

# 2016 Minerals Yearbook

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## INDIA

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# THE MINERAL INDUSTRY OF INDIA

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In 2016, India ranked first in the world in the production of iron oxide pigments; second in the production of barite, cement, and graphite; third, of chromium (chromite ore), kaolin, pig iron, lime, nitrogen (ammonia), and raw steel; fourth, of alumina, feldspar, and iron ore; fifth, of bauxite; sixth, of manganese; and seventh, of lead. The country's estimated share of world production for barite in 2016 was 14%; graphite, 13%; kaolin, 12%; chromium (chromite ore), 11%; bauxite, 9%; iron ore (Fe content) and nitrogen (ammonia), 8% each; cement, 7%; feldspar and raw steel, 6% each; and lime, manganese, and pig iron, 5% each (table 1; Apodaca, 2018; Bray, 2018; Corathers, 2018a, b; Fenton, 2018; Klocho, 2018; McRae, 2018; Olson, 2018; Singerling, 2018; Tanner, 2018; Tuck, 2018; van Oss, 2018).

## Minerals in the National Economy

In 2016, India's real gross domestic product (GDP) increased by 7.1% compared with 8.0% (revised) in 2015. The nominal GDP in 2016 was \$2.46 trillion. The mining and quarrying sector accounted for 2.4% of the GDP in 2016 compared with 2.6% in 2015. The manufacturing sector accounted for 16.1% of the GDP in 2016 compared with 16.3% in 2015 (Ministry of Statistics and Programme Implementation, 2017, front page; International Monetary Fund, 2018; World Bank, The, 2018).

## Government Policies and Programs

In 2016, the amended Mines and Minerals (Development and Regulations) Act, 1957 (MMDR) was passed by Parliament. The objectives of the MMDR are to identify illegally awarded mining licenses, make allocation of licenses more transparent and only through auctions, improve the living conditions of communities around mines, and give States the right to award licenses with approval from the central Government. According to the MMDR, the minerals in India are classified as major minerals and minor minerals. Major minerals include bauxite, bentonite, chromite, coal, copper, diamond, fluorite, garnet, gold, graphite, ilmenite, iron ore, kyanite, lead, limestone, magnesite, manganese, marble, phosphate rock, rutile, salt, selenite, sillimanite, silver, sulfur, tin concentrates, uranium, vermiculite, wollastonite, and zinc. Minor minerals include barite, calcite, clay, corundum, diaspore, dolomite, dunite, feldspar, granite, gypsum, kaolin, mica, ochre, quartz, and talc (Bhushan, 2015; Times of India, The, 2016; Indian Bureau of Mines, 2017e; Prsindia.org, 2018).

## Production

The production of minor minerals has not been reported by the Indian Bureau of Mines since 2015. The production estimates of minor minerals in table 1 are based on past levels of production and occasional data reports published in the mass media. In 2016, the production of salt increased by 117%; calcite, by 100%; barite, by 50%; ferrovanadium, by 44%; ferroaluminum, by 38%; diamond, by 36%; gold (mine

production, gross weight), by 35%; graphite, by 33%; iron ore (mine production, gross weight), by 30%; iron ore (Fe content) and magnesite, by 29% each; mica, by 27%; ferromolybdenum, by 26%; chromite (mine production), by 25%; sulfur (as a byproduct of petroleum and fertilizer) and uranium, by 19% each; silver, mine production, by 16%; copper (mine production, Cu content) and natural gas, by 15% each; ferrotitanium, primary gold (smelter production), and quartz and quartzite, by 13% each; silver, refinery production, by 12%; pig iron, by 9%; cement and lead (mine production, Pb content), by 8% each; raw steel, garnet (abrasives), and feldspar (mine production), by 7% each; limestone and silicomanganese, by 6% each; and finished steel products, by 5% (table 1).

In 2016 the production of cadmium (refined) decreased by 84%; ball clay, by 75%; kaolin (total), by 64%; phosphate rock (gross weight), by 58%; cobalt (refined), by 50%; fire clay, by 41%; vermiculite, by 39%; zinc (smelter, primary), by 26%; tin (mine production, concentrate), by 24%; zinc (mine production, Zn content), by 23%; sponge iron and manganese (Mn content), by 17% each; phosphate rock (P<sub>2</sub>O<sub>5</sub> content), by 58%; fluorspar and semimanufactured steel products, by 15% each; bauxite, by 14%; soapstone and steatite, by 9% combined; and primary lead (refined), by 6%. Data on mineral production are in table 1.

## Structure of the Mineral Industry

In 2016, the number of mines (excluding those for nuclear and minor minerals) that reported production was 2,054 compared with 3,635 (revised) in 2015. Of the 2,054 operating mines, 512 were fuel mineral mines, 667 were metallic mineral mines, and 875 were industrial mineral mines. In 2016, the Government continued with privatization of coal mines owned by Coal India Ltd. Hindustan Copper Ltd. was the sole company that produced copper metal from the ore produced at its mines. Vedanta Ltd. (formerly known as Sesa Sterlite Ltd.) and Hindalco Industries Ltd. produced copper metal from imported copper concentrates. Table 2 is a list of major mineral industry facilities (Indian Bureau of Mines, 2015, p. ix; 2016, p. 17; 2017b, p. 21; Deccan Chronicle, 2017).

## Mineral Trade

The total value of India's exports decreased to \$264 billion in 2016 from \$267 billion in 2015. The total value of the country's imports decreased by 8% to \$360 billion in 2016 from \$392 billion in 2015.

In 2016, owing to banknote demonetization, consumption of gold increased, which led to an increase in imports of gold. In fiscal year 2016,<sup>1</sup> gold metal imports increased to 968,075 kilograms (kg) from 915,473 kg in fiscal year 2015. India's main gold import

<sup>1</sup>The Government of India's fiscal year runs from April 1 of the year stated to March 31 of the following year; for example, fiscal year 2016 ran from April 1, 2016, through March 31, 2017.

partners were Switzerland (which supplied 48% of India's gold imports) and the United Arab Emirates (9%). Exports increased by 91% to 135,275 kg from 70,796 kg in fiscal year 2015, and the main gold export partner was the United Arab Emirates (which received 99% of India's gold exports) (tables 3, 4; United Nations Conference on Trade and Development, 2016, p. 4–5; 2017, p. 90; Indian Bureau of Mines, 2017c, p. 23–24; Topf, 2017a).

In 2016, India's exports of iron ore increased to 21.7 million metric tons (Mt) from 4.2 Mt in 2015. The increase of exports of iron ore was owing to the increase in mine production of iron ore in the State of Goa. In 2016, imports of iron ore decreased to 3.6 Mt from 9.5 Mt in 2015. The main export partners for iron ore were China (which received 60% of India's iron ore exports), Japan, (25%), and Iran and the Republic of Korea (7% each). The main import partners for iron ore were South Africa (which supplied 42% of India's iron ore imports), Brazil (28%), and Australia (16%) (tables 3, 4; Topf, 2017b; World Steel Association, 2017, p. 104–105).

In 2015, India imposed a 20% antidumping import tax on stainless-steel imports from China. India also imposed a 2.5% duty on imports of basic steel products in June 2015. The duty on flat-rolled products increased to 10% from 7.5%, and that on long products increased to 7.5% from 5.0%. India had been a net importer of steel products since 2006. In 2016, imports of long products decreased by 29% to 1.4 Mt from 2.0 Mt in 2015; flat products, by 28% to 7.1 Mt from 9.8 Mt; semifinished and finished steel products, by 25% to 9.9 Mt from 13.3 Mt; ingots and semis, by 25% to 577,000 metric tons (t) from 765,000 t. Exports of ingots and semis increased by 130% to 1.8 Mt in 2016 from 769,000 t in 2015; semifinished and finished steel products, by 37% to 10.3 Mt from 7.6 Mt; long products, by 37% to 1.0 Mt from 766,000 t; and flat products, by 32% to 5.8 Mt from 4.4 Mt (tables 3, 4; Times of India, The, 2015; International Trade Administration, 2016, p. 13; World Steel Association, 2017, p. 55, 58, 60, 63, 68, 70, 73).

In 2016, imports of copper blister and anode increased by 80%; alumina, by 43%; copper ore concentrates, by 24%; semifabricated copper and alloys, by 20%; cement, by 16%; graphite (natural), by 15%; and gypsum, by 13%. Imports of lead ore and concentrates decreased by 87% in 2016; zinc ore and concentrates, by 86%; potash, by 22%; copper alloy ingots, by 13%; and refined copper, by 10%. Exports of zinc ore and concentrates decreased by 100% in 2016; bauxite, by 66%; potash, by 31%; diamond, by 19%; barite, by 18%; and refined copper, by 11%. Exports of gypsum increased by 50%; graphite, by 32%; and coal, by 27% (tables 3, 4).

## Commodity Review

### *Metals*

**Bauxite and Alumina and Aluminum.**—In 2016, India produced 6.0 Mt of alumina compared with 5.5 Mt in 2015. In 2016, National Aluminium Co. Ltd. (NALCO) was the leading producer of alumina in India and accounted for 46% of the country's alumina production. Hindalco Industries Ltd. (which was 33% owned by Aditya Birla Group; 26%, by foreign investors; 23%, by private Indian investors; and 18%, by financial institutions) was planning to increase the production capacity

of its alumina refinery in Belagavi, State of Karnataka, to 650,000 metric tons per year (t/yr) from 350,000 t/yr; the year in which this was to take place was not specified (tables 1, 2; Indian Bureau of Mines, 2017a, p. 3, 6).

**Iron Ore and Steel.**—India produced 114 Mt of iron ore (Fe content) in 2016 compared with 88 Mt (revised) in 2015. In 2016, the leading producing State was Odisha, which accounted for 51% of India's total production; followed by Karnataka, 16%; Chhattisgarh, 15.8%; and Jharkhand, 12%; Andhra Pradesh, Goa, Madhya Pradesh, and Rajasthan contributed the remaining 4.7% (table 1; Indian Bureau of Mines, 2017d, p. 2).

In 2016, The Steel Authority of India Ltd. (SAIL; a Government-owned company) operated five steel plants—the Bhilai steel plant in the State of Chhattisgarh, the Rourkela steel plant in the State of Odisha, the Durgapur steel plant in the State of West Bengal, the Bokaro steel plant in the State of Jharkhand, and the Indian Iron and Steel Co. Ltd. (IISCO) steel plant at Burnpur in the State of West Bengal. In 2016, SAIL was working on expanding the production capacity of the four steel plants at Bhilai, Bokaro, Burnpur, and Rourkela to 21.4 million metric tons per year (Mt/yr) from 12.8 Mt/yr (Indian Bureau of Mines, 2017d, p. 14).

In 2016, POSCO of the Republic of Korea announced the decision not to pursue any longer the plan to construct a 12-Mt/yr steel plant in the State of Odisha; the project was one of India's biggest foreign direct investments in 2005. As of yearend 2014, POSCO had received environmental clearance approval; however, POSCO would not be able to start construction of the plant owing to land acquisition issues. Also, implementation of the Mineral (Auction) Rule indicated that the company would have to obtain a mining license through an auction (Nam and Mukherji, 2015; Sethi, 2016).

**Rare Earths (Monazite).**—In 2016, the Government announced plans to auction off a rare-earth mining block in the Bramer District in the State of Rajasthan in April 2017. In 2015, the state-owned Indian Rare Earths Ltd. (IREL) (India Department of Atomic Energy, 100%) commenced its only monazite-processing plant with a production capacity of 11,000 t/yr of mixed rare-earth chlorides. The plant would process monazite from the beaches of the States of Kerala, Odisha, and Tamil Nadu. The State of Andhra Pradesh hosts monazite deposits with an estimated resource of 3.70 Mt; Tamil Nadu, 2.50 Mt; Odisha, 2.40 Mt; Kerala, 2.0 Mt; West Bengal, 1.0 Mt; and Jharkhand, 220,000 t (Dickson, 2015, p. 14; India Bureau of Mines, 2017f, p. 2; Li, 2017).

**Titanium and Zirconium (Mineral Sands).**—In 2016, Trimex Group of the United Arab Emirates received approval from the State of Andhra Pradesh to develop heavy-mineral-sand projects at Bhavanapadu and Kalingaratnam in Srikakulam District. The Bhavanapadu project was expected to be developed by Trimex Heavy Minerals Pvt Ltd. (THMPL), and the production capacity was expected to be 10 Mt/yr of heavy-mineral sand. The Kalingaratnam project was expected to be developed by Trimex Ores Pvt Ltd., and the production capacity was expected to be 4 Mt/yr of heavy-mineral sand, including ilmenite, rutile, zircon, garnet, and sillimanite (Salwan, 2016).

**Diamond.**—In 2016, Rio Tinto Ltd. of Australia announced that it would not proceed further with its wholly owned Bunder diamond project in the State of Madhya Pradesh owing to regulatory issues and local opposition. As of yearend 2015, Rio Tinto had planned to invest \$500 million and was awaiting environmental and forest clearances. As of 2015, the total inferred mineral resources were reported to be 44 Mt at an average grade of 0.7 carats per metric ton diamond (Jamasmie, 2015, 2016; Rio Tinto Ltd., 2015, p. 222).

### Minerals Fuels

**Coal.**—In 2016, the total proved mineral reserves of coal in India were estimated to be 94.8 billion metric tons (Gt), and India was the fifth-ranked country in the world for coal reserves after China, the United States, Russia, and Australia. India produced 647 Mt of bituminous coal and 45 Mt of lignite coal in 2016 compared with 631 Mt of bituminous coal and 44 Mt of lignite coal in 2015. In 2016, India remained the world's third-ranked consumer of coal (411.9 Mt) after China (1.9 Gt) and the United States (358.4 Mt). The country's imports of coal increased to 204 Mt in 2016 from 212 Mt in 2015. Despite large reserves of coal and an increase in the production of coal, India remained dependent on imported coal. The Government decided to reduce dependency on imported coal and increase production of coal to meet the country's power generation needs. In 2015, through its Billion Ton policy, the Government set a production goal for Coal India Ltd., which was responsible for more than 80% of the coal production in the country. According to the policy, the company was to increase its production to 1 billion metric tons per year of coal by 2020 (tables 1, 4, 5; PwC India, 2016, p. 2; U.S. Energy Information Administration, 2016, p. 1, 17; BP p.l.c., 2017, p. 39; Russell, 2017).

### Reserves and Resources

Table 5 is a list of mineral reserves in India.

### Outlook

The Government is intensifying its efforts to increase the country's mineral production by adopting new mineral policies and amending existing ones, implementing new trade policies, and trying to attract foreign investment into its mineral industry. In 2017, the production capacities for alumina and iron ore are expected to continue to increase, and during the next few years, production of steel and coal are also most likely to continue to increase. India is likely to continue to import copper, natural gas, petroleum, and other raw materials. The development of India's mining industry will depend on how the country overcomes the challenges facing its mineral industry, the speed of implementation of some reforms and policies, and the pace of growth in domestic demand.

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TABLE 1  
INDIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons, gross weight, unless otherwise specified)

Commodity <sup>2</sup>	2012	2013	2014	2015	2016
<b>METALS</b>					
<b>Aluminum:</b>					
Bauxite thousand metric tons	13,463	20,664 <sup>r</sup>	22,636 <sup>r</sup>	27,757	23,886
Alumina, Al <sub>2</sub> O <sub>3</sub> equivalent do.	4,347	4,040	5,060	5,512 <sup>r</sup>	6,028
Metal, primary do.	1,704	1,703 <sup>r</sup>	1,939 <sup>r</sup>	2,355 <sup>r</sup>	2,723
Cadmium, refinery production, primary, metal	377 <sup>r</sup>	287	116 <sup>r</sup>	130 <sup>r</sup>	21
Chromite, mine production thousand metric tons	3,255	2,633 <sup>r</sup>	2,374	2,656	3,329
Cobalt, refinery production, Co content	800	295	100	100 <sup>r</sup>	50
<b>Copper:</b>					
Mine production, Cu content	34,000 <sup>s, r</sup>	34,800 <sup>r</sup>	26,700 <sup>r</sup>	29,900 <sup>r</sup>	34,346
Refinery production, primary, electrolytic	695,400 <sup>r</sup>	617,000	766,000	791,900	773,300
<b>Smelter production:</b>					
Primary	680,000 <sup>r</sup>	617,000 <sup>r</sup>	766,000	792,600 <sup>r</sup>	773,300
Secondary	--	--	--	--	8,000
Total	680,000	617,000	766,000	793,000	781,000
<b>Ferroalloys:</b>					
Ferroaluminum	5,386	5,108	4,596	3,009	4,139
Ferroboreon	34	30	45	218	--
Ferromanganese	419,200 <sup>r</sup>	455,400 <sup>r</sup>	533,300 <sup>r</sup>	476,300 <sup>r</sup>	518,000
Ferromolybdenum	1,057	1,151	1,281	1,281	1,614
Ferrosilicomagnesium	18,246	21,365	25,788 <sup>r</sup>	21,887	21,140
Ferrosilicon	90,000	92,013 <sup>r</sup>	92,014 <sup>r</sup>	92,000 <sup>s, r</sup>	90,000
Ferrosilicozirconium	--	--	--	10 <sup>e</sup>	--
Ferrotitanium	542	692 <sup>r</sup>	760	204 <sup>r</sup>	231
Ferrovandium	815	815	1,031	879 <sup>r</sup>	1,266
Silicomanganese	234,639 <sup>r</sup>	220,275 <sup>r</sup>	243,246 <sup>r</sup>	276,455 <sup>r</sup>	292,000
Total	770,000 <sup>r</sup>	797,000 <sup>r</sup>	902,000 <sup>r</sup>	872,000 <sup>r</sup>	637,000
<b>Gold:</b>					
Mine production, gross weight kilograms	504,549	403,723	435,245	469,336	631,815
Mine production, Au content <sup>e</sup> do.	3,200	1,600	1,600	2,000	1,700
Smelter production, primary do.	1,748	1,423	1,587	1,375	1,555
Refinery production, bullion do.	9,388	7,282	10,304	10,255	10,299
<b>Iron and steel:</b>					
Direct-reduced iron thousand metric tons	20,050	16,893	20,366	16,228	16,244
Pig iron do.	47,987	51,359	55,166	58,393	63,714
Raw steel do.	77,264	81,299	87,292	89,026	95,477
<b>Products:</b>					
Finished do.	84,369	92,911	105,861	99,650	104,931
Semimanufactured do.	29,147	42,314	61,751	45,266	38,391
<b>Iron ore, mine production:</b>					
Gross weight do.	122,491 <sup>r</sup>	140,416 <sup>r</sup>	138,000 <sup>r</sup>	142,399 <sup>r</sup>	184,501
Fe content <sup>e</sup> do.	75,900 <sup>r</sup>	87,100 <sup>r</sup>	85,600 <sup>r</sup>	88,300 <sup>r</sup>	114,000
<b>Lead:</b>					
Mine production, ore, Pb content	100,000	105,000	106,000 <sup>e</sup>	136,000	147,000
<b>Refinery production:</b>					
Primary	119,000	120,000	129,000	143,000	134,000
Secondary	341,000	343,000	348,000	358,000	385,000
Total	460,000	463,000	477,000	501,000	519,000
Magnesite	216,072	183,716	266,856	246,055	317,084
<b>Manganese, mine production:</b>					
Ore and concentrate thousand metric tons	2,226 <sup>r</sup>	2,536 <sup>r</sup>	2,382 <sup>r</sup>	2,117 <sup>r</sup>	2,100
Mn content do.	689 <sup>r</sup>	1,184 <sup>r</sup>	600 <sup>r</sup>	900	745
Selenium kilograms	16,000	17,000 <sup>r</sup>	17,000	17,000	17,000 <sup>e</sup>

See footnotes at end of table.

TABLE 1—Continued  
INDIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons, gross weight, unless otherwise specified)

Commodity <sup>2</sup>	2012	2013	2014	2015	2016
METALS—Continued					
Silver:					
Mine production (byproduct), Ag content kilograms	342,684	367,022	338,084	383,479	445,367
Refinery production do.	399,352	426,581	409,756	453,073	508,756
Tin:					
Mine production, concentrate, Sn content	49	33	30	17	13
Smelter production:					
Primary	3,600	3,800	3,800	3,800 <sup>e</sup>	3,800 <sup>e</sup>
Secondary	3,600	3,600	3,800	3,800	3,800 <sup>e</sup>
Titanium mineral concentrates: <sup>e</sup>					
Ilmenite and leucoxene	340,000	436,000	320,000 <sup>r</sup>	300,000 <sup>r</sup>	300,000
Rutile	24,000	26,000	19,100 <sup>r</sup>	20,000 <sup>r</sup>	20,000
Zinc:					
Mine production, Zn content	758,000	793,000	706,000	821,617	636,000
Smelter production:					
Primary	703,495 <sup>r</sup>	768,834 <sup>r</sup>	705,707 <sup>r</sup>	821,617 <sup>r</sup>	611,814
Secondary	25,505 <sup>r</sup>	19,166 <sup>r</sup>	18,293 <sup>r</sup>	16,383 <sup>r</sup>	16,816
Total	729,000	788,000 <sup>r</sup>	724,000	838,000	629,000
INDUSTRIAL MINERALS					
Abrasives:					
Diaspore, natural	18,366	12,920	17,753	15,000	NA
Garnet thousand metric tons	1,420	552	88 <sup>r</sup>	76 <sup>r</sup>	81
Asbestos, primary	359 <sup>e</sup>	267 <sup>e</sup>	227 <sup>e</sup>	--	--
Barite thousand metric tons	1,675	1,316	1,183 <sup>r</sup>	700 <sup>e</sup>	1,050
Cement, hydraulic <sup>c</sup> do.	220,000 <sup>r</sup>	231,000 <sup>r</sup>	240,000 <sup>r</sup>	260,000 <sup>r</sup>	280,000
Clay and shale:					
Ball clay do.	1,853	1,770	1,927	1,970 <sup>r</sup>	500 <sup>e</sup>
Bentonite <sup>c</sup> do.	658	663	800	802	1,370
Fire clay do.	764	601	712	765 <sup>r</sup>	450 <sup>e</sup>
Kaolin, marketable: <sup>c</sup>					
Crude do.	2,350 <sup>r</sup>	4,070 <sup>r</sup>	4,580 <sup>r</sup>	4,040 <sup>r</sup>	4,110
Processed do.	100 <sup>r</sup>	68	86	74 <sup>r</sup>	31
Total	2,450 <sup>r</sup>	4,130 <sup>r</sup>	4,660 <sup>r</sup>	4,110 <sup>r</sup>	1,480
Diamond:					
Gem thousand carats	7 <sup>r</sup>	10 <sup>r</sup>	10 <sup>r</sup>	9 <sup>r</sup>	12 <sup>e</sup>
Industrial do.	20 <sup>r</sup>	27 <sup>r</sup>	27 <sup>r</sup>	24 <sup>r</sup>	33
Total	27 <sup>r</sup>	37 <sup>r</sup>	37 <sup>r</sup>	33 <sup>r</sup>	45 <sup>e</sup>
Feldspar, mine production thousand metric tons	1,067 <sup>r</sup>	1,225 <sup>r</sup>	1,634 <sup>r</sup>	1,400 <sup>r,e</sup>	1,500
Fluorspar, metallurgical grade	2,549 <sup>r</sup>	3,094 <sup>r</sup>	2,439 <sup>r</sup>	2,270 <sup>r</sup>	1,920
Gemstones:					
Agate, excluding diamond	559	290	--	--	--
Unspecified	9,603	2,017	NA	9,330	--
Graphite	139,742	157,999	107,688 <sup>r</sup>	112,000 <sup>r,e</sup>	149,019
Gypsum <sup>c</sup> thousand metric tons	11,000 <sup>r</sup>	12,000 <sup>r</sup>	12,000 <sup>r</sup>	13,000 <sup>r</sup>	14,000
Iron oxide pigments, pigments, mineral, natural, ocher	1,628,522 <sup>r</sup>	1,490,033 <sup>r</sup>	2,467,767 <sup>r</sup>	2,203,708	2,200,000 <sup>e</sup>
Kyanite and related minerals:					
Sillimanite	43,187	56,830	73,661 <sup>r</sup>	65,243 <sup>r</sup>	64,923
Other, unspecified <sup>c</sup>	2,200	1,090	6,680	2,300	3,000
Lime thousand metric tons	15,000	16,000	16,000	16,000	16,000
Mica:					
Crude	1,507	1,403	962	1 <sup>e</sup>	1
Scrap and waste	11,128 <sup>r</sup>	17,992 <sup>r</sup>	16,218	14 <sup>r,e</sup>	18
Total	12,600 <sup>r</sup>	19,400 <sup>r</sup>	17,200	15 <sup>r,e</sup>	19
Nitrogen, ammonia, N content thousand metric tons	10,650	10,840	10,780	10,800	10,800 <sup>e</sup>

See footnotes at end of table.

TABLE 1—Continued  
INDIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons, gross weight, unless otherwise specified)

Commodity <sup>2</sup>	2012	2013	2014	2015	2016
<b>INDUSTRIAL MINERALS—Continued</b>					
Phosphate rock, including apatite:					
Gross weight thousand metric tons	2,100 <sup>e</sup>	1,500 <sup>e</sup>	1,470 <sup>r,e</sup>	1,960	820
P <sub>2</sub> O <sub>5</sub> content, 25% P <sub>2</sub> O <sub>5</sub> <sup>e</sup> do.	530 <sup>r</sup>	380 <sup>r</sup>	370 <sup>r</sup>	490	206
Rare earths, monazite concentrate <sup>e</sup>	3,000 <sup>r</sup>	3,000 <sup>r</sup>	3,000 <sup>r</sup>	3,000 <sup>r</sup>	3,000
Salt:					
Rock <sup>e</sup> thousand metric tons	-- <sup>r</sup>	-- <sup>r</sup>	--	--	25000
Other do.	17,000 <sup>e</sup>	26,900 <sup>r,e</sup>	23,000 <sup>r,e</sup>	24,241 <sup>r</sup>	27,500 <sup>e</sup>
Total do.	17,000 <sup>e,r</sup>	26,900 <sup>r,e</sup>	23,000 <sup>r,e</sup>	24,200 <sup>r</sup>	52,500 <sup>e</sup>
Soda ash, synthetic do.	2,510 <sup>r</sup>	2,490 <sup>r</sup>	2,370 <sup>r</sup>	2,500 <sup>r</sup>	2,400 <sup>e</sup>
Stone, sand, and gravel:					
Sand and gravel, industrial, sand do.	2,659	2,575	2,728	3,000	NA
Silica, mine production:					
Quartz and quartzite do.	3,950 <sup>r</sup>	3,288 <sup>r</sup>	3,778 <sup>r</sup>	4,000 <sup>r</sup>	4,530 <sup>e</sup>
Unspecified do.	7,493	6,942	6,302	4,000	4,000 <sup>e</sup>
Stone, crushed:					
Calcite	43,710	95,177	109,446	92,000	184,000 <sup>e</sup>
Chalk	173,331	127,859	125,244	107,000	NA
Dolomite thousand metric tons	6,064	6,810	7,411	6,485	NA
Limestone do.	273,996	277,601	291,042	294,621	312,644
Stone, dimension:					
Felsite	688	791	492	500	NA
Slate	--	278	239	288	NA
Sulfur, byproduct, S content:					
Metallurgy thousand metric tons	1,209 <sup>e</sup>	1,200 <sup>e</sup>	1,200 <sup>e</sup>	1,200 <sup>e</sup>	1,200
Petroleum and fertilizer do.	459 <sup>r,e</sup>	388 <sup>r,e</sup>	402 <sup>r,e</sup>	429 <sup>r,e</sup>	510
Talc and related materials:					
Pyrophyllite	257,704 <sup>r</sup>	386,660 <sup>r</sup>	401,347 <sup>r</sup>	167,000 <sup>r,e</sup>	170,000 <sup>e</sup>
Soapstone and steatite	997,243 <sup>r</sup>	821,163 <sup>r</sup>	936,261 <sup>r</sup>	803,000 <sup>r,e</sup>	730,000 <sup>e</sup>
Vermiculite, elemental content	8,358	7,460 <sup>r</sup>	16,384	13,250	8,058
Wollastonite	162,035	178,058	177,465	181,720 <sup>r</sup>	166,554
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Coal:					
Bituminous thousand metric tons	560,113	561,272	600,970	631,085	647,344
Lignite do.	46,533	44,760	46,167	44,453	45,049
Total do.	607,000	606,000 <sup>r</sup>	647,000 <sup>r</sup>	676,000 <sup>r</sup>	692,000
Natural gas:					
Gross million cubic meters	41,726	35,061	33,046	26,517	30,391
Marketable do.	38,900 <sup>r</sup>	32,100 <sup>r</sup>	30,500 <sup>r</sup>	24,500 <sup>r</sup>	28,100
Petroleum:					
Crude thousand 42-gallon barrels	295,200 <sup>r</sup>	293,040 <sup>r</sup>	291,700 <sup>r</sup>	289,400 <sup>r</sup>	280,100
Refinery production: <sup>e</sup>					
Distillate fuel oil do.	750,000	812,000	830,000	805,000	843,000
Gasoline do.	231,000	250,000	200,000	200,000	282,000
Kerosene, including jet fuel do.	140,000	141,000	146,000	151,000	147,000
Liquefied petroleum gas do.	85,000	89,000	92,000	100,000	116,000
Other do.	280,000	275,000	300,000	300,000	137,000
Residential fuel oil do.	234,000	191,000	175,000	195,000	280,000
Total do.	1,720,000	1,760,000 <sup>r</sup>	1,740,000 <sup>r</sup>	1,750,000 <sup>r</sup>	1,810,000
Uranium, mine production, U content	323	336	323	323	385

<sup>e</sup>Estimated. <sup>r</sup>Revised. do. Ditto. NA Not available. -- Zero.

<sup>1</sup>Table includes data available through January 9, 2018. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits.

<sup>2</sup>In addition to the commodities listed, boron, corundum, and other gemstones (aquamarine, emerald, ruby, and spinel) may have been produced in India, but available information was inadequate to make reliable estimates of output.



TABLE 2  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
Alumina	National Aluminium Co. Ltd. (NALCO) (Government, 80.93%)	Dhamanjodi refinery, Odisha	2,300
Do.	Bharat Aluminium Co. Ltd. [Government, 49%, and Vedanta Aluminum Ltd., 51%]	Korba, Chhattisgarh	200 <sup>1</sup>
Do.	Utkal Alumina International Ltd. [Hindalco Industries Ltd. (Aditya Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%), 100%]	Koraput refinery, Odisha	1,500
Do.	Madras Aluminium Co. Ltd. (MALCO) [Vedanta Group, 80%, and others, 20%]	Mettur refinery, Tamil Nadu	85 <sup>1</sup>
Do.	Hindalco Industries Ltd. (Aditya Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Renukoot refinery, Uttar Pradesh	700
Do.	do.	Belagavi, Karnataka	350
Do.	do.	Muri, Jharkhand	450
Do.	Vedanta Aluminium Ltd. (Vedanta Resources plc, 100%)	Lanjigarh, Odisha	1,000
Aluminum	do.	Jharsuguda I and II, Odisha	1,750
Do.	Bharat Aluminium Co. Ltd. [Government, 49%, and Vedanta Aluminum Ltd., 51%]	Korba I and II <sup>1</sup>	570
Do.	National Aluminium Co. Ltd. (NALCO) (Government, 100%)	Angul smelter, Odisha	460
Do.	Hindalco Industries Ltd. (Aditya Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Hirakud smelter, Odisha	220
Do.	do.	Renukoot, Uttar Pradesh	350
Do.	do.	Aditya smelter, Sambalpu, Odisha	360
Do.	do.	Mahan smelter, Bargawan, Madhya Pradesh	360
Barite	Andhra Pradesh Mineral Development Corp. Ltd. (Andhra Pradesh State government, 100%)	Kadapa District mines, Andhra Pradesh	1,600
Do.	ICL Ltd.	do.	300
Do.	Associated Mineral Corp.	do.	75
Do.	Pragathi Minerals	do.	50
Do.	Vijayalaxmi Minerals Trading Co.	do.	50
Bauxite	Bharat Aluminium Co. Ltd. [Government, 49%, and Sterlite Industries (India) Ltd., 51%]	Mainpat, Chattisgarh	750
Do.	do.	Bodai Daldali (Kawardha), Chattisgarh	1,250
Do.	Indian Aluminium Co. Ltd. (Indian interests, 60.4%, and Alcan Aluminium Ltd., 39.6%)	Kolhapur District mines, Maharashtra	600
Do.	Gujarat Mineral Development Corp. (Gujarat State government, 75% and public and institutional investors, 25%)	Gadhsisa Mine and Ratadia project, Kutch District, Bhatia project, Jamnagar Distirct	500
Do.	do.	Mewasa Mines Devbhoomi Dwarka Gujarat	125
Do.	Hindalco Industries Ltd. (Aditya Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Mines in Lohardaga District, Jharkhand	750
Do.	National Aluminium Co. Ltd. (NALCO) (Government, 100%)	Mines in Panchpatmali Hills, Damanjodi Koraput District, Odisha	6,800
Do.	Minerals & Minerals Ltd. (Government, 100%)	Mines in Richuguta, Palamau District, Jharkhand	200
Do.	Panditrao Mines and Minerals Pvt. Ltd.	Maharashtra, Kolhapur	NA
Do.	Prabhudas Vithaldas	Gujarat	NA
Do.	Bombay Minerals Ltd.	Asota Mewasa, Gujarat	NA
Do.	Utkal Alumina International Ltd.	Rayagada District	8,500
Do.	Carborundum Universal Ltd.	Gujarat, Devbhoomi Dwarka	NA
Boron	Borax Morarji Ltd.	Ambernath, Maharashtra	17

See footnotes at end of table.

TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
Cadmium	metric tons	Hindustan Zinc Ltd.	Debari zinc smelter, Rajasthan	250
Do.	do.	do.	Vizag zinc smelter, Andhra Pradesh	115
Do.	do.	do.	Chanderiya zinc smelter, Rajasthan	468
Do.	do.	Binani Zinc Ltd.	Edayar Zinc Ltd., Kerala	80
Cement	million metric tons	Ultratech Cement Ltd.	12 integrated plants and 12 grinding units	59
Do.		Century Cement [Century Textiles and Industries Ltd. (Birla Group, 100%)]	Baikunth plant, Madhya Pradesh	1,120
Do.	million metric tons	Ambuja Cements Ltd. (LafargeHolcim Group, 14.8%)	Plants in 7 States	25
Do.		JSW Cement	Nandyal Works, Vijaynagar Works Dolvi Works	6,000
Do.		Coromandel Fertilizers Ltd. [Chevron Chemical Co., 23.55%; International Minerals and Chemical Co., 20.89%; Parry and Co., 10.64%; E.I.D. Parry (India) Ltd., 6.65%; others, 38.27%]	Chilamkur plant, Andhra Pradesh	1,000
Do.	million metric tons	Dalmia Cement (Bharat) Ltd.	Dalmiapuram and Ariyalur, Tamil Nadu; and Kadapa, Andhra Pradesh	21
Do.		do.	Belgalum, Karnataka	2,500
Do.		Birla Corp. Ltd. (M.P. Birla Group)	Birla Vikas & Satna, Birla Cement & Chanderia, Durgapur, Rae Bareli, Durga Hitech	5,780
Do.	million metric tons	ACC Ltd. (LafargeHolcim Group, 67%)	Gagal I & II, Wadi I & II, Jamul, Lakheri Thondebhavi, Kudithini, Kymore, Chanda, Chaibasa and Sindri, Damodhar, Bargarh, Madhukarai, Tikaria, Vizag	29
Do.		Raymond Cement Works (Raymond Woolen Mills Ltd.)	Gopalnagar plant, West Bengal	1,250
Do.		Shree Cement Ltd.	Haridwar plant, Uttarakhand	1,800
Do.		OCL India Ltd.	Kapilas and Rajgangpur, Odisha	5,500
Do.		Rajashree Cement (Indian Rayon and Industries Ltd., 100%)	Khor plant, Karnataka	1,020
Do.		My Home Industries Ltd. (My Home Group and CRH plc)	Mellacheruvu and Visakhapatnam in Andhra Pradesh	4,600
Do.		HeidelbergCement India Ltd.	Narasingarh plant, Haryana	1,090
Do.		CCI Ltd. (Government, 100%)	Adilabad, Akaltara, Bokajan, Charkhi-Dadri, Kurkunta, Mandhar, Neemuch, Rajban, Tandur, Delhi	3,850
Do.		Andhra Cements Ltd. (Jaypee Group 100%)	Vizag, Nadikude-Durga Cement	1,420
Do.	million metric tons	J.K. Cement Works (JK Synthetics Ltd.), 100%	Nimbahera plant, Mangrol, Muddapur Jhari, Gotan, Lakshmi Cement, Lakshmi Cement-Kalol	11
Do.	do.	India Cements Co. Ltd. (Government, 26%; Life Insurance Corp. of India, 24%; others, 50%)	Sankarnagar plant and 2 plants, Tamil Nadu; 4 plants, Andhra Pradesh; Mahi plant, Rajasthan	16
Do.		Prism Cement Ltd.	Satna plant, Madhya Pradesh	3,000
Do.		Jaiprakash Associates Ltd.	Sewagram, Gujarat	2,400
Do.		Shree Digvijay Cement Co. Ltd.	Shreeniwas plant, Maharashtra	1,070
Do.		JK Lakshmi Cement Ltd. (Straw Products Ltd.)	Sirohi plant, Rajasthan and Ahmadabad, Gujarat	4,700
Do.		do.	Durg, Chhattisgarh	1,700
Do.		Lafarge S.A.	Arasmeta and Sonadih, Chhattisgarh; Jojobera, Jharkhand; and Mejia, West Bengal	1,400
Do.		Manikgarh Cement [Century Textiles and Industries Ltd. (Birla Group, 100%)]	Tehsil Rajura plant, Maharashtra	1,000
Do.		Vikram Cement [Grasim Industries Ltd. (Birla Group, 100%)]	Vikram plant, Madhya Pradesh	1,000

See footnotes at end of table.

TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>c</sup>
Cement—Continued	Raasi Cement Ltd. (Andhra Pradesh State government, 50%, and Development Co. Ltd., 50%)	Vishnupuram plant, Andhra Pradesh	1,000
Do.	Tamil Nadu Cements Corp. Ltd.	Alangulam, Ariyalur, Virundhunagar District	900
Do.	Ramco Cement Ltd.	Ramasamyraja Nagar, Jayantipuram, Alathiyur Works I and II, Ariyalur Uthiramerur, Salem, Kolaghat	2,000
Do.	The Mehta Group	Suarashtra Cement, Gujarat Sidhee Cement	2,700
Do.	million metric tons Jaypee Cement Ltd.	Jaypee Rewa, Jaypee Bela, Jaypee Sadva Khurd, Jaypee Ayodhya Dalla Chunar, Jaypee Panipat, Jaypee Kutch, Jaypee Wanakbori, Jaypee Roorkee, Jaypee Wanakbori, Jaypee Bagheri, Bhilai Jaypee	14
Do.	Kesoram Industries Ltd.	Kesoram Cement, Vasvadatta Cement	7,250
Do.	Mangalam Cement Ltd.	Mangalam Cement, Neer Shree Cement	2,000
Do.	Orient Papers & Industries	Orient Cement, Orient-Cement-Jalgaon	5,000
Do.	Penna Cement Ltd.	Penna Tadippatri I & II, Penna Ganeshpahad, Penna-Boyareddypalli Ltd., Penna-Tandur	6,500
Do.	Malabar Cements Ltd.	Malabar Cements, Malabar Cements	620
Do.	Binani Cement Ltd.	Binani Cement Sirohi, Binani Cement Sikar	6,250
Do.	Rain Cement Ltd.	Rain Comdt. Unit I, Rain Comdt. Unit LN–1, Rain Comdt. Unit LN–2	4,000
Do.	KCP Ltd.	KCP Ltd-Macherla, Maktyala	2,350
Do.	Cement Manufacturing Co. Ltd.	Cement Manufacturing Co. Ltd., Megha T&E (P) Ltd.	1,270
Do.	million metric tons Chettinad Cement Corp. Ltd.	Chettinad-Karur, Chettinad Karikkali, Chettinad-Ariyalur	11
Do.	Sagar Cement Ltd.	BMM Cements Ltd., Andhra Pradesh	3,750
Do.	Zuari Cement Ltd.	Zuari Cement, Sri Vishnu Cement	3,400
Chromite	Mysore Minerals Ltd. (state-owned)	Aladahalli mines	37
Do.	do.	Byrapura mines	15
Do.	do.	Bhakthara Halli mines	24
Do.	do.	Jambur mines	5
Do.	do.	Tagadur mines	12
Do.	do.	Hassan District, Karnataka	12
Do.	Ferro Alloys Corp. Ltd.	Randia plant, Bhadrak, Cuttack District, Odisha; Khamman District, Andhra Pradesh; Dhenkanal and Kendujhar Districts, Odisha	310
Do.	Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	Dhenkanal and Kendujhar District, Odisha Randia plant, Bhadrak, Cuttack District, Odisha; Hassan District Karnataka	700
Do.	Tata Steel Ltd.	Randia plant, Bhadrak, Cuttack District, Odisha	351
Do.	Balasore Alloys Ltd.	Sukinda Valley, Jajpur, Odisha	95
Do.	Indian Metal & Ferro Alloys Corp. Ltd.	Therubali, Ryaagada and Choudwar, Cuttack, Mahagiri and Nuasahi mines	62
Do.	Misrilall Mines Pvt Ltd.	Saruabil village, Jajpur District, Orissa	NA
Do.	Jindal Stainless Ltd.	Jindal chromite mines, Jajpur, Odisha	NA
Clay:			
Ball clay	Bikaner Ceramics	Rajasthan, Bikaner	75
Do.	Sampat Lal Daga	do.	NA

See footnotes at end of table.

TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
Clay:—Continued				
Bentonite		Ashapura Minechem Ltd. (Ashapura Group)	Kutch, Gujarat	350
Do.		Ashapura Volclay Ltd. (Ashapura Minechem Ltd. and AMCOL International Corp.)	Bhuj and Dharur	72
Do.		Ashapura International Ltd.	NA	NA
Do.		Vijaylaxmi Group of Industries	West Rajasthan	NA
Do.		Gimpex Ltd.	Chennai	NA
Fireclay		Shanta Sales Corp.	Rajasthan, Bikaner	NA
Kaolin		20 Microns Ltd.	Bhuj, Gujarat	65
Do.		English India Clays Ltd.	Veli, Kerala	240
Coal	million metric tons	Bharat Coking Coal Ltd. [Coal India Ltd. (Government, 100%)]	Bihar and West Bengal	26
Do.	do.	Central Coalfields Ltd. [Coal India Ltd. (Government, 100%)]	Bihar	27
Do.	do.	Eastern Coalfields Ltd. [Coal India Ltd. (Government, 100%)]	Bihar and West Bengal	21
Do.	do.	Mahanadi Coalfields Ltd. [Coal India Ltd. (Government, 100%)]	Odisha	21
Do.	do.	North Eastern Coalfields Ltd. [Coal India Ltd. (Government, 100%)]	Assam	64
Do.	do.	Northern Coalfields Ltd. [Coal India Ltd. (Government, 100%)]	Madhya Pradesh and Uttar Pradesh	24
Do.	do.	Singareni Collieries Co. Ltd. (Andhra Pradesh State government, 50%, and Government, 50%)	Andhra Pradesh and Maharashtra	18
Do.	do.	South Eastern Coalfields Ltd. [Coal India Ltd. (Government, 100%)]	Chhattisgarh	36
Do.	do.	Western Coalfields Ltd. [Coal India Ltd. (Government, 100%)]	Madhya Pradesh and Maharashtra	18
Do.	do.	Neyveli Lignite Corp. Ltd. (NLC) (Government, 100%)	Tamil Nadu	17
Copper ore, mine output, gross weight		Hindustan Copper Ltd. (HCL) (Government, 100%)	Indian Copper Complex Mines, Ghatsila District, Jharkhand	400
Do.	do.		Khetri Copper Complex Mines, Khetrinagar Rajasthan	1,000
Do.	do.		Malanjkhand Copper Complex Mines, Balaghat District, Madhya Pradesh	2,000
Copper, metal		Hindalco Industries Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Birla Copper Complex smelter, Dahej, Gujarat	500
Do.		Hindustan Copper Ltd. (HCL) (Government, 100%)	Indian Copper Complex smelter-refinery, Ghatsila District, Jharkhand	19
Do.	do.		Khetri Copper Complex smelter-refinery, Khetrinagar District, Rajasthan	31
Do.	do.		Taloja copper project, Maharashtra	NA
Do.		Vedanta Ltd.	Tuticorin smelter, Tamil Nadu	400
Do.	do.		Silvassa refinery, Gujarat	300
Do.		Jhagadia Copper Ltd.	Jhagadia, Gujarat	50
Diamond	thousand carats	National Mineral Development Corp. Ltd. (NMDC) (Government, 100%)	Mahjgawan Mine	25
Fluorite		Maharashtra State Mining Corporation Ltd.	Dongargaon, Maharashtra, Chandrapur	12
Gold, mine production	kilograms	Hutti Gold Mines Co.	Hutti Mine, Karnataka	490
Do.	do.	do.	Uti Mine, Karnataka	55
Do.	do.	do.	Hira-Buddini	157
Do.		Mahmohan Minera Industries (Pvt) Ltd.	Kunderkocha Mine, Jharkahand	NA
Graphite		Agrawal Graphite Industries Ltd.	Belpara District, Odisha	10
Do.		Tamil Nadu Minerals Ltd.	Sivaganga District, Tamil Nadu	NA
Gypsum		FCI Aravali Gypsum and Minerals India Ltd.	Kavas-Utarali group of mines, Mohangarh group of mines, Bikaner group of mines, Suratgarh group of mines, Rainsinghpur group of mines, Kishanpura A and B, Rajasthan	526

See footnotes at end of table.

TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>c</sup>
Iron and steel	Visvesvaraya Iron and Steel Ltd. (Karnataka State government, 60%, and Government-owned Steel Authority of India Ltd., 40%)	Bhadravati steel plant, Karnataka	180
Do.	Steel Authority of India Ltd. (SAIL) (Government, 100%)	Bhilai steel plant, Chattisgarh	5,100
Do.	do.	Bokaro steel plant, Jharkhand	3,400
Do.	do.	Rourkela steel plant, Odisha	2,700
Do.	do.	Durgapur steel plant, West Bengal	2,000
Do.	Indian Iron and Steel Co. Ltd. (IISCO) [Steel Authority of India Ltd. (Government, 100%), 100%]	Burnpur steel plant, West Bengal	870
Do.	Tata Steel Ltd.	Jamshedpur steel plant, Jharkhand	6,800
Do.	do.	Jagdarpur, Chattisgarh	2,000
Do.	do.	Duburi, Odisha	3,000
Do.	Rashtriya Ispat Nigam Ltd.	Visakhapatnam steel plant, Andhra Pradesh	6,300
Do.	million metric tons JSW Steel Co. Ltd.	Vijayanagar, Karnataka	12
Do.	do.	Dolvi, Maharashtra	5,000
Do.	do.	Salem Special Steel plant, Karnataka	1,200
Do.	Ministeel plants (privately owned)	18 plants located throughout India	4,700
Do.	Essar Steel Co. Ltd.	Hazira, Gujarat	3,000
Do.	Lloyds Steel Industries Ltd.	Wardha, Maharashtra	500
Do.	MSP Steel and Power Ltd.	Raipur, Chhattisgarh	750
Iron ore	National Mineral Development Corp. Ltd. (NMDC) (Government, 100%)	Bailadila, Chhattisgarh	9,000
Do.	Steel Authority of India Ltd. (Government, 100%)	Bastar and Durg District, Chhattisgarh; Bolani, Odisha; and Chiria, Jharkhand	7,000
Do.	million metric tons Kudremukh Iron Ore Co. Ltd. (Government, 100%)	Kudremukh, Chikmagalur District, Karnataka	10
Do.	National Mineral Development Corp. Ltd. (NMDC) (Government, 100%)	Donimalai, Karnataka	9,000
Do.	Chowgule and Co. Ltd.	Goa	2,500
Do.	Dempo Mining Corp. Ltd.	do.	2,500
Do.	V.M. Salgaocar & Bros. Pvt. Ltd.	do.	2,500
Do.	Sesa Goa Ltd. (Vedanta Resources plc, 51%)	Codli and Sonshi, Goa	NA
Do.	Steel Authority of India Ltd. (Government, 100%)	Kendujhar District, Odisha	3,000
Do.	do.	do.	3,500
Do.	Tata Steel Ltd.	do.	2,000
Do.	do.	do.	3,500
Do.	NSL Consolidated Ltd. (China Metallurgical Group Corp., 10%)	Mangal, Andhra Pradesh	200
Do.	Indian Iron and Steel Co. Ltd. [Steel Authority of India Ltd. (Government, 100%), 100%]	Singhbhum District, Bihar	2,500
Kyanite	Associated Mining Co.	Bhandara District, Maharashtra	10
Do.	Maharashtra Mineral Corp. Ltd.	do.	10
Do.	Bihar State Mineral Development Corp. Ltd. (Bihar State government, 100%)	Singhbhum District, Bihar	10
Do.	Hindustan Copper Ltd. (HCL) (Government, 100%)	do.	22
Lead, refined:			
Primary	Hindustan Zinc Ltd. (Sterlite Opportunities and Ventures Ltd., 64.9%, and Government, 29.5%)	Chanderiya smelters, Rajasthan	105
Do.	do.	Tundoo smelter, Bihar	8
Do.	do.	Dariba smelter	100
Secondary	Indian Lead Co.	Thane refinery, Mumbai, Maharashtra	12
Do.	do.	Refinery at Kolkata	12

See footnotes at end of table.



TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>c</sup>
Lead concentrate, Pb content		Hindustan Zinc Ltd. (Sterlite Opportunities and Ventures Ltd., 64.9%, and Government, 29.5%)	Agnigundala Mine, Andhra Pradesh	72
Do.		do.	Sargipalli Mine, Odisha	150
Lead-zinc ore, gross weight		do.	Rampura-Agucha Mine, Rajasthan	6,500
Do.		do.	Zawar Mine group, Rajasthan	1,200
Do.		do.	Kayad Mine, Rajasthan	350
Magnesite		Steel Authority of India Ltd. (Government, 100%)	Salem, Tamil Nadu	150
Do.		Dalmia Magnesite Corp.	do.	72
Do.		Tamil Nadu Magnesite Ltd. (Tamil Nadu State government, 100%)	do.	150
Manganese ore, gross weight <sup>2</sup>		MOIL Ltd. (Government, 100%)	Ukwa Mine, Madhya Pradesh	55
Do.		do.	Balaghat, Madhya Pradesh	310
Do.		do.	Chikla Mine, Maharashtra	150
Do.		do.	Munsar Mine, Maharshtra	55
Do.		do.	Gumgaon, Maharshtra	60
Do.		Falechand Marsingdas	Andhra Pradesh	NA
Do.		J.A. Trivedi Bros.	do.	NA
Do.		Sandur Manganese and Iron Ores Ltd.	Bellary, Karnataka	NA
Do.		Eastern Mining Co.	North Kanara, Karnataka	NA
Do.		Mysore Minerals Ltd.	do.	NA
Do.		do.	Shimoga, Karnataka	NA
Do.		Mangilall, Rungta (Pvt.) Ltd.	Keonjhar, Odisha	NA
Do.		Orissa Mining Corp. Ltd.	do.	NA
Do.		do.	do.	NA
Do.		Rungta Mines (Pvt.) Ltd.	do.	NA
Do.		Tata Steel Ltd.	Ferromanganese plant, Odisha	NA
Do.		do.	Keonjhar, Odisha	NA
Do.		do.	do.	NA
Do.		S. Lall & Co.	do.	NA
Do.		Orissa Mineral Development Co. Ltd.	Koraput, Odisha	NA
Do.		Aryan Mining & Trading Corp.	Sundargarh, Odisha	NA
Do.		Orissa Manganese & Minerals (Pvt.) Ltd.	do.	NA
Do.		R.B.S. Shreeram Durga Prasad and Falechand Marsingdas	Vizianagaram, Andhra Pradesh	NA
Do.		Radhika Metals & Minerals Pvt. Ltd.	NA	NA
Mica		Micafab India Pvt. Ltd.	Sydapuram Mandal, Andhra Pradesh	4,500
Do.		Premier Mica Co.	Rjupalem, Andhra Pradesh	200
Do.		Dwarakananad Reddy, and 4 others, 1-C, Vaibhav Enclave	Nellore, Andhra Pradesh	NA
Petroleum, refined	thousand 42-gallon barrels per day	Cochin Refineries Ltd. (Oil and Natural Gas Corp., 55%, and private interests, 45%)	Ambalamugal refinery, Kerala	67
Do.	do.	do.	Haldia refinery, West Bengal	61
Do.	do.	Reliance Industries Ltd.	Jamnagar refinery, Gujarat	430
Do.	do.	do.	Koyali refinery, Gujarat	185
Do.	do.	Madras Refineries Ltd. (Oil and Natural Gas Corp., 52%, and private interests, 48%)	Madras refinery, Tamil Nadu	131
Do.	do.	Bharat Petroleum Corp. Ltd. (Oil and Natural Gas Corp., 67%, and private interests, 33%)	Mahul refinery, Mumbai, Maharashtra	135
Do.	do.	Hindustan Petroleum Corp. Ltd. (Oil and Natural Gas Corp., 51%, and private interests, 49%)	do.	110
Do.	do.	Essar Oil Ltd.	Vadinar refinery, Gujarat	245
Do.	do.	do.	Visakhapatnam refinery, Andhra Pradesh	90
Do.	do.	Indian Oil Corp. (Oil and Natural Gas Corp., 91%, and private interests, 9%)	Mathura refinery, Uttar Pradesh	156
Do.	do.	do.	Panipat refinery, Haryana	240

See footnotes at end of table.

TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>c</sup>
Phosphate rock		Rajasthan State Mineral Development Corp. Ltd. (Rajasthan State government, 100%)	Jamarkotra, Badgaon, Dakankotra, Kanpur, Kharbaria-ka-Guda, and Sallopat Mines, Rajasthan	20
Do.		Pyrites Phosphates and Chemicals Ltd.	Durmala and Maldeota underground mines, Uttar Pradesh	NA
Do.		Madhya Pradesh State Mining Corp. Ltd. (Madhya Pradesh State government, 100%)	Hirapur (Maddeora) and Khatamba Mines, Madhya Pradesh	NA
Do.		Madhya Pradesh State Mining Corp. Ltd. (Madhya Pradesh State government, 100%)	Hirapur Mine (Tigoda), Madhya Pradesh	NA
Do.		do.	Jhabua Mine, Madhya Pradesh	NA
Do.		Hindustan Zinc Ltd. (HZL) (Sterlite Opportunities and Ventures Ltd., 64.9%, and Government, 29.5%)	Maton Mine, Rajasthan	NA
Rare earths, monazite	metric tons	Indian Rare Earths Ltd. (IREL) (India Department of Atomic Energy, 100%)	Manavalakurichi, Tamil Nadu	6,000
Do.	do.	Kerala Minerals and Metals Ltd.	Kollam, Kerala	240
Silver, mine output	thousand kilograms	Hindustan Zinc Ltd. (HZL) (Sterlite Opportunities and Ventures Ltd., 64.9%, and Government, 29.5%)	Chavara, Kerala	518
Titanium, ilmenite-rutile ore		Kerala Minerals and Metals Ltd. (Kerala State government, 100%)	do.	103
Do.		do.	Orissa Sands Complex, Ganjam, Odisha	240
Do.		do.	Manavalakurichi, Tamil Nadu, Ilmenite	100
Do.		do.	Garnet	9
Do.		Trimex Sands Pvt. Ltd. (Trimex Group)	Sirkurman deposit, Srikakulam	NA
Do.		do.	Andhra Pradesh	300
Do.		V.V. Mineral Ltd.	Thoothukudi, Tamil Nadu	500
Do.		Beach Minerals Co. Pvt. Ltd., Tamil Nadu	Kuttam, Chennai, Tamil Nadu	150
Uranium, ore		Uranium Corp. of India (Government—Department of Atomic Energy, 100%)	Jaduguda, Jharkhand, Tummalpalle, Andhra Pradesh	5,190
Zinc, metal		Binani Zinc Ltd. (Binani Industries Ltd., 89.9%)	Binanipuram smelter, Kerala	38
Do.		Hindustan Zinc Ltd. (HZL) (Sterlite Opportunities and Ventures Ltd., 64.9%, and Government, 29.5%)	Rampura, Agacha Mine, Chanderiya smelter, Rajasthan	6,150
Do.		do.	Dariba Smelting Complex, Rajasthan	210
Do.		do.	Zinc smelter Debari, Rajasthan	88
Do.		do.	Zinc smelter Vizag, at Vizag, Andhra Pradesh	56
Zinc, mine output, Pb content		do.	Sindesar Khurf Mine, Rajasthan	2,000
Do.		do.	Rajpura Dariba Mine, Rajasthan	900
Do.		do.	Kayad Mine, Rajasthan	350
Do.		do.	Zawar Mine, Rajasthan	1,200
Do.		do.	Chanderiya zinc smelter, Rajasthan	525

<sup>c</sup>Estimated. Do., do. Ditto. NA Not available.

<sup>1</sup>The Korba I plant was not in operation.

<sup>2</sup>Capacity of clusters of surface mines varies extremely; annual production depends on demand. Estimated total capacity is 3.0 million metric tons per year.

TABLE 3  
INDIA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		2012	2013	2014	2015	2016
<b>METALS</b>						
<b>Aluminum:</b>						
Alumina		991	1,190	1,526	1,419	1,437
Bauxite		401	4,200	3,500	8,315	2,812
<b>Copper, metal and alloys:</b>						
Ore and concentrates		--	8	4	--	10
Blister and anode		100	--	100	100	1,900
Refined copper		254	237	362	341	305
Copper alloy, ingots		3	3	2	2	2
Copper and alloys, semi-fabricated		20	17	21	31	33
Copper and alloys, scrap		6	6	6	5	4
Gold, metal <sup>1</sup>	kilograms	169,126	85,349	70,721	70,796	135,275
<b>Iron and steel:</b>						
Direct-reduced iron		126	117	167	132	262
Iron ore		28,432	14,426	9,844	4,211	21,697
Iron ore, Fe content		17,628	8,944	6,103	2,611	13,500
Pig iron		394	1,063	835	542	556
Sponge iron		3,115	2,331	2,828	937	937
<b>Steel:</b>						
Flat products		4,445	6,369	5,899	4,373	5,791
Ingots and semis		601	1,253	1,601	769	1,766
Long products		707	776	908	766	1,048
Semifinished and finished steel products		8,232	10,078	10,379	7,563	10,325
Tabular products		1,989	1,430	1,463	1,215	1,345
Lead ores and concentrates	metric tons	10,226	14	7	509	--
Zinc ore and concentrates, Zn content <sup>1</sup>		5,591	75,870	45,660	40	--
<b>INDUSTRIAL MINERALS</b>						
Barite		3,784	1,971	1,641	1,285	1,057
Cement <sup>1</sup>		3,399	2,918	5,141	6,288	6,222
Diamond, mostly cut <sup>1</sup>	carats	62,654	65,561	83,851	74,999	60,738
Graphite, natural	metric tons	2,217	922	2,790	302	400
Gypsum	do.	29,401	54,854	38,719	63,531	95,391
Potash		32	14	20	39	27
Talc		101	118	149	158	162
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Coal <sup>1</sup>		3,025	2,514	2,189	1,237	1,576
Liquefied gas		22	28	5	5	5
Petroleum, crude	thousand 42-gallon barrels	156	NA	350	1,050	NA

NA Not available. -- Zero.

<sup>1</sup>Data are for the fiscal year ending on March 31 of the year shown in the column heading.

Sources: Indian Minerals Yearbook 2011–2016; World Steel Association, 2016; International Copper Study Group, 2016; United Nations Comtrade database, 2011–2016.

TABLE 4  
INDIA: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		2012	2013	2014	2015	2016
<b>METALS</b>						
<b>Aluminum:</b>						
Alumina		735	1,384	818	874	1,251
Bauxite		79	66	422	1,193	1,207
<b>Copper:</b>						
Ore and concentrates		580	920	594	543	672
Copper alloy, ingots		4	3	4	3	3
Copper and alloys, semifabricated		134	180	227	247	296
Copper and alloys, scrap		204	141	169	174	180
Blister and anode		29	16	38	83	149
Refined copper		21	41	31	40	36
Gold metal <sup>1</sup>	kilograms	1,078,354	1,013,703	661,715	915,473	968,075
<b>Iron and steel:</b>						
Iron ore, gross weight		2,882	1,115	7,413	9,515	3,597
Iron ore, Fe content		1,787	691	4,596	5,899	2,200
Direct-reduced iron		1,069	671	178	38	22
Pig iron		12	46	27	35	38
Sponge iron		214	17	18	13	13
Scrap		8,156	5,632	5,699	6,710	6,380
<b>Steel:</b>						
Flat products		6,868	5,648	6,744	9,829	7,119
Ingots and semis		823	248	413	765	577
Long products		963	881	1,626	2,015	1,421
Semifinished and finished		9,341	7,392	9,477	13,284	9,904
Tabular products		642	576	657	643	752
Lead ore and concentrates		30	56	33	39	5
Zinc ore and concentrates		63	112	33	36	5
<b>INDUSTRIAL MINERALS</b>						
Barite	metric tons	3,720	6,174	5,687	7,484	7,414
Cement		9,189	11,967	13,676	7,165	8,285
Diamond, rough <sup>1</sup>	carats	152,811	135,730	146,612	150,487	151,535
Graphite, natural	metric tons	18,334	23,291	25,235	29,227	33,523
Gypsum	do.	3,197	3,011	4,066	3,955	4,451
Potash <sup>1</sup>		2,842	2,123	3,395	4,621	3,595
Talc		5	3	3	4	5
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Coal <sup>1</sup>		102,841	145,790	166,861	212,103	204,000
Liquefied gas		13,200	13,136	13,021	21,700	22,500
Petroleum, crude	million 42-gallon barrels	1,233	1,381	1,324	1,372	1,489

<sup>1</sup>Data are for the fiscal year ending on March 31 of the year shown in the column heading.

Source: Indian Minerals Yearbook, 2011–2016; World Steel Association, 2016; International Copper Study Group, 2016; United Nations Comtrade database, 2011–2016.

TABLE 5  
INDIA: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES IN 2016<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity	Reserves
Apatite	31,000
Asbestos (all grades)	2,500
Barite (all grades)	51,300
Bauxite	830,000
Calcite	3,400
Chalk	4,000
Chromite ore (all grades)	107,000
Clay:	
Ball clay	50,000
Fireclay	30,000
Kaolin	230,000
Coal, lignite	138,000,000
Copper:	
Crude ore	208,000
Cu content	2,700
Corundum	metric tons 200
Diamond	thousand carats 960
Diaspore	3,000
Dolomite	678,000
Dunite	13,000
Feldspar (all grades)	320,000
Fluorite	4,600
Garnet	19,000
Gold:	
Crude ore	17,000
Au content	kilograms 70,000
Graphite	8,000
Gypsum	37,000
Iron ore:	
Crude ore	6,640,000
Iron content	4,120,000
Iron oxide pigmetites; ochre	37,000
Kyanite and related minerals:	
Kyanite	1,600
Sillimanite	4,100
Lead and zinc ore	103,000
Lead (Pb content)	2,200
Limestone	15,000,000
Magnesite	21,000
Manganese ore	96,000
Marl	140,000
Mica	144
Perlite	430
Phosphate rock	70,000
Pyrophyllite	25,000
Ruby	kilograms 236
Silica	650,000
Salt (rock)	16,000,000
Silver:	
Crude ore	150,000
Ag content	7,200
Talc	106,000
Tin concentrate, Sn content of ore	metric tons 7,000
See footnotes at end of table.	



TABLE 5—Continued  
INDIA: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES IN 2016<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity	Reserves
Titanium minerals:	
Ilmenite	594,000
Rutile	31,400
Vermiculite	1,700
Wollastonite	2,500
Zinc (Zn content)	11,000
Zircon	33,700

<sup>1</sup>The total reserves of major mineral commodities include proven and probable reserves.

Source: Indian Bureau of Mines, 2016.