water and deliver both cost savings and reduced pressure on local water resources, in line with IRMA’s detailed requirements for water management. South Africa continues to face structural water stress, with renewable water resources of around 800–900 m^3 per person per year, but national water-use-efficiency and mine-water-management programmes, together with company-level integrated water and waste management plans, are designed to ensure that mining does not crowd out essential domestic and agricultural uses.

Sources: PGM mining and processing in the circular economy: A framework towards circularity (J. Kruger, 2022) and UN

Tailings and waste rock are an inherent by-product of all hard-rock mining, but in the PGM sector, they are managed as engineered storage facilities rather than unmanaged “waste dumps”, with design, monitoring and closure governed by international standards such as the Global Industry Standard on Tailings Management and, increasingly, IRMA requirements. Leading PGM producers report full conformance with these standards for high-consequence facilities and are investing in tailings re-treatment, re-vegetation, and long-term stability measures to reduce legacy impacts and recover additional metal value. Through the IPA, member companies have committed and continue to align their operations with recognised responsible mining and sourcing frameworks, including IRMA and other sustainability assurance schemes (such as the forthcoming Consolidated Mining Standard Initiative – CMSI), demonstrating measurable progress over time and helping ensure that PGM production supports local development while minimising environmental impacts.

Sources: IPA

ECONOMIC IMPORTANCE OF RHODIUM FOR EXPORTING COUNTRIES

Rhodium and the PGM industry are economically significant for South Africa and, to a lesser extent, for Zimbabwe and Russia. In South Africa, platinum group metals are a major mining industry, a source of export earnings, industrial employment and fiscal revenue, and an anchor for local refining and fabrication capabilities.

PGM mines in South Africa and Zimbabwe are not government-owned but are owned by publicly listed companies and their shareholders.

For producers and their downstream customers, the government policies, infrastructure performance and macroeconomic conditions in the countries where they mine can significantly affect supply. Such issues may cause short-term disruptions, while, of course, the fundamental geology determines the long-term potential of a mine region.

RESEARCH AND DEVELOPMENT TRENDS

Rhodium and all the PGMs continue to feature in R&D projects, from the highly academic to those close to market.

A new collaboration was launched in February 2026 to develop high-impact PGM technologies and drive the next wave of industrial innovation. This recognises that currently, some 60% of global PGM supply is used in autocatalysts; in the long term, this is threatened by the increasing share of battery-electric vehicles. Johnson Matthey, Sibanye-Stillwater, and Valterra Platinum launched the programme to explore and scale technologies that leverage the exceptional performance and durability of PGMs, as well as their robust, circular supply chains. Expected to expand with additional partners in the coming months, the collaboration will explore uses across multiple sectors, including clean hydrogen, enhanced emissions detection and reduction across stationary and mobile sources, new electronic materials, and high-performance alloys and other advanced materials.

APPENDIX: RELEVANT HS/CN CODES

RHODIUM METAL, SEMI-MANUFACTURED AND SCRAP

Level	Code	Description
7113	71103100	Rhodium, unwrought or in powder form
	71103900	Rhodium in semi-manufactured forms
7112	7112.30	Ash containing precious metal or precious metal compounds, principally for recovery. Covers Rh-bearing sweepings, ash and spent catalyst fines.
	7112.99	Waste and scrap of platinum (including platinum-group metals). The WCO 6-digit schedule has no dedicated rhodium-only scrap line.

RHODIUM COMPOUNDS (SALTS ETC)

Level	Code	Description
2843	2843.10	Colloidal precious metals. Covers colloidal rhodium suspensions used in coatings, electronics and specialist chemistry.
	2843.90	Other inorganic or organic compounds of precious metals; amalgams. The primary code for rhodium salts and chemical intermediates — rhodium(III) chloride, rhodium(III) nitrate, rhodium(III) iodide, rhodium acetate, rhodium sulphate — confirmed by US Customs ruling. Homogeneous catalysts, e.g. ROPAC or CARAC
	2843.90.12	India's national tariff further splits this specifically for noble metal solutions of platinum, rhodium and palladium.

RHODIUM REAGENT SOLUTIONS AND KITS

Level	Code	Description (short)
3815	3815.12	Supported precious metal catalysts where the active substance is a precious metal or compound. Covers Rh/Al_2O_3, Rh/C and Rh/SiO_2 catalytic preparations.
	3815.90	Other reaction initiators and accelerators not elsewhere specified. Used for rhodium-containing homogeneous catalyst preparations where 3815.12 does not apply
3822	3822.19	Prepared diagnostic or laboratory reagents (other), including kits. The standard code for rhodium ICP/AAS standard solutions and analytical reagent kits without certified reference material status.
	3822.90	Certified reference materials. Covers rhodium single-element CRM standards (e.g. 1,000 mg/L Rh in HNO_3). Plain rhodium chloride solutions without CRM certification remain under 2843.90.

REFERENCES

Heraeus Precious Metals
https://www.heraeus-precious-metals.com/en/products-solutions/metal/rhodium/
https://www.heraeus-precious-metals.com/en/products-solutions/category/electrical-contacts/wires/thermocouple-wires/

International Platinum Group Metas Association (IPA)
https://ipa-news.de/assets/pdfs/2022-06-21-new-environmental-profile-of-pgms-ipa.pdf
https://www.ipa-news.com/assets/contentimg/sustainability/ipa-lca-3-fact-sheet-final-april-2025.pdf
https://ipa-news.com/index/sustainability/social/
https://ipa-news.com/index/sustainability/responsible-mining-and-sourcing.html

Johnson Matthey Circularity Whitepaper - Reclaiming the future: PGM insights for a circular economy (2025)
https://matthey.com/documents/161599/3147297/JM_Circularity_Whitepaper.pdf

Johnson Matthey PGM Market Reports – latest market data available behind the link:
https://matthey.com/products-and-markets/pgms-and-circularity/pgm-markets/pgm-market-reports

British Government
https://www.gov.uk/government/publications/south-africa-platinum-strike-ends-june-2014/south-africa-platinum-strike-ends-june-2014

African Mining ./ Minerals Council South Africa
https://www.africanmining.co.za/2025/01/24/minerals-council-south-africa-record-2024-safety-performance-on-sa-mines/

United Nations
https://sdg6data.org/en/country-or-area/South%20Africa

PGM mining and processing in the circular economy: A framework towards circularity (J. Kruger, 2022)

Sources: African Mining / SA Minerals Council and 2024 mine health and safety statistics SA

African Mining
https://www.africanmining.co.za/2025/01/24/minerals-council-south-africa-record-2024-safety-performance-on-sa-mines/

South Africa Government - 2024 mine health and safety statistics SA
https://www.gov.za/news/speeches/minister-gwede-mantashe-release-2024-mine-health-and-safety-statistics-23-jan-2025

Semafor Africa
https://www.semafor.com/article/01/07/2026/south-africa-marks-231-consecutive-days-in-2025-without-load-shedding

Other sources: Eurostat and Bloomberg Finance LP

DEFINITIONS & METHODOLOGY FOR DATA

The demand, primary, and secondary data used to create charts and quoted in the text are based on Johnson Matthey's PGM Market Report dataset (most recent edition: May 2025) and have been updated with estimates to reflect the situation as of December 2025.

Primary supply

Supply figures represent producers' sales of primary PGM and are allocated to the region where mining took place, rather than to the region of subsequent processing.

Secondary supply

Secondary supply is the quantity of metal recovered from open-loop recycling (i.e. where the original purchaser does not retain ownership of the PGM).

Outside the automotive, jewellery and electronics markets, open-loop recycling is negligible.

Automotive recycling represents the weight of metal recovered from end-of-life vehicles and aftermarket scrap. It does not include warranty or production scrap.

Demand

Demand figures for any given application represent the sum of industry demand for new metal in that application, net of any closed-loop recycling (i.e. where industry participants retain ownership of the metal: an example would be recycling of spent chemical catalysts, where the metal is retained to be used on fresh catalyst that replaces the spent charge).

Automotive demand is allocated to the region where the vehicle is manufactured and is accounted for at the time of vehicle production. It includes emissions catalysts on vehicles, motorcycles and three-wheelers, as well as fuel cell vehicles. Non-road mobile machinery is counted as industrial demand, in the pollution control category.

Jewellery demand is allocated to the region where the finished jewellery is manufactured, not to the region where it is sold.

Regional definitions

Europe: EU+ (includes UK and Turkey but excludes Russia)

Open-loop recycling

When the original purchaser of the metal does not retain control over the PGM, the metal is available to the market again once recovered. The main source of open-loop metal is automotive catalytic converters, which are widely recovered from scrapped vehicles and recycled to recover the contained platinum, palladium or rhodium contained. Some metal is also recovered from the jewellery and electronics markets.

Closed-loop recycling

Refers to the situation where the metal remains within the application, e.g., when metal is recovered from used chemical catalysts and is used to produce fresh catalysts to replace the spent charge. While this metal is processed by PGM refiners, the equivalent amount of metal is usually returned to the original owner, who retains the metal value. As the net amount of metal in use has not changed, this returned metal is not counted towards market supply. Re-using metal in such way avoids the need for virgin mined metal, thereby contributing to make demand more sustainable.