



# 2014 Minerals Yearbook

---

**INDIA [ADVANCE RELEASE]**

---

# THE MINERAL INDUSTRY OF INDIA

By Karine M. Renaud

India held significant resources of metals and industrial minerals; it produced 89 mineral commodities, including 72 industrial minerals; 10 metals; and 7 mineral fuels and related materials. The country ranked 1st in world production of garnet (industrial) and iron oxide pigments; 2d in cement and graphite (natural)<sup>1</sup>; 3d in chromium,<sup>1</sup> lime, nitrogen, and pig iron; 4th in crude steel and iron ore; 5th in aluminum; 6th in bromine, lead, manganese,<sup>1</sup> vermiculite, and zircon concentrates<sup>1</sup>; 7th in silicon; 10th in ilmenite concentrates; and 12th in gypsum (Apodaca, 2016; Bedinger, 2016b; Bray, 2016; Corathers, 2016a, b; Crangle, 2016; Fenton, 2016; Guberman, 2016; Olson, 2016a, b; Papp, 2016; Schnebele, 2016a, b; Tanner, 2016a, b; Tuck, 2016; van Oss, 2016).

The country's estimated share of world production of garnet (industrial) in 2014 amounted to 48%; graphite (natural),<sup>1</sup> 15%; chromium,<sup>1</sup> 13%; lime, manganese,<sup>1</sup> and pig iron, 5% each; aluminum and iron ore, 4% each; ilmenite concentrates, vermiculite, and zircon concentrates,<sup>1</sup> 3% each; and lead, 2% (Bedinger, 2016b; Bray, 2016; Corathers, 2016a, b; Fenton, 2016; Guberman, 2016; Olson, 2016a, b; Papp, 2016; Tanner, 2016b; Tuck, 2016).

## Minerals in the National Economy

India's real gross domestic product (GDP) increased by 7.3% in 2014 from 5.0% in 2013, owing to an increase in exports and industrial activities; the nominal GDP in 2014 was \$2.07 trillion. Mining and quarrying accounted for 2.5% of the GDP in 2014 compared with 2.1% in 2013. Owing to a decrease in production and the value of some mineral commodities, the total value of mineral production (excluding nuclear energy related minerals) decreased by 9.3% in 2014 compared with 2013. In 2014, coal accounted for 32.6% of the total value of mineral production; mineral fuels (other than coal), 30.4%; iron ore, 14.2%; natural gas, 12.6%; lignite, 2.4%; limestone, 2.1%; and zinc, 1.2% (Indian Bureau of Mines, 2014i; International Monetary Fund, 2014, p. 55; 2015a, p. 5; 2015b, p. 33; World Bank, The, 2014; Ministry of Statistics and Programme Implementation, 2015, p. x).

In 2014, India continued implementing policy changes to attract foreign investment in the mining industry. For exploration activities in oil and natural gas fields and related oil and natural gas infrastructure, 100% of foreign ownership was allowed. Central Public Sector Enterprises allowed 49% foreign ownership of petroleum refineries without approval from the Foreign Investment Promotion Board. Foreign direct investment in the petroleum and natural gas sector increased by 8.5% to \$24.3 billion in 2014 compared with \$22.4 billion, revised, in 2013 (Ministry of Petroleum and Natural Gas, 2015, p.11).

Although India allowed 100% foreign direct investment in the mining sector, only two companies, ArcelorMittal S.A.

of Luxembourg and Pohang Iron and Steel Co. (POSCO) of the Republic of Korea, proposed constructing steel plants with production capacities of 12 million metric tons per year (Mt/yr) and 6 Mt/yr in 2009 and 2005, respectively. As of 2014, construction had not yet started owing to delays in the approval processes (Chaturvedi and Mukherji, 2013).

## Government Policies and Programs

In 2014, a new Government was installed following elections. The new Government planned to change some policies related to the country's industrial mineral sector. In 2014, the Mines and Minerals (Development and Regulations) Act, 1957 (MMDR) was being amended, and was expected to be implemented in 2015. The objectives of the amended MMDR were to improve mining laws and to identify illegally awarded mining licenses, to make allocation of licenses more transparent, to improve living conditions at communities around mines, to give State Governments the right to award licenses with the approval of the Central Government (Corporate Catalyst India Pvt. Ltd., 2014, p. 2; Indian Parliament, 2014; Yamada, 2014, p. 16; Biswas, 2015).

In September 2014, the Government launched a program called "Make in India." The objectives of the "Make in India" program were (1) to attract foreign companies to invest in India, (2) to reform policies (such as, land acquisition laws and labor laws), (3) to construct infrastructure, (4) to increase the manufacturing sector, and (5) to create new jobs (Mehra, 2014).

In September 2014, the Government revised the royalty rates for major minerals, excluding coal, lignite, and sand for hydraulic stowing. The royalty rates in the States of Andhra Pradesh, Jharkhand, Karnataka, and Odisha increased for the following metals: nonmetallurgical-grade bauxite, 25% of the average sale price based on its value; lead, contained lead in the concentrate produced, 14.5%; cadmium, chromite, and iron ore, 15%; zinc, contained zinc in concentrate produced, 10%; gold, byproduct, 13.3%; zinc, contained zinc in ore produced, 9.5%; lead, contained lead in ore produced, 8%; silver, byproduct, 7%; manganese ore and silver, primary, 5%; copper, 4.62%; gold, primary, 4%; manganese concentrates, 1.7%; and nickel, 0.12%. Royalty rates increased for the following industrial minerals: slate, 45% of the average sale price based on its value; gypsum, pyrophyllite, and vanadium, 20%; soapstone, steatite, and talc, 18%; amphibolite, calcite, feldspar, quartz, and wollastonite, 15%; phosphate rock, above 25% P<sub>2</sub>O<sub>5</sub> content, 12.5%; china clay (including ball clay and white shale), white clay (processed, including washed), fire clay, and other minerals (agate, corundum, diaspore, feldspar, fuschite-quartzite, jasper, kyanite, perlite, pyroxenite, rock salt, and selenite), 12%; diamond, 11%; columbite-tantalite, ruby, molding sand, quartzite, and silica sand, 10%; fluorspar, china clay (including ball clay and white shale), and white clay (crude), 8%; tin, 7.5%; phosphate rock, up to 25% P<sub>2</sub>O<sub>5</sub> content, 6%; barite, 6.5%; garnet, crude

<sup>1</sup>Does not include U.S. production.

mica, waste mica, and scrap, 4%; magnesite, 3%; apatite and vermiculite, 5%; sillimanite, 2.5%; and brown ilmenite, pyrite, and uranium, 2% (Mineweb, 2014; Press Information Bureau, 2014).

The Government created several types of free trade zones—Special Economic Zone (SEZ), Export Processing Zone (EPZ), Software Technology Park (STP), and Export Oriented Unit (EOU)—to encourage production of exports. The Government also planned to establish 16 additional types of free trade zones, the National Industrial and Manufacturing Zones (NIMZs), to increase the share of manufacturing in the GDP to 25% and to create new job opportunities. Eight of the 16 NIMZ were expected to be established along the Delhi-Mumbai Industrial Corridor (DMCI) with the help of the Government of Japan. The DMCI project would cross the States of Gujarat, Haryana, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh along Indian's Railways Western Dedicated Freight Corridor. The other seven free trade zones were expected to be established in the cities of Bidar, Gulbarga, Kolar, Nagpur, and the Districts of Chittoor, Medak, and Tumkur. Companies that wanted to operate in an NIMZ would be able to obtain Government approvals for all clearances at one site (U.S Department of State, 2013, p. 14, 15; Hindu, The, 2014b).

## Production

The production of fluorspar increased by 61%; ferromanganese, 49%; quartz and quartzite, 47%; wollastonite, 32%; phosphate rock, 30%; aluminum (primary), bromine, and copper (smelter), 24% each; silicomanganese, 6%; direct-reduced iron, 21%; chromium (chromite, gross weight), 20%; graphite, 19%; sand (other), 17%; garnet, 14%; kyanite, 13%; semimanufactures, 12%; manganese (ore and concentrate, gross weight), 11%; lead (metal refined, primary) and sillimanite, 8% each; mica (crude), steel (crude), and vermiculite, 7% each; kaolin (crude), 6%; and dolomite, 29% (table 1).

In 2014, the production of pyroxenite decreased by 81%; cobalt, 66%; agate, 50%; tin, 40%; asbestos, 33%; ilmenite and rutile, 27% each; feldspar, 23%; salt (total), and silver (smelter), 15% each; kaolin (processed) and slate, 14% each; zinc (mine output), 11%; barite, cadmium, steatite (soapstone), and zinc (metal), 8% each; chalk and magnesite, 7% each; natural gas and sulfur (byproduct from petroleum), 6% each; and iron ore (gross weight) and refined copper, 5% each (table 1). Data on mineral production are in table 1.

## Structure of the Mineral Industry

In 2014, 3,722 mines reported production compared with 3,978 (revised) in 2013. Of the 3,722 operating mines, 661 were located in the State of Andhra Pradesh; 557, in Rajasthan; 464, in Gujarat; 364, in Madhya Pradesh; 354, in Tamil Nadu; 257, in Jharkhand; 202, in Chhattisgarh; 187, in Karnataka; 180, in Odisha; 163, in Maharashtra; 122, in West Bengal; and 211, in the remaining States. Total employment in the mining industry was estimated to be 49 million in 2014 compared with 50 million in 2013, of which 29% were employed in the production of iron ore; 16%, limestone; 11%, manganese ore; 5% each, bauxite, chromite, lead, and zinc; 3% each, dolomite,

gold, and garnet (abrasive); 2% each, copper, feldspar, kaolin, quartz, sillimanite, and steatite; and 1% each, barite, chalk, laterite, magnesite, phosphorite, pyrophyllite, and silica sand (table 2; Indian Bureau of Mines, 2014i, p. x; 2014o, p. 1; Ministry of Mines, 2014a, p. 12). Table 2 is a list of major mineral industry facilities.

India's Steel Policy (2005), which was implemented in 2013, allowed private companies to invest in the iron and steel sector, which was previously reserved for public sector investment. The country's steel policy allowed technology to be imported and also allowed private companies to modernize and expand existing sectors and to construct new, cost-effective greenfield plants (Ministry of Steel, 2015).

In 2014, the Government approved the sale of a 10% share of Coal India Ltd. (CIL), an 11.36% share of National Hydroelectric Power Corp. (NHPC), and a 5% share of Oil and Natural Gas Corp. (ONGC) to private companies. The partial sale of these three major state-owned companies was expected to reduce India's fiscal deficit to 4.1% of GDP by 2015. The sale was expected to be offered by Bank of America Merrill Lynch, Credit Suisse, Deutsche Bank, and Goldman Sachs (Crabtree, 2014; Hindustan Times, 2014; Kumar and Das, 2014).

## Mineral Trade

The total value of India's exports increased by 2% to \$321 billion in 2014 from \$315 billion (revised) in 2013. The total value of imports decreased to \$463 billion in 2014 from \$465 billion (revised) in 2013 (United Nations Conference on Trade and Development, 2015, p. 4–5).

In 2014, India was the world's leading consumer of gold; the consumption in gold jewelry and for investment totaled 842.7 metric tons (t). Imports of gold declined in 2014. According to the Ministry of Finance, the decision to reduce the duty on gold imports to 2% from 10%, was expected to be announced by February 2015. In 2014, imports of nonmonetary and monetary gold were 661,715 kilograms (kg) compared with 1,000 t in 2013. Exports of nonmonetary and monetary gold totaled 70,721 kg in 2014 compared with 85,349 kg in 2013. The Government increased import duties on gold bullion to 10% from 1% in 2012, and required the importers to reexport 20% of the gold brought into the country in 2012 in order to protect the interests of small artisans and the domestic industry (tables 3, 4; Hindu, The, 2013; Sahu and Mukherji, 2014; Roy and Agarwal, 2015).

In 2011, the Government imposed a 30% tax on exports of iron ore fines and lumps, and in 2014, it added a 5% tax on exports of iron ore pellets in order to make raw material available for domestic steelmakers. The tariff caused a decrease in the volume of iron ore exports to China (Thomson Reuters, 2014).

The Federation of Indian Chambers of Commerce and Industry proposed a 10% tax on bauxite exports in 2013, to discourage exports of bauxite and to increase its availability for domestic aluminum producers. In 2013, exports of bauxite increased to 4.2 million metric tons (Mt) from 401,000 t in 2012, of which 91% was exported to China. In 2014, India increased the export tariff on bauxite exports to 20%, and exports decreased to 3.5 Mt. China imported 84% of bauxite

from India (table 3; India Bureau of Mines, 2013a, p. 13; Economic Times, The, 2014a, b; Mukherji, 2014).

In 2014, India was the third-leading coal importer in the world. Owing to low domestic production of coal and increased domestic demand, imports of coal increased by 14% to 166 Mt in 2014 from 146 Mt in 2013 (table 4; Das, 2015).

India met its demand for potash through imports. The country was the second-ranked importer of potash after China. In 2014, India's potash imports increased by 60% to 3.4 Mt from 2.1 Mt in 2013. Indian Potash Ltd. was the leading potash importer in the country, and Zauri Agro Chemicals Ltd. was the second largest importer (table 4; Mukherji, 2013).

India had a limited supply of crude oil and natural gas, and it had to import more than 75% of its domestic consumption. Most imports came from the Middle East, and India was the second-ranked importer of oil from Iran. Owing to sanctions against Iran, India's oil imports decreased by more than 40% during the first 5 months of 2013. In June 2014, despite the easing of sanctions on Iran, the United States announced that India should wait until the final nuclear agreement with Iran was completed, and suggested that India would have to make an effort to substantially reduce its oil imports from Iran. In 2013, Iraq replaced Iran as the secondary supplier of crude oil to India; Saudi Arabia provided 20% of total crude oil imports to India, and Iraq provided 14%. Other suppliers of crude oil were Venezuela, 12%, and Oman, 9%. In 2014, India was concerned about the instability in Iraq, which could decrease India's oil imports and hamper the country's economic development (Oilprice.com, 2013; Thomson Reuters, 2013; Bhandari, 2014; Brics Post, The, 2014; Mashru, 2014; U.S. Energy Information Administration, 2014, p. 10; Gupta, 2015; Ministry of Petroleum and Natural Gas, 2015, p. 5).

India's exports to the United States were valued at \$45.2 billion in 2014 compared with \$41.8 billion in 2013. Of this amount, gem diamonds accounted for \$7.6 billion; petroleum products, about \$3.4 billion; fuel oil, \$1.4 billion; iron and steel products, \$456 million; other gemstones, \$347 million; stone, sand, and cement, \$325 million; chemical fertilizer, \$273 million; iron and steel, advanced, \$187 million; bauxite and alumina, \$79 million; sulfur, \$24 million; nonmetallic minerals, \$50 million; nonferrous metals, \$40.2 million; other precious metals, \$7 million; liquefied petroleum gas, \$3 million; nickel, \$2 million; nonmonetary gold, \$373,000; coal and related fuels, \$300,000; tin, \$186,000; copper, \$177,000; and zinc, \$9,000. In 2014, India's imports from the United States were valued at \$21.6 billion compared with about \$21.8 billion in 2013. Imports included gem diamonds, \$3.7 billion; nonmonetary gold, \$1.2 billion; petroleum products, \$910 million; chemical fertilizers, \$508 million; metallurgical-grade coal, \$320 million; steelmaking materials, \$269 million; nonferrous metals, \$114 million; aluminum and alumina, \$133 million; other iron and steel products, \$94 million; copper, \$88 million; precious metals, \$88 million; iron and steel mill products, \$76 million; natural gas liquids, \$64,000; coal and fuels, \$32 million; nonmetallic minerals, \$17 million; fuel oil, \$11 million; and nuclear fuel materials, \$8.9 million (U.S. Census Bureau, 2014a, b).

## Commodity Review

### Metals

**Bauxite and Alumina and Aluminum.**—The major companies involved in the mining of bauxite were Ashapura Minechem Ltd., Bharat Aluminum Co. Ltd. (BALCO), Bombay Minerals Ltd., Dr. Nirmalaben Mehta, Gujarat Mineral Development Corp. Ltd. (GMDC), Hindalco Industries Ltd. (Hindalco), National Aluminium Co. Ltd. (NALCO), Prabhudas Vithaldas, Pravin Kumar Ghosalia, Pushpaben Prabhudas Mkhecha, and Utkal Alumina International Ltd. In 2014, the State of Odisha was the leading bauxite producer and accounted for 35% of total production; followed by Gujarat, 32%; Jharkhand, 11%; Maharashtra, 9%; Chhattisgarh, 6%; Madhya Pradesh, 3%; and Goa, Karnataka, and Tamil Nadu contributed the remaining 3% (table 2; Indian Bureau of Mines, 2014c, p. 5).

In 2014, NALCO remained the leading bauxite producer. It operated the Panchpatmali bauxite mine at the industrial town of Damanjodi, Koraput District, in the State of Odisha. Panchpatmali had a production capacity of 6.3 Mt/yr of bauxite. NALCO planned to increase the mine's capacity to 6.8 Mt/yr (date unspecified). The Panchpatmali Mine contributed 29% of India's total bauxite production, which was used for alumina production at NALCO's refineries (Indian Bureau of Mines, 2014c, p. 2, 10; 2014i, p. x; Ministry of Mines, 2014b, p. 3; 2015, p. 80; National Aluminum Co. Ltd., 2015c).

BALCO operated two bauxite mines, two powerplants, and refining and smelting facilities. Vedanta Ltd. (formerly known as Sesa Sterlite Ltd.), held a 51% share in BALCO, and the remaining 49% was held by the Government. In 2014, Vedanta Aluminium Ltd. (VAL), a wholly owned subsidiary of Vedanta Ltd. entered into a joint-venture agreement with Orissa Mining Corp. Ltd. (OMCL) and South West Orissa Bauxite Mining Pvt. Ltd. (SWOBM) for bauxite production at the Niyamgiri project in the State of Odisha. The Niyamgiri project was a source of bauxite supply for the alumina refinery at Lanjigarh. The request for forest clearance was rejected by the Ministry of Environment, Forest, and Climate Change owing to environmental concerns by the State of Odisha (Sesa Sterlite Ltd., 2013; 2014, p. 250).

GMDC was a State-owned company in which the State of Gujarat held 75% interest and 25% was distributed through private and institutional investors. In 2014, GMDC operated one calcined bauxite mine and two bauxite projects—the Gadhsisa Mine in Kutch District, the Bhatia project in Jamnagar District, and the Ratadia project in Kutch District. In 2014, GMDC signed a lease deed agreement with the district collector for the Mewasa Mine bauxite project; the exact date for commencement of mining was undetermined. GMDC, as a joint venture with Credo Mineral Industries Ltd., commissioned the beneficiation of a low-grade bauxite facility for which GMDC would supply the bauxite (Gujarat Mineral Development Corp., 2014, p. 9–10, 17).

The major alumina and aluminum producers in India were BALCO, Hindalco, Madras Aluminium Co. Ltd. (MALCO), NALCO, and VAL. Production of aluminum increased to 2.1 Mt in 2014 from 1.7 Mt in 2013 in response to domestic

demand from construction, power, transportation, and other sectors. In 2014, 48% of the country's output of aluminum was consumed by the power sector, 15% by the transportation sector, and 13% by the construction sector (Indian Bureau of Mines, 2014a, p. 2; Srinivasan, 2014).

Hindalco, which was 33% owned by Aditya Birla Group, 26% by foreign investors, 23% by private Indian investors, and 18% by financial institutions, made significant progress on the Utkal alumina greenfield project. The Utkal project was operated by Utkal Alumina International Ltd. (UAIL), which was a wholly owned subsidiary of Hindalco. In 2014, after a 21-year delay owing to concerns by environmental groups, UAIL operated its refinery and produced 277,000 t of alumina. The production capacity of the refinery was 1.5 Mt/yr of alumina. The bauxite for Utkal refinery came from the Baphimali bauxite mine, which had reserves estimated to last for 25 years. The alumina produced by UAIL would be used at the Aditya and Mahan smelters (Mohanty, 2013; Indian Bureau of Mines, 2014a, p. 5; Hindalco Industries Ltd., 2013, p. 4, 14–15; 2014a, p. 10; 2014b).

The Muri alumina refinery, which was located on the bank of the Subarnarekha River in the village of Chhotamuri, experienced a water shortage. The refinery depended on the Subarnarekha River for its water supply and, owing to low rainfall during the summer season, the river's water level dropped and it became insufficient for withdrawal. The production capacity of the Muri refinery was 450,000 metric tons per year (t/yr) of alumina and hydrates. At the Belgaum alumina refinery, which was located in the State of Karnataka, the production capacity increased to 350,000 t/yr of alumina hydrates. In 2014, Hindalco planned to increase production capacity at the Belgaum alumina refinery to 650,000 t from 350,000 t, however, the plan was put on hold as the company waited for Government approval for bauxite mining (Indian Bureau of Mines, 2014a, p. 4, 5; Hindalco Industries Ltd., 2013, p. 4, 14–15; 2014a, p. 10; 2014b, c).

In 2014, NALCO, a state-owned company of the Navratna Central Public Sector Enterprise under the Ministry of Mines, was the leading producer of alumina in India and accounted for 51% of the country's alumina production. The company upgraded the fourth line at its Damanjodi refinery, which increased the production capacity to 2.1 Mt/yr in 2014. NALCO planned to add 1 Mt/yr of production capacity at each of its greenfield alumina refineries in the Sundergarh District, State of Odisha, and in the Kutch District, State of Gujarat. GMDC would supply bauxite for the alumina refinery in the Kutch District (Indian Bureau of Mines, 2014a, p. 5; National Aluminium Co. Ltd., 2014, p. 56; 2015a–c).

VAL operated a 1-Mt/yr alumina refinery at Lanjigarh in the Kalahandi District, State of Odisha, and a 500,000-t/yr aluminum smelter in Jharsuguda District, State of Odisha. In 2014, VAL planned to increase production capacity at its alumina refinery at Lanjigarh in the Kalahandi District, State of Odisha, to 200,000 t/yr from 100,000 t/yr of alumina; however, it was awaiting government approval to increase production. VAL also planned to construct a 300,000-t/yr capacity refinery at an unspecified location, however, the project was on hold awaiting government approval. The construction of an alumina smelter in Jharsuguda, Odisha, was in progress in 2014 (Indian Bureau of Mines, 2014a, p. 6).

Hindalco also made significant progress on its greenfield projects—the Aditya aluminum project in the State of Odisha, the Mahan aluminum project in the State of Madhya Pradesh, and the Jharkhand aluminum project in the State of Jharkhand. The Aditya aluminum project was located at Lapanga, Sambalpu District, in the State of Odisha, and consisted of a powerplant and a smelter with the capacity to produce 360,000 t/yr of aluminum. The Mahan aluminum project is located at Bargawan, in the State of Madhya Pradesh, and consisted of a 360,000-t/yr-capacity smelter and a powerplant. In 2014, the Mahan aluminum smelter produced 54,000 t of aluminum (Mohanty, 2013; Indian Bureau of Mines, 2014a, p. 5; Hindalco Industries Ltd., 2013, p. 4, 14–15; 2014a, p. 10; 2014b).

In 2014, Hindalco operated two aluminum smelters—the Renukoot smelter in the State of Uttar Pradesh and the Hirakud smelter in the State of Odisha. A third smelter owned by Hindalco at Alupuram, Kerala District, remained closed in 2014. Hindalco expanded its major manufacturing facilities through brownfield projects at the Hirakud smelter. Hirakud upgraded its horizontal-stud Søderberg smelter (HSS) technology to modern, environmentally friendly pre-brake smelter technology in 2013 (the first smelter in India to have done so). Owing to the plant modernization in 2014, the capacity of the Hirakud smelter increased to 217,000 t/yr from 161,400 t/yr. In 2014, NALCO increased the production capacity at its Angul aluminum smelter in the State of Odisha to 567,000 t/yr from 460,000 t/yr (Indian Bureau of Mines, 2014a, p. 4, 5; Hindalco Industries Ltd., 2013, p. 4, 14–15; 2014a, p. 10; 2014b, c; National Aluminium Co. Ltd., 2014, p. 56; 2015a–c).

BALCO planned to modernize and expand the capacity of the Korba aluminum smelter in 2015 to 670,000 t/yr from 345,000 t/yr by adding a new 325,000-t/yr-capacity Korba-III smelter. The Korba-I, which had a capacity of 100,000 t/yr, was shut down in 2014 (Sesa Sterlite Ltd., 2013).

**Chromium.**—Almost all chromite production was in the States of Odisha and Karnataka in 2014, and the State of Odisha was the leading chromite producer. Chromite was produced by six companies—Balasore Alloys Ltd., Ferro Alloys Corp. Ltd. (FACOR), Indian Metals & Ferro Alloys Corp. Ltd. (IMFAL), Orissa Mining Corp. Ltd. (OMC), Jindal Stainless Ltd. (JSL), and Tata Steel Ltd. (Tata Steel)—all located in the State of Odisha. Mysore Minerals Ltd., which was state-owned, was the only chromite producer in the State of Karnataka. Tata Steel planned to increase its production capacity by 600,000 t/yr of ferrochrome by developing an underground mine at the Sukinda Mine, which is located in the State of Odisha. The mining license for the Sukinda Mine expired on January 12, 2013; since the expiration, Tata Steel operated the mine with a deemed extension permit (meaning that the operation was permitted to operate at one-half of the capacity). In 2014, the environmental clearance for the Sukinda Mine was extended until March 2026, with a limited production capacity of 351,000 t/yr of chromite. IMFAL stopped operations at the Mahagiri chromite mines in October 2013, because the company failed to meet certain conditions required by the Ministry of Environment, Forest, and Climate Change. The mine was operated as an opencast and underground mine. In 2014, the environmental clearance for the Mahagiri chromite mines was extended until January 2015;

however, the approval for forest clearance was not obtained. In January 2013, IMFAL recommissioned the Nuasahi underground chromite mine following an order of the Orissa High Court, and in 2014, IMFAL applied for environmental clearance for the Nuasahi underground mine (Balasore Alloys Ltd., 2013, p. 6–8; MoneyWorks4me, 2013; Ferro Alloys Corp. Ltd., 2014; p. x; Indian Metals & Ferro Alloys Ltd., 2014a, p. 1; 2014b, p. 1; 2014c; 2014d, p. 15; Ministry of Mines, 2014a, p. 19).

**Copper.**—In 2014, the leading state producer of copper concentrate was the State of Madhya Pradesh, which accounted for 57% of the country's total copper concentrate production, followed by Rajasthan, 33%; and Jharkhand, 10%. Government-owned Hindustan Copper Ltd. (HCL) was the only producer of primary refined copper to use output from its mines and from imported copper concentrates. Hindalco (a subsidiary of Birla Copper), Jhagadia Copper Ltd., and VAL were privately owned companies and mainly used imported copper concentrates. In 2014, HCL operated the Indian Copper Complex (ICC) in Ghatsila, East Singhbhum District, the State of Jharkhand; the Khetri Copper Complex (KCC) in Khetrinagar, Jhunjhunu District, in the State of Rajasthan; the Malanjhand copper project (MCP) at the Malanjhand Copper Complex Mines in Balaghat District, the State of Madhya Pradesh; and the Taloja copper project (TCP) in the State of Maharashtra. KCC consisted of two underground mines, Khetri and Kolihan, and a beneficiation plant. HCL began the development of the Banwas Mine in the State of Rajasthan in May 2010, which was scheduled to be completed in 2015. HCL's Khetri and Kolihan Mines planned to expand their total production capacity to 3.1 Mt/yr from 1.0 Mt/yr of ore. The expansion project at the Khetri and Kolihan Mines started in September 2011, however, the completion date was unspecified. The MCP consisted of four copper deposits—Garhi Dongri, Gidhri Dhori, Jatta, Malanjhand, and Shitalpani. HCL planned to increase Malanjhand's production capacity to 5 Mt/yr from 2 Mt/yr of ore by developing an underground mine below the open pit mine. The project was expected to be commissioned after the company obtained the required clearance from the Standing Committee of the National Board for Wildlife. In 2014, HCL planned to resume operations at its closed Kendadih and Rakha Mines at Singhbhum in ICC, which had production capacities of 1.5 Mt/yr of ore and 210,000 t/yr of ore, respectively, as soon as the environmental clearance was obtained. The Surda Mine at the ICC was operated by India Resource Ltd. through an alliance with HCL. In September 2014, the State government of Jharkhand ordered HCL to stop operations at the Surda Mine while awaiting the renewal of its mining license. In November 2014, the High Court of Jharkhand ordered HCL to obtain environmental clearance for the Surda Mine (Hindustan Copper Ltd., 2014, p. 15; Indian Bureau of Mines, 2014e, p. 14–18; India Resources Ltd., 2015).

In 2013, the Tamilnadu Pollution Control Board (TNPCB) ordered VAL to close the Tuticorin copper smelter. The company filed an appeal against the TNPCB's order with the National Green Tribunal (NGT). In the first quarter of 2014, the smelter was closed, but the NGT was allowed to resume operations at the Tuticorin smelter after a report was submitted by an expert committee. The TNPCB filed the appeal against the

NGT with the Supreme Court of India; the date of the hearing was unspecified (Sesa Sterlite, 2014, p. 250).

**Gold.**—In 2014, almost all the gold produced in India came from the State of Karnataka, which accounted for 99% of total production. The remaining production of gold was from the State of Jharkhand. Production of gold was reported by the only public company, Hutti Gold Mine Ltd. (HGML), which was located in the State of Karnataka; Manmohan Mineral Industries (Pvt.) Ltd., which was the private sector that operated the underground Kunderkocha gold mine in Singhbhum East District in the State of Jharkhand; and by Hindalco (BCC and ICC) and NMDC (Indian Bureau of Mines, 2014g, p. 13).

In 2014, HGML operated three gold mines (the Heera-Buddini, the Hutti, and the Uti Mines in Raichur District in the State of Karnataka), and remained the leading producer of primary gold in India. The Uti Mine, which was an open pit mine in the northern part of the licensed area, had a production capacity of 25,960 t/yr of ore. HGML submitted a proposal to the government of Karnataka to establish an open pit mine in the southern part of the licensed area, and it was conducting exploratory development of underground mines at the Uti and Hutti Mines. Deccan Gold Mines Ltd. (DGML) conducted exploratory work in the Hutti-Maski Belt at various prospects, including the Hutti North and Hirenagnur prospects, the southern and northern continuation of the Uti Mine lodes, and other prospects. DGML created a joint venture with JB Group to evaluate the available data and to select an area for exploration study. In 2014, the joint venture conducted detailed geologic mapping and channel sampling and identified five subparallel zones of gold mineralization in the Hesaba and Asaleyta prospects in Dgibouti (Indian Bureau of Mines, 2014g, p. 13–15).

In 2014, KGF proposed the acquisition of the state-owned Bharat Gold Mines Ltd. (BGML) assets, and the tender process was expected to be finalized in 2015. In 2013, the Ministry of Mines decided to tender BGML, which operated the Kolar Gold Field (KGF) in the State of Karnataka, the Bisanatham Mine and the Chigaragunta Mine in Chittoor District, and the Ramagiri Mine in Anantapur District in the State of Andhra Pradesh. In 2001, BGML abandoned some mining operations owing to high operational costs. Vedanta Resources plc of the United Kingdom planned to expand its production and considered bidding for BGML (Agrawal, 2013; Bhayani and Taneja, 2013; Kolar Gold Ltd., 2014, p. 4; Singh, 2013).

In August 2013, Kolar Gold Ltd. of the United Kingdom announced that Jonnagiri's mining license was awarded to its partner Geomysore Services India (Pvt.) Ltd. (GMSI), which was a joint venture between Australian Indian Resources of Australia (80%) and Sun Mining and Exploration Ltd. (20%). The Jonnagiri project was located in Kurmool District in the State of Andhra Pradesh and was divided into two blocks—the Dona East block and the Dona Temple block. The Joint Open Reserves Committee-compliant estimate of the total resources of the project was 22,000 kg of gold. The open pit resources at the Dona East block were estimated to have a grade of 2.1 grams per metric ton (g/t) gold and contain 5,900 kg gold (reported as 190,000 troy ounces), and the underground resources were estimated to have a grade of 4.3 g/t gold and contain 16,500 kg

of gold (reported as 530,000 ounces). Thriveni Earth Movers Ltd. (Thriveni), a mine developer and operator, agreed to invest in the Jonnagiri drilling program (Kolar Gold Ltd., 2013; 2014, p. 3, 5, 6).

**Iron Ore and Iron and Steel.**—Iron ore production decreased to 129.8 Mt in 2014 from 136.1 Mt in 2013 and 152.6 Mt in 2012. The decrease in iron ore production was a consequence of the Supreme Court's ban on iron ore mining in 2011, and the lengthy processes for renewing mining licenses and issuing environmental and forest clearance approvals. In 2011, the Supreme Court suspended iron-ore mining activities in the States of Karnataka and Goa because of illegal mining activities that were producing negative environmental effects. In April 2013, the Supreme Court lifted the ban on 63 mines in the State of Karnataka, including one with a capacity of 2.3 Mt/yr; however, many iron ore mines remained closed because they could not meet the Government's environmental standards. In 2014, the Supreme Court lifted the ban on mining iron ore in the State of Goa and allowed production of 20 Mt/yr of iron ore. The Supreme Court announced that it would not issue mining licenses for areas within a 1-kilometer radius of national parks and wildlife sanctuaries, and ordered the Ministry of Environment, Forest, and Climate Change to identify the ecologically sensitive areas around national parks (Komnencic, 2013; Siddiqui, 2013; Business Standard, 2014; Indian Express, The, 2014; Ministry of Steel, 2014, p. 2; Sesa Sterlite Ltd., 2015).

In 2014, the State of Odisha remained the leading producer of iron ore in India and accounted for 50% of the country's total iron ore production, Chhattisgarh, 19.8%; Jharkhand, 14.8%; Karnataka, 12%; and Andhra Pradesh, Madhya Pradesh, Maharashtra, and Rajasthan, 3.4% (combined). In 2014, Goa did not report any iron ore production owing to the Supreme Court's suspension of mining operations (Indian Bureau of Mines, 2014j, p. xii; 2014l, p. 3).

In 2014, NMDC (a state-owned company) continued to explore for minerals and developed mines to supply iron ore for the steel industry. NMDC also continued to operate large iron ore mines at Bailadila in the State of Chhattisgarh and at Donimalai in the State of Karnataka. The company continued to diversify its resources and to set up an integrated steel plant with a production capacity of 3 Mt/yr of steel at Nagarnar, Bastar District, in the State of Chhattisgarh. It also planned to construct a 1.2-Mt/yr pellet plant at Donimalai in the State of Karnataka, a 360,000-t/yr banded hematite jasper ore beneficiation plant at Donimalai, a 2-Mt/yr pellet plant at Nagarnar, and a 2-Mt/yr beneficiation plant at Bachelu that would be connected by a slurry pipeline between Bachelu and Nagarnar in the State of Chhattisgarh. NMDC signed a memorandum of understanding (MOU) with the Indian Railway for the Jagdalpur-Karindul section of the Kottavasla-Kirandul line of the East Coast Railway to deliver iron ore from Bailadila (Ministry of Steel, 2013, p. 8; 2014, p. 22–23).

In 2013, the Steel Authority of India Ltd. (SAIL) received "final forest clearance" approval for the Barsua and the Bolani iron ore mines, and in 2014, it received stage-1 forest and environmental clearance from the Ministry of Environment, Forest, and Climate Change to expand iron-ore capacity at the

Gua iron ore mines. The Government of Odisha's approval of the technical committee's report on the Karo-Karampada Elephant Corridor allowed SAIL to increase the production capacity of the Bolani Mine to 10 Mt/yr of iron ore. The Barsua and Kalta Mines in Odisha operated under deemed extension (Indian Bureau of Mines, 2013c, p. 14, 15; 2014k, p. 14; Steel Authority of India Ltd., 2013, p. 2; 2014, p. 8, 9).

In 2014, India ranked fourth in world production of crude steel after China, Japan, and the United States. In 2014, India's production of steel increased by 7% to 87 Mt from 81 Mt. SAIL 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 Jharkhand, and the Indian Iron and Steel Company (IISCO) steel plant at Burnpur in the State of West Bengal). SAIL also operated three alloy steel plants (the plant at Durgapur in the State of West Bengal, the plant at Salem in the State of Tamil Nadu, and the Visceswaraya iron and steel plant at Bhadravati in the State of Karnataka), and several Visakhapatnam steel plant (Vizag Steel) units located at Visakhapatnam in the State of Andhra Pradesh. In 2014, SAIL increased the combined production capacity at five of its steel plants to 23.5 Mt/yr from 14.4 Mt/yr. The modernization and capacity expansion plan included the commissioning of a new sinter plant at the Rourkela steel plant; the installation of an Air Separation Unit-4 and an Oxygen Plant-II at Bhilai steel plant; and the installation of a raw material processing plant, a sinter plant, a coke oven battery-II, and a wire-rod mill at the IISCO steel plant at Burnpur. In 2014, SAIL commenced the operation of a new steel plant at Burnpur with a production capacity of 2.5 Mt/yr of steel (Indian Bureau of Mines, 2013c, p. 14, 15; 2014k, p. 14; Steel Authority of India Ltd., 2013, p. 2; 2014, p. 8, 9; World Steel Association, 2015, p. 2).

In 2014, Rashtriya Ispat Nigam Ltd. (RINL), a Navaratna (which is a public sector enterprise) was in the process of increasing the production capacity of Vizag Steel to 6.3 Mt/yr from 3.0 Mt/yr. According to an MOU between RINL and NMDC that was signed in 2013, the NMDC supplied iron ore through a pipeline from its Bailadila complex in the State of Chhattisgarh from Jagdapur to Vizag steel in the State of Andhra Pradesh. RINL also planned to obtain iron ore from its subsidiary Orissa Mineral Development Corp. Ltd. (Indian Bureau of Mine, 2014m, p. 15–16; Ministry of Steel, 2013, p. 8; Rashtriya Ispat Nigam Ltd., 2013, p. 25; 2014, p. 9).

**Lead and Zinc.**—Hindustan Zinc Ltd. (HZL) produced primary lead and zinc and accounted for 98% of India's total production of zinc metal; Binani Zinc Ltd. produced the remaining 2%. HZL operated the Dariba smelting complex, the Chanderiya lead and zinc smelter, and the Debari zinc smelter. The Dariba smelting complex had a hydrometallurgical zinc smelter with a processing capacity of 210,000 t/yr of zinc and 100,000 t/yr of lead. The Chanderiya lead and zinc smelter included a pyrometallurgical smelter with a processing capacity of 105,000 t/yr of zinc and a hydrometallurgical smelter with a processing capacity of 420,000 t/yr of zinc. The Debari zinc smelter included a hydrometallurgical zinc smelter with a processing capacity of 88,000 t/yr of zinc. Binani Zinc Ltd., which was a subsidiary of Binani Industries Ltd. (89.9%),

operated a smelter at Kochi in Ernakulam District in the State of Kerala with a capacity of 38,000 t/yr of zinc metal. The Tundo lead smelter was closed for economic reasons in 2013 (Hindustan Zinc Ltd., 2013, p. 21, 23; 2014, p. 9).

The Rampura Agucha Mine, which operated as an opencast lead-zinc mine with HZL, had a production capacity of 6.15 Mt/yr of ore. HZL expected to start production at its underground mine with a production capacity of 3.75 Mt/yr of ore. The Rampura Agucha Mine reserves were estimated to be 57.5 Mt grading at 13.7% zinc and 1.8% lead. HZL also operated three underground mines—the Rajpura Dariba Mine, the Zawar Mine, and the Sindesar Khurd Mine. The Rajpura Dariba Mine's production capacity was 900,000 t/yr of zinc ore, and HZL planned to increase its production capacity by 33% to 1.20 Mt/yr. The reserves at the Rajpura Dariba Mine were estimated to be 10.0 Mt grading 6.4% zinc and 1.6% lead. The reserves at Sindesar Khurd Mine were estimated to be 20.4 Mt grading 4.6% zinc and 2.6% lead. Since 2010, operations at three of the four mines at the Zawar complex were suspended as the company waited for forest clearance approval from the Ministry of Environment, Forest, and Climate Change. The reserves at the Zawar mining complex were estimated to be 9.9 Mt grading 3.8% zinc and 1.9% lead. In 2014, HZL developed the new Kayad Mine in the State of Rajasthan. The reserves of Kayad Mine were estimated to be 6.2 Mt grading 10.4% zinc and 1.5% lead. The production capacity of the mine was 350,000 t/yr (Hindustan Zinc Ltd., 2013, p. 21, 23; 2014, p. 8, 18).

**Manganese.**—In 2014, the leading State producer of manganese ore was the State of Madhya Pradesh, which accounted for 30% of the country's total production; the States of Maharashtra and Odisha, 26% each, the State of Andhra Pradesh, 13%, and the State of Karnataka, 5%. MOIL Ltd. remained the leading producer of manganese ore, followed by Tata Steel, RBSSDP & FN Das, Mangilal Rungta, Orissa Manganese and Minerals Ltd., S.R. Ferro Alloys, and the Sandur Manganese and Iron Ore Ltd. (Indian Bureau of Mines, 2014m, p. 5–6).

MOIL planned to increase production at its mines in 2014. Production at the Balaghat Mine was expected to increase to 420,000 t/yr from 310,000 t/yr by deepening the Holmes shaft to 435 meters (m) from 300 m. The deepening of the Holmes shaft was expected to be completed by 2017. The company planned to sink a 134-m vertical shaft in the Ukwa Mine; the project was expected to be completed by 2015. The company also planned to sink a vertical shaft to 169 m from 109 m to sustain and increase production at the Chikla Mine. MOIL planned to increase production at the Munsar Mine to 125,000 t from 55,000 t of ore by 2021. Production at the Munsar Mine was expected to increase by sinking a 156-m vertical shaft at the central portion of the main ore body; the project was scheduled to be completed in 2015. The sinking of the first vertical shaft at the Gumgaon Mine was completed in 2012, and the sinking of the second vertical shaft to 350 m was expected to be completed by 2018 (MOIL Ltd., 2014, p. 11, 13).

## **Industrial Minerals**

**Barite.**—In 2014, Andhra Pradesh Mineral Development Corp. Ltd. operated the Mangampeta barite project, which is located in the village of Mangampeta in Cuddapah District. The company remained the only State-owned barite producer in India. The State of Andhra Pradesh accounted for about 94% of India's production of barite; the remaining 6% was produced by 20 private companies (Indian Bureau of Mines, 2014b, p. 2; 2014i, p. xiii). In 2014, owing to allegations of illegal barite mining, the Government of Andhra Pradesh canceled the barite mining licenses in Mangampeta and established a technical committee to tender canceled licenses in a more transparent way (Hindu, The, 2014a; Times of India, The, 2014).

**Cement.**—In 2014, India ranked second in the world in cement production after China. In 2014, a shortage of coal resulted in the closure of cement plants, including Bheema Cements Ltd. and Panyam Cement and Mineral Industries Ltd. in the States of Andhra Pradesh and Telengana. Production was estimated to have decreased by 8% to 260 Mt from 280 Mt, which accounted for 6.2% of world output (Ambuja Cements Ltd., 2014, p. 14; Global Cement, 2014d, g; UltraTech Cement Ltd., 2014, p. 2).

In 2013, UltraTech Cement Ltd., which was India's leading producer of gray cement, white cement, and concrete mix, acquired the Gujarat Cement Unit of Jaypee Cement Corp. Ltd. (JCLL), a subsidiary of Jaiprakash Associates Ltd. in the State of Gujarat. In June 2013, the cement plant at Sewagram and the grinding unit at Wanakbori, which had a combined capacity of 4.8 Mt, became the company's 12th cement plant and grinding unit. UltraTech also acquired a 57-megawatt powerplant, a jetty for clinker, a desalinization plant, and a cement-bag manufacturing unit. The total capacity of UltraTech's cement plants increased to 58.8 Mt/yr in 2014. UltraTech submitted a letter of intent to the Infrastructure Development Department in the State of Karnataka for the construction of two new cement plants at Tuni in Dehradun District and at Someshwar in Almora District with production capacities of 3.5 Mt/yr and 2 Mt/yr, respectively. No update on the construction of two new cement plants was available at yearend 2014 (Global Cement, 2013d; 2014o; Projects Today, 2013; UltraTech Cement Ltd., 2013; 2014, p. 49).

In January 2013, the operations at Ambuja Cements Ltd. were stopped because a fly ash container crashed into the mixing unit. Holcim India Ltd., which is a subsidiary of Holcim Group of Switzerland, planned to restructure Ambuja Cements Ltd. and ACC Ltd. (formerly known as Associate Cement Co. Ltd.) by combining common functions across the two companies, while keeping the two brands independent. The restructuring was expected to save the company \$14.4 million in supply chain and fixed-cost optimization. The integration process was expected to be completed by 2015. In 2014, Ambuja Cement was expected to invest \$133 million to increase its production capacity by constructing three greenfield cement plants in the States of Rajasthan, Madhya Pradesh, and Uttar Pradesh, each with a production capacity of 1.5 Mt/yr, and plants with clinker capacity of 800,000 t/yr were constructed in the States of West Bengal and Rajasthan (Global Cement, 2013a; 2014b; 2015).



Dalmia Bharat Cement Ltd. was expected to increase its capacity to 24 Mt/yr after commissioning a greenfield cement plant unit with a capacity of 2.5 Mt/yr at Belgaum in the State of Karnataka; the exact date for the completion of the project was unknown. In 2014, Daima Bharat Cement became the sole owner of Bokaro Jaypee Cement Ltd. in the State of Jharkhand by acquiring the remaining 26% share from the SAIL for \$150 million (Global Cement, 2013c; 2014f).

In 2014, JSW Cement planned to construct a greenfield cement plant in Gulbarga in the State of Karnataka, which would have the capacity to produce 4.3 Mt/yr of cement. ACC Ltd. planned to invest \$499 million on the modernization of Jamul facilities in the State of Chhattisgarh and to add a grinding unit with a production capacity of 1.5 Mt/yr to its existing unit in the State of Jharkhand. ACC planned to stop production at its existing Jamul plant and to construct a new plant with a production capacity of 4 Mt/yr, which would increase ACC's production capacity to 10 Mt/yr from 6 Mt/yr by 2016. In 2014, Sagar Cement Ltd. (SCL) acquired a 100% stake in BMM Cements Ltd., which operated a 1 Mt/yr cement plant in the State of Andhra Pradesh, and increased its production capacity to 3.75 Mt/yr. Cement Corp. of India Ltd. halted cement production at its Bokajan cement plant in January 2014 owing to a shortage of funds to purchase coal (Global Cement, 2014a, j, k, m, n).

In 2014, Chettinad Cement Corp. Ltd. (CCCL) purchased a 20.58% share of Anjani Portland Cement Ltd. Anjani Portland Cement operated two plants in Nalgona District in the State of Andhra Pradesh with a production capacity of 1.2 Mt/yr, and planned to construct a greenfield cement plant in the State of Karnataka. In 2014, Mangalam Cement Ltd. commissioned a new grinding mill in Kota District in the State of Rajasthan. The total cement production capacity at the plant increased to 3.25 Mt/yr from 2.0 Mt/yr. India Cements Ltd. operated seven cement plants in the States of Tamil Nadu and Andhra Pradesh, one plant in the State of Rajasthan, and two grinding units in the States of Tamil Nadu and Maharashtra. The merger of India Cements with its subsidiary Trinetra Cemt Ltd. would increase the total production capacity of India Cements to 15.8 Mt/yr from 15.5 Mt/yr (Global Cement, 2013b; 2014e, h, l).

India Cements was cited by the State of Andhra Pradesh for failure to meet emission standards, inappropriate storage of limestone in open areas, an inadequate water sprinkler system, and other violations. The Andhra Pradesh Pollution Control Board ordered the closure of India Cements Ltd.'s plant at Yerraguntla and requested an investigation of the company's four cement plants in Kadapa District owing to severe pollution in areas surrounding the plant (Global Cement, 2013b; 2014e, h, l).

**Fluorspar.**—In 2014, Maharashtra State Mining Corp. Ltd. was the only company in India that operated fluorite mines. Maharashtra State Mining Corp. Ltd. operated the Dongargaon fluorite mine in Chandrapur District. Owing to the high cost of land diversion required by the Ministry of Environment, Forest, and Climate Change, Rajasthan State Mines and Minerals Ltd. gave up three production licenses for the Karara, the Lakhawas-II, and the Tavidar (fluorite) mines in 2013. GMDC operated Kadipani, the largest fluorspar project in Baroda District in 2013. The mining was done by opencast

method. GMDC (50%) in a joint venture with Swarnim Gujarat Fluorspar Pvt. Ltd. (50%) planned to construct a fluorite beneficiation plant with a capacity of 40,000 t/yr at Kadipani in Vadodara District (Rajasthan State Mines and Minerals Ltd., 2012, p. 5; Gujarat Mineral Development Corp. Ltd., 2013, p. 14, 30, 38; Indian Bureau of Mines, 2014f, p. 5; Maharashtra State Mining Corp. Ltd., 2014).

**Gypsum.**—In 2014, owing to the insufficient supply of domestic gypsum to meet the country's increased demand, the Indian cement companies had to invest in gypsum mines in Iran, Oman, and Thailand, and in the production of synthetic gypsum. In 2014, the State of Rajasthan remained the country's leading producer of gypsum and accounted for 99% of the country's production. The States of Gujarat, Jammu, Kashmir, and Tamil Nadu contributed the remaining 1%. At yearend 2014, the minable reserves of gypsum in India increased to 150 Mt from 140 Mt, of which 125 Mt were available to the cement industry, which was enough to supply the cement industry for 7 to 8 years. Thirty gypsum mines were operated by State-owned Rajasthan State Mines and Minerals and FCI Aravali Gypsum & Minerals India Ltd. (FAGMIL), which was formerly part of the Fertilizer Corporation of India Ltd. In 2013, FAGMIL obtained two new gypsum mining licenses for the Kishanpura A and the Kishanpura B properties, each of which had a capacity of 50,000 t/yr. Owing to the gradual depletion of the country's high-grade gypsum resources and to increased production, FAGMIL applied to the Rajasthan State Government for permission to enhance the capacity of the two mines in Padampura and Dhandra. The Padampura Mine is located in the Sri Gangangar District in the State of Rajasthan, and was a part of the Surtagarh group of mines. The lease area of the Padampura Mine was 120 hectares, and it had the capacity to produce 15,000 t/yr of gypsum. The Dhandra Mine is located in the Sri Ganganagar District in the State of Rajasthan, and it was a part of the Rmsinghpur group of mines. The lease area of the Dhandra Mine was 132 hectares, and it had the capacity to produce 35,000 t/yr of gypsum (FCI Aravali Gypsum and Minerals India Ltd., 2013, p. 5, 6; 2015a, b; Global Cement, 2014c; Indian Bureau of Mines, 2014h, p. 4; 2014i, p. xiii).

### *Minerals Fuels and Related Materials*

**Coal.**—In 2014, coal remained the leading source of energy in India for manufacturing and for the production of bricks, cement, chemicals, fertilizer, steel, and textiles, and it was expected to remain important until 2032. About 76% of India's coal output was consumed by power sector producers. The demand for coal from the domestic market, especially electricity generation, was increasing; however, new coal projects were delayed owing to the long permitting process required by the Ministry of Environment, Forest, and Climate Change (Das, 2014; Eastern Coalfields Ltd., 2014, p. 4; Indian Bureau of Mines, 2014d, p. 2, 14–15, 31).

Coal India Ltd., a state-owned company, decided to invest in overseas assets in 2014 to fill the demand gap, which made India the world's third leading importer of coal. In 2014, the Government planned to break up Coal India Ltd. and open the coal production industry to foreign investors to increase output,

reduce imports, and auction coal blocks through open tenders. The State of Chhattisgarh remained the leading coal-producing State in the country; it accounted for 22.5% of total production, followed by Jharkhand 20%; Odisha, 19.9%; Madhya Pradesh, 13.4%; Andhra Pradesh, 8.9%; Maharashtra, 6.6%; West Bengal, 5%; Uttar Pradesh, 2.6%; and Arunachal Pradesh, Assam, Jammu and Kashmir, and Meghalaya, 1.1% each. In 2014, 536 coal mines were in production in India, of which 152 were located in the State of Jharkhand; 100, in West Bengal; 71, in Madhya Pradesh; 63, in Maharashtra; 61, in Chhattisgarh; 49, in Andhra Pradesh; 27, in Odisha; and the remaining 13 mines were located in Arunachal Pradesh, Assam, Jammu and Kashmir, Meghalaya, and Uttar Pradesh (Das, 2014; Eastern Coalfields Ltd., 2014, p. 4; Indian Bureau of Mines, 2014d, p. 2, 14–15, 31).

In 2014, coal production was reported out by eight state-owned companies— Bharat Coking Coal Ltd. (BCCL), Central Coalfields Ltd. (CCL), Eastern Coalfields Ltd. (ECL), Mahanadi Coalfields Ltd. (MCL), Northern Coalfields Ltd. (NCL), North-Eastern Coalfields Ltd. (NEC), South-Eastern Coalfields Ltd. (SECL), and Western Coalfields Ltd. (WCL), all of which were subsidiaries of Coal India Limited (CIL), as well as Singareni Collieries Co. Ltd. (SCCL) (a joint venture between the Government of India, and the State government of Andhra Pradesh), and the Neyveli Lignite Corp. (NLC), which produced lignite. In 2013, CIL approved two open pit mines for Southeast Coal Chhal-OC, which had a production capacity of 6.0 Mt/yr. The company planned to increase capacity at the Kusmunda-OC project to 50 Mt/yr from 15 Mt/yr. CIL operated four mines—the Ledo, the Tikak, the Tipong, and the Tirap Mines—at the Makum Coalfields of Assam in the northeastern region. The Ledo, the Tikak, and the Tirap Mines were opencast projects, and the Tipong Mine was an underground mine (Hindu, The, 2014c).

In 2014, the Supreme Court of India canceled 218 of 222 coal blocks that were allocated since 1993. The cancellation was followed with a penalty of \$4.79 per ton of coal extracted since 1993. Four blocks were exempted from the penalty, including the Moher and the Moher Amroli Extension, which was operated by Sasan Power Ltd.; Tasra, which was operated by SAIL; and Pakri Barwadih, which was operated by National Thermal Power Corp. (Indian Bureau of Mines, 2013b, p. 23; Global Cement, 2014i; Hindu, The, 2014c; Ministry of Coal, 2014, p. 4–5).

**Natural Gas and Petroleum.**—In 2014, India remained the fourth largest consumer of oil and petroleum in the world after China, the United States, and Russia, and it was the world's fourth-ranked importer of crude oil and petroleum products. The demand for hydrocarbons and renewables was increasing in India owing to development and growth and a shift from coal to hydrocarbons and renewable sources of energy for homes and transportation (Oilprice.com, 2013; Thomson Reuters, 2013; Bhandari, 2014; Brics Post, The, 2014; Mashru, 2014; U.S. Energy Information Administration, 2014, p. 10; Gupta, 2015; Ministry of Petroleum and Natural Gas, 2015, p. 5).

State-owned companies Oil Natural Gas Corp. Ltd., (ONGC) and Oil India Ltd. (OIL) accounted for 68% of oil production and 73% of natural gas production. ONGC accounted for 59% of crude oil and 66% of natural gas production; OIL, 9%

of crude oil and 7% of natural gas; and private joint-venture companies, 32% of oil and 26% of natural gas. Offshore crude oil production accounted for 48% of total production, and the remaining 52% of crude oil was produced by six States— Rajasthan (24.3%), Gujarat (13.4%), Assam (12.4%), and Andhra Pradesh, Arunachal Pradesh, and Tamil Nadu (1.7% combined). The offshore natural gas production accounted for 75% of total natural gas production, and the remaining natural gas was produced in eight States—Assam (8.1%), Gujarat (4.7%), Tamil Nadu (3.7%), Andhra Pradesh (3.3%), Rajasthan (2.8%), Tripura (2.3%), and Arunachal Pradesh and West Bengal (0.6% combined) (Indian Bureau of Mines, 2014n, p. 5; Ministry of Petroleum and Natural Gas, 2015, p. 18, 23–24).

**Uranium.**—In 2014, Uranium Corp. of India Ltd. operated seven mines in the State of Jharkhand at Bagjata, Banddudurand, Bhatin, Jaduguda, Mahuldih, Narwapahar, and Turamdih. In 2013, Jaduguda had a production capacity of 300,000 t/yr of uranium. The Jadugora Mine was the deepest underground mine in the country. The Bhatin Mine was undergoing improvements of layout and ore hosting arrangements. The applications for lease renewal for the Jaduguda and the Bahtine Mines were waiting for approval. The most modern underground uranium mine was the Narwapahar Mine, which had a production capacity of 350,000 t/yr. The company planned to increase Narwapahar Mine, which had a production capacity to 525,000 t/yr. Turamdih, which was a modernized underground mine, had a production capacity of 263,000 t/yr in 2013. The company planned to increase its capacity to 350,000 t/yr. The Banddudurang open pit mine had a production capacity of 1.2 Mt/yr of ore and faced many social, political, and environmental problems, which caused frequent disruptions. The ore produced at the Bagjata Mine was used by the Jaduguda processing plant; however, political issues were affecting the transportation of ore to the plant. The Mahuldih Mine was commissioned in March 2013, and the ore produced at the mine was used by the Turamdih processing plant.

In 2014, the mining license for the Jaduguda Mine (which is located in the State of Jharkhand) expired, and the Government of Jharkhand stopped operations. The company planned to increase production from other mines; however, owing to the low quality of the ore, the production costs increased. In 2014, India planned to import uranium ore from Australia, Kazakhstan, and Russia (Uranium Corp. of India Ltd., 2014, p. 9–11).

New uranium deposits were discovered near Jharkhand's East Singhbhum District between the Jaduguda and the Narwapahar Mines in 2013. The new discovery was expected to expand the life of the country's first uranium mine in Jaduguda by 5 to 6 years and to allow India to make major changes in its nuclear program (Seth, 2013; Economic Times, The, 2014c).

## Reserves and Resources

Data for reserves and resources are in table 5.

## Outlook

The mineral industry of India faces many challenges, including Government delays in clearance processing and land acquisition, inadequate infrastructure, insufficient funding, and

limited domestic energy resources to support economic growth and to meet the residential and transportation needs. The new Government intensified its efforts to increase the country's mineral production by adopting new mineral and trade policies to attract foreign investment, and to overcome the challenges that the mining industry faced. The Government implemented a "Make in India" strategic plan that sought to transform India into a global design and manufacturing hub. The Government is also amending its land acquisition and labor laws. Given its efforts, India is likely to continue to be self-sufficient in some of the minerals and metals that constitute the primary raw materials for its various industries. In the next few years, production of steel is expected to continue to increase. Aluminum and alumina companies and cement plants are expected to continue to expand their production capacities. Newly discovered uranium deposits are likely to improve the domestic nuclear fuel supply. India's economic development would be affected by how the country overcomes challenges faced by the mineral industry, and by the speed of the implementation of some reforms and policies (Chaturvedi and Mukherji, 2013; McKinsey & Co., 2014, p. 5, 12–14; Ministry of Steel, 2014, p. 4; U.S. Energy Information Administration, 2014, p. 1; World Bank Group, The, 2014, p. 3; Ministry of Petroleum and Natural Gas, 2015, p. 5).

## References Cited

- Agrawal, Anil, 2013, Vedanta looking to expand into gold mining, eyeing Kolar mines: The Economic Times [Mumbai, India], October 1. (Accessed January 20, 2015, at [http://articles.economicstimes.indiatimes.com/2013-10-01/news/42576573\\_1\\_bgml-mines-ministry-global-tender.](http://articles.economicstimes.indiatimes.com/2013-10-01/news/42576573_1_bgml-mines-ministry-global-tender.))
- Ambuja Cements Ltd., 2014, Annual report 2014—I can: Andheri, Mumbai, India, Ambuja Cements Ltd., 145 p. (Accessed May 18, 2014, at <http://www.ambujacement.com/wp-content/uploads/Ambuja%20%20Cement%20Annual%20Report%202014%20Web%20Version.pdf.>)
- Apodaca, L.E., 2016, Nitrogen (fixed)—Ammonia: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 118–119.
- Balasure Alloys Ltd., 2013, 25th corporate report 2012–13—A global source for core sector: Kolkata, India, Balasure Alloys Ltd., 102 p. (Accessed January 10, 2015, at [www.balasurealloys.com/upload/media/financial/2013/Annual%20Report%202013.pdf.](http://www.balasurealloys.com/upload/media/financial/2013/Annual%20Report%202013.pdf.))
- Bedinger, G.M., 2016a, Titanium mineral concentrates: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 178–179.
- Bedinger, G.M., 2016b, Zirconium and hafnium: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 194–195.
- Bhandari, Amit, 2014, How the continuing Iraq crisis will impact India's economy: Firstpost, June 17. (Accessed December 30, 2015, at <http://www.firstpost.com/world/how-the-continuing-iraq-crisis-will-impact-indias-economy-1574189.html.>)
- Bhayani, Rajesh, and Taneja, Mansi, 2013, Govt to invite bids for stake in gold mines: Business Standard [New Delhi, India], November 7. (Accessed March 20, 2015, at [http://www.business-standard.com/article/economy-policy/govt-to-invite-bids-for-stake-sale-in-gold-mines-113110601079\\_1.html.](http://www.business-standard.com/article/economy-policy/govt-to-invite-bids-for-stake-sale-in-gold-mines-113110601079_1.html.))
- Biswas, Beethika, 2015, Will MMDR amendment act 2015 change the mining situation in India?: AlCircle, May 5. (Accessed May 19, 2016, at [http://blog.alcircle.com/2015/05/05/will-mmdr-amendment-act-2015-change-mining-situation-india/.](http://blog.alcircle.com/2015/05/05/will-mmdr-amendment-act-2015-change-mining-situation-india/))
- Bray, L.E., 2016, Aluminum: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 22–23. (Accessed May 11, 2016, at <http://minerals.usgs.gov/minerals/pubs/commodity/aluminum/mcs-2016-alumi.pdf.>)
- Brics Post, The, 2014, Iraq oil crisis could derail India economic revival—Report: The Brics Post [London, United Kingdom], June 27. (Accessed December 30, 2015, at <http://thebricspost.com/iraq-oil-crisis-could-derail-india-economic-revival-report/#.VoRaLUorLq4.>)
- Business Standard, 2014, Supreme Court lifts ban on iron ore mining in Goa: Business Standard [New Delhi, India], April 22. (Accessed December 26, 2015, at [http://www.business-standard.com/article/economy-policy/supreme-court-lifts-ban-on-iron-ore-mining-in-go-114042100501\\_1.html.](http://www.business-standard.com/article/economy-policy/supreme-court-lifts-ban-on-iron-ore-mining-in-go-114042100501_1.html.))
- Chaturvedi, Saurabh, and Mukherji, Biman, 2013, Arcelor Mittal joins Posco to scrap India steel projects: The Wall Street Journal, July 18. (Accessed May 19, 2016, at <http://www.wsj.com/articles/SB10001424127887324448104578611691330921694.>)
- Corathers, L.A., 2016a, Lime: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 98–99.
- Corathers, L.A., 2016b, Manganese: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 106–107.
- Corporate Catalyst India Pvt. Ltd., 2014, A brief report on iron and steel industry in India: New Delhi, India, Corporate Catalyst India Pvt. Ltd., May, 16 p. (Accessed January 20, 2015, at <http://www.cci.in/pdfs/surveys-reports/iron-and-steel-industry-in-india.pdf.>)
- Crabtree, James, 2014, Narendra Modi pushes ahead with Coal India stake sale: Financial Times [London, United Kingdom], November 17. (Accessed May 25, 2016, at <http://www.ft.com/intl/cms/s/0/30db9a80-6e4d-11e4-bffb-00144feabdc0.html#axzz49gUu8ebi.>)
- Crangle, R.D., 2015, Gypsum: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 76–77. (Accessed May 11, 2016, at <http://minerals.usgs.gov/minerals/pubs/commodity/gypsum/mcs-2016-gypsu.pdf.>)
- Das, N.K., 2014, Modi exploring breakup of Coal India, opening up sector-sources: Thomson Reuters, May 21. (Accessed December 30, 2015, at <http://in.reuters.com/article/india-coal-india-idINKBN0E10KB20140521.>)
- Das, N.K., 2015, India's coal imports jump 19 pct in 2014—mjunction: Thomson Reuters, January 7. (Accessed May 19, 2016, at <http://in.reuters.com/article/india-coal-imports-idINKBN0KG00020150107.>)
- Eastern Coalfields Ltd., 2014, Annual report and accounts 2013–2014: West Bengal, India, Eastern Coalfields Ltd., 179 p. (Accessed December 30, 2015, at <http://www.easterncoal.gov.in/annualreport/annualreport13-14.pdf.>)
- Economic Times, The, 2014a, Budget 2013—FM proposes 10% export duty on bauxite: The Economic Times [Mumbai, India], February 28. (Accessed May 16, 2016, at <http://economictimes.indiatimes.com/industry/indl-goods/svs/metals-mining/budget-2013-fm-proposes-10-export-duty-on-bauxite/articleshow/18731776.cms.>)
- Economic Times, The, 2014b, Budget 2013—Impose export duty on bauxite, recommends FICCI: The Economic Times [Mumbai, India], February 28. (Accessed May 16, 2016, at [http://articles.economicstimes.indiatimes.com/2013-02-28/news/37352922\\_1\\_bauxite-export-duty-ficci.](http://articles.economicstimes.indiatimes.com/2013-02-28/news/37352922_1_bauxite-export-duty-ficci.))
- Economic Times, The, 2014c, Decline in India's uranium production: The Economic Times [Mumbai, India], December 21. (Accessed December 30, 2015, at [http://articles.economicstimes.indiatimes.com/2014-12-21/news/57280947\\_1\\_jaduguda-mine-ucil-uranium-corporation.](http://articles.economicstimes.indiatimes.com/2014-12-21/news/57280947_1_jaduguda-mine-ucil-uranium-corporation.))
- FCI Aravali Gypsum and Minerals India Ltd., 2013, Director's report: Rajasthan, India, FCI Aravali Gypsum and Minerals India Ltd., May 23, 13 p. (Accessed January 21, 2015, at <http://www.fagmil.nic.in/images/Finance/dt%201314.pdf.>)
- FCI Aravali Gypsum and Minerals India Ltd., 2015a, Ramisinghpur group mines: Rajasthan, India, FCI Aravali Gypsum and Minerals India Ltd. (Accessed January 21, 2015, at <http://fagmil.nic.in/index.php/en/about-fagmil/mines/119-ramisinghpur.>)
- FCI Aravali Gypsum and Minerals India Ltd., 2015b, Suratgarh group mines: Rajasthan, India, FCI Aravali Gypsum and Minerals India Ltd. (Accessed January 21, 2015, at <http://fagmil.nic.in/index.php/en/about-fagmil/mines/113-raghunathpura-main-mines.>)
- Fenton, M.D., 2016, Iron and steel: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 84–85.
- Ferro Alloys Corp. Ltd., 2014, 58th annual report 2013–14: Maharashtra, India, The Facor Group, 67 p. (Accessed January 10, 2015, at <http://www.facorgroup.in/images/FACOR%20A.R.2013-2014%20FULL.pdf.>)
- Global Cement, 2013a, Ambuja Cements and ACC integration to save US\$14.4 m: Pro Global Media Ltd., December 3. (Accessed January 1, 2014, at [http://www.globalcement.com/news/item/2120-ambuja-cements-and-acc-integration-to-save-us\\$144m.](http://www.globalcement.com/news/item/2120-ambuja-cements-and-acc-integration-to-save-us$144m.))
- Global Cement, 2013b, Andhra Pradesh closes one plant and demands changes at three others: Pro Global Media Ltd., August 27. (Accessed January 1, 2014, at <http://www.globalcement.com/news/item/1899-andhra-pradesh-closes-one-plant-and-demands-changes-at-three-others.>)
- Global Cement, 2013c, Dalmia Cement to invest US\$335m by 2014: Pro Global Media Ltd., January 23. (Accessed January 1, 2014, at [www.globalcement.com/news/item/1385-dalmia-cement-to-invest-us\\$335m-by-2014.](http://www.globalcement.com/news/item/1385-dalmia-cement-to-invest-us$335m-by-2014.))
- Global Cement, 2013d, Ultratech Cement to build two cement plants in Uttarakhand: Pro Global Media Ltd., December 12. (Accessed January 1, 2014, at [www.globalcement.com/news/item/2149-ultratech-cement-to-build-two-cement-plants-in-uttarakhand.](http://www.globalcement.com/news/item/2149-ultratech-cement-to-build-two-cement-plants-in-uttarakhand.))

- Global Cement, 2014a, ACC to invest US\$499m to modernize its plants in Jharkhand and Chhattisgarh: Pro Global Media Ltd., May 7. (Accessed December 30, 2015, at [http://www.globalcement.com/news/item/2473-acc-to-invest-us\\$499m-to-modernise-its-plants-in-jharkhand-and-chhattisgarh](http://www.globalcement.com/news/item/2473-acc-to-invest-us$499m-to-modernise-its-plants-in-jharkhand-and-chhattisgarh).)
- Global Cement, 2014b, Ambuja Cement to set up three new plants: Pro Global Media Ltd., April 15. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2422-ambuja-cements-to-set-up-three-new-plants>.)
- Global Cement, 2014c, Cement firms scout for overseas mines to secure gypsum supplies: Pro Global Media Ltd., May 9. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2486-cement-firms-scout-for-overseas-mines-to-secure-gypsum-supplies>.)
- Global Cement, 2014d, Cement plants in Andhra Pradesh and Telengana have closed on weak demand: Pro Global Media Ltd., August 15. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2796-cement-plants-in-andhra-pradesh-and-telengana-have-closed-on-weak-demand>.)
- Global Cement, 2014e, Chettinad Cement increases its stake in Anjani portland to 41%: Pro Global Media Ltd., July 9. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2666-chettinad-cement-increases-its-stake-in-anjani-portland-to-41>.)
- Global Cement, 2014f, Dalmia Bharat buys out SAIL in Bokaro Jaypee Cement: Pro Global Media Ltd., December 3. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/3110-dalmia-bharat-buys-out-sail-in-bokaro-jaypee-cement>.)
- Global Cement, 2014g, Indian cement demand unlikely to improve in the 2015 financial year: Pro Global Media Ltd., November 21. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/3075-indian-cement-demand-unlikely-to-improve-in-the-2015-financial-year>.)
- Global Cement, 2014h, Indian Cements to merge with subsidiary Trinetra Cements: Pro Global Media Ltd., May 28. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2537-india-cements-to-merge-with-subsidiary-trinetra-cements>.)
- Global Cement, 2014i, India's Supreme Court cancels 218 of 222 coal blocks allocated since 1993: Pro Global Media Ltd., September 26. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2917-india-s-supreme-court-cancels-218-of-222-coal-blocks-allocated-since-1993>.)
- Global Cement, 2014j, JK Cement completes expansion: Pro Global Media Ltd., October 3. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2932-jk-cement-completes-expansion>.)
- Global Cement, 2014k, JSW Cement plans 4.3 Mt/yr capacity cement plant in Karnataka: Pro Global Media Ltd., September 24. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2905-jsw-cement-plans-4-3mt-yr-capacity-cement-plant-in-karnataka>.)
- Global Cement, 2014l, Mangalam Cement's Rajasthan cement plant increases production capacity to 3.25 Mt/yr: Pro Global Media Ltd., May 29. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2542-mangalam-cement%E2%80%99s-rajasthan-cement-plant-increases-production-capacity-to-325mt-yr>.)
- Global Cement, 2014m, Production halted at Bokajan cement plant since the start of 2014: Pro Global Media Ltd., January 15. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2210-production-halted-at-bokajan-cement-plant-since-the-start-of-2014>.)
- Global Cement, 2014n, Sagar Cements announces acquisition of BMM Cements: Pro Global Media Ltd., September 25. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2913-sagar-cements-announces-acquisition-of-bmm-cements>.)
- Global Cement, 2014o, UltraTech completes acquisition of cement units of Jaypee Cement: Pro Global Media Ltd., September 3. (Accessed December 30, 2015, at <http://www.globalcement.com/news/item/2844-ultratech-completes-acquisition-of-cement-units-of-jaypee-cement>.)
- Global Cement, 2015, Dalmia Cement starts trial production in Karnataka plant: Pro Global Media Ltd., March 31. (Accessed May 18, 2016, at <http://www.globalcement.com/news/item/3484-dalmia-cement-starts-trial-production-in-karnataka-plant>.)
- Guberman, D.E., 2016, Lead: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 96–97. (Accessed May 11, 2016, at <http://minerals.usgs.gov/minerals/pubs/commodity/lead/mcs-2016-lead.pdf>.)
- Gujarat Mineral Development Corp. Ltd., 2013, 50th annual report 2012–2013: Ahmedabad, India, Gujarat Mineral Development Corp. Ltd., 63 p. (Accessed January 19, 2015, at [www.gmdcltd.com/downloads/50th-Annual-Report%2012-13.pdf](http://www.gmdcltd.com/downloads/50th-Annual-Report%2012-13.pdf).)
- Gujarat Mineral Development Corp. Ltd., 2014, 51st annual report 2013–2014: Ahmedabad, India, Gujarat Mineral Development Corp. Ltd., 73 p. (Accessed December 29, 2015, at <http://www.gmdcltd.com/downloads/GMDC-AGM-Notice-14.pdf>.)
- Gupta, Kanchi, 2015, India-Iran and the easing of sanctions: The Diplomat [Washington, DC], May 13. (Accessed December 30, 2015, at <http://thediplomat.com/2015/05/india-iran-and-the-easing-of-sanctions/>.)
- Hindalco Industries Ltd., 2013, Annual report 2012–2013: Mumbai, India, Aditya Birla Management Corp. Pvt. Ltd., 176 p. (Accessed January 4, 2015, at [http://www.hindalco.com/portals/0/documents/investors/downloads/Hindalco\\_Annual\\_Report\\_2012-13.pdf](http://www.hindalco.com/portals/0/documents/investors/downloads/Hindalco_Annual_Report_2012-13.pdf).)
- Hindalco Industries Ltd., 2014a, Annual report 2013–2014—Staying focused delivering performance: Mumbai, India, Aditya Birla Management Corp. Pvt. Ltd., 176 p. (Accessed December 28, 2015, at [http://www.hindalco.com/upload/pdf/Hindalco\\_Annual\\_Report\\_2013-14.pdf](http://www.hindalco.com/upload/pdf/Hindalco_Annual_Report_2013-14.pdf).)
- Hindalco Industries Ltd., 2014b, Brownfield projects: Aditya Birla Management Corp. Pvt. Ltd. Web site. (Accessed January 4, 2015, at <http://www.hindalco.com/brownfield-projects>.)
- Hindalco Industries Ltd., 2014c, Greenfield projects: Aditya Birla Management Corp. Pvt. Ltd. Web site. (Accessed January 4, 2015, at <http://www.hindalco.com/greenfield-projects>.)
- Hindu, The, 2013, Imports duty on gold jewellery hiked to 15%: The Hindu [Chennai (Madras), India], September 18. (Accessed January 4, 2015, at <http://www.thehindu.com/business/Industry/import-duty-on-gold-jewellery-hiked-to-15/article5138304.ece>.)
- Hindu, The, 2014a, AP Cabinet approves cancellation of barytes leases: The Hindu [Chennai (Madras), India], November 9. (Accessed December 30, 2015, at <http://www.thehindu.com/news/national/andhra-pradesh/ap-cabinet-approves-cancellation-of-barytes-leases/article6612085.ece>.)
- Hindu, The, 2014b, Govt to set up 16 NMIZs to boost manufacturing: The Hindu [Chennai (Madras), India], July 9. (Accessed May 16, 2016, at <http://www.thehindu.com/business/Economy/govt-to-set-up-16-nimzs-to-boost-manufacturing/article6193081.ece>.)
- Hindu, The, 2014c, Supreme Court quashes allocation of 214 coal blocks: The Hindu [Chennai (Madras), India], September 25. (Accessed December 30, 2015, at <http://www.thehindu.com/news/national/supreme-court-quashes-allocation-of-all-but-four-of-218-coal-blocks/article6441855.ece>.)
- Hindustan Copper Ltd., 2014, Annual report 2013–14: Kolkata, India, Hindustan Copper Ltd., 86 p. (Accessed May 25, 2016, at [http://www.hindustancopper.com/Admin/FlatFile/AR\\_13-14.pdf](http://www.hindustancopper.com/Admin/FlatFile/AR_13-14.pdf).)
- Hindustan Copper Ltd., 2014, Annual report 2013–14—The copper miner to the nation: Kolkata, India, Hindustan Copper Ltd., 86 p. (Accessed January 4, 2015, at [www.hindustancopper.com/Admin/FlatFile/AR\\_13-14.pdf](http://www.hindustancopper.com/Admin/FlatFile/AR_13-14.pdf).)
- Hindustan Times, 2014, Govt okays Rs 44,000-crore stake sale in three PSUs: Hindustan Times [New Delhi, India], September 11. (Accessed May 25, 2016, at <http://www.hindustantimes.com/business/govt-okays-rs-44-000-crore-stake-sale-in-three-psus/story-Qdqqe1URVvZSpR1DbNsCfJ.html>.)
- Hindustan Zinc Ltd., 2013, Annual report 2012–2013—Reinforcing the core: Rajasthan, India, Hindustan Zinc Ltd., 135 p. (Accessed January 4, 2015, at [www.hzllindia.com/common/images/HZL\\_AR\\_2012-13.pdf](http://www.hzllindia.com/common/images/HZL_AR_2012-13.pdf).)
- Hindustan Zinc Ltd., 2014, Annual report 2013–2014—Transform deliver sustain: Rajasthan, India, Hindustan Zinc Ltd., 117 p. (Accessed December 29, 2015, at <http://www.hzllindia.com/common/images/AnnualReportFY13-14.pdf>.)
- Indian Bureau of Mines, 2013a, Bauxite, chap. 4 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook 2013, v. III, p. 1–14. (Accessed May 16, 2016, at [http://ibm.nic.in/writereaddata/files/073020151237021MYB2013\\_Bauxite.pdf](http://ibm.nic.in/writereaddata/files/073020151237021MYB2013_Bauxite.pdf).)
- Indian Bureau of Mines, 2013b, Coal & lignite, chap. 10 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook 2013, v. III, p. 1–37. (Accessed January 21, 2015, at [http://ibm.nic.in/writereaddata/files/01192015114434IMYB\\_2013\\_Vol%20III\\_Coal%202013.pdf](http://ibm.nic.in/writereaddata/files/01192015114434IMYB_2013_Vol%20III_Coal%202013.pdf).)
- Indian Bureau of Mines, 2013c, Iron & steel and scrap, chap. 9 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook 2013, v. II, p. 1–27. (Accessed January 21, 2015, at [http://ibm.nic.in/writereaddata/files/01012015112554IMYB-2013-VOL-II\\_Iron%20&%20Steel%20and%20Scrap.pdf](http://ibm.nic.in/writereaddata/files/01012015112554IMYB-2013-VOL-II_Iron%20&%20Steel%20and%20Scrap.pdf).)

- Indian Bureau of Mines, 2014a, Aluminium and alumina, chap. 1 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook, vol. II, p. 1–13. (Accessed December 24, 2015, at [http://ibm.nic.in/writereaddata/files/110420151109051MYB2014Alumina\(Advance\).pdf](http://ibm.nic.in/writereaddata/files/110420151109051MYB2014Alumina(Advance).pdf).)
- Indian Bureau of Mines, 2014b, Barytes, chap. 3 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook, vol. III, p. 1–11. (Accessed December 26, 2015, at [http://ibm.nic.in/writereaddata/files/12172015172536IMYB-2014\\_Barytes\(Adv\).pdf](http://ibm.nic.in/writereaddata/files/12172015172536IMYB-2014_Barytes(Adv).pdf).)
- Indian Bureau of Mines, 2014c, Bauxites, chap. 4 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook 2014, vol. III, p. 1–14. (Accessed December 26, 2015, at [http://ibm.nic.in/writereaddata/files/12172015172623IMYB-2014\\_Bauxite\(Adv\).pdf](http://ibm.nic.in/writereaddata/files/12172015172623IMYB-2014_Bauxite(Adv).pdf).)
- Indian Bureau of Mines, 2014d, Coal & lignite, chap. 10 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook, vol. III, p. 1–36. (Accessed December 26, 2015, at [http://ibm.nic.in/writereaddata/files/12172015173558IMYB-2014\\_Coal\(Adv\).pdf](http://ibm.nic.in/writereaddata/files/12172015173558IMYB-2014_Coal(Adv).pdf).)
- Indian Bureau of Mines, 2014e, Copper, chap. 5 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook, vol. II, p. 1–25. (Accessed December 26, 2015, at [http://ibm.nic.in/writereaddata/files/110420151109471MYB2014Copper\(Advance\).pdf](http://ibm.nic.in/writereaddata/files/110420151109471MYB2014Copper(Advance).pdf).)
- Indian Bureau of Mines, 2014f, Fluorite, chap. 21 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook, vol. III, p. 1–12. (Accessed December 30, 2015, at [http://ibm.nic.in/writereaddata/files/12182015100309IMYB-2014\\_Fluorite\(Adv\).pdf](http://ibm.nic.in/writereaddata/files/12182015100309IMYB-2014_Fluorite(Adv).pdf).)
- Indian Bureau of Mines, 2014g, Gold, chap. 8 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook, vol. III, 1–22 p. (Accessed December 26, 2015, at [http://ibm.nic.in/writereaddata/files/1104201511024IMYB2014Gold\(Advance\).pdf](http://ibm.nic.in/writereaddata/files/1104201511024IMYB2014Gold(Advance).pdf).)
- Indian Bureau of Mines, 2014h, Gypsum, chap. 26 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook, vol. II, 1–14 p. (Accessed December 30, 2015, at [http://ibm.nic.in/writereaddata/files/12182015101100IMYB-2014\\_Gypsum\(Adv\).pdf](http://ibm.nic.in/writereaddata/files/12182015101100IMYB-2014_Gypsum(Adv).pdf).)
- Indian Bureau of Mines, 2014i, Highlights of mineral production April 2013 to March 2014, in Monthly statistics of mineral production: Nagpur, India, NIC, p. x–xiii. (Accessed January 6, 2015, at [http://ibm.nic.in/writereaddata/files/10202014112509msmpmar14\\_07\\_Highlights\\_Eng.pdf](http://ibm.nic.in/writereaddata/files/10202014112509msmpmar14_07_Highlights_Eng.pdf).)
- Indian Bureau of Mines, 2014j, Iron ore, chap. 28 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook, vol. III, p. 1–33. (Accessed December 26, 2015, at [http://ibm.nic.in/writereaddata/files/12182015145327IMYB-2014\\_Iron%20Ore\(Adv\).pdf](http://ibm.nic.in/writereaddata/files/12182015145327IMYB-2014_Iron%20Ore(Adv).pdf).)
- Indian Bureau of Mines, 2014k, Iron and steel and scrap, chap. 9 of Mineral reviews Nagpur, India, Indian Minerals Yearbook, vol. II, p. 1–27. (Accessed December 26, 2015, at [http://ibm.nic.in/writereaddata/files/110420151110371MYB2014Iron&Steel\(Advance\).pdf](http://ibm.nic.in/writereaddata/files/110420151110371MYB2014Iron&Steel(Advance).pdf).)
- Indian Bureau of Mines, 2014l, Lead & zinc, chap. 10 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook, vol. II, p. 1–25. (Accessed December 26, 2015, at [http://ibm.nic.in/writereaddata/files/110420151110491MYB2014Lead&Zinc\(Advance\).pdf](http://ibm.nic.in/writereaddata/files/110420151110491MYB2014Lead&Zinc(Advance).pdf).)
- Indian Bureau of Mines, 2014m, Manganese ore, chap. 34 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook, vol. III, p. 1–24. (Accessed December 30, 2015, at [http://ibm.nic.in/writereaddata/files/12182015102130IMYB-2014\\_Manganese%20Ore%20\(Adv\).pdf](http://ibm.nic.in/writereaddata/files/12182015102130IMYB-2014_Manganese%20Ore%20(Adv).pdf).)
- Indian Bureau of Mines, 2014n, Petroleum and natural gas, chap. 39 of Mineral reviews: Nagpur, India, Indian Minerals Yearbook, vol. III, p. 1–18. (Accessed December 30, 2015, at [http://ibm.nic.in/writereaddata/files/12182015145152IMYB-2014\\_PNG\(Adv\).pdf](http://ibm.nic.in/writereaddata/files/12182015145152IMYB-2014_PNG(Adv).pdf).)
- Indian Bureau of Mines, 2014o, Statistical profiles of minerals 2013–2014: Nagpur, India, 131 p. (Accessed December 18, 2015, at <http://ibm.nic.in/writereaddata/files/04102015130532Profile%202013-14.pdf>.)
- Indian Express, The, 2014, Goa mining ban lifted, Supreme Court allows annual cap of 20 mn tonnes of iron ore excavation: The Indian Express [Uttar Pradesh, India], April 21. (Accessed December 26, 2015, at <http://indianexpress.com/article/business/economy/goa-mining-ban-lifted-supreme-court-allows-annual-cap-of-20-mn-tonnes-of-iron-ore-excavation/>.)
- Indian Metals & Ferro Alloys Ltd., 2014a, Compliance status of environmental clearance: Odisha, India, Indian Metals & Ferro Alloys Ltd., August 11, 13 p. (Accessed December 29, 2015, at [http://www.imfa.in/pdfs/MMC\\_Oct-13toMar-14.pdf](http://www.imfa.in/pdfs/MMC_Oct-13toMar-14.pdf).)
- Indian Metals & Ferro Alloys Ltd., 2014b, Compliance status of environmental clearance: Odisha, India, Indian Metals & Ferro Alloys Ltd., August 11, 13 p. (Accessed December 29, 2015, at [http://www.imfa.in/pdfs/SMC\\_Apr-14toSep-14.pdf](http://www.imfa.in/pdfs/SMC_Apr-14toSep-14.pdf).)
- Indian Metals & Ferro Alloys Ltd., 2014c, Compliance status of environmental clearance: Odisha, India, Indian Metals & Ferro Alloys Ltd., August 11, 13 p. (Accessed December 29, 2015, at [http://www.imfa.in/pdfs/NCM\\_Oct-14toMar-15.pdf](http://www.imfa.in/pdfs/NCM_Oct-14toMar-15.pdf).)
- Indian Metals & Ferro Alloys Ltd., 2014d, Director’s report: Odisha, India, Indian Metals & Ferro Alloys Ltd., 19 p. (Accessed January 6, 2015, at [http://www.imfa.in/pdfs/Directors\\_Report.pdf](http://www.imfa.in/pdfs/Directors_Report.pdf).)
- Indian Parliament, 2014, The Mines and Minerals (Development and Regulations) (Amendment) Bill, 2014: New Delhi, India, Indian Parliament, 12 p. (Accessed December 21, 2015, at [http://www.prsindia.org/uploads/media/draft/Draft%20MMDR%20\(A\)%20bill.pdf](http://www.prsindia.org/uploads/media/draft/Draft%20MMDR%20(A)%20bill.pdf).)
- India Resources Ltd., 2015, Shareholder update: India Resources Ltd., March 6. (Accessed December 29, 2015, at <http://www.asx.com.au/asxpdf/20150306/pdf/42x3lqnq04h0mw.pdf>.)
- International Monetary Fund, 2014, World economic outlook—Legacies, clouds, uncertainties: Washington, DC, International Monetary Fund, October, 222 p. (Accessed December 9, 2015, at <http://www.imf.org/external/pubs/ft/weo/2014/02/pdf/text.pdf>.)
- International Monetary Fund, 2015a, India—2015 article IV consultation—Staff report—Press release—And statement by the executive director for India: Washington, DC, International Monetary Fund, March, 66 p. (Accessed December 9, 2015, at <http://www.imf.org/external/pubs/ft/scr/2015/cr1561.pdf>.)
- International Monetary Fund, 2015b, World economic outlook—Adjusting to lower commodity prices: Washington, DC, International Monetary Fund, October, 208 p. (Accessed December 9, 2015, at <http://www.imf.org/external/pubs/ft/weo/2015/02/pdf/text.pdf>.)
- Kolar Gold Ltd., 2013, Jonnagiri mining lease granted: London, United Kingdom, Kolar Gold Ltd., October 28, 2 p. (Accessed March 20, 2015, at [http://www.kolargold.com.au/siteadmin/userfiles/28%2010%2013%20Jonnagiri%20Mining%20Lease%20Granted%20FINAL\(1\).pdf](http://www.kolargold.com.au/siteadmin/userfiles/28%2010%2013%20Jonnagiri%20Mining%20Lease%20Granted%20FINAL(1).pdf).)
- Kolar Gold Ltd., 2014, Director’s report and financial statements: London, United Kingdom, Kolar Gold Ltd., June 30, 42 p. (Accessed December 29, 2015, at <http://www.kolargold.com.au/siteadmin/userfiles/2014%20Annual%20Report%20FINAL.pdf>.)
- Komnenic, Ana, 2013, Indian Government looking at lifting iron ore mining ban; exports down 70 percent: Mining.com, September 1. (Accessed January 23, 2015, at <http://www.mining.com/indian-government-looking-at-lifting-iron-ore-mining-ban-exports-down-70-percent-86141/>.)
- Kumar, Manoj, and Das, N.K., 2014, PM Modi steps up economic reforms, eyes privatization: Thomson Reuters, October 21. (Accessed May 25, 2016, at <http://in.reuters.com/article/india-economy-idINKN01900120141020>.)
- Maharashtra State Mining Corp. Ltd., 2014, Dongargaon fluorite mine: Maharashtra State Mining Corp. Ltd. Web site. (Accessed December 30, 2015, at <http://msmc.gov.in/dongargaonmine.php>.)
- Mashru, Ram, 2014, India’s exposure to ISIS in Iraq: The Diplomat [Washington, DC], June 24. (Accessed December 30, 2015, at <http://thediplomat.com/2014/06/indias-exposure-to-isis-in-iraq/>.)
- McRae, M.E., 2016, Barite: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 30–31.
- Mehra, 2014, “Make in India” pitch from Sept. 25: The Hindu [Chennai (Madras), India], September 21. (Accessed May 17, 2016, at <http://www.thehindu.com/business/Economy/modi-to-launch-make-in-india-campaign-on-sep-25/article6422804.ece>.)
- Metal Bulletin, 2014, MBR analysis: Metal Bulletin, June 2014, 66 p.
- Mineweb, 2014, India hikes mining royalty: Moneyweb Holdings Ltd., August 25. (Accessed January 23, 2015, at <http://www.mineweb.com/uncategorized/india-hikes-mining-royalty/>.)
- Ministry of Coal [India], 2014, Annual report 2013–14: New Delhi, India, Ministry of Coal, 196 p. (Accessed January 22, 2015, at [www.coal.nic.in/sites/upload\\_files/coal/files/coalupload/Chap1AnRep1314.pdf](http://www.coal.nic.in/sites/upload_files/coal/files/coalupload/Chap1AnRep1314.pdf).)
- Ministry of Mines, 2014a, Annual report 2013–2014: New Delhi, India, Ministry of Mines, Government of India, 206 p. (Accessed January 11, 2015, at <http://mines.gov.in/annual2013t14e.pdf>.)
- Ministry of Mines, 2014b, National Aluminium Company Limited (NALCO): New Delhi, India, NIC, 14 p. (Accessed January 5, 2015, at <http://mines.nic.in/writereaddata%5CCcontentlinks%5Ca132d0168fc44b87b278a89643e6ccb0.pdf>.)
- Ministry of Mines, 2015, Annual report 2014–2015: New Delhi, India, Ministry of Mines, Government of India, 186 p. (Accessed December 28, 2015, at <http://mines.nic.in/writereaddata/UploadFile/Annual%20Report%202014-15635699605386348293.pdf>.)

- Ministry of Petroleum and Natural Gas, 2015, Annual report 2015—Energizing the nation: New Delhi, India, Ministry of Petroleum and Natural Gas, Government of India, 168 p. (Accessed December 10, 2015, at [http://petroleum.nic.in/docs/Annual\\_Report/AR14-15.pdf](http://petroleum.nic.in/docs/Annual_Report/AR14-15.pdf).)
- Ministry of Statistics and Programme Implementation, 2015, Annual report 2014–15: New Delhi, India, 122 p. (Accessed December 9, 2015, at [http://mospi.nic.in/Mospi\\_New/upload/mospi\\_annual\\_report\\_2014-15.pdf](http://mospi.nic.in/Mospi_New/upload/mospi_annual_report_2014-15.pdf).)
- Ministry of Steel, 2013, Annual report 2012–2013: New Delhi, India, Ministry of Steel, Government of India, 183 p. (Accessed January 20, 2015, at [http://steel.gov.in/Annual%20Report%20\(2012-13\)/English/Annual%20Report%20\(2012-13\).pdf](http://steel.gov.in/Annual%20Report%20(2012-13)/English/Annual%20Report%20(2012-13).pdf).)
- Ministry of Steel, 2014, Annual report 2013–2014: New Delhi, India, Ministry of Steel, Government of India, 183 p. (Accessed January 20, 2015, at [http://steel.gov.in/Annual%20Report%20\(2013-14\)/English/Annual%20Report%20\(English\).pdf](http://steel.gov.in/Annual%20Report%20(2013-14)/English/Annual%20Report%20(English).pdf).)
- Ministry of Steel, 2015, An overview of the steel sector: Ministry of Steel Web page, August 7. (Accessed December 17, 2015, at <http://steel.gov.in/overview.htm>.)
- Mohanty, 2013, Utkal alumina refinery goes on stream after 21-year delay: Business Standard Private Ltd., June 7. (Accessed January 20, 2015, at [http://www.business-standard.com/article/companies/utkal-alumina-refinery-goes-on-stream-after-21-year-delay-113060700931\\_1.html](http://www.business-standard.com/article/companies/utkal-alumina-refinery-goes-on-stream-after-21-year-delay-113060700931_1.html).)
- MOIL Ltd., 2014, 52nd annual report 2013–2014—Adding strength to steel: Nagpur, India, MOIL Ltd., 78 p. (Accessed December 30, 2015, at [http://moil.nic.in/writereaddata/pdf/MOIL\\_AR\\_2013-14-English1.pdf](http://moil.nic.in/writereaddata/pdf/MOIL_AR_2013-14-English1.pdf).)
- MoneyWorks4me, 2013, Indian Metals & Ferro Alloys stops operations at Mahagiri chromite mines: The Alchemists Ark Pvt. Ltd., January 11. (Accessed January 20, 2015, at <http://www.moneyworks4me.com/company/news/index/id/81062#sthash.R0BM2AW1.dpbs>.)
- Mukherji, Biman, 2013, India importer seeks price cuts on potash: The Wall Street Journal, October 8. (Accessed May 20, 2016, at <http://www.wsj.com/articles/SB10001424052702303442004579122932515855414>.)
- Mukherji, Biman, 2014, China pain on bauxite as India ups export duty: The Wall Street Journal, July 15. (Accessed December 28, 2015, at <http://blogs.wsj.com/moneybeat/2014/07/15/china-pain-on-bauxite-as-india-ups-export-duty/>.)
- National Aluminium Co. Ltd., 2014, 3rd sustainable development report 2013–2014—Sustainable metal green energy: Bhubaneswar, India National Aluminium Company Ltd., 62 p. (Accessed December 28, 2015, at <http://www.nalcoindia.com/download/Sustainable-Report-Nalco-2013-14.pdf>.)
- National Aluminium Co. Ltd., 2015a, Alumina refinery: NALCO India Web page. (Accessed January 4, 2015, at <http://www.nalcoindia.com/Alumina-Refinery.aspx>.)
- National Aluminium Co. Ltd., 2015b, Aluminium smelter: NALCO India Web page. (Accessed January 4, 2015, at <http://www.nalcoindia.com/Aluminium-Smelter.aspx>.)
- National Aluminium Co. Ltd., 2015c, Bauxite mines: NALCO India Web page. (Accessed January 4, 2015, at <http://www.nalcoindia.com/Bauxite-Mines.aspx>.)
- Oilprice.com, 2013, India's energy ties with Iran unsettle Washington: Mining.com, June 17. (Accessed January 23, 2015, at <http://www.mining.com/web/indias-energy-ties-with-iran-unsettle-washington/>.)
- Olson, D.W., 2016a, Garnet (industrial): U.S. Geological Survey Mineral Commodity Summaries 2016, p. 66–67.
- Olson, D.W., 2016b, Graphite (natural): U.S. Geological Survey Mineral Commodity Summaries 2016, p. 74–75.
- Papp, J.F., 2016, Chromium: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 48–49. (Accessed May 11, 2016, at <http://minerals.usgs.gov/minerals/pubs/commodity/chromium/mcs-2016-chrom.pdf>.)
- Press Information Bureau, 2014, Revision of royalty rates of minerals: Press Information Bureau, Government of India, December 9. (Accessed January 22, 2015, at <http://pib.nic.in/newsite/PrintRelease.aspx?relid=117120>.)
- Projects Today, 2013, UltraTech Cement to acquire Jaypee's Gujarat cement unit: Projects Today, September 13. (Accessed January 2, 2015, at <http://www.projectstoday.com/news/ultratech-cement-to-acquire-jaypees-gujarat-cement-unit?Token=a0ee940308072e95fa64dd6402f283389b43c2f68fe073d3adcd613a618ccf&RequestId=5095dd>.)
- Rajasthan State Mines and Minerals Ltd., 2012, Annual report—A Government of Rajasthan Enterprise: Jaipur, India, Rajasthan State Mines and Minerals Ltd., 111 p. (Accessed January 19, 2015, at [www.rsmm.com/annual201112.pdf](http://www.rsmm.com/annual201112.pdf).)
- Rashtriya Ispat Nigam Ltd., 2013, 31st annual report 2012–13—Scaling new peaks... In pursuit of excellence: Visakhapatnam, India, Rashtriya Ispat Nigam Ltd., 82 p. (Accessed January 20, 2015, at <https://www.vizagsteel.com/myindex.asp?tm=1&url=insiderin/FinancialPerformance.asp>.)
- Rashtriya Ispat Nigam Ltd., 2014, Sustainability report 2014: Visakhapatnam, India, Rashtriya Ispat Nigam Ltd., 73 p. (Accessed December 29, 2015, at [https://www.vizagsteel.com/SR\\_2014.pdf](https://www.vizagsteel.com/SR_2014.pdf).)
- Roy, Rajesh, and Agarwal, Vibhuti, 2015, India's trade ministry seeks cut in gold import tax: The Wall Street Journal, February 9. (Accessed December 18, 2015, at <http://www.wsj.com/articles/indias-trade-ministry-seeks-cut-in-gold-import-tax-1423481303>.)
- Sahu, Prasanta, and Mukherji, Biman, 2014, India may cut import tax on gold: The Wall Street Journal, February 19. (Accessed December 18, 2015, at <http://www.wsj.com/articles/SB10001424052702303945704579392140117895418>.)
- Schnebele, E.K., 2016a, Bromine: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 40–41.
- Schnebele, E.K., 2016b, Silicon: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 150–151. (Accessed May 11, 2016, at <https://minerals.usgs.gov/minerals/pubs/commodity/silicon/mcs-2016-simet.pdf>.)
- Sesa Sterlite Ltd., 2013, Aluminium—Bharat Aluminium Company (BALCO): Sesa Sterlite Web site. (Accessed January 5, 2015, at <http://www.sesasterlite.com/our-operations/aluminium.aspx>.)
- Sesa Sterlite Ltd., 2014, Annual report 2013–14—Consolidated strengths sustainable value: Goa, India, Vedanta Ltd., 276 p. (Accessed December 26, 2015, at <http://ar2014.sesasterlite.com/pdf/Sesa%20Sterlite%20AR%2013-14.pdf>.)
- Sesa Sterlite Ltd., 2015, Iron ore: Vedanta Resources. (Accessed January 20, 2015, at <http://www.vedantaresources.com/our-operations/iron-ore.aspx>.)
- Seth, Shivom, 2013, New uranium deposits a boon for India's nuclear ambitions: Moneyweb Holdings Ltd., August 9. (Accessed December 30, 2014, at [www.mineweb.com/archive/new-uranium-deposits-a-boon-for-indias-nuclear-ambitions/](http://www.mineweb.com/archive/new-uranium-deposits-a-boon-for-indias-nuclear-ambitions/).)
- Siddiqui, Danish, 2013, After coal, India now urgently needs to sort out its iron ore sector: Quartz, India, Reuters, December 15. (Accessed January 23, 2015, at <http://qz.com/312393/after-coal-india-now-urgently-needs-to-sort-out-its-iron-ore-sector/>.)
- Singh, Animesh, 2013, Bharat Gold Mines revival plan, govt to float bids for assets sale: The Pioneer [New Delhi, India], August 15. (Accessed January 20, 2015, at <http://www.dailypioneer.com/business/bharat-gold-mines-revival-plan-govt-to-float-bids-for-assets-sale.html>.)
- Srinivasan, Ajay, 2014, Pressure on profitability of aluminium producers to continue: The Hindu Business Line [Chennai (Madras), India], June 23. (Accessed December 28, 2015, at <http://www.thehindubusinessline.com/markets/commodities/pressure-on-profitability-of-aluminium-producers-to-continue/article6141007.ece>.)
- Steel Authority of India Ltd., 2013, Annual report 2012–13—Sustaining growth, maintaining leadership: New Delhi, India, Steel Authority of India Ltd., 124 p. (Accessed January 16, 2015, at [http://www.sail.co.in/sites/default/files/investor/SAIL\\_Annual\\_Report.pdf](http://www.sail.co.in/sites/default/files/investor/SAIL_Annual_Report.pdf).)
- Steel Authority of India Ltd., 2014, Annual report 2013–14—Director's report: New Delhi, India, Steel Authority of India Ltd., 21 p. (Accessed December 29, 2015, at [http://www.sail.co.in/sites/default/files/investor/director\\_report\\_2013\\_2014.pdf](http://www.sail.co.in/sites/default/files/investor/director_report_2013_2014.pdf).)
- Tanner, A.O., 2016a, Iron oxide pigments: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 92–93.
- Tanner, A.O., 2016b, Vermiculite: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 184–185.
- Thomson Reuters, 2013, India cuts Iran oil imports 42 pct, takes Venezuelan, other crudes: Thomson Reuters, June 17. (Accessed March 13, 2015, at <http://www.reuters.com/article/2013/06/17/india-iran-imports-idUSL3N0EQ20720130617>.)
- Thomson Reuters, 2014, Update 1—India imposes 5% export duty on iron ore pellets: Thomson Reuters, January 28. (Accessed December 29, 2015, at <http://in.reuters.com/article/india-iron-idINL3N0L202U20140128>.)
- Times of India, The, 2014, AP government to call for global tenders for barytes mining: The Times of India [New Delhi, India], December 23. (Accessed December 30, 2015, at <http://timesofindia.indiatimes.com/city/hyderabad/AP-government-to-call-for-global-tenders-for-barytes-mining/articleshow/45610007.cms>.)
- Tolcin, A.C., 2016, Zinc: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 192–193.

- Tuck, C.A., 2016, Iron ore: U.S. Geological Survey Mineral Commodity Summaries 2016, p. 90–91.
- U.S. Census Bureau, 2015a, U.S. exports to India by 5-digit end-use code 2005–2014: U.S. Census Bureau. (Accessed December 28, 2015, at <https://www.census.gov/foreign-trade/statistics/product/enduse/exports/c5330.html>.)
- U.S. Census Bureau, 2015b, U.S. imports from India by 5-digit end-use code 2005–2014: U.S. Census Bureau. (Accessed December 28, 2015, at <https://www.census.gov/foreign-trade/statistics/product/enduse/imports/c5330.html>.)
- U.S. Department of State, 2013, 2013 investment climate statement—India: Bureau of Public Affairs, U.S. Department of State, February. (Accessed January 2, 2015, at <http://www.state.gov/e/eb/rls/othr/ics/2013/204659.htm#>.)
- U.S. Energy Information Administration, 2014, India: Washington, DC, U.S. Energy Information Administration, 26 p. (Accessed March 13, 2015, at <http://www.eia.gov/countries/analysisbriefs/India/india.pdf>.)
- UltraTech Cement Ltd., 2013, UltraTech completes acquisition of Jaypee’s Gujarat units: Mumbai, India, Aditya Birla. (Accessed January 1, 2015, at [www.ultratechcement.com/UltraTech\\_MediaLink.aspx?ID=167](http://www.ultratechcement.com/UltraTech_MediaLink.aspx?ID=167).)
- UltraTech Cement Ltd., 2014, Annual report 2013–2014—Staying focused delivering performance: Mumbai, India, Aditya Birla. (Accessed December 30, 2015, at [http://www.ultratechcement.com/common/images/downloads/UltraTech\\_Annual\\_Report\\_2013\\_14.pdf](http://www.ultratechcement.com/common/images/downloads/UltraTech_Annual_Report_2013_14.pdf).)
- United Nations Conference on Trade and Development, 2015, UNCTAD handbook of statistics, 2014: Geneva, Switzerland, United Nations, 364 p. (Accessed March 10, 2013, at [http://unctad.org/en/PublicationsLibrary/tdstat39\\_en.pdf](http://unctad.org/en/PublicationsLibrary/tdstat39_en.pdf).)
- Uranium Corp. of India Ltd., 2014, 47th annual report 2014—At the fore front [sic] of green mining: Jharkhand, India, Uranium Corp. of India Ltd., 72 p. (Accessed January 2, 2015, at <http://www.ucil.gov.in/pdf/report/eng2014.pdf>.)
- van Oss, H.G., 2016, Cement: U.S Geological Survey Mineral Commodity Summaries 2016, p. 44–45. (Accessed May 11, 2016, at <http://minerals.usgs.gov/minerals/pubs/commodity/cement/mcs-2016-cemen.pdf>.)
- World Bank, The, 2014, Data—GDP (current US\$): Washington, DC, The World Bank Group. (Accessed January 10, 2015, at <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD/countries?display=default>.)
- World Steel Association, 2015, Steel statistical yearbook 2015: Brussels, Belgium, World Steel Association, 122 p. (Accessed May 26, 2016, at <https://www.worldsteel.org/en/dam/jcr:3e501c1b-6bf1-4b31-8503-a2e52431e0bf/Steel+Statistical+Yearbook+2015+r3.pdf>.)
- Yamada, Wayne, 2014, Political change in India could prove shot in the arm for mineral industry: Industrial Minerals, no. 562, July, 55 p.

TABLE 1  
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2010	2011	2012	2013	2014	
<b>METALS</b>						
<b>Aluminum:<sup>4</sup></b>						
Alumina, Al <sub>2</sub> O <sub>3</sub> equivalent	thousand metric tons	3,540 <sup>r</sup>	3,842 <sup>r</sup>	3,690 <sup>r</sup>	3,739	3,800
Bauxite, gross weight	do.	12,851 <sup>r</sup>	13,000 <sup>r</sup>	15,300 <sup>r</sup>	20,420 <sup>r</sup>	21,000
Metal, primary	do.	1,586 <sup>r</sup>	1,645 <sup>r</sup>	1,704 <sup>r</sup>	1,700 <sup>r</sup>	2,100
Cadmium, metal		550	455 <sup>r</sup>	391 <sup>r</sup>	418 <sup>r</sup>	385
Chromium, chromite, gross weight	thousand metric tons	3,426 <sup>r</sup>	4,326 <sup>r</sup>	2,923 <sup>r</sup>	2,950	3,540
Cobalt, metal <sup>4</sup>		1,187	1,299	800	295	100
<b>Copper:<sup>4</sup></b>						
Mine output, Cu content		35,500	37,700	34,000	36,100	36,000
<b>Metal, primary:</b>						
Smelter		748,800	670,000	680,000	617,000	765,000
<b>Refinery:</b>						
Electrolytic, cathode		654,900	671,100	670,000	680,000	644,000
Fire refined		9,000	9,200 <sup>r</sup>	9,210 <sup>r</sup>	9,300 <sup>r</sup>	8,900
Total		663,900	680,300	679,210	689,300	652,900
<b>Ferroalloys:</b>						
Ferroaluminum		7,000	7,000	7,100	5,400	5,500
Ferroboration		95	98	95	26	21
Ferrochromium, including charge chrome		850,000	890,000 <sup>r</sup>	800,000 <sup>r</sup>	902,000 <sup>r</sup>	916,000
Ferrosilicon		10,000	10,000 <sup>r</sup>	9,000 <sup>r</sup>	11,000	11,000
Ferromanganese <sup>4</sup>		440,000	440,000	402,000	447,000	666,000
Ferromolybdenum		3,000	3,200	3,100	1,200	1,200
Ferronickel magnesium		227	253	270	473	473
Ferrosiliconmagnesium		17,000	18,000	18,000	21,000	22,000
Ferrosilicon		115,000	127,000	89,000 <sup>r</sup>	90,000 <sup>r</sup>	90,000
Ferrosiliconzirconium		150	170	180	--	--
Ferrotitanium		2,200	2,300	2,400	800	800
Ferrotungsten		150	225	--	--	--
Ferrovandium		1,800	1,850	1,900	879	906
Silicomanganese <sup>4</sup>	thousand metric tons	1,200 <sup>r</sup>	1,400	1,500	1,600 <sup>r</sup>	1,700
Total		1,447,822	1,501,496 <sup>r</sup>	1,334,545	1,481,378	1,715,600
Gold, smelter output	kilograms	2,320	2,245	2,194 <sup>r</sup>	1,588 <sup>r</sup>	1,560
<b>Iron:<sup>4</sup></b>						
Pig iron	thousand metric tons	39,560 <sup>r</sup>	43,624 <sup>r</sup>	47,987 <sup>r</sup>	51,359 <sup>5</sup>	55,166
Direct-reduced	do.	23,420 <sup>r</sup>	21,970 <sup>r</sup>	20,050 <sup>r</sup>	16,893 <sup>r</sup>	20,366
<b>Iron and steel:</b>						
<b>Iron ore and concentrate:</b>						
Gross weight	do.	212,383 <sup>r</sup>	187,749 <sup>r</sup>	152,600 <sup>r</sup>	136,100 <sup>r,5</sup>	129,800 <sup>5</sup>
Fe content (62%)	do.	131,677 <sup>r</sup>	116,404 <sup>r</sup>	94,612 <sup>r</sup>	84,382 <sup>r</sup>	80,476
<b>Steel:</b>						
Crude <sup>4</sup>	do.	68,976 <sup>r</sup>	73,471 <sup>r</sup>	77,264 <sup>r</sup>	81,299 <sup>r</sup>	87,292
Semimanufactures <sup>6</sup>	do.	51,000	53,000	52,000	53,000	59,400
<b>Lead:</b>						
Mine output, Pb content		70,000	84,000	100,000	105,000	106,000
<b>Metal, refined:<sup>4</sup></b>						
Primary		62,000	92,000	119,000 <sup>r</sup>	120,000 <sup>r</sup>	129,000
Secondary		305,000	327,000	341,000	343,000	348,000
Total		367,000	419,000	460,000 <sup>r</sup>	463,000 <sup>r</sup>	477,000
<b>Manganese:</b>						
Ore and concentrate, gross weight <sup>4</sup>	thousand metric tons	2,858	2,542	2,470 <sup>r</sup>	2,320 <sup>r</sup>	2,570
Mn content <sup>4</sup>	do.	1,013	895	888 <sup>r</sup>	920 <sup>r</sup>	945
Selenium	kilograms	15,000	16,000	16,000	16,000	--

See footnotes at end of table.



TABLE 1—Continued  
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2010	2011	2012	2013	2014
METALS—Continued					
Silver, smelter output <sup>4</sup> kilograms	145,922	192,434	332,321	355,842	303,339
Tin, metal, smelter <sup>4</sup> do.	60,236	51,735	48,023	38,082	22,719
Titanium concentrates, gross weight:					
Ilmenite	729,177 <sup>r</sup>	550,000	340,000	436,000 <sup>r</sup>	320,000
Rutile	19,097 <sup>r</sup>	18,573 <sup>r</sup>	24,000	26,000	19,100
Zinc: <sup>4</sup>					
Mine output, Zn content	740,000	796,000	758,000	793,000 <sup>r</sup>	706,000
Metal:					
Primary	694,000	726,000	666,000	734,000	673,000
Secondary	52,000	54,000	49,000	54,000	50,000
Total	746,000	780,000 <sup>r</sup>	715,000	788,000	723,000
Zirconium, zircon concentrate, gross weight	27,800	39,000	40,000	40,000	40,000
INDUSTRIAL MINERALS					
Abrasives, natural, n.e.s.: <sup>7</sup>					
Garnet thousand metric tons	1,990 <sup>r</sup>	1,820 <sup>r</sup>	1,388 <sup>r</sup>	700	800
Jasper	8,800	8,900	8,800	8,800	--
Diaspore	26,000	24,000	18,000	15,000	15,000
Asbestos	300 <sup>r</sup>	300 <sup>r</sup>	400 <sup>r</sup>	300	200
Barite thousand metric tons	2,293 <sup>r</sup>	1,918 <sup>r</sup>	1,749 <sup>r</sup>	1,740 <sup>r</sup>	1,600
Bromine, elemental	1,600	1,600	1,700	1,700 <sup>r</sup>	2,100
Cement, hydraulic thousand metric tons	220,000	240,000	270,000	280,000	280,000
Chalk	179,000	178,000	170,000	136,000	126,000
Clays: <sup>8</sup>					
Ball thousand metric tons	1,000	1,500	1,800	1,900	1,900
Bentonite	561,000	739,000	996,000	1,100,000	1,100,000
Fire thousand metric tons	780	950	860 <sup>r</sup>	740	710
Kaolin:					
Salable crude do.	2,700	2,900	3,400	4,400	4,700
Processed do.	78	76	101	78	67
Total do.	2,778 <sup>r</sup>	2,976 <sup>r</sup>	3,501 <sup>r</sup>	4,478 <sup>r</sup>	4,767
Diamond: <sup>5</sup>					
Gem thousand carats	13	16	28	36	37
Industrial do.	37	36	35	37	38
Total do.	50	52	63	73	75
Dunite	35,700 <sup>r</sup>	35,010 <sup>r</sup>	74,565 <sup>r</sup>	70,447 <sup>r</sup>	70,447
Feldspar	506,000 <sup>r</sup>	763,000	1,180,000 <sup>r</sup>	1,500,000 <sup>r</sup>	1,400,000
Felsite <sup>5</sup>	2,015 <sup>r</sup>	1,255 <sup>r</sup>	1,176 <sup>r</sup>	711 <sup>r</sup>	549
Fluorspar: <sup>5</sup>					
Concentrates, metallurgical grade	4,600 <sup>r</sup>	8,000 <sup>r</sup>	5,010 <sup>r</sup>	3,107 <sup>r</sup>	5,000
Other fluorspar materials, acid grade	8,400 <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	--
Gemstones, excluding diamond:					
Agate	17 <sup>r</sup>	362 <sup>r</sup>	489 <sup>r</sup>	198 <sup>r</sup>	100
Agate, including chalcedony pebble	150	150	140	140	140
Graphite <sup>9</sup>	117,929 <sup>r</sup>	143,929 <sup>r</sup>	137,452 <sup>r</sup>	142,546 <sup>r</sup>	170,000
Gypsum <sup>5</sup> thousand metric tons	4,531 <sup>r</sup>	5,214 <sup>r</sup>	3,648 <sup>r</sup>	3,540 <sup>r</sup>	3,500
Selenite	8,702 <sup>r</sup>	11,469 <sup>r</sup>	8,945 <sup>r</sup>	2,293 <sup>r</sup>	532
Kyanite and related materials:					
Kyanite	5,866 <sup>r</sup>	4,537 <sup>r</sup>	1,816 <sup>r</sup>	1,708 <sup>r</sup>	1,922 <sup>5</sup>
Sillimanite	45,010 <sup>r</sup>	56,601 <sup>r</sup>	47,604 <sup>r</sup>	57,132 <sup>r</sup>	61,597 <sup>5</sup>
Lime	14,000 <sup>r</sup>	15,000 <sup>r</sup>	15,000 <sup>r</sup>	16,000	16,000

See footnotes at end of table.

TABLE 1—Continued  
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2010	2011	2012	2013	2014
<b>INDUSTRIAL MINERALS—Continued</b>					
Magnesite	301,000	236,000	224,000	213,000	200,000
Mica: <sup>5</sup>					
Crude	1,265 <sup>r</sup>	1,758 <sup>r</sup>	1,416 <sup>r</sup>	1,512 <sup>r</sup>	1,610
Scrap and waste	7,508 <sup>r</sup>	12,467 <sup>r</sup>	14,186 <sup>r</sup>	16,826 <sup>r</sup>	17,545
Total	8,773 <sup>r</sup>	14,225 <sup>r</sup>	15,602 <sup>r</sup>	18,338 <sup>r</sup>	19,155
Nitrogen, N content of ammonia	10,600	10,500 <sup>r</sup>	10,650 <sup>r</sup>	10,840 <sup>r</sup>	10,780
thousand metric tons					
Phosphate rock, including apatite <sup>5</sup>	6,357	5,471 <sup>r</sup>	3,350 <sup>r</sup>	2,157	2,796
do.					
Pigments, mineral, natural, ocher	1,229 <sup>r</sup>	1,200	1,400	1,500	1,400
do.					
Pyrite, gross weight	115,000	110,000	110,000	110,000	110,000
Pyroxenite <sup>5</sup>	259,737 <sup>r</sup>	127,824 <sup>r</sup>	62,201 <sup>r</sup>	15,803 <sup>r</sup>	2,985
Rare-earth, monazite concentrate, gross weight <sup>10</sup>	5,200	5,200	5,400	2,900	NA
Salt:					
Rock	1	2	2	2	--
thousand metric tons					
Other	17,000	16,000	17,000	18,000	17,000
do.					
Total	18,000	18,000	19,000	20,000	17,000
do.					
Sand: <sup>5</sup>					
Silica	3,172 <sup>r</sup>	4,496 <sup>r</sup>	3,985 <sup>r</sup>	3,432 <sup>r</sup>	3,346
do.					
Other	2,083 <sup>r</sup>	2,483 <sup>r</sup>	2,628 <sup>r</sup>	2,572 <sup>r</sup>	3,000
do.					
Slate <sup>5</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	278 <sup>r</sup>	239
Soda ash	1,500 <sup>r</sup>	1,400	1,500	1,500	1,500
thousand metric tons					
Stone, sand and gravel: <sup>5</sup>					
Calcite	41,447 <sup>r</sup>	50,267 <sup>r</sup>	67,577 <sup>r</sup>	87,129 <sup>r</sup>	92,146
Dolomite	5,858 <sup>r</sup>	5,937 <sup>r</sup>	6,527 <sup>r</sup>	7,010 <sup>r</sup>	7,108
thousand metric tons					
Limestone	242,990 <sup>r</sup>	258,510 <sup>r</sup>	275,444 <sup>r</sup>	278,978 <sup>r</sup>	279,000
do.					
Quartz and quartzite	501 <sup>r</sup>	712 <sup>r</sup>	977 <sup>r</sup>	1,307 <sup>r</sup>	1,925
do.					
Sulfur:					
Byproduct from metallurgy	1,143 <sup>r</sup>	1,000	1,209 <sup>r</sup>	1,200	1,200
do.					
Byproduct from petroleum	1,600	1,600	1,600	1,600	1,500
do.					
Talc and related materials:					
Pyrophyllite <sup>5</sup>	240,248 <sup>r</sup>	251,939 <sup>r</sup>	248,022 <sup>r</sup>	217,690 <sup>r</sup>	207,454
Steatite, soapstone	897,000 <sup>r</sup>	974,000	954,000	940,000	865,126 <sup>5</sup>
Vermiculite	17,341 <sup>r</sup>	12,454 <sup>r</sup>	8,315 <sup>r</sup>	9,554 <sup>r</sup>	10,176
Wollastonite <sup>5</sup>	170,932 <sup>r</sup>	184,179 <sup>r</sup>	152,274 <sup>r</sup>	145,000 <sup>r</sup>	192,000
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Coal: <sup>5</sup>					
Bituminous	480,000	500,000	550,000	563,000	540,000
thousand metric tons					
Lignite	27,000	28,000	30,000	26,000 <sup>r</sup>	27,000
do.					
Total	507,000	528,000	580,000	589,000	567,000
do.					
Gas, natural:					
Gross	50,800 <sup>r</sup>	46,100 <sup>r</sup>	40,300 <sup>r</sup>	33,700 <sup>r</sup>	31,700
million cubic meters					
Marketable	32,000	33,000	35,000	34,400	33,000
do.					
Petroleum:					
Crude	318,000 <sup>r</sup>	330,000 <sup>r</sup>	326,000 <sup>r</sup>	326,000 <sup>r</sup>	322,000
thousand 42-gallon barrels					
Refinery products:					
Liquefied petroleum gas	94,000 <sup>r</sup>	86,000 <sup>r</sup>	85,000 <sup>r</sup>	89,000 <sup>r</sup>	92,000
do.					
Gasoline	190,000 <sup>r</sup>	222,000 <sup>r</sup>	231,000 <sup>r</sup>	250,000 <sup>r</sup>	200,000
do.					
Kerosene and jet fuel	140,000 <sup>r</sup>	136,000 <sup>r</sup>	140,000 <sup>r</sup>	141,000 <sup>r</sup>	146,000
do.					
Distillate fuel oil	677,000 <sup>r</sup>	717,000 <sup>r</sup>	750,000 <sup>r</sup>	812,000 <sup>r</sup>	830,000
do.					
Residual fuel oil	228,000 <sup>r</sup>	261,000 <sup>r</sup>	234,000 <sup>r</sup>	191,000 <sup>r</sup>	175,000
do.					
Other	310,000	300,000	280,000	275,000	300,000
do.					
Total	1,639,000	1,722,000	1,720,000	1,758,000	1,743,000
do.					

See footnotes at end of table.

TABLE 1—Continued  
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2010	2011	2012	2013	2014
MINERAL FUELS AND RELATED MATERIALS—Continued					
Uranium, U <sub>3</sub> O <sub>8</sub> <sup>4</sup>	400	400	385	400	385
U content <sup>4</sup>	336	336	323	336	323

<sup>1</sup>Revised. do. Ditto. NA Not available. -- Zero.

<sup>1</sup>Estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes data available through December 17, 2015.

<sup>3</sup>In addition to the commodities listed, boron, corundum, fuller's earth, and other gemstones (aquamarine, emerald, ruby, and spinel) were produced, but output was not reported and available information was inadequate to make reliable estimates of output.

<sup>4</sup>Reported figure.

<sup>5</sup>The quantity reported is for the fiscal year, which runs from April of the preceding year to March of that stated.

<sup>6</sup>Excludes production from small steel plants.

<sup>7</sup>Not elsewhere specified.

<sup>8</sup>Updated data for clays are based on data from the India Bureau of Mines.

<sup>9</sup>Marketable production is 10% to 20% of mine production.

<sup>10</sup>Significant quantities are contained in stockpiled monazite tailings, but quantitative data are not available.

TABLE 2  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(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 <sup>1</sup>	2,100
Do.	Bharat Aluminium Co. Ltd. (Government, 49%, and Vedanta Aluminium Ltd., 51%)	Korba refinery, Chhattisgarh	200
Do.	Utkal Alumina International Ltd. (Hindalco Industries Ltd., 100%)	Koraput refinery, Odisha <sup>1</sup>	1,500
Do.	Madras Aluminium Co. Ltd. (MALCO) (Vedanta Group, 80%, and others, 20%)	Mettur refinery, Tamil Nadu	85
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.	Belgaum, Karnataka	350
Do.	do.	Muri, Jharkhand	450
Do.	Vedanta Aluminium Ltd. (Vedanta Resources plc, 100%)	Lanjigarh, Odisha	1,000
Aluminium	do.	Jharsuguda, Odisha <sup>1</sup>	500
Do.	National Aluminium Co. Ltd. (NALCO) (Government, 100%)	Angul smelter, Odisha <sup>1</sup>	567
Do.	Hindalco Industries Ltd. (Aditya Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Hirakud smelter, Odisha <sup>1</sup>	217
Do.	do.	Renukoot, Uttar Pradesh	345
Do. <sup>2</sup>	do.	Alupuram, Kerala	NA
Do. <sup>3</sup>	Bharat Aluminium Co. Ltd. (Government, 49%, and Vedanta Aluminium Ltd., 51%)	Korba smelter, Korba-III smelter, Chhattisgarh	670
Do. <sup>4</sup>	Madras Aluminium Co. Ltd. [Sterlite Industries (India) Ltd., 80%, and others, 20%]	Mettur smelter, Tamil Nadu	40
Do.	Hindalco Industries Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Renukoot smelter, Uttar Pradesh	345
Barite	Andhra Pradesh Mineral Development Corp. Ltd. (Andhra Pradesh State government, 100%)	Cuddapah 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%]	Amarkantak Mine, Madhya Pradesh	200
Do.	Dr. Nirmalaben Mehta	Gujarat	NA
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. Ltd. (Gujarat State government, 75%, and public and institutional investors, 25%)	Gadhsisa Mine and Ratadia project, Kutch District, Bhatia project, Jamnagar District	500
Do.	Hindalco Aluminium Co. Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Mines in Lohardaga District, Jharkhand	750
Do.	Indian Aluminium Co. Ltd. (Indian interests, 60.4%, and Alcan Aluminium Ltd., 39.6%)	do.	200
Do.	National Aluminium Co. Ltd. (Government, 100%)	Mines in Panchpatmali Hills, Damanjodi Koraput District, Odisha <sup>1</sup>	6,300
Do.	Minerals & Minerals Ltd. (Government, 100%)	Mines in Richuguta, Palamau District, Jharkhand	200
Do.	Ashapura Minechem Ltd	Rajasthan, Gujarat, Maharashtra, Karnataka Kerala, Andhra Pradesh and Odisha <sup>1</sup>	NA
Do.	M.P. State Mining Corp. Ltd.	Chachandeeh Mine, Anuppur District	NA
Do.	Bharatesh Construction Co.	Maharashtra, Kolhapur	NA
Do.	Alatage Stone Crushing Ind.	Maharashtra, Raigarh	NA
Do.	Ram Awatar Agrawal	Madhya, Pradesh	NA
Do.	Panditrao Mines & Minerals Pvt. Ltd.	Maharashtra, Kolhapur	NA
Do.	Prabhudas Vithaldas	Gujarat	NA

See footnotes at end of table.

TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
Bauxite—Continued	Pravin Kumar Ghosalia	Goa	NA
Do.	Pushpaben Prabhudas Mkhecha	Gujarat	NA
Do.	Bombay Minerals Ltd.	Asota Mewasa, Gujarat	NA
Do.	Utkal Alumina International Ltd.	Rayagada District	8,500
Bentonite	Ashapura Minechem Ltd (Ashpura Group)	Kutch, Gujarat	350
Do.	Ashpura Volclay Ltd. (Ashpura Minechem Ltd. and AMCOL Int. Corp)	Bhuji and Dharur	72
Do.	Ashpura International Ltd.	NA	NA
Do.	Vijaylaxmi Group of Industries	West Rajasthan	NA
Do.	Gimpex Ltd.	Chennai	NA
Boron	Borax Morarji Ltd.	Ambernath, Maharashtra	17
Cement	Ultratech Cement Ltd.	12 integrated plants and 12 grinding units	58,800
Do.	Century Cement [Century Textiles and Industries Ltd. (a subsidiary of the Birla Group, 100%)]	Baikunth plant, Madhya Pradesh	1,120
Do.	Ambuja Cements Ltd. (Holcim Group, 14.8%)	Plants in 7 States	25,000
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.	Dalmia Cement (Bharat) Ltd.	Dalmiapuram and Ariyalur, Tamil Nadu; and Kadapa, Andhra Pradesh	21,000
Do.	Birla Corp. Ltd. (M.P. Birla Group)	Birla Vikas & Satna, Birla Cement & Chanderia, Durgapur, Rae Bareli, Durga Hitech	5,780
Do.	ACC Ltd. (Holcim Group, 67%)	Gagal I & II, Wadi I & II, Jamul, Lakheri Thondebhavi, Kudithini, Kymore, Chanda, Chaibasa and Sindri, Damodhar, Bargarh, Madhukkarai, Tikaria, Vizag	28,800
Do.	Raymond Cement Works (a division of Raymond Woolen Mills Ltd., JK Singhania, principal shareholder)	Gopalnagar plant, West Bengal	1,250
Do.	Shree Cement Ltd.	Haridwar plant, Uttarakhand	1,800
Do.	OCL India Ltd.	Kapilas and Rajgangpur, Odisha <sup>1</sup>	5,500
Do.	Rajashree Cement (a division of Indian Rayon and Industries Ltd., 100%)	Khor plant, Karnataka	1,020
Do.	My Home Industries Ltd. (joint venture of 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.	J. K. Cement Works (a division of JK Synthetics Ltd.), 100%	Nimbahera plant, Mangrol, Muddapur Jhari, Gotan, Lakshim Cement, Lakshmi Cement-Kalol	11,000
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	15,800
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. (a division of Straw Products Ltd., JK Singhania, principal shareholder)	Sirohi plant, Rajasthan and Ahmadabad, Gujarat	4,700
Do.	Lafarge S.A.	Arasmeta and Sonadih, Chhattisgarh; Jojobera, Jharkhand; and Mejia West Benga	1,400
Do.	Manikgarth Cement [Century Textiles and Industries Ltd. (a subsidiary of the Birla Group, 100%)]	Tehsil Rajura plant, Maharashtra	1,000

See footnotes at end of table.

TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
Cement—Continued	Vikram Cement [Grasim Industries Ltd. (a subsidiary of the Birla Group, 100%)]	Vikram plant, Madhya Pradesh	1,000
Do.	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.	Madras Cements Ltd.	Ramasamyraja Nagar, Jayantipuram, Alathiyur Works I and II, Ariyalur Uthiramerur, Salem, Kolaghat	13
Do.	The Mehta Group	Suarashtra Cement, Gujarat Sidhee Cement	2,700
Do.	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	27
Do.	Kesoram Industries Ltd.	Kesoram Cement, Vasvadata Cement	7,250
Do.	Mangalam Cement Ltd.	Mangalam Cement, Neer Shree Cement	3,250
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.	Chettinad Cement Corp. Ltd.	Chettinad-Karur, Chettinad Karikkali, Chettinad-Ariyalur	10,500
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.	Ferro Alloys Corp. Ltd.	Randia plant, Bhadrak, Cuttack District, Odisha <sup>1</sup>	65
Do.	Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	300
Do.	Tata Steel Ltd.	do.	351
Do.	Ferro Alloys Corp. Ltd.	Dhenkanal and Kendujhar District, Odisha <sup>1</sup>	150
Do.	Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	200
Do.	Mysore Minerals Ltd.	Hassan District, Karnataka	125
Do.	Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	100
Do.	Ferro Alloys Corp. Ltd.	Khammam District, Andhra Pradesh	100
Do.	Balasure Alloys Ltd.	Sukinda Valley, Jajpur, Odisha <sup>1</sup>	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, Odisha <sup>1</sup>	NA
Do.	Jindal Stainless Ltd.	Jindal Chromite Mines, Jajpur, Odisha <sup>1</sup>	NA
Clay:			
Ball clay	Bikaner Ceramics	Rajasthan, Bikaner	75
Do.	Sampat Lal Daga	do.	NA
Fire clay	Shanta Sales Corp.	do.	NA

See footnotes at end of table.

TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(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:				
Kaolin		20 Microns Ltd.	Bhuj, Gujarat	65
Do.		English India Clays Ltd.	Veli, Kerala	240
Coal, bituminous	million metric tons	Bharat Coking Coal Ltd. [a subsidiary of Coal India Ltd. (Government, 100%)]	Bihar and West Bengal	26
Do.	do.	Central Coalfields Ltd. [a subsidiary of Coal India Ltd. (Government, 100%)]	Bihar	27
Do.	do.	Eastern Coalfields Ltd. [a subsidiary of Coal India Ltd. (Government, 100%)]	Bihar and West Bengal	21
Do.	do.	Mahanadi Coalfields Ltd. [a subsidiary of Coal India Ltd. (Government, 100%)]	Odisha <sup>1</sup>	21
Do.	do.	North Eastern Coalfields Ltd. [a subsidiary of Coal India Ltd. (Government, 100%)]	Assam	640
Do.	do.	Northern Coalfields Ltd. [a subsidiary of 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. [a subsidiary of Coal India Ltd. (Government, 100%)]	Chhattisgarh	36
Do.	do.	Western Coalfields Ltd. [a subsidiary of Coal India Ltd. (Government, 100%)]	Madhya Pradesh and Maharashtra	18
Coal, lignite	do.	Neyveli Lignite Corp. Ltd. (NLC) (Government, 100%)	Tamil Nadu	17
Copper, mine		Hindustan Copper Ltd. (HCL) (Government, 100%)	Indian Copper Complex Mines, Ghatsila District, Jharkhand	450
Do.	do.		Khetri Copper Complex Mines, Khetrinagar Rajasthan	1,400
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	21
Do.		do.	Khetri Copper Complex smelter-refinery, Khetrinagar District, Rajasthan	3,000
Do.		do.	Taloja copper project, Maharashtra	NA
Do.		Vedanta Aluminum Ltd.	Tuticorin smelter, Tamil Nadu	400
Do.		do.	Silvassa refinery, Gujarat	300
Do.		Jhagadia Copper Ltd.	Jhagadia, Gujarat	50
Diamond	carats	National Mineral Development Corp. Ltd. (NMDC) (Government, 100%)	Mahjgawan Mine	25,000
Fluorite		Maharashtra State Mining Corporation Ltd.	Dongargaon, Maharashtra, Chandrapur	12
Do.		Gujarat Mineral Development Corporation Ltd.	Gujarat, Vadodara	185
Do.		Rajasthan State Mines and Minerals Ltd.	Rajasthan, Jalore	NA
Gold	kilograms	Hutti Gold Mines Co.	Hutti Mine, Karnataka	490
Do.	do.	do.	Uti Mine, Karnataka	55
Do.	do.	do.	Hira-Buddini	157
Do.	do.	Mahmohan Minera Industries (Pvt) Ltd.	Kunderkocha Mine, Jharkahand	NA
Graphite		Agrawal Graphite Industries Ltd.	Belpara District, Odisha <sup>1</sup>	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
Iron and steel, crude 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. (Government, 100%)	Bhilai steel plant, Jharkhand	4,930
Do.		do.	Bokaro steel plant, Jharkhand	4,600

See footnotes at end of table.

TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
Iron and steel, crude steel —Continued	Indian Iron and Steel Co. Ltd. (a wholly owned subsidiary of Government-owned Steel Authority of India Ltd.), 100%	Burnpur steel plant, West Bengal	1,500
Do.	Ispat Industries Ltd.	Dolvi, Maharashtra	3,000
Do.	Steel Authority of India Ltd. (Government, 100%)	Durgapur steel plant, West Bengal	1,600
Do.	Tata Steel Ltd.	Jamshedpur steel plant, Jharkhand	6,800
Do.	do.	Jagdapur, Chhattisgarh	2,000
Do.	do.	Duburi, Odisha <sup>1</sup>	3,000
Do.	Steel Authority of India Ltd. (Government, 100%)	Rourkela steel plant, Odisha <sup>1</sup>	1,800
Do.	Rashtriya Ispat Nigam Ltd.	Visakhapatnam steel plant, Andhra Pradesh	3,000
Do.	JSW Steel Co. Ltd.	Vijayanagar, Karnataka	7,800
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; <sup>1</sup> and Chiria, Jharkhand	7,000
Do.	Kudremukh Iron Ore Co. Ltd. (Government, 100%)	Kudremukh, Chikmagalur District, Karnataka	10,300
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 <sup>1</sup>	3,000
Do.	Tata Steel Ltd.	do.	2,000
Do.	NSL Consolidated Ltd. (China Metallurgical Group Corp., 10%)	Mangal, Andhra Pradesh	200
Do.	Indian Iron and Steel Co. Ltd. (a wholly owned subsidiary of Government-owned Steel Authority of India Ltd.), 100%	Singhbhum District, Bihar	2,500
Do.	Steel Authority of India Ltd. (Government, 100%)	do.	3,500
Do.	Tata Steel Ltd.	do.	3,500
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:			
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
Ore	Hindustan Zinc Ltd. (Sterlite Opportunities and Ventures Ltd., 64.9%, and Government, 29.5%)	Agnigundala Mine, Andhra Pradesh	72
Do.	do.	Sargipalli Mine, Odisha <sup>1</sup>	150
Lead-zinc ore	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

See footnotes at end of table.



TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity <sup>e</sup>
Manganese ore <sup>5</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, Maharashtra	55
Do.	do.		Gumgaon, Maharashtra	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.	Mangilall, Rungta (Pvt.) Ltd.		Keonjhar, Odisha <sup>1</sup>	NA
Do.	Orissa Mining Corp. Ltd.		do.	NA
Do.	Rungta Mines (Pvt.) Ltd.		do.	NA
Do.	Tata Steel Ltd.		Ferro Manganese plant, Odisha <sup>1</sup>	NA
Do.	S. Lall & Co.		do.	NA
Do.	Tata Steel Ltd.		Keonjhar, Odisha <sup>1</sup>	NA
Do.	Orissa Mineral Development Co. Ltd.		Koraput, Odisha <sup>1</sup>	NA
Do.	Orissa Mining Corp. Ltd.		do.	NA
Do.	Mysore Minerals Ltd.		Shimoga, Karnataka	NA
Do.	Aryan Mining & Trading Corp.		Sundargarh, Odisha <sup>1</sup>	NA
Do.	Orissa Manganese & Minerals (Pvt.) Ltd.		Surodargarh, Odisha <sup>1</sup>	NA
Do.	Tata Steel		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	93
Do.	do.	do.	Haldia refinery, West Bengal	61
Do.	do.	Reliance Industries Ltd.	Jamnagar refinery, Gujarat	540
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	375
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
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.	do.		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

See footnotes at end of table.

TABLE 2—Continued  
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
Silver	Hindustan Zinc Ltd. (HZL) (Sterlite Opportunities and Ventures Ltd., 64.9%, and Government, 29.5%)	Chandera, Chittorgarh, Rajasthan	518
Titanium, ilmenite-rutile ore	Kerala Minerals and Metals Ltd. (Kerala State government, 100%)	Chavara, Kerala:	
Do.	do.	Ilmenite	52
Do.	do.	Rutile	34
Do.	do.	Zircon	65
Do.	do.	Sillimanite	4
Do.	Indian Rare Earths Ltd. (IREL) (Government, 100%)	Chavara, Kerala:	
Do.	do.	Ilmenite	154
Do.	do.	Rutile	10
Do.	do.	Zircon	12
Do.	do.	Sillimanite	10
Do.	do.	Orissa Sands Complex, Ganjam, Odisha: <sup>1</sup>	
Do.	do.	Ilmenite	220
Do.	do.	Rutile	10
Do.	do.	Zircon	5
Do.	do.	Sillimanite	10
Do.	do.	Garnet	24
Do.	do.	Manavalakurichi, Tamil Nadu:	
Do.	do.	Ilmenite	90
Do.	do.	Rutile	4
Do.	do.	Zircon	10
Do.	do.	Monazite	6
Do.	do.	Garnet	9
Do.	Trimex Sands Pvt. Ltd. (Trimex Group)	Sirkurman deposit, Srikakulam	NA
Do.	do.	Andhra Pradesh:	
Do.	do.	Ilmenite	200
Do.	do.	Rutile	6
Do.	do.	Zircon	6
Do.	do.	Garnet	60
Do.	do.	Sillimanite	50
Do.	V.V. Mineral Ltd.	Thoothukudi, Tamil Nadu:	
Do.	do.	Ilmenite	450
Do.	do.	Rutile	12
Do.	do.	Zircon	18
Do.	do.	Zircon-sillimanite	24
Do.	do.	Garnet	150
Do.	Beach Minerals Co. Pvt. Ltd., Tamil Nadu	Kuttam, Chennai, Tamil Nadu, for ilmenite	150
Uranium ore	Uranium Corp. of India (Government, 100%)	Jaduguda, Jharkhand, Tummalpalle, Andhra Pradesh	5,190
Zinc	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, Rajasthan	6,150
Do.	do.	Sindesar Khurd 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
Do.	do.	Dariba smelting complex, Rajasthan	210
Do.	do.	Zinc smelter, Debari, Rajasthan	88
Do.	do.	Zinc smelter, Vizag, Andhra Pradesh	56

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

<sup>1</sup>Formerly Orissa.

<sup>2</sup>Closed.

<sup>3</sup>Korba-I smelter was not operational.

<sup>4</sup>MALCO's smelter was closed in December 2008.

<sup>5</sup>Capacity of clusters of surface mines varies significantly. Estimated total capacity is 3.0 million metric tons per year.

TABLE 3  
INDIA: EXPORTS OF SELECTED MINERAL COMMODITIES

Thousand metric tons unless otherwise specified

Commodity	2010	2011	2012	2013	2014	
METALS						
Aluminum:						
Alumina <sup>1</sup>	703	428	861	567	707	
Bauxite <sup>1</sup>	478	116	401	4,198	3,493	
Metal and alloys	448	242	316	440	589	
Copper, metal and alloys:						
Blister and anode	1	100	100	--	100	
Ingots	1	3	3	3	2	
Ore and concentrates	1	2	--	8	4	
Refined copper	202	342	254	237	362	
Scrap	6	7	6	6	6	
Semifabricated	101	52	20	17	21	
Gold: <sup>1</sup>						
Ore and concentrates (Au content)	kilograms	7,568	2,625	NA	82,031	57
Nonmonetary and monetary	do.	22,990	34,595	169,126	85,349	70,721
Nonmonetary, other unwrought forms	do.	NA	917,775	1,028,449	85,334	70,335
Iron and steel:						
Iron ore	95,931	39,156	28,432	14,426	9,844	
Pig iron	752	1,197	394	1,063	835	
Direct-reduced	69	70	126	117	167	
Steel:						
Semifinished and finished	6,690	8,940	8,232	10,078	10,379	
Ingots and semifabricated	430	552	585	1,074	1,661	
Products:						
Flat	3,097	4,985	4,445	6,369	5,899	
Long	621	949	707	776	908	
Tubular	2,235	2,047	1,989	1,430	1,463	
Ferroalloys	NA	1,483	1,725	1,910	1,667	
Scrap	4,643	6,175	8,156	5,632	5,699	
Zinc, metal and alloys:						
Ores and concentrates (Zn content) <sup>1</sup>	192	68	6	76	46	
Zinc and alloys, scrap <sup>1</sup>	178	264	296	199	195	
Metals	241	323	207	195	174	
Lead, metal and alloys:						
Ore and concentrates <sup>1</sup>	36	122	30	14	7	
Metal <sup>1</sup>	27	149	NA	30	58	
Lead alloys, scrap <sup>1</sup>	54	286	241	47	81	
INDUSTRIAL MINERALS						
Barite <sup>1</sup>	999	816	1,037	1,740	1,068	
Cement	2,690	3,612	3,399	2,918	5,141	
Diamond: <sup>1</sup>						
Industrial	thousand carats	770	923	252	1,702	2,121
Mostly cut	do.	66,091	78,994	62,654	65,561	83,851
Graphite, natural	846	1,900	2,217	922	2,790	
Gypsum	NA	62,987	22,938	54,509	38,213	
Potash	30	30	32	14	20	
MINERAL FUELS AND RELATED MATERIALS						
Coal <sup>1</sup>	2,471	4,327	3,025	2,514	2,189	
Coke, semicoke <sup>1</sup>	128	650	612	1,138	151	
Liquified gas	9	27	22	28	5	
Petroleum, crude	thousand 42-gallon barrels	253	7	156	NA	NA

do. Ditto. NA Not available. -- Zero.

<sup>1</sup>Reported by fiscal year, which runs from April of the preceding year to March of that stated.

Sources: Indian Minerals Yearbook, 2010–14; World Steel Association, 2015; International Copper Study Group, 2015; and United Nations Comtrade database, 2010–14.

TABLE 4  
INDIA: IMPORTS OF SELECTED MINERAL COMMODITIES

Thousand metric tons unless otherwise specified

Commodity	2010	2011	2012	2013	2014	
<b>METALS</b>						
<b>Aluminum:</b>						
Alumina <sup>1</sup>	337	281	549	1,114	1,170	
Bauxite	54	64	79	67	422	
Metal and alloys, unwrought	219	233	292	348	345	
<b>Copper:</b>						
Blister and anode	500	600	400	500	700	
Ingots	910	4	4	3	4	
Ore and concentrates	621	582	580	920	594	
Semi-fabricated	104	139	134	180	227	
Scrap	92	153	204	141	169	
Refined copper	9	14	21	41	31	
<b>Gold:<sup>1</sup></b>						
Nonmonetary and monetary	kilograms	851,023	696,738	1,078,354	1,013,703	661,715
Nonmonetary, other semimanufactured forms	do.	4,760	51,961	49,905	98,310	53,288
Nonmonetary, other unwrought forms	do.	846,231	917,775	1,028,449	915,366	608,424
<b>Iron and steel:</b>						
Iron ore	450	1,316	2,882	1,115	7,413	
Pig iron	256	11	12	46	27	
Direct-reduced	39	422	1,069	671	178	
<b>Steel:</b>						
Semi-finished and finished	9,744	9,213	9,341	7,392	9,477	
Ingots and semifabricates	559	563	823	248	413	
<b>Products:</b>						
Flat	7,289	6,896	6,868	5,648	6,744	
Long	1,008	904	960	881	1,626	
Tubular	674	813	642	576	657	
Ferroalloys	220	260	285	258	301	
<b>Lead:</b>						
Ore and concentrates	5	19	34	7	29	
Metal	97	78	99	102	113	
<b>Zinc:</b>						
Ores and concentrates	42	49	56	21	23	
Metals	74	56	78	62	112	
<b>INDUSTRIAL MINERALS</b>						
Barite <sup>1</sup>	metric tons	111	17	4,000	6,000	6,000
Cement		2,112	1,096	1,011	1,282	778
<b>Diamond:<sup>1</sup></b>						
Industrial	thousand metric tons	2	104	19	53	3,136
Rough		130,101	182,227	152,811	135,730	146,612
Gypsum		1,567	2,337	2,818	3,011	4,066
Potash		5,189	4,618	2,842	2,123	3,395
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Coal <sup>1</sup>		73,257	69,918	102,841	145,790	166,861
Coke, semicoke <sup>1</sup>		2,356	1,490	2,365	3,077	4,167
Liquefied gas		9,111	9,766	13,200	13,136	13,021
Petroleum, crude	million 42-gallon barrels	1,143	1,139	1,233	1,381	1,408
do. Ditto.						

<sup>1</sup>Reported by fiscal year, which runs from April of the preceding year to March of that stated.

Sources: Indian Minerals Yearbook, 2010–14; World Steel Association, 2015; International Copper Study Group 2015; and United Nations Comtrade database, 2010–14.

TABLE 5  
INDIA: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Reserves
Apatite	2,100
Asbestos (all grades)	3,000
Ball clay	17,000
Barite	32,000
Bauxite	593,000
Calcite	3,000
Chalk	4,000
Chromite ore (all grades)	107,000
Coal, lignite	125,000,000
Copper, ore (gross weight)	238,000
Copper (Cu content)	3,000
Corundum	metric tons 600
Diamond	carats 1,000
Diaspore	3,000
Dolomite	738,000
Dunite	17,000
Feldspar	45,000
Fire clay	30,000
Fluorite	5,000
Garnet	19,000
Gold, ore (gross weight), primary	15,000
Gold (Au content)	metric tons 72
Graphite	8,000
Gypsum	39,000
Iron ore, crude ore	8,100,000
Kaolin	177,000
Kyanite	2,000
Lead and zinc ore	103,000
Lead (Pb content)	2,000
Limestone	15,000,000
Magnesite	21,000
Manganese ore	142,000
Mica	190
Monazite	12,000
Ochre	55,000
Perlite	400
Phosphate rock	70,000
Pyrophyllite	23,000
Salt (rock)	16,000
Silica sand and quartz	430,000
Sillimanite	4,100
Silver, ore (gross weight)	118,000
Silver (Ag content)	8
Talc/steatite/soapstone	90,000
Tin ore	7
Tin (Sn content)	1
Titanium:	
Ilmenite	594,000
Rutile	31,000
Vermiculite	1,700
Wollastonite	2,500
Zinc (Zn content)	11,000
Zircon	33,710
Zirconium	3,400

Source: Indian Bureau of Mines, 2014.