[Data in metric tons of rare-earth oxide (REO) equivalent content unless otherwise noted]

Domestic Production and Use: Rare earths were mined by one company in 2014. Bastnäsite, a fluorocarbonate mineral, was mined and processed into concentrates and rare-earth compounds at Mountain Pass, CA. The United States continued to be a net importer of rare-earth products in 2014. The estimated value of rare-earth metals and compounds imported by the United States in 2014 was \$210 million, a decrease from \$256 million imported in 2013. The estimated distribution of rare earths by end use was as follows, in decreasing order: catalysts, 60%; metallurgical applications and alloys, 10%; permanent magnets, 10%; glass polishing, 10%; and other, 10%.

Salient Statistics—United States:	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u> ^e
Production, bastnäsite concentrates	—	—	3,000	5,500	7,000
Imports: ²					
Compounds:					
Cerium compounds	1,770	1,120	1,390	1,160	1,500
Other rare earth compounds	10,500	6,020	3,900	8,080	10,000
Metals:					
Rare-earth metals, scandium, and yttrium	525	468	240	393	310
Ferrocerium, alloys	131	186	267	313	360
Exports: ²					
Compounds:					
Cerium compounds	1,350	1,640	992	734	640
Other rare-earth compounds	1,690	3,620	1,830	5,570	5,600
Metals:					
Rare-earth metals, scandium, and yttrium	1,380	3,030	2,080	1,040	160
Ferrocerium, alloys	3,460	2,010	951	1,420	2,100
Consumption, estimated	15,000	11,000	15,000	15,000	17,000
Price, dollars per kilogram, yearend ³ :					
Cerium oxide, 99% minimum	60–62	40–45	10–12	5–6	4–5
Dysprosium oxide, 99% minimum	285–305	1,400–1,420	600–630	440–490	320–360
Europium oxide, 99.9% minimum	620–640	3,780-3,800	1,500–1,600	950–1,000	680–730
Lanthanum oxide, 99% minimum	59–61	50–52	9–11	6	5
Mischmetal, 65% cerium, 35% lanthanum	57–60	47–49	14–16	9–10	9–10
Neodymium oxide, 99% minimum	86–89	190–200	75–80	65–70	56–60
Terbium oxide, 99% minimum	595–615	2,800-2,820	1,200–1,300	800-850	590–640
Employment, mine and mill, annual average	98	146	275	380	394
Net import reliance ⁴ as a percentage of					
estimated consumption ^e	100	100	80	63	59

Recycling: Limited quantities, from batteries, permanent magnets, and fluorescent lamps.

Import Sources (2010–13): Rare-earth compounds and metals: China, 75%; France, 6%; Japan, 6%; Estonia, 4%; and other, 9%.

<u>Tariff</u> : Item	Number	Normal Trade Relations 12–31–14
Rare-earth metals, scandium and yttrium		
whether or not intermixed or interalloyed	2805.30.0000	5.0% ad val.
Cerium compounds		
Oxides	2846.10.0010	5.5% ad val.
Other	2846.10.0050	5.5% ad val.
Other rare-earth compounds		
Lanthanum oxides	2846.90.2005	Free.
Other oxides	2846.90.2040	Free.
Lanthanum carbonates	2846.90.8070	3.7% ad val.
Other carbonates	2846.90.8075	3.7% ad val.
Other rare-earth compounds	2846.90.8090	3.7% ad val.
Ferrocerium and other pyrophoric alloys	3606.90.3000	5.9% ad val.

Depletion Allowance: Monazite, 22% on thorium content and 14% on rare-earth content (Domestic), 14% (Foreign); bastnäsite and xenotime, 14% (Domestic and foreign).

RARE EARTHS

Government Stockpile: None.

Events, Trends, and Issues: In 2014, increased domestic consumption of rare earths was stimulated by lower prices and increased availability of rare-earth compounds. Increased domestic production of separated rare-earth products was hampered by technical difficulties in the rampup of new production capacity. Despite increased global demand for rare earths in the permanent magnet and catalyst industries, prices for most rare-earth compounds declined in 2014 owing to an excess of inventory in the market. Consumption of rare-earths in the phosphor industry decreased owing to the increased use of LED lighting, which requires less rare earths than fluorescent lighting.

Global consumption of rare earths was expected to increase at a compound annual growth rate in excess of 5% from 2014 through 2020. China continued to dominate the global supply of rare earths. In 2014, China's rare-earth export quotas were 31,000 tons, including 27,383 tons for light rare earths and 3,617 tons for heavy rare earths. In August, the World Trade Organization upheld a ruling in favor of the United States, the European Union, and Japan's claims that China violated trade rules with respect to the unfair imposition of export restrictions on rare earths despite China's claims that the controls were aimed at protecting the environment and conserving resources. China continued efforts to consolidate its rare-earths industry and clamp down on illegal production and exports. China's State Bureau of Material Reserve continued to expand its stockpile of rare earths.

Exploration efforts to develop rare-earth projects continued in 2014. Exploration and development assessments in the United States included Bear Lodge, WY; Bokan Mountain, AK; Diamond Creek, ID; Elk Creek, NE; La Paz, AZ; Lemhi Pass, ID-MT; Pea Ridge, MO; Round Top, TX; and Thor, NV. Additional projects were underway in Australia, Brazil, Canada, China, Finland, Greenland, India, Kyrgyzstan, Madagascar, Malawi, Mozambique, Namibia, South Africa, Sweden, Tanzania, Turkey, and Vietnam.

<u>World Mine Production and Reserves</u>: U.S. reserves were revised to include only those reserves compliant with recognized standards. This resulted in a large reduction in the U.S. reserves reported in 2015 compared to previous years. Domestic reserves include an estimated 1.5 million tons at Mountain Pass that were compliant with the Securities and Exchange Commission's Industry Guide 7 and 390,000 tons of reserves at the Bear Lodge deposit in Wyoming compliant with Canada's National Instrument 43-101 standard. The reserves reported for other countries will transition to stricter standards as better information becomes available.

	Mine p	Reserves⁵	
	2013	<u>2014</u>	
United States	5,500	7,000	1,800,000
Australia	2,000	2,500	⁶ 3,200,000
Brazil	330	_	22,000,000
China	95,000	95,000	55,000,000
India	2,900	3,000	3,100,000
Malaysia	180	200	30,00 <u>0</u>
Russia	2,500	2,500	(')
Thailand	800	1,100	NA
Vietnam	220	200	(')
Other countries	<u>NA</u>	NA	41,000,000
World total (rounded)	110,000	110,000	130,000,000

World Resources: Rare earths are relatively abundant in the Earth's crust, but discovered minable concentrations are less common than for most other ores. U.S. and world resources are contained primarily in bastnäsite and monazite. Bastnäsite deposits in China and the United States constitute the largest percentage of the world's rare-earth economic resources, and monazite deposits constitute the second largest segment.

Substitutes: Substitutes are available for many applications but generally are less effective.

^eEstimated. NA Not available. — Zero.

¹Data include lanthanides and yttrium but exclude most scandium. See also Scandium and Yttrium.

- ²REO equivalent or contents of various materials were estimated. Source: U.S. Census Bureau.
- ³Price range from Metal-Pages Ltd.

⁵See<u>Appendix C</u> for resource/reserve definitions and information concerning data sources.

⁶For Australia, Joint Ore Reserves Committee (JORC)-compliant reserves were about 2.2 million tons.

⁷Included with "Other countries."

⁴Defined as estimated consumption – production. Insufficient data were available to determine stock changes and unattributed imports and exports of rare-earth materials.