

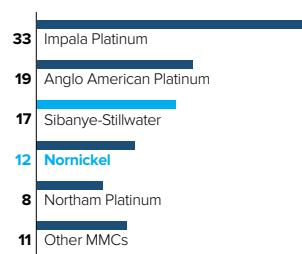
# RHODIUM (Rh)

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## THE COMPANY'S INDUSTRY POSITION

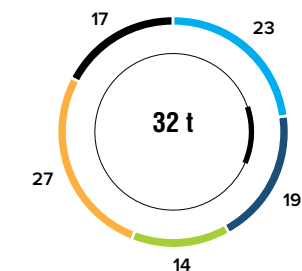
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IN RHODIUM PRODUCTION<sup>1</sup> (%)



Source: Company data

## RHODIUM CONSUMPTION BY REGION (%)



- Europe
- North America
- Japan
- China
- Rest of world

Source: Company data

## KEY TRENDS IN THE RHODIUM MARKET

2020 saw a major increase in rhodium prices although with high volatility: rhodium prices reached an all-time high of USD 13,800/oz amid high demand and shortages in the spot market in early March, but due to the spread of COVID-19, the price plunged 60% to USD 5,500/oz on 24 March. However, prices quickly recovered to between USD 8,000/oz and USD 9,000/oz as early as in the beginning of April. In the second half of 2020, the automotive industry recovery and relaxation of coronavirus restrictions as well as the breakdown in Anglo American Platinum's pyrometallurgical processes led

to resumed growth in rhodium prices reaching a new high of USD 17,000/oz at the end of December. Stronger rhodium price fluctuations in 2020 compared to other PGMs are attributed to a relatively small size of the market, expectations of further growth in consumption by the automotive industry driven by the new vehicle emission standards, nontransparent reserves, and concentration of production in the southern Africa where production suffered from instability during the year.

## AVERAGE ANNUAL RHODIUM PRICES (USD/OZ)

2015	2016	2017	2018	2019	2020
952	694	1,105	2,220	3,904	11,231

Source: JMI

Rhodium prices in 2020 averaged at

# 11,231

USD/oz,

up 188% from the 2019 average of USD 3,904/oz.

<sup>1</sup> Refined metal including production from own feedstock by third parties under tolling agreements.

## MARKET BALANCE

In 2020, the rhodium market remained undersupplied, as the metal's production decline outpaced growth in demand from the automotive and other industries.

### RHODIUM CONSUMPTION IN 2020 BY INDUSTRY (t)

production and consumption balance	-2
Investor demand	0
ETF inflow	0
Supply and demand balance	-2

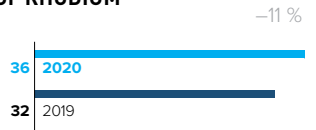
## CONSUMPTION

Industrial consumption of rhodium in 2020 declined to 32 t, down 4 t (or 11%) y-o-y.

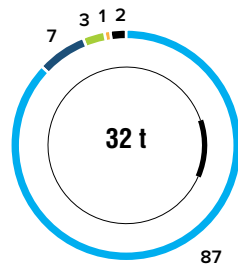
### AUTOMOTIVE INDUSTRY

The automotive industry is the key consumer of rhodium which is used in catalytic converters to detoxify exhaust fumes, thanks to the unique properties of this metal. Installation of such converters on motor vehicles is a legal requirement. Rhodium is considered the best catalyst for nitrogen oxide removal in petrol motors. In 2020, rhodium consumption by the automotive industry decreased by 3.2 t (down 10%) to 27.4 t, mainly due to falling vehicle output amid lockdown restrictions. However, the relaxation of coronavirus restrictions in the second half of the year, fiscal stimuli from most governments and monetary easing led to a recovery in demand. Another growth driver included tougher regulations on pollutant emissions, including the Real Driving Emissions (RDE) test, in effect in the EU as of September 2019. In China, the marked increase of rhodium usage in autocatalysts came in the wake of tougher environmental requirements as part of the China 6 rollout across the country starting from 2019. Tighter Tier 3 and LEV III standards in the USA and declining global share of diesel vehicles (due to their replacement

### INDUSTRIAL CONSUMPTION OF RHODIUM



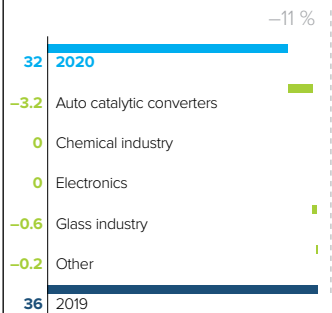
### RHODIUM CONSUMPTION IN 2020 BY INDUSTRY



- Exhaust treatment systems
- Chemical catalysts
- Glass production
- Electronics
- Other

Source: Company data

### RHODIUM CONSUMPTION BY APPLICATION AREA (t)



Source: Company data

with petrol vehicles) also partly offset the consequences of the decline in vehicle production in 2020 thanks to higher rhodium use per vehicle.

In 2020, rhodium consumption in the glass industry also plunged. Rhodium is used to make crucibles for glass batch melting. In 2020, the industry's demand for this metal decreased by 0.6 t due to its replacement with cheaper platinum.

Rhodium consumption in the chemical and electronics industries remained flat.

## PRODUCTION

Global production of primary refined rhodium in 2020 decreased by 5 t y-o-y to 20 t. In the reporting period, supply from South Africa, the world's largest rhodium producer, declined by 5 t due to the nationwide lockdown and operational issues at Anglo American Platinum's pyrometallurgical facilities. The output of the Russian Federation, North American and other countries remained flat.

Used exhaust gas catalysts are the main source of recycled rhodium. In 2020, recycled output declined by 0.6 t to 10.4 t due to the pandemic restrictions and a drop in new car sales which, in turn, impacted the supply of vehicles for recycling.

### PRIMARY RHODIUM PRODUCTION IN 2019–2020 (t)

2019–25 t

Countries	2020
South Africa	-5.1
Zimbabwe	+0.1
Russia	0
Canada	0
USA	0
Rest of world	0
<b>Total</b>	<b>20</b>

Source: Company data