

PLATINUM-GROUP METALS

(Platinum, palladium, rhodium, ruthenium, iridium, and osmium)
(Data in kilograms of platinum-group-metal content unless otherwise noted)

Domestic Production and Use: In 2017, one domestic company produced about 16,900 kilograms of platinum-group metals (PGMs) with an estimated value of about \$480 million from its two mines in south-central Montana. Small quantities of primary PGMs also were recovered as byproducts of copper refining. The leading use for PGMs was in catalytic converters to decrease harmful emissions from automobiles. PGMs are also used in catalysts for bulk-chemical production and petroleum refining; in electronic applications, such as in computer hard disks, in multilayer ceramic capacitors, and in hybridized integrated circuits; in glass manufacturing; in jewelry; and in laboratory equipment. Platinum is used in the medical sector; platinum and palladium, along with gold-silver-copper-zinc alloys, are used as dental restorative materials. Platinum, palladium, and rhodium are used as investments as exchange-traded products and individual holding of physical bars and coins.

Salient Statistics—United States:	2013	2014	2015	2016	2017^e
Mine production: ¹					
Platinum	3,720	3,660	3,670	3,890	3,900
Palladium	12,600	12,400	12,500	13,100	13,000
Imports for consumption ²					
Platinum	38,600	45,800	42,700	42,300	48,000
Platinum waste and scrap	77,200	112,000	123,000	159,000	380,000
Palladium	83,100	92,900	85,300	80,400	80,000
Rhodium	11,100	11,100	10,600	10,700	12,000
Ruthenium	15,400	11,000	8,230	8,410	13,000
Iridium	1,740	1,960	1,010	1,300	1,600
Osmium	77	322	8	27	90
Exports ³					
Platinum	11,100	14,800	14,400	14,000	16,000
Platinum waste and scrap	364,000	254,000	246,000	273,000	250,000
Palladium	25,900	22,100	23,000	17,500	38,000
Rhodium	1,220	433	759	794	650
Other PGMs	1,320	901	781	736	500
Price, dollars per troy ounce: ⁴					
Platinum	1,489.57	1,387.89	1,056.09	989.52	960.00
Palladium	729.58	809.89	694.99	617.39	860.00
Rhodium	1,069.10	1,174.23	954.90	696.84	1,050.00
Ruthenium	75.63	65.13	47.63	42.00	61.00
Iridium	826.45	556.19	544.19	586.90	907.00
Employment, mine, number ¹	1,773	1,619	1,439	1,432	1,400
Net import reliance ⁵ as a percentage of apparent consumption:					
Platinum ⁶	67	67	69	66	68
Palladium	60	65	53	53	45

Recycling: About 110,000 kilograms of platinum, palladium, and rhodium was recovered globally from new and old scrap in 2017, including about 55,000 kilograms recovered from automobile catalytic converters in the United States.

Import Sources (2013–16): Platinum:² South Africa, 40%; Germany, 15%; United Kingdom, 10%; Russia, 4%; and other, 31%. Palladium: South Africa, 30%; Russia, 25%; Italy, 14%; United Kingdom, 7%; and other, 24%.

Tariff: All unwrought and semimanufactured forms of PGMs are imported duty free.

Depletion Allowance: 22% (Domestic), 14% (Foreign).

PLATINUM-GROUP METALS

Government Stockpile:

Stockpile Status—9–30–17⁷

Material	Inventory	Disposal Plan FY 2017	Disposals FY 2017
Platinum	261	261	—
Iridium	15	15	—

Events, Trends, and Issues: The sole domestic PGM-mining company was sold to a South Africa-based mining company in May 2017. As of October, production was about the same as that in 2016. Progress continued on expansion development adjacent to one of its mines; development was ahead of schedule and first production was expected in the fourth quarter of 2017. The same mining company from South Africa also purchased platinum mines in South Africa, resulting in the company becoming the third-ranked platinum-producing company in the world.

Annual average prices of iridium, palladium, rhodium, and ruthenium increased by 55%, 39%, 51%, and 45%, respectively, compared with those of 2016. The average annual price of platinum was 3% lower than that of 2017 owing to a decrease in demand for diesel automobiles, in which platinum is used in catalytic converters. The palladium price increase was owing to increased demand for gasoline-powered automobiles, in which palladium is used in catalytic converters. The price increases for iridium and ruthenium were a result of increased industrial demand. In September, the price of palladium was briefly higher than that of platinum, which has not been the case since 2001.

Introduction of more stringent emission standards for automobiles in some countries is expected to result in increased demand for palladium, platinum, and rhodium for use in catalytic converters. Increased automobile production in developing countries indicates expected increased demand for PGMs beyond 2017.

World Mine Production and Reserves: Reserves for Russia were revised based on Government reports.

	Mine production				PGMs Reserves ⁸
	Platinum		Palladium		
	<u>2016</u>	<u>2017^e</u>	<u>2016</u>	<u>2017^e</u>	
United States	3,890	3,900	13,100	13,000	900,000
Canada	12,600	12,000	21,000	19,000	310,000
Russia	23,000	21,000	79,400	81,000	3,900,000
South Africa	133,000	140,000	76,300	78,000	63,000,000
Zimbabwe	14,900	15,000	12,000	12,000	1,200,000
Other countries	<u>3,300</u>	<u>4,000</u>	<u>8,200</u>	<u>8,400</u>	NA
World total (rounded)	191,000	200,000	210,000	210,000	69,000,000

World Resources: World resources of PGMs are estimated to total more than 100 million kilograms. The largest reserves are in the Bushveld Complex in South Africa.

Substitutes: Palladium has been substituted for platinum in most gasoline-engine catalytic converters because of the historically lower price for palladium relative to that of platinum. About 25% of palladium can routinely be substituted for platinum in diesel catalytic converters; the proportion can be as much as 50% in some applications. For some industrial end uses, one PGM can substitute for another, but with losses in efficiency.

^eEstimated. NA Not available. — Zero.

¹Estimates from published sources.

²Includes data for the following Harmonized Tariff Schedule codes: 7110.11.0010, 7110.11.0020, 7110.11.0050, 7110.19.0000, 7110.21.0000, 7110.29.0000, 7110.31.0000, 7110.39.0000, 7110.41.0010, 7110.41.0020, 7110.41.0030, 7110.49.0010, 7112.92.0000, and 7118.90.0020.

³Includes data for the following Schedule B numbers: 7110.11.0000, 7110.19.0000, 7110.21.0000, 7110.29.0000, 7110.31.0000, 7110.41.0000, 7110.49.0000, and 7112.92.0000.

⁴Engelhard Corp. unfabricated metal.

⁵Defined as imports – exports + adjustments for industry stock changes.

⁶Excludes imports and exports of waste and scrap.

⁷See [Appendix B](#) for definitions.

⁸See [Appendix C](#) for resource and reserve definitions and information concerning data sources.