

RARE EARTHS¹

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

Domestic Production and Use: Rare earths were mined domestically in 2020. Bastnaesite (or bastnäsite), a rare-earth fluorocarbonate mineral, was mined as a primary product at a mine in Mountain Pass, CA. Monazite, a phosphate mineral, was produced as a separated concentrate or included as an accessory mineral in heavy-mineral concentrates. The estimated value of rare-earth compounds and metals imported by the United States in 2020 was \$110 million, a significant decrease from \$160 million in 2019. The estimated distribution of rare earths by end use was as follows: catalysts, 75%; ceramics and glass, 6%; polishing, 5%; metallurgical applications and alloys, 4%; and other, 10%.

Salient Statistics—United States:	2016	2017	2018	2019	2020^e
Production, bastnaesite and monazite concentrates ^e	—	—	14,000	28,000	38,000
Imports: ^{2, e}					
Compounds	11,800	11,000	10,800	12,300	6,700
Metals:					
Ferrocerium, alloys	268	309	298	332	260
Rare-earth metals, scandium, and yttrium	404	524	526	627	380
Exports: ^{2, e}					
Ores and compounds	590	1,740	17,900	28,200	38,000
Metals:					
Ferrocerium, alloys	943	982	1,250	1,290	630
Rare-earth metals, scandium, and yttrium	103	55	28	83	27
Consumption, apparent ³	10,500	9,060	6,520	11,700	7,800
Price, average, dollars per kilogram: ⁴					
Cerium oxide, 99.5% minimum	2	2	2	2	2
Dysprosium oxide, 99.5% minimum	198	187	179	239	258
Europium oxide, 99.99% minimum	74	77	53	35	31
Lanthanum oxide, 99.5% minimum	2	2	2	2	2
Mischmetal, 65% cerium, 35% lanthanum	5	6	6	6	5
Neodymium oxide, 99.5% minimum	40	50	50	45	47
Terbium oxide, 99.99% minimum	415	501	455	507	628
Employment, mine and mill, annual average, number	—	24	190	202	180
Net import reliance ⁵ as a percentage of apparent consumption: ⁶					
Compounds and metals	100	100	100	100	100
Mineral concentrates	XX	XX	E	E	E

Recycling: Limited quantities of rare earths are recovered from batteries, permanent magnets, and fluorescent lamps.

Import Sources (2016–19): Rare-earth compounds and metals: China, 80%; Estonia, 5%; Japan and Malaysia, 4% each; and other, 7%. Compounds and metals imported from Estonia, Japan, and Malaysia were derived from mineral concentrates and chemical intermediates produced in Australia, China, and elsewhere.

Tariff:	Item	Number	Normal Trade Relations
			12–31–20
	Rare-earth metals	2805.30.0000	5.0% ad val.
	Cerium compounds	2846.10.0000	5.5% ad val.
	Other rare-earth compounds:		
	Oxides or chlorides	2846.90.2000	Free.
	Carbonates	2846.90.8000	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).

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Government Stockpile:⁷ In the addition to the materials listed below, the FY 2021 potential acquisitions include neodymium, 600 tons; praseodymium, 70 tons; and samarium-cobalt alloy, 50 tons.

Material	Inventory as of 9–30–20	FY 2020		FY 2021	
		Potential acquisitions	Potential disposals	Potential acquisitions	Potential disposals
Cerium	—	900	—	500	—
Dysprosium	0.2	—	—	20	—
Europium	20.9	—	—	—	—
Ferrodysprosium	0.5	—	—	—	—
Lanthanum	—	4,100	—	1,300	—
Rare-earth-magnet feedstock	—	100	—	100	—
Yttrium	25	—	—	600	—

Events, Trends, and Issues: Global mine production was estimated to have increased to 240,000 tons of rare-earth-oxide equivalent. According to China's Ministry of Industry and Information Technology, the mine production quota for 2020 was 140,000 tons with 120,850 tons allocated to light rare earths and 19,150 tons allocated to ion-adsorption clays.

World Mine Production and Reserves: Reserves for Brazil and the United States were revised based on information from Government and industry reports.

	Mine production		Reserves ⁸
	2019	2020 ^e	
United States	28,000	38,000	1,500,000
Australia	20,000	17,000	⁹ 4,100,000
Brazil	710	1,000	21,000,000
Burma	25,000	30,000	NA
Burundi	200	500	NA
Canada	—	—	830,000
China	¹⁰ 132,000	¹⁰ 140,000	44,000,000
Greenland	—	—	1,500,000
India	2,900	3,000	6,900,000
Madagascar	4,000	8,000	NA
Russia	2,700	2,700	12,000,000
South Africa	—	—	790,000
Tanzania	—	—	890,000
Thailand	1,900	2,000	NA
Vietnam	1,300	1,000	22,000,000
Other countries	66	100	310,000
World total (rounded)	220,000	240,000	120,000,000

World Resources:⁸ Rare earths are relatively abundant in the Earth's crust, but minable concentrations are less common than for most other mineral commodities. In North America, measured and indicated resources of rare earths were estimated to include 2.7 million tons in the United States and more than 15 million tons in Canada.

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

^eEstimated. E Net exporter. NA Not available. XX Not applicable. — Zero.

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

²REO equivalent or content of various materials were estimated. Source: U.S. Census Bureau.

³Defined as production + imports – exports.

⁴Source: Argus Media group—Argus Metals International.

⁵Defined as imports – exports.

⁶In 2018–2020, all domestic production of mineral concentrates was exported, and all compounds and metals consumed were assumed to be imported material.

⁷Gross weight. See Appendix B for definitions.

⁸See Appendix C for resource and reserve definitions and information concerning data sources.

⁹For Australia, Joint Ore Reserves Committee-compliant reserves were 2.8 million tons.

¹⁰Production quota; does not include undocumented production.