

## PLATINUM-GROUP METALS

(Platinum, palladium, rhodium, ruthenium, iridium, osmium)  
(Data in kilograms unless otherwise noted)

**Domestic Production and Use:** The Stillwater and East Boulder Mines in south-central Montana were the only primary platinum-group metals (PGMs) mines in the United States and were owned by one company. Small quantities of PGMs were also recovered as byproducts of copper refining. The leading demand sector for PGMs continued to be catalysts to decrease harmful emissions in both light- and heavy-duty vehicles. PGMs are also used in the chemical sector as catalysts for manufacturing bulk chemicals such as nitric acid and in the production of specialty silicones; in the petroleum refining sector; and in laboratory equipment, including crucibles for growing high-purity single crystals for use in the electronics sector. Also in the electronics sector, PGMs are used in computer hard disks to increase storage capacity, in multilayer ceramic capacitors, and in hybridized integrated circuits. PGMs are used by the glass manufacturing sector in the production of fiberglass, liquid crystal displays, and flat-panel displays. Platinum alloys, in cast or wrought form, are commonly used for jewelry. Platinum, palladium, and a variety of complex gold-silver-copper alloys are used as dental restorative materials. Platinum, palladium, and rhodium are used as investment tools in the form of exchange-traded notes and exchange-traded funds.

<b>Salient Statistics—United States:</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012<sup>e</sup></b>
Mine production: <sup>1</sup>					
Platinum	3,580	3,830	3,450	3,700	3,700
Palladium	11,900	12,700	11,600	12,400	12,200
Imports for consumption:					
Platinum	150,000	183,000	152,000	129,000	164,000
Palladium	120,000	69,700	70,700	98,900	81,500
Rhodium	12,600	11,200	12,800	13,100	13,000
Ruthenium	49,800	21,200	14,100	13,200	12,500
Iridium	2,550	1,520	3,530	2,880	1,300
Osmium	11	68	76	48	75
Exports:					
Platinum	15,600	15,600	16,900	11,300	10,000
Palladium	26,400	30,300	38,100	32,000	36,000
Rhodium	1,980	1,220	2,320	1,370	1,600
Other PGMs	6,450	4,020	3,720	1,150	800
Price, <sup>2</sup> dollars per troy ounce:					
Platinum	1,578.26	1,207.55	1,615.56	1,724.51	1,580.00
Palladium	355.12	265.65	530.61	738.51	650.00
Rhodium	6,533.57	1,591.32	2,459.07	2,204.35	1,300.00
Ruthenium	324.60	97.28	198.45	165.85	115.00
Iridium	448.34	420.40	642.15	1,035.87	1,070.00
Employment, mine, number <sup>1</sup>	1,360	1,270	1,350	1,570	1,500
Net import reliance as a percentage of apparent consumption <sup>e</sup>					
Platinum	89	95	91	89	91
Palladium	79	62	49	64	54

**Recycling:** An estimated 150,000 kilograms of PGMs was recovered globally from new and old scrap in 2012.

**Import Sources (2008–11):** Platinum: Germany, 17%; South Africa, 14%; United Kingdom, 9%; Canada, 7%; and other, 53%. Palladium: Russia, 39%; South Africa, 24%; United Kingdom, 11%; Norway, 5%; and other, 21%.

**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 2012.

### Stockpile Status—9–30–12<sup>3</sup>

Material	Uncommitted inventory	Authorized for disposal	Disposal plan FY 2012	Disposals FY 2012
Platinum	261	261	<sup>4</sup> 778	—
Iridium	18	18	<sup>4</sup> 186	—

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**Events, Trends, and Issues:** The global economy continued to struggle, and average annual prices for palladium, platinum, rhodium, and ruthenium were lower in 2012 than those of 2011 owing to economic concerns. Prices for platinum, palladium, rhodium, and ruthenium increased from the beginning of the year until late February in response to supply disruptions caused by a 6-week workers' strike at a major PGM producer in South Africa that began in January. Prices decreased after resolution of the strike. In August, prices again spiked in response to workers' strike actions that erupted into violence at another major PGM producer in South Africa. Strikes spread to several other South African PGM mining companies resulting in supply disruptions, and prices remained elevated through September in response. The iridium price decreased in July and August owing to decreased buying. The platinum price was above that for rhodium for the first time since 2004, and continued to be below that for gold throughout the year.

The single domestic mining company continued progress on expansion projects adjacent to its two existing mines. The projects were expected to increase production, and one of the projects was expected to be completed in 2015 and the other in 2017. Test work continued on precious metals refinery technology.

A new palladium trading service was launched in China, which allowed private individuals to trade palladium via account, to let investors amass quantities of palladium through regular small investments in order to spread cost and diversify risks. In Canada, a new platinum and palladium exchange-traded fund (ETF) was scheduled to be launched and would be backed by physical metal held at the Royal Canadian Mint. The ETF was intended for long-term investment rather than short-term investment on price fluctuations. Unlike traditional ETFs, investors could redeem the physical metal.

### World Mine Production and Reserves:

	Mine production				PGMs Reserves <sup>5</sup>
	Platinum		Palladium		
	2011	2012 <sup>e</sup>	2011	2012 <sup>e</sup>	
United States	3,700	3,700	12,400	12,200	900,000
Canada	7,000	6,500	14,000	13,000	310,000
Colombia	1,230	660	NA	NA	( <sup>6</sup> )
Russia	25,000	26,000	86,000	82,000	1,100,000
South Africa	145,000	128,000	82,000	72,000	63,000,000
Zimbabwe	10,600	11,500	8,200	8,900	( <sup>6</sup> )
Other countries	2,500	2,500	12,200	12,000	800,000
World total (rounded)	195,000	179,000	215,000	200,000	66,000,000

**World Resources:** World resources of PGMs in mineral concentrations that can be mined economically are estimated to total more than 100 million kilograms. The largest reserves are in the Bushveld Complex in South Africa.

**Substitutes:** Most motor vehicle manufacturers have substituted palladium for the more expensive platinum in gasoline-engine catalytic converters. As much as 25% palladium can routinely be substituted for platinum in diesel catalytic converters; new technologies have increased that proportion to around 50% in some applications. For other end uses, some PGMs can be substituted for other PGMs, with some losses in efficiency.

<sup>e</sup>Estimated. NA Not available. — Zero.

<sup>1</sup>Estimates from published sources.

<sup>2</sup>Engelhard Corporation unfabricated metal.

<sup>3</sup>[See Appendix B for definitions.](#)

<sup>4</sup>Actual quantity limited to remaining inventory.

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

<sup>6</sup>Included with "Other countries."