

PLATINUM-GROUP METALS

(Platinum, palladium, rhodium, ruthenium, iridium, osmium)

(Data in kilograms unless otherwise noted)

Domestic Production and Use: In 2014, platinum-group metals (PGMs), with an estimated value of nearly \$495 million, were produced by one domestic mining company from its Stillwater and East Boulder Mines in south-central Montana. Small quantities of PGMs were also recovered as byproducts of copper refining. The leading demand for PGMs continued to be catalytic converters to decrease harmful emissions from automobiles. PGMs are also used in the glass industry; in jewelry; in the chemical industry for catalysts in nitric acid and other bulk-chemical production, for refining petroleum, and for fabricating laboratory equipment; and in the electronics industry in computer hard disks to increase storage capacity, in multilayer ceramic capacitors, and in hybridized integrated circuits. Platinum and palladium, along with gold-silver-copper-zinc alloys, are used as dental restorative materials. Platinum, palladium, and rhodium are used as investment in the form of exchange-traded products, as well as physical bars and coins.

Salient Statistics—United States:	2010	2011	2012	2013	2014^e
Mine production: ¹					
Platinum	3,450	3,700	3,670	3,720	3,650
Palladium	11,600	12,400	12,300	12,600	12,200
Imports for consumption:					
Platinum	152,000	129,000	172,000	116,000	130,000
Palladium	70,700	98,900	80,100	83,100	99,000
Rhodium	12,800	13,100	12,800	11,100	11,000
Ruthenium	14,100	13,300	10,200	15,300	11,000
Iridium	3,530	2,790	1,230	1,720	2,500
Osmium	76	48	130	77	235
Exports:					
Platinum	16,900	11,300	8,630	11,200	16,000
Palladium	38,100	32,000	32,200	25,900	24,000
Rhodium	2,320	1,370	1,040	1,220	700
Other PGMs	3,720	1,150	1,640	1,320	1,000
Price, ² dollars per troy ounce:					
Platinum	1,615.56	1,724.51	1,555.39	1,489.57	1,440.00
Palladium	530.61	738.51	649.27	729.58	830.00
Rhodium	2,459.07	2,204.35	1,274.98	1,069.10	1,180.00
Ruthenium	198.45	165.85	112.26	75.63	67.00
Iridium	642.15	1,035.87	1,066.23	826.45	573.00
Employment, mine, number ³	1,350	1,570	1,660	1,770	1,660
Net import reliance ³ as a percentage of apparent consumption ^e					
Platinum	91	89	90	84	85
Palladium	49	64	57	60	65

Recycling: An estimated 155,000 kilograms of platinum, palladium and rhodium was recovered globally from new and old scrap in 2014, including about 50,000 kilograms recovered from automobile catalytic converters in the United States.

Import Sources (2010–13): Platinum: Germany, 16%; South Africa, 16%; United Kingdom, 8%; Canada, 7%; and other, 53%. Palladium: Russia, 31%; South Africa, 28%; United Kingdom, 23%; Norway, 5%; and other, 13%.

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

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

Government Stockpile: Sales of iridium and platinum from the National Defense Stockpile remained suspended through FY 2014. Iridium inventory decreased by 3 kg from FY13 owing to losses resulting from purity upgrading.

Stockpile Status—9–30–14⁴

Material	Inventory	Disposal Plan FY 2014	Disposals FY 2014
Platinum	261	—	—
Iridium	15	—	—

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Events, Trends, and Issues: Workers at the three leading platinum mining companies in South Africa were on strike to demand higher wages. The strike, which lasted from January until June, was the longest in South Africa's mining history. At least 70,000 workers participated in the strike, which, according to the mining companies, resulted in lost production of about 33,600 kilograms of platinum and lost revenue of about \$2.3 billion. Rampup to full production levels was expected to be completed by December. In an effort to return to profitability in the face of increased expenses, one of the PGM producers planned to sell four of its mines.

Production began on schedule in July at one of the expansion projects adjacent to the only U.S. PGM mining company's existing mines. The company entered into a 5-year contract with a refiner whereby the refiner will process all of the PGM filter cake produced and had exclusive rights to purchase all of the mined palladium and a portion of the mined platinum. The mining company scaled back its spending and suspended the review process on its Canadian PGM project owing to an unacceptable rate of return at current metal prices.

A new domestic nickel-copper mine in Michigan began production in September and was expected to produce byproduct PGMs.

Prices of platinum fluctuated during the year, and were not markedly affected by the strikes in South Africa because producers processed PGMs from stocks. In contrast, prices of palladium steadily increased throughout the year, reaching \$900 per troy ounce in August for the first time since 2001. Palladium prices were supported by the political crisis in Ukraine, which led to concerns that economic sanctions might be enforced against Russia, the world's leading producer of palladium, and that supply disruptions might occur. Prices for rhodium fluctuated in the first half of the year and spiked in August, when prices were briefly higher than those for platinum for the first time since December 2011, owing to increased investor and industrial demand. Prices for iridium increased throughout the year but the average annual prices for both iridium and ruthenium were below those for 2013.

Automobile production levels were expected to climb, particularly in developing countries, and this was expected to result in increased demand for palladium, platinum, and rhodium, which are used in catalytic converters. Prices were expected to be supported by the robust automobile and industrial demand.

World Mine Production and Reserves:

	Mine production				PGMs Reserves ⁵
	Platinum		Palladium		
	<u>2013</u>	<u>2014^e</u>	<u>2013</u>	<u>2014^e</u>	
United States	3,720	3,650	12,600	12,200	900,000
Canada	7,000	7,200	16,500	17,000	310,000
Russia	25,500	25,000	80,000	81,000	1,100,000
South Africa	131,000	110,000	75,000	60,000	63,000,000
Zimbabwe	12,400	11,000	9,600	10,000	(⁶)
Other countries	<u>3,780</u>	<u>3,800</u>	<u>8,900</u>	<u>10,000</u>	<u>800,000</u>
World total (rounded)	183,000	161,000	203,000	190,000	66,000,000

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: Less-expensive palladium has been substituted for platinum in most gasoline-engine catalytic converters. About 25% 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. — Zero.

¹Estimates from published sources.

²Engelhard Corporation unfabricated metal.

³Defined as imports – exports + adjustments for Government and industry stock changes.

⁴See [Appendix B](#) for definitions.

⁵See [Appendix C](#) for resource/reserve definitions and information concerning data sources.

⁶Included with "Other countries."