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2016 Minerals Yearbook

CHINA [ADVANCE RELEASE]

U.S. Department of the Interior
U.S. Geological Survey

December 2018

The Mineral Industry of China

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In China, unprecedented economic growth since the late 20th century had resulted in large increases in the country's production of and demand for mineral commodities. These changes were dominating factors in the development of the global mineral industry during the past two decades. In more recent years, owing to the country's economic slowdown and to stricter environmental regulations in place by the Government since late 2012, the mineral industry in China had faced some challenges, such as underutilization of production capacity, slow demand growth, and low profitability. To address these challenges, the Government had implemented policies of capacity control (to restrict the addition of new capacity and to shut down inefficient capacity), enterprise reorganization (to more heavily concentrate production with large-scale producers), and downstream development (to increase demand, promote high-value products, and improve supply chain integration). In 2016, production of most of the mineral commodities listed in table 1 showed modest growth or remained at a level similar to that of 2015, which was in line with the modest and steady growth of the country's overall economy. The economic performance of the metal sector generally was stronger in 2016 owing mainly to the recovery of metal prices on the global market during the year (table 1).

In 2016, China invested about $11.2 billion[1] in mineral exploration and $144.7 billion in mining (fuel and nonfuel minerals), representing year-on-year decreases of 16.6% and 20.4%, respectively. According to the Ministry of Land and Resources, in 2016, China's output of coal ranked first in the world, and production of crude petroleum and natural gas both ranked sixth. China was the leading producer and consumer of energy in the world. The country's production and consumption of most nonferrous metals, raw steel, and gold ranked first in the world (Ministry of Land and Resources, 2017b, p. 11–12, 16–18).

Minerals in the National Economy

China's real gross domestic product (GDP) rate of growth was 6.7% in 2016 compared with 6.9% in 2015. The nominal GDP was about $10.8 trillion in 2016. In 2015 (the latest year for which data were available), mining and manufacturing contributed 2.8% and 29.4% to the GDP, respectively, compared with 3.6% and 30.4%, respectively, in 2014. The portion of the GDP generated by the mining sector decreased by 18.4% in 2015 compared with that of 2014, and the portion of the GDP generated by the manufacturing sector increased by 3.5%. In 2016, the number of people employed in the mining and manufacturing sectors was about 4.91 million and 48.94 million, respectively, which accounted for 2.7% and 27.4%, respectively, of the country's total nonagricultural employment. In 2016, the total investment in fixed assets (excluding that by rural households; see reference at the end of the paragraph for a detailed definition) was $8.78 trillion, of which $2.72 trillion was invested in the manufacturing sector and $149 billion was invested in the mining sector (National Bureau of Statistics of China, 2017b, sec. 3–1, 3–3, 3–6, 4–5, 10–6).

In 2016, the foreign direct investment (FDI) actually used in China was $126 billion, which was the same as in 2015. In 2016, about 0.08% of the FDI was directed to the mining sector compared with 0.2% in 2015, and 27% was directed to the manufacturing sector compared with 31% in 2015. In 2016, overseas direct investment (ODI) was $196 billion compared with $146 billion in 2015; the amount of ODI continued to exceed FDI for the second year, and the net outflow increased in 2016 compared with that of 2015. As of yearend 2016, the stock of China's ODI amounted to $1.36 trillion. In 2016, about 1.0% of the ODI was in the mining sector compared with 7.7% in 2015, and 14.8% was in the manufacturing sector compared with 13.7% in 2015. The ODI in the mining sector amounted to about $1.9 billion in 2016, representing an 83% decrease from that of 2015 and the lowest level since 2005; the decrease was mainly owing to the low mineral commodity prices on the global market. The ODI in the manufacturing sector amounted to about $29 billion in 2016, representing a 45% increase from that of 2015. As of yearend 2016, mining and manufacturing accounted for 11.2% and 8.0% of the stock of China's ODI, respectively (National Bureau of Statistics of China, 2017b, sec. 11–14, 11–16, 11–20).

China's two leading overseas acquisitions in the mining sector in terms of transaction value were China Molybdenum Co. Ltd.'s (CMOC's) $2.65 billion acquisition of a 56% interest in the Tenke Fungurume copper-cobalt mine located in the Democratic Republic of the Congo [Congo (Kinshasa)] and CMOC's $1.7 billion acquisition of 100% interest in Anglo American's niobium and phosphate rock businesses located in the States of Goias and Sao Paulo in Brazil (including the niobium marketing function located in London and Singapore) (O'Brien, 2016a, b).

Government Policies and Programs

In November, the Ministry of Land and Resources and other agencies jointly issued a document titled National Mineral Resource Planning (2016–2020). The plan provides guidance on the exploration for and the development, utilization, and protection of mineral resources in the country for the purpose of safeguarding the security of the nation's resources and leading a reform of the mining industry during the next 5 years. Specific objectives in the plan include a steady increase in the resources and reserves of important minerals, development of 103 energy resource zones, and designation and development of 267 national-level mining zones, including 28 high-value

[1]Where necessary, values have been converted from Chinese yuan renminbi (CNY) to U.S. dollars at an annual average exchange rate of CNY6.91= $1.00 for 2016.

national mining zones that are deemed to be critical to the national economy. The plan also identifies 24 strategic minerals, including 6 energy minerals (coal, coalbed methane, natural gas, petroleum, shale gas, and uranium), 14 metallic minerals (aluminum, antimony, chromium, cobalt, copper, gold, iron, lithium, molybdenum, nickel, rare earths, tin, tungsten, and zirconium), and 4 nonmetallic minerals (crystalline graphite, fluorite, phosphorus, and potassium salt). According to the plan, these mineral commodities are the key ones that would be subject to Government macro-control, supervision, and monitoring, and they would be supported by policies regarding resource allocation, financial input, major project development approval, and mining land use—all to improve supply security. The plan proposes to establish a strategic monitoring and early-warning mechanism for mineral resources and to systematically analyze the supply of and demand for mineral products and resources in the country and abroad (Ministry of Land and Resources, 2016, p. 8, 15, 58–72).

Production

The output of iron ore (gross weight of crude ore) was 1.28 billion metric tons (Gt), which was a decrease of 7.2% compared with that of 2015; crude steel, 808 million metric tons (Mt) (an increase of 0.5%); and rolled steel, 1.13 Gt (an increase of 1.0%). The output of refined copper was 8.44 Mt in 2016, which was an increase of 6.0% compared with that of 2015, and primary aluminum, 31.9 Mt (an increase of 1.5%). In 2016, the output of gold was 453.5 t, which was an increase of 0.8% compared with that of 2015. Refined cobalt production decreased by 7.5% in 2016 (table 1).

China was the leading energy-producing and -consuming country in the world in 2016. Primary energy output totaled 3.46 Gt of standard coal equivalent, and energy consumption was 4.36 Gt of standard coal equivalent. The energy self-sufficiency rate in 2016 was 79.4%. Coal accounted for 62.0% of the energy consumption matrix; oil, 18.3%; and hydropower, wind power, nuclear power, and natural gas, 19.7%. Coal production decreased by 9.1% to 3.41 Gt, whereas crude petroleum production increased by 7.7% to 1,670 million barrels. The output of natural gas increased by 1.5% to 137 billion cubic meters (table 1; Ministry of Land and Resources, 2017b, p. 16–18).

In 2016, the output of cement was 2.41 Gt, which was an increase of 2.2% compared with that of 2015; phosphate rock (P_2O_5 equivalent), 43.3 Mt (an increase of 1.6%); and potash fertilizer (K_2O equivalent), 5.78 Mt (an increase of 1.2%). Data on mineral production are in table 1.

Structure of the Mineral Industry

In China, the majority of the mining and mineral-processing activities were conducted by state-owned or state-holding enterprises. The share of state ownership was high in the energy sectors and relatively low in the downstream metal manufacturing sectors, and the state-owned companies were mostly large in size, whereas private enterprises were small. Foreign ownership in China's mineral industry was insignificant. In recent years, reorganization of enterprises was one of the major measures the Government adopted to increase the efficiency and competitiveness of state-owned enterprises and gain better control over current and new production capacities. In 2016, China Building Materials Group Co. Ltd. merged with China National Materials Group (the new company was China Building Materials Group Co. Ltd.), and Baoshan Iron and Steel Co. Ltd. (Baosteel) merged with Wuhan Iron and Steel Corp. (the new company was Baowu Steel Group Corp. Ltd.) (table 2; Tang, 2016; National Bureau of Statistics of China, 2017b, sec. 13–4, 13–6).

Mineral Trade

In 2016, the total value of exported goods was $2.10 trillion compared with $2.27 trillion in 2015. The value of mineral product exports accounted for 1.4% of total exports compared with 1.4% in 2015; exports of base metals and the articles made of them accounted for 7.4% of the total compared with 7.8% in 2015. In 2016, the total value of imported goods was $1.59 trillion compared with $1.68 trillion in 2015. The value of mineral product imports accounted for 17.3% of the total compared with 17.7% in 2015; imports of base metals and the articles made of them accounted for about 4.96% of the total compared with 5.18% in 2015 (tables 3, 4; National Bureau of Statistics of China, 2017b, sec. 11–2, 11–4, 11–7, 11–8).

Commodity Review

Metals

Aluminum and Bauxite and Alumina.—As of yearend 2016, China's primary aluminum production capacity was 43.2 million metric tons per year (Mt/yr), which was an increase of 11% compared with that of 2015. The regions with the largest primary aluminum production capacity were Shandong, which accounted for 27% of the country's total capacity; Xinjiang, 17%; Inner Mongolia and Henan, 9% each; Gansu and Qinghai, 7% each; Yunnan, 4%; Guangxi, Guizhou, and Ningxia, 3% each; and others, 11%. About 31.9 Mt of primary aluminum was produced in 2016, which was a 1.5% increase compared with that of 2015. The rate of increase had been slowing during the past 5 years. At yearend 2016, about 36.5 Mt/yr of primary aluminum production capacity was in operation, which was an increase of 20% compared with that at yearend 2015. The increase was due to the reopening of previously closed operations (about 2.1 Mt/yr of capacity) and the commissioning of new capacity (about 3.9 Mt/yr) in 2016. The consumption of primary aluminum in 2016 was estimated to be about 32.7 Mt, which was an increase of 7.9% compared with that of 2015. The leading consumption areas were construction, which accounted for 32.3% of total primary aluminum consumption; electricity and electronics, 15.6%; and transportation, 12.7% (table 1; Yao and Sheng, 2017, p. 9–11, 18, 22).

Copper.—Production of copper concentrate increased by about 10.8% in 2016 compared with that of 2015. Production in each of six Provinces (Anhui, Gansu, Inner Mongolia, Jiangxi, Xinjiang and Yunnan) exceeded 100,000 metric tons (t) from January to November 2016, accounting for 74.3% of the country's total for that time period. Imports of copper

concentrate amounted to about 4.4 Mt (copper content) in 2016 compared with 3.5 Mt in 2015. Consumption of copper concentrate was estimated to be 5.2 Mt in 2016 compared with 5.0 Mt in 2015 (table 1; He, 2017, p. 8, 9).

Production of refined copper increased by 6.0% in 2016 compared with that of 2015. Imports of refined copper amounted to 3.60 Mt in 2016 compared with 3.68 Mt in 2015. Consumption of refined copper was estimated to be 10.3 Mt in 2016 compared with 9.9 Mt in 2015. New capacities added in 2016 were 280,000 metric tons per year (t/yr) of smelting capacity and 280,000 t/yr of refining capacity. As of yearend 2016, the total capacities for smelting and refining were 6.5 Mt/yr and 10.9 Mt/yr, respectively (table 1; He, 2017, p. 8, 13).

In 2016, the major consumption sectors for refined copper in China were electricity (which accounted for 5.23 Mt of refined copper consumption), air conditioning (1.55 Mt), transportation (970,000 t), construction (840,000 t), electronics (710,000 t), and others (1.0 Mt). The consumption by the electricity and air conditioning sectors increased by 6.0% and 1.7%, respectively, in 2016 compared with that of 2015. Total consumption increased by 3.7% in 2016, which was higher than the increase of 2.8% in 2015 (He, 2017, p. 12).

Zijin Mining Group Co. Ltd., through its wholly owned subsidiary Gold Mountains (Hong Kong) International Mining Co. Ltd., held 39.6% interest in the Kamoa project in Congo (Kinshasa); Ivanhoe Mines US LLC of the United States, which was a subsidiary of Ivanhoe Mines Ltd. of Canada, and the Government of Congo (Kinshasa) held the remaining interest. In October, an additional resource of 9.4 Mt of high-grade copper (3.21% copper) was discovered in the Kakula deposit at the Kamoa copper mine, making the Kamoa copper mine one of the top 10 copper mines in the world, in terms of resources, and the largest copper mine discovered in Africa. The copper resources of the Kamoa copper mine totaled 33.4 Mt of copper content, which was about one-third of China's copper resources as of 2016 and higher than the total copper reserves in China (which were 26.2 Mt of copper content). The Kamoa project was expected to have a significant effect on China's long-term copper supply (table 5; Zijin Mining Group Co., Ltd., 2017, p. 8, 13, 14, 115; undated).

Iron and Steel.—In 2016, production of iron ore amounted to 1.28 Gt (crude ore gross weight) compared with 1.38 Gt in 2015. The crude iron ore produced in China generally has iron content of 20% to 30% and needs to be processed to produce concentrate that has iron content comparable to iron ore on the global market. The iron content of the iron ore concentrate produced in China was estimated to be 216 Mt in 2016 compared with about 232 Mt in 2015. Imports increased to 1.02 Gt (gross weight, with iron content of about 62.5%) in 2016 from 953 Mt in 2015, marking the first year that China's iron ore imports exceeded 1 Gt. In 2016, raw steel production amounted to about 808 Mt compared with 804 Mt in 2015. Rolled steel production (including double counting in processing processes, which may involve multiple steps and companies that report their output separately) amounted to about 1.13 Gt, which was an increase of about 1% from that of 2015. Exports of manufactured steel decreased by 3.5% in 2016 compared with that of 2015 to 108 Mt; imports of manufactured steel increased by 3.2% to 13.5 Mt. Net exports of crude steel equivalent decreased by 4.4% to 98.6 Mt, accounting for 12.2% of domestic crude steel production. In 2016, a total of 117 antidumping and countervailing cases were filed against China, of which 49 cases concerned China's steel products compared with 37 cases in 2015. Investment in fixed assets in China's steel industry continued to decline in 2016; about $60.2 billion was invested in ferrous metal smelting and rolling (a decrease of 2.2% from that of 2015) and about $14.2 billion was invested in ferrous metal mining (a decrease of 28.4% from that of 2015) (tables 1, 4; Ministry of Industry and Information Technology, 2017).

In October, the Ministry of Industry and Information Technology issued an Adjustment and Upgrading Plan for the Iron and Steel Industry (2016–2020), which provided detailed guidance on and laid out goals for the development of China's iron and steel industry in the country's 13th 5-year plan. According to the plan, China's crude steel production capacity would likely decrease to less than 1.0 billion metric tons per year (Gt/yr) by 2020 from 1.13 Gt/yr in 2015 and the capacity utilization rate would increase to 80% by 2020 from 70% in 2015. The combined capacity of the top 10 producers would account for 60% of the country's total capacity by 2020 compared with 34.2% in 2015. The plan anticipated that the consumption of crude steel in China would decrease to about 650 to 700 Mt in 2020 from the peak of 760 Mt in 2013 (Ministry of Industry and Information Technology, 2016a, p. 7–10).

In December, the merger of Baosteel and Wuhan Iron and Steel Co. to form the new Baowu Steel Group Corp. was completed. The new company had a production capacity of about 65 Mt/yr of crude steel, and it was the leading steelmaker in China and second in the world after ArcelorMittal S.A. of Luxembourg. The merger between the two steel companies was part of the country's ongoing efforts to increase production concentration and efficiency in the sector. In April, China's Hebei Iron & Steel Group signed a $52 million agreement to buy the Zelezara Smederevo mill and pledged to invest $300 million in the loss-making Serbian steel plant and increase the production of steel to 2.1 Mt/yr in 3 to 4 years from 875,000 t in 2015. The plant employed 5,050 people and posted a net loss of $113 million in 2015. China considered this acquisition a model project for international capacity cooperation between China and Central and Eastern Europe, which was one of the major components in China's "One Belt One Road" initiative. The "One Belt One Road" initiative is a development strategy and framework that that seeks to increase cooperation among China and other countries, primarily between China and the rest of Eurasia. It has two main components—the land-based "Silk Road Economic Belt" and the oceangoing "Maritime Silk Road" (Lin and Stanway, 2016; Vasovic, 2016).

Lead.—Production of lead concentrate was 2.41 Mt (lead content) in 2016 compared with 2.34 Mt (revised) in 2015. From January to November, the leading lead-concentrate-producing Province was Inner Mongolia, which produced 871,000 t of lead concentrate, followed by Hunan (298,000 t), Yunnan (151,000 t), Henan (107,000 t), Sichuan (100,000 t),

and Guangxi (78,000 t). Imports of lead concentrate amounted to 730,000 t (lead content) in 2016 compared with 957,000 t in 2015. Consumption of lead concentrate was estimated to be 3.10 Mt in 2016 compared with 3.21 Mt in 2015 (Zuo and Yang, 2017, p. 10–12, 14).

Production of refined lead was 4.67 Mt in 2016 compared with 4.42 (revised) Mt in 2015. Primary lead production increased by 5.1% to 3.02 Mt, and secondary lead production increased by 6.8% to 1.66 Mt. From January to November, the leading refined-lead-producing Province was Henan (which produced 1.27 Mt of refined lead), followed by Hunan (861,000 t), Anhui (424,000 t), Hubei (324,000 t), and Yunnan (321,000 t). Net exports of refined lead were 12,000 t in 2016 compared with 60,000 t in 2015. Consumption of refined lead was estimated to be 4.66 Mt in 2016 compared with 4.36 Mt in 2015, of which about 40% was used for lead-acid electric-vehicle batteries (or traction batteries) and about 25% was used for automotive lead-acid batteries (Zuo and Yang, 2017, p. 14–15, 20).

Rare Earths.—In 2016, the Ministry of Industry and Information Technology and other agencies had completed the integration plan for the rare-earth industry. The plan was aimed at forming six large rare-earth companies in order to integrate the management and operations of the rare-earth industry and improve international competitiveness. The six companies were Aluminum Corporation of China (Chinalco), China Minmetals Co., China North Rare Earth (Group) High Technology Co. Ltd., China Southern Rare Earth Group Co. Ltd., Guangdong Province Rare Earth Industry Group Co. Ltd., and Xiamen Tungsten Co. Ltd. As of yearend 2016, 22 out of 23 rare-earth mines in the country were integrated into the six companies and the other one had stopped production. As a result, 99% of the rare-earth resources in the country were under the control of these six companies. There were 59 rare-earth separation plants in the country in 2016, of which 57 were integrated into the 6 companies and the other 2 had stopped production. The formation of these six rare-earth companies was intended to improve the efficiency of resource use (such as by achieving high recovery rates and low environmental impact) in the industry as well as improve the ability of the Government to implement policy for the industry (Rare Earth Information, 2017).

In October, the International Organization for Standardization, Technical Committee for Standardization of Rare Earth (ISO/TC 298) held its first meeting in Beijing. Participants included more than 40 industry experts from Australia, Canada, China, Japan, the Republic of Korea, and other countries. A draft strategic plan for the ISO/TC 298 was passed at the meeting. Two standard proposals on rare-earth terms by China and three preliminary standard proposals on recycling of rare-earths by the Republic of Korea were approved. Because China is the leading rare-earth-producing and -consuming country in the world, a representative of China served as secretary general of ISO/TC 298 technical committee. The committee was established in 2015 and sought to promote the development of international industry standards for rare earths (Tu and Zhang, 2016).

In October, the Ministry of Industry and Information Technology issued the Rare Earth Industry Development Plan (2016–2020) (Ministry of Industry and Information Technology Regulation [2016 (No. 319)]. The plan proposed to reduce smelting and separation capacity to 200,000 t/yr of rare-earth oxides (REOs) in 2020 from 300,000 t/yr in 2015, and to keep production to less than 140,000 t/yr by 2020 (according to the document, separation production in 2015 was 100,000 t). The plan also focused on expansion of high-value-added rare-earth products. According to the plan, the share of low-value-added raw materials in China's total rare-earth exports would decrease to 30% by 2020 from 57% in 2015 and China's global market share of high-end rare-earth materials and devices made from them would increase to 50% by 2020 from 25% in 2015 (Ministry of Industry and Information Technology, 2016c).

Tin.—Production of tin concentrate was 105,000 t (tin content) in 2016 compared with 110,156 t (revised) in 2015. Imports of tin concentrate gross weight and tin content were estimated to be 470,000 t and 44,000 t, respectively, in 2016, which were increases of 47.1% and 91%, respectively, from those in 2015. The considerable increase in tin concentrate imports indicated the shortage of domestic raw material supply. The increase in tin content was higher than the increase in gross weight owing to the increased average grade of ore imported in 2016 (tables 1, 4; Xia, 2017, p. 3, 6).

Production of refined tin was 183,000 t in 2016 compared with 167,000 t in 2015. In 2016, the leading refined-tin-producing Province was Yunnan, which produced 97,500 t of refined tin, followed by Hunan (35,000 t), Jiangxi (22,900 t), and Guangxi (11,500 t). Imports of refined tin were about 8,000 t in 2016, of which about 52% was supplied by Bolivia; 26%, by Indonesia; and 12.5%, by Malaysia. From January to November, imported tin from Indonesia decreased by 42% and that from Bolivia increased by 48% compared with same period of 2015. Consumption of refined tin was estimated to be 158,000 t in 2016 compared with 154,000 t (revised) in 2015, of which about 98,000 t was used by the soldering industry; 35,000 t, by the lead-acid battery and chemical industry; 15,000 t, by the plating industry; and the rest, by other sectors, such as the glass industry (table 1; Xia, 2017, p. 7–8, 10–11).

Zinc.—Production of zinc concentrate was 4.8 Mt (zinc content) in 2016 compared with about 4.75 Mt (revised) in 2015. In 2016, the leading zinc-concentrate-producing Province was Inner Mongolia (which produced 1.2 Mt of zinc concentrate), followed by Yunnan (721,000 t), Hunan (341,000 t), Gansu (338,000 t), Shanxi (332,000 t), Guangxi (260,000 t), and Sichuan (240,000 t). Most small mines were closed in 2015 owing to implementation of environmental and mineral integration policies, and they mostly remained closed through 2016. The slight increase in mine output in 2016 was mostly owing to the improved profitability caused by the increased metal price. Net imports of zinc concentrates (zinc content) were estimated to be 950,000 t in 2016 compared with 1.49 Mt in 2015. The significant decrease in the import tonnage was a result of the price of domestic concentrate being lower than imported concentrate and because production outside of China decreased and there was less supply available on the global market in 2016. China's demand for zinc concentrate in 2016 was estimated to be about 5.8 Mt, and the overall supply shortage was about 50,000 t. Production of refined zinc in 2016

was not affected by this supply shortage owing to the large amount of stockpiled ore and concentrate at smelters at the beginning of year (table 1; Liu, 2017, p. 12–16).

Production of primary refined zinc was 5.98 Mt in 2016 compared with 5.91 Mt (revised) in 2015. In 2016, the leading refined-zinc-producing Province was Yunnan, which produced 1.21 Mt of refined zinc, followed by Hunan (1.04 Mt), Shanxi (860,000 t), Inner Mongolia (586,000 t), Guangxi (463,000 t), and Gansu (403,000 t). Output of most smelters in northern China increased slightly, whereas those in southern China operated at less than full capacity owing to the shortage of available raw material and stricter environmental regulations. Net imports of refined zinc were about 505,000 t in 2016 compared with 510,000 t in 2015. Consumption of refined zinc was estimated to be 6.57 Mt in 2016 compared with 6.28 Mt in 2015. The increase in consumption was mainly attributable to strong growth in the real estate, automobile, and infrastructure sectors. In 2016 the supply shortage of refined zinc was estimated to be 205,000 t compared with a surplus of 9,000 t in 2015 (table 1; Liu, 2017, p. 16–22).

Industrial Minerals

Cement.—In 2016, cement production increased by about 2.2% to 2.41 Gt. The modest increase was owing to the demand from the real estate and infrastructure sectors. The rate of growth in real estate investment was 6.9% in 2016 compared with 1.0% in 2015, and the rate of growth in infrastructure investment was 17.4% in 2016 compared with 17.2% in 2015. The total revenue of the cement industry was estimated to be $136 billion, and the cement industry's total profit was $4.6 billion; the industry's profit margin was 5.9% in 2016 compared with 3.7% in 2015. In 2016, cement exports amounted to about 8.14 Mt, which was a decrease of 11.4% from those of 2015; clinker exports amounted to about 9.63 Mt, which was an increase of 46.9% from those of 2015. The significant increase in clinker exports in 2016 was due to the slow growth in domestic demand, which forced the cement industry to increase clinker exports to reduce domestic market pressure. The production capacity for clinker increased by 1% in 2016 to 1.83 Gt/yr. Newly added clinker capacity was 25.58 Mt/yr in 2016, which was a 46% decrease compared with that of 2015. The capacity utilization rate in the cement industry increased to about 68% from 67% in 2015, which was still much lower than the normal operation level of 80% as determined by the Government. In 2016, the Government continued to control capacity additions and to close inefficient operations to address overcapacity in the cement industry (Chen, 2017).

Mineral Fuels

Coal.—In 2016, coal output decreased by 9.1% compared with that of 2015. China's coal production reached a peak of about 4 Gt in 2013 and had declined since then owing to the slowdown in the economy, weak domestic demand, and low prices for coal. The three major coal-producing Provinces—Inner Mongolia, Shanxi, and Shaanxi—accounted for 24.8%, 24.3%, and 15.1% of total production, respectively. Other Provinces with coal production higher than 100 Mt were Anhui, Henan, Guizhou, Shandong, and Xinjiang. Coal imports in 2016 reached 260 Mt, which was an increase of 25.2% compared with those of 2015. According to China's Energy Development 13th Five-Year Plan, consumption of coal would increase slightly to 4.1 Gt by 2020 from 3.96 Gt in 2015, whereas the share of coal in total energy consumption would decrease to 58% by 2020 from 64% in 2015 (National Bureau of Energy, 2016, p. 15; National Bureau of Statistics of China, 2017a).

In December, Shenhua Ningxia Coal Industry Group Co. Ltd., which was a subsidiary of state-owned Shenhua Corp. Ltd., commissioned its coal-to-liquid project in the Ningxia Hui Autonomous Region. The project, which cost about $7.9 billion and was built using domestic technology, equipment, and materials, had the capacity to process more than 20 Mt/yr of coal to produce 4 Mt/yr of oil products, including 2.7 Mt/yr of diesel, 980,000 t/yr of naphtha, and 340,000 t/yr of liquefied natural gas. The plant also would produce 200,000 t/yr of sulfur, 75,000 t/yr of mixed alcohol, and 145,000 t/yr of ammonium sulfate as byproducts. According to Shenhua Ningxia Coal Industry, the project was the largest single coal-to-liquid project in the world. The project was part of the Government's energy transformation plan to use less coal in order to reduce the environment impact of using coal, and to improve the security of the energy supply by replacing petroleum (of which the country had limited resources and was highly dependent on imports) with coal, of which the country had rich resources and a large production capacity (National Bureau of Energy, 2016, p. 19–20, 25–26; Xinhua News Agency, 2016).

Petroleum and Natural Gas.—On August 29, Sinopec Corp. announced that it had made major progress in the exploration of the Shunbei oilfield located in the central and western Tarim Basin in Xinjiang. The resources were estimated to be 1.7 Gt of oil equivalent, including 1.2 Gt of oil and 500 billion cubic meters of natural gas. The Shunbei 1–1H test well started high-yield and steady production of oil and gas in 2015 and, as of August 2016, the well had produced a total of 25,000 t of crude petroleum and 11.5 million cubic meters of natural gas. The Shunbei oilfield had a high-quality crude petroleum reservoir at an average depth of more than 7,300 meters. The discovery of the Shunbei oilfield could expand Sinopec's exploration in the Tarim Basin, and the company planned to build an oilfield with a capacity of 1.5 Mt/yr during the country's 13th Five-Year Plan period (Xinhuanet.com, 2016).

In 2016, output of natural gas increased by 1.5% to 137 billion cubic meters compared with that of 2015. The leading natural-gas-producing Province was Shaanxi, which produced 41.2 billion cubic meters, followed by Sichuan (29.7 billion cubic meters) and Xinjiang (29.1 billion cubic meters). Imports of natural gas increased by 22% to 74.6 billion cubic meters (or 50.03 Mt). In July, the China Geological Survey (CGS) announced the discovery of a shale gas field in Zunyi, Guizhou Province. A test well (Anye Well 1) produced steady daily output of 100,000 cubic meters of natural gas. This was the first major shale gas discovery in the geologically complex areas of southern China and Guizhou Province, outside the Sichuan Basin, and had opened up a new oil and gas exploration area. According to China's Energy Development 13th Five-Year Plan, the share of natural gas in total energy consumption would

increase to 10% by 2020 from 5.9% in 2015 (National Bureau of Energy, 2016, p. 15; Yu, 2016; National Bureau of Statistics of China, 2017a).

Uranium.—In September, China General Nuclear Group (CGN) entered into cooperative agreements with Électricité de France S.A. (EDF; a public utility) of France to invest in nuclear power projects in the United Kingdom. The Hinkley Point powerplant in the United Kindom was a $23.4 billion project, and CGN would finance one-third of that investment. CGN and EDF would also jointly invest in the Bradwell and Sizewell nuclear power projects. CGN would hold 66.5% interest in the Bradwell project and planned to use China's third-generation nuclear technology, Hualong One. CGN would submit the Hualong One technology to the United Kingdom's General Design Assessment to determine if the technology can be used in the United Kingdom. This was a significant step in the export of technology by China and is representative of China's "Go Out Policy" (a strategy to encourage its enterprises to invest overseas) and the nuclear "Go Out" strategy of the CGN Group (Peterson and Liu, 2016; China General Nuclear Group, 2017, p. 13).

Reserves and Resources

In 2016, China's investment in petroleum and gas exploration was $7.6 billion, which was down by 12.1% from that of 2015, and exploration for nonfuel minerals and coal was $3.6 billion, which was down by 24.8%. Among nonfuel mineral commodities and coal, the leading commodities in terms of exploration investment in 2016, were gold (which had exploration investment of $490 million in 2016), copper ($450 million), coal and lead-zinc ($250 million each), iron ($148 million), uranium ($98 million), silver ($54 million), graphite ($48 million), and bauxite ($46 million). A group of minerals that were defined as strategic and emerging minerals and included some minor metals, along with rare-earth minerals, graphite, and diamond, had total exploration investment of $110 million. The number of newly discovered mineral deposits in 2016 was 140, of which the leading minerals were gold (12 deposits), lead and zinc (11 deposits), coal (10 deposits), iron (8 deposits), and copper (7 deposits). Newly discovered major mineral resources in 2016 included 20.4 Gt of coal, 545 Mt of phosphate ore, 323 Mt of iron ore, 265 Mt of bauxite, 29 Mt of graphite, 28 Mt of manganese ore, 1.9 Mt of lead and zinc, 476,000 t of copper, 108,000 t of tungsten (WO_3 content), 61,700 t of molybdenum, 2,430 t of silver, and 235 t of gold (Ministry of Land and Resources, 2017a, p. 5, 10).

Major discoveries by exploration projects included the Jiwanggou bauxite deposit in Fengxi County, Shanxi, which added about 83 Mt of bauxite resources; the Santanghuxiang coal field in Barkol county, Kumul City, Xinjiang, which added 9.6 Gt of coal resources; the Chagan Wenduri graphite deposit in Darhan Muminggan, Baotou City, Inner Mongolia, which added about 5.3 Mt of graphite resources; the Zhangjiawa iron mine, Laiwu City, Shandong, which added 107 Mt of iron ore resources; the Aketasi lithium mine in Hetian County, Xinjiang, which added 85,700 t of lithium (Li_2O content) resources, 1,387 t of niobium (Nb_2O_5 content) and tantalum (Ta_2O_5 content) resources, and 2,434 t of beryllium (BeO content) resources; the Alto Kashgar manganese mine in Aktay County, Xinjiang, which added 117 Mt of manganese ore resources; the Taoziping manganese mine in Songtao County, Guizhou, which added 106 Mt of manganese ore resources; the Dazhou Mine in Pingnan County, Guangxi, which added 530,000 t of rare-earth resources;and the Zhuxi tungsten mine in Leping City, Jiangxi, which added 579,000 t of tungsten (WO_3 content) resources. Exploration at the Honghaigou uranium deposit in Chabuchar County, Xinjiang Uygur Autonomous Region, discovered a large amount of uranium resources, although the specific quantity was not reported (Ministry of Land and Resources, 2017a, p. 10–13).

China's reserves of major minerals as of 2016 are listed in table 5. The major increases in reserves compared with those in 2015 include those for graphite, which increased by 33%; kaolin, 21%; manganese ore, 12%; antimony, 8.7%; zinc, 8.3%; titanium ore, 7.9%; vanadium, 7.3%; tin, 6.4%; and silver 5.1%. The major decreases in reserves in 2016 compared with those in 2015 include those for copper, which decreased by 3.7% from those of 2015; nickel, 3.5%; iron ore, 3.4%; and chromite, 3.1% (table 5).

Outlook

China's mining industry is expected to continue to face challenging conditions, such as production overcapacity and slow demand growth for most minerals, including coal, cement, steel, and major nonferrous metals. The industry plans to continue to increase operational efficiency and competitiveness through reorganization and technology upgrades. The situation may gradually improve in coming years as excess capacity is eliminated and metal prices recover. Overseas investment in the mineral sector is likely to increase in coming years as China continues to promote international collaboration on infrastructure and economic development through the "One Belt One Road" initiative and the Asian Infrastructure Investment Bank programs. For the strategic minerals identified in the National Mineral Resource Planning (2016–2020) report, the Government will likely provide strong support on domestic exploration and production as well as overseas acquisition to ensure long-term supply security.

Consumption of most nonferrous metals, such as aluminum and copper, will increase at a modest rate (likely 3% to 4% annually) compared with the rapid growth of about 10% annual growth from 2010 to 2015. Exceptions are some minor metals that are used for new energy, advanced manufacturing, and other high-tech applications, such as cobalt and lithium, which may see double-digit annual growth rates in next few years. Output for most nonferrous metals will likely match the growth rates of consumption. According to the Energy Development 13th Five-Year Plan, production of energy will increase at a rate of 2% per year and consumption will increase at a rate less than 3% per year until 2020. The share of coal in total energy consumption will gradually decrease as natural gas production increases. Output of coal and oil may remain at levels similar to those of 2016, and output of natural gas is expected to increase gradually by 2020. Demand for cement clinker may decrease slightly in the next a few years owing to slowing real estate investment, although infrastructure investment is expected to remain at high levels. Cement production capacity may decrease

by 10% by 2020 if the Government can successfully eliminate excess capacity. Demand for other industrial minerals may remain steady or decrease slightly, except for graphite, which has a variety of applications in emerging technologies (Ministry of Industry and Information Technology, 2016b, p. 8; National Bureau of Energy, 2016, p. 15).

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TABLE 1
CHINA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise noted)

Commodity[2]		2012	2013	2014	2015	2016
METALS						
Aluminum:						
Bauxite	thousand metric tons	47,000	50,400	59,200	65,000	60,800
Alumina	do.	37,700	47,000	51,300	58,978 r	60,907
Aluminum metal:						
Primary	do.	23,500	26,500	28,300	31,400	31,873
Secondary	do.	4,830	5,270	5,650	5,780 r	6,200
Total	do.	28,330	31,770	33,950	37,180 r	38,073
Products, manufactured aluminum	do.	30,735	39,625	48,458	52,361	57,961
Antimony:						
Mine production, Sb content		135,600 r	152,100 r	140,400 r	120,700 r	117,100
Refinery production, metal		242,000 r	263,100 r	257,100 r	209,900 r	210,000
Bismuth:						
Mine production, Bi content		2,500	1,400	1,500	1,590 r	1,500 e
Refinery production		15,000	15,500	15,900	16,013 r	14,000 e
Cadmium, refinery production, primary, metal		7,265 r	7,496 r	8,201 r	8,162 r	8,200 e
Chromite, mine production	thousand metric tons	123	105	24	23 r	20 e
Cobalt, Co content:						
Mine production:						
All forms, including from imports		7,498	8,580	9,619	10,093	10,500 e
From domestic ore only[e]		2,200 r	2,600 r	2,800 r	3,000 r	3,100
Refinery production:						
All forms		29,800	36,100	39,300	48,719 r	45,046
Cobalt metal only		6,400	5,620	4,780	5,159 r	7,500 e
Copper:						
Mine production, concentrate, Cu content		1,550,000	1,680,000	1,740,000	1,670,000	1,850,700
Smelter production:						
Primary		3,600,000	4,230,000	5,170,000	5,500,000	5,798,000
Secondary		1,150,000	1,300,000	1,350,000	1,350,000	1,410,300
Total		4,750,000	5,530,000	6,520,000	6,850,000	7,208,300
Refinery production:						
Primary:						
Leaching, electrowon		25,300	33,900	40,000	39,400	45,000
Other		3,905,000	4,656,000	4,780,000	4,921,000	5,410,000
Total		3,930,300	4,689,900	4,820,000	4,960,400	5,455,000
Secondary		1,950,000	1,980,000	2,830,000	3,000,000	2,985,000
Total, primary and secondary refinery production		5,880,300	6,669,900	7,650,000	7,960,400	8,440,000
Products, manufactured copper		11,680,000	14,986,000	17,837,000	19,135,000	20,960,000
Ferroalloys, gross weight:						
Ferrochromium		3,041,900	3,928,700	4,300,000 e	4,500,000 e	4,500,000 e
Ferromanganese:						
Blast furnace		295,600	452,600	457,000 e	446,000 e	340,000 e
Electric furnace		3,016,700	3,150,300	2,170,000 e	2,120,000 e	1,610,000 e
Ferromolybdenum		181,300	120,000	120,000 e	116,000	127,000
Ferronickel[e]		5,890,000	8,000,000	7,870,000	6,420,000	6,250,000
Ferrosilicon		5,758,100	5,940,000	5,500,000	4,730,000	4,300,000
Ferrovanadium		37,900	61,400	40,000	20,380	30,590
Silicomanganese		7,406,000	7,919,400	7,319,000	5,870,000	7,267,000
Other, unspecified		5,670,000	8,130,000	10,100,000	12,400,000	11,200,000
Total		31,300,000	37,700,000	37,900,000	36,700,000 r	35,600,000
Gallium[e]		300	300	450	450	225
Germanium, Ge content		105	110	98 r	100 r	80
Gold, mine production, Au content	kilograms	403,000	428,000	451,000	450,000	453,500
Indium, refinery, primary and secondary	do.	405,000	430,000	460,000	421,000 r	404,000 e

See footnotes at end of table.

TABLE 1—Continued
CHINA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise noted)

Commodity[2]		2012	2013	2014	2015	2016
METALS—Continued						
Iron and steel:						
Pig iron	thousand metric tons	663,500	708,970	713,740	691,410	702,270
Raw steel	do.	723,880	779,040	822,300	803,820	807,610
Products, rolled	do.	955,780	1,067,620	1,125,130	1,123,500	1,134,610
Iron ore, mine production:						
Crude ore	do.	1,330,000	1,450,000	1,510,000	1,380,000	1,280,000
Usable ore	do.	420,206 r	417,287 r	410,123 r	374,838 r	348,000 e
Fe content	do.	260,528 r	258,718 r	254,276 r	232,400 r	216,000 e
Lead:						
Mine production, Pb content	do.	2,613 r	2,697 r	2,609 r	2,335 r	2,408
Refinery production:						
Primary	do.	3,220	3,440	3,210	2,870 r	3,017
Secondary	do.	1,370	1,500	1,530	1,552 r	1,657
Total	do.	4,590	4,940	4,740	4,422 r	4,674
Smelter production, primary	do.	3,121 r	3,269 r	3,055 r	2,811 r	2,950 e
Magnesium metal, primary, metal and alloy		698,000	770,000	874,000	859,000 r	871,000
Manganese:						
Mine production:						
Ore	thousand metric tons	20,000	17,500	15,000 r	13,000	15,528
Mn content	do.	3,800	3,150	2,630 r	2,080 r	2,329
Metal	do.	1,110	1,050	1,280 r	1,040 r	1,240
Mercury, Hg content		1,347 r	1,822 r	2,259 r	2,801 r	3,250 e
Molybdenum, mine production, Mo content		120,000	122,000	129,000	135,000	129,000
Nickel, Ni content:						
Mine production, ore		93,300	93,200 r	101,100 r	101,400 r	98,070
Intermediate production, matte		153,000	157,000	160,000	162,500 r	150,000 e
Chemicals		9,000	9,000	21,000	19,000	29,000
Ferronickel		353,200	480,000	472,000	385,000	375,000
Metal		197,000	227,000	247,000	236,700 r	216,200
Niobium, mine production, mineral concentrate:						
Nb_2O_5 content		21	22	28	43	50 e
Nb content		15	15	20	30	35 e
Platinum-group metals:						
Palladium, mine output, Pd content	kilograms	750	850	850	1,200	1,300
Platinum, mine output, Pt content	do.	1,400	1,600	1,600	2,300	3,000
Rare earths, mineral concentrate, rare-earth-oxide equivalent[e]		93,800 r	93,800 r	105,000	105,000	105,000
Rhenium, Re content, in NH_4ReO_5[e]	kilograms	2,200	2,300	2,350	2,500	2,500
Silicon, metal	thousand metric tons	1,137 r	1,452 r	1,705 r	1,954 r	2,100
Selenium, refinery production		520	510	635	815	920
Silver, mine production, Ag content		3,639 r	3,673 r	3,568 r	3,393 r	3,496
Tantalum, mine production, mineral concentrate:						
Ta_2O_5 content		55	58	75	116	130 e
Ta content		45	48	61	95	105 e
Tellurium, refinery production		250	255	320	285	280
Tin:						
Mine production, Sn content		91,000	101,200 r	102,100 r	110,156 r	105,000
Metal		148,000	159,000	187,000	167,000	183,000
Titanium:						
Ilmenite and leucoxene:						
Ore		1,333,333	1,700,000 e	1,864,500	1,778,667	1,400,000
TiO_2 content		800,000	1,020,000	1,118,700	1,067,200	840,000
Sponge		82,120 r	82,619 r	68,167 r	58,762 r	73,100 e
Tungsten, mine production, concentrate, W content		64,400	71,100	71,000	72,300 r	70,400
Vanadium, V content		40,000	45,000	48,000	45,000	41,000

See footnotes at end of table.

TABLE 1—Continued
CHINA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise noted)

Commodity[2]		2012	2013	2014	2015	2016
METALS—Continued						
Zinc:						
Mine production, Zn content	thousand metric tons	4,859 r	5,188 r	5,118 r	4,749 r	4,800
Smelter production:						
Primary	do.	4,770	5,160	5,610	5,910 r	5,980
Secondary	do.	120	150	170	206 r	290
Total	do.	4,890	5,310	5,780	6,116 r	6,270
Zirconium mineral concentrates[e]		210,000	150,000	150,000	150,000	140,000
INDUSTRIAL MINERALS						
Asbestos, primary[e]		320,000	280,000	250,000	210,000	200,000
Barite		4,200,000 r	3,200,000 r	3,108,300 r	2,270,000 r	2,100,000 e
Boron, B_2O_3 content[e]		132,000	114,000	97,000	90,000	80,000
Bromine		160,000	110,000	75,500	86,400 r	57,600
Celestite, strontium carbonate		96,000	76,000	50,600	53,200 r	50,000 e
Cement, hydraulic	thousand metric tons	2,210,000 r	2,411,000 r	2,492,000 r	2,359,000 r	2,410,000
Clay and shale:[e]						
Bentonite	do.	4,000	4,500	5,000	5,600	5,600
Kaolin	do.	3,300	3,300	3,200	3,200	3,200
Diamond:						
Gem, unspecified[e]	thousand carats	200	200	200	200	150
Industrial, synthetic	do.	13,000,000	15,000,000	17,000,000	15,100,000	13,900,000
Diatomite		250,000	310,000	379,000	208,300 r	420,000
Feldspar, mine production[e]	thousand metric tons	3,350	3,500	3,670	3,820 r	3,800
Fluorspar	do.	5,200	4,800	4,310	3,980 r	3,730
Garnet, industrial		66,033	87,667	109,300	68,500	88,900
Graphite:						
Aphanitic		150,000	140,000	250,000	200,000	150,000 e
Flake		650,000	700,000	650,000	660,000	400,000 e
Total		800,000	840,000	900,000	860,000	550,000
Gypsum:						
Natural	thousand metric tons	35,000	28,000	19,970 r	16,300 r	15,500 e
Industrial byproduct	do.	172,000	184,000	192,000	200,000	200,000 e
Lime[e]	do.	200,000	220,000	230,000	250,000 r	290,000
Lithium:						
Mine production, Li content		1,900	2,100	1,900	2,000	2,150 e
Lithium carbonate		35,000	38,000	41,600	42,000	53,400
Lithium hydroxide		18,000	22,000	21,000	22,000	25,000
Lithium metal		2,000	2,300	2,650	2,680	2,800
Magnesite[e]	thousand metric tons	16,000	17,000	16,000	18,400 r	18,600
Mica		56,000 e	41,000 e	25,600	25,100 r	25,000 e
Nitrogen, N content, ammonia	thousand metric tons	45,520	48,326	45,642	49,706	41,055
Perlite		2,100,000	1,800,000	2,037,000 r	723,800 r	1,800,000 e
Phosphate rock, mine production:						
Ore	thousand metric tons	95,000	111,700	120,000	142,000	144,400
P_2O_5 content[e]	do.	28,500	33,500	36,000	42,600	43,300
Potash, K_2O content, marketable	do.	3,770	5,300	6,110	5,710	5,780
Salt	do.	69,120	73,676	70,497	66,655	66,201
Sodium compounds:						
Caustic soda	do.	26,970	29,270	30,640	30,210	32,020
Mirabilite	do.	7,400	6,500	5,750	4,510 r	4,000 e
Soda ash, natural and synthetic	do.	24,010	24,320	25,260	25,920	25,850
Stone, dolomite, size and shape unspecified	do.	7,300	8,330	9,520	10,600	11,700 e

See footnotes at end of table.

TABLE 1—Continued
CHINA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise noted)

Commodity[2]		2012	2013	2014	2015	2016
INDUSTRIAL MINERALS—Continued						
Sulfur, S content:[e]						
Byproduct, domestic:						
Nonferrous, metallurgy	thousand metric tons	3,370	3,560	4,140	3,800	3,930
Petroleum and coal chemical industry	do.	4,910	5,190	6,020	5,530	5,700
Pyrite	do.	5,820	6,150	7,140	6,570	6,770
Total	do.	14,100	14,900	17,300	15,900	16,400
Sulfuric acid	do.	76,367	80,776	88,463	89,755	88,891
Talc and related materials	do.	2,060	1,970	1,870	1,846 [r]	1,800 [e]
Wollastonite[e]		300,000	300,000	450,000	450,000	500,000
MINERAL FUELS AND RELATED MATERIALS						
Asphalt	thousand metric tons	28,801	29,205	29,269	32,165	32,649
Coal:						
Anthracite	do.	470,000	451,000	422,000	401,000	364,000
Bituminous	do.	2,260,000 [r]	2,580,000 [r]	2,550,000 [r]	2,480,000 [r]	2,250,000
Lignite	do.	371,000	300,000	272,000	252,000	229,000
Metallurgical	do.	560,000	641,000	640,000	620,000	564,000
Total	do.	3,661,000	3,972,000	3,884,000	3,753,000	3,411,000
Coke, metallurgical	do.	447,790	481,794	479,809	448,225	449,115
Gas, natural						
All forms	million cubic meters	107,000	121,000	130,000	135,000	137,000
Coalbed gas only	do.	3,390	4,110	5,690	6,340	7,480
Liquefied natural gas	thousand metric tons	1,277	2,884	4,376	5,127	6,953
Petroleum:						
Crude, including from oil shale	million 42-gallon barrels	1,510	1,520	1,530	1,550	1,670
Refinery production:						
Diesel	do.	1,273	1,289	1,316	1,343	1,337
Fuel oil	do.	133	177	176	160	179
Gasoline	do.	766	839	941	1,032	1,103
Kerosene	do.	165	194	232	283	308
Liquefied petroleum gas	do.	262	290	314	340	406
Naphtha	do.	228	236	239	233	270
Other	do.	533	475	492	509	437
Total	do.	3,360	3,500	3,710	3,900	4,040
Petroleum coke	thousand metric tons	19,416	23,557	24,318	25,004	25,909
Uranium, mine production, U content		1,500	1,450	1,500	1,620	1,620 [e]

[e]Estimated. [r]Revised. do. Ditto.

[1]Table includes data available through December 12, 2017. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]In addition to the commodities listed, arsenic, beryllium, iodine, other stone, and tellurium may have been produced in China, but available information was inadequate to make reliable estimates of output.

TABLE 2
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners[1]	Location of main facilities[2]	Annual capacity[e]
Aluminum:				
Alumina		Guangxi Huayin Aluminium Industry Co. Ltd.	Guangxi, Debao	2,200
Do.		Luoyang Xiangjiang Wanji Aluminium Industry Co. Ltd.	Henan, Luoyang	1,800
Do.		Hangzhou Jinjian Group	Jiangsu, Hangzhou	6,000
Do.		Aluminum Corporation of China (Chinalco)	Plants in many Provinces	17,500
Do.		China Power Investment Corp.	do.	3,800
Do.		East Hope Group	do.	3,500
Do.		Xinfa Aluminium Group Co. Ltd.	do.	12,500
Do.		Nanshan Group	Shandong,Yantai	2,000
Do.		Weiqiao Aluminum and Electricity Co. Ltd.	Shandong, Zouping	12,000
Do.		Yangquan Coal Industry Group Co. Ltd.	Shanxi, Yangquan	1,000
Metal		Dongxing Aluminum Co. Ltd.	Gansu Province	1,700
Do.		Shenhuo Group Co. Ltd.	Henan, Yongcheng	925
Do.		Yidian Holding Group Co. Ltd.	Plants in Henan Province	2,010
Do.		Aluminum Corporation of China (Chinalco)	Plants in many Provinces	3,800
Do.		China Power Investment Corp.	do.	3,230
Do.		East Hope Group	do.	1,660
Do.		Xinfa Aluminium Group Co. Ltd.	do.	3,480
Do.		Weiqiao Aluminum and Electricity Co. Ltd.	Shandong, Zouping	4,020
Do.		Tianshan Aluminum Co. Ltd.	Xinjiang, Shihezi	1,000
Do.		Yunnan Aluminium Co. Ltd.	Yunnan, Kunming	1,200
Antimony		Huaxi (China Tin) Group Industrial Co.	Guangxi, Hechi	25
Do.		Jiyuan Wangyang Smelter (Jiyuan Wangyang Smeltery Group Co. Ltd.)	Henan, Jiaozuo	10
Do.		Hunan Chenzhou Mining Group Co. Ltd.	Hunan, Yuanling	20
Do.		Hsikuangshan Twinkling Star Antimony Co. Ltd. (China Minmetals Group)	Hunan, Lengshuijiang	40
Asbestos		China National Nonmetallic Industry Corp.	Nei Mongol, Baotou; Shanxi, Lai Yuan, and Lu Liang	130
Barite		do.	Guizhou, Xiangshou	NA
Bismuth	metric tons	Guangzhou Smelter	Guangdong, Guangzhou	300
Do.	do.	Jiyuan Wangyang Smelter (Jiquan Wangyang Smeltery Group Co. Ltd.)	Henan, Jiaozuo	200
Do.	do.	Hunan Bismuth Industry Co. Ltd.	Hunan, Chouzhou	3,500
Do.	do.	Shizhuyuan Nonferrous Metals Co. Ltd.	Hunan, Shizhuyuan	1,200
Do.	do.	Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	350
Do.	do.	Yunnan Copper Group Co. Ltd.	Nei Mongol, Chifeng	300
Do.	do.	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qujing	300
Cadmium	do.	Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	1,000
Do.	do.	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qujing	800
Cement, clinker		China Building Materials Group Co. Ltd.	Beijing	402,000
Do.		Anhui Conch Cement Co. Ltd.	Auhui, Wuhu	207,000
Do.		Tangshan Jidong Cement Co. Ltd.	Hebei, Tangshan	104,000
Do.		China Resources Cement Holdings Ltd.	Southern China	67,900
Do.		Lafarge China Cement Ltd. (LafargeHolcim Ltd.)	Various locations	65,600
Do.		Shandong Shanshui Cement Group Co. Ltd.	Shandong, Jinan	54,600
Do.		Red Lion Holdings Ltd.	Zhejiang, Jinhua	44,000
Do.		Tian Rui Group Cement Co. Ltd.	Henan, Ruzhou	32,100
Do.		Asia Cement (China) holding company	Jiangxi, Ruichang	20,600
Coal		Jizhong Energy Group Co. Ltd.	Hebei, Handan	157,000
Do.		Kailuan Group Co. Ltd.	Hebei, Tangshan	141,000
Do.		Henan Energy and Chenial Industry Group Co. Ltd.	Henan, Zhengzhou	156,000
Do.		China National Coal Group Corp.	Mines in Nei Mongol, Shanxi, Jiangsu, and other Provinces	256,000

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners[1]	Location of main facilities[2]	Annual capacity[e]
Coal—Continued		Shenhua Group Corp. Ltd.	Mines in Nei Mongol, Xinjiang, and other Provinces	666,000
Do.		Shaanxi Coal and Chemical Industry Group Co. Ltd.	Shaanxi, Chengcheng	196,000
Do.		Shandong Energy Group Co. Ltd.	Shandong, Jinan	206,000
Do.		Yanzhou Coal Mining Co. Ltd.	Shandong, Jining	168,000
Do.		Datong Coal Mine Group Co. Ltd	Shanxi, Datong	267,000
Do.		Shanxi Coking Coal Group Co. Ltd.	Shanxi, Taiyuan	174,000
Cobalt	metric tons	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchang	10,000
Do.	do.	Huayou Cobalt Co. Ltd.	Zhejiang, Tongxiang	3,000
Copper, refined		Jinchang Smelter (Tongling Nonferrous Metals Group Holding Co. Ltd.)	Anhui, Tongling	170
Do.		Jinlong Smelter (Tongling Nonferrous Metals Group Holding Co. Ltd.)	do.	400
Do.		Wuhu Smelter (Hengxin Copper Industry Group Co.)	Anhui, Wuhu	120
Do.		Zijin Copper Co. Ltd.	Fujian, Shanghang	200
Do.		Baiyin Nonferrous Metals Group Co. Ltd.	Gansu, Baiyin	200
Do.		Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	550
Do.		do.	Guangxi, Fangchenggang	400
Do.		Luoyang Copper Processing Factory	Henan, Luoyang	240
Do.		Daye Nonferrous Metals Co.	Hubei, Daye	300
Do.		Zhangjiagang United Copper Co. (Tongling Nonferrous Metals Group Holding Co. Ltd.)	Jiangsu, Zhangjiagang	200
Do.		Guixi Smelter (Jiangxi Copper Co. Ltd.)	Jiangxi, Guixi	1,200
Do.		Dongfang Copper Co. (Huludao Nonferrous Metals Group)	Liaoning, Huludao	100
Do.		Chifeng Fubang Copper Co. Ltd.	Nei Mongol, Chifeng	100
Do.		Chifeng Jingeng Copper Co. Ltd.	Nei Mongol, Chifeng, Harqin Banner	582
Do.		Shandong Dongying Fangyuan Nonferrous Metals Co. Ltd.	Shandong, Dongying	400
Do.		Shandong Jinsheng Nonferrous Metals Corp.	Shandong, Linyi	100
Do.		Yanggu Xiangguang Copper Co. Ltd. (Shandong Fengxiang Group)	Shandong, Liaocheng, Yanggu	600
Do.		Yantai Penghui Copper Industry Co. Ltd.	Shandong, Yantai	200
Do.		Taiyuan Copper Industry Co.	Shanxi, Taiyuan	100
Do.		Yuanqu Smelter (Zhongtiaoshan Nonferrous Metals Group Co. Ltd.)	Shanxi, Yuangu	100
Do.		Huili Kunpeng Co. Ltd.	Sichuan, Huili	100
Do.		Tianjin Datong Copper Co. Ltd. (formerly Tianjin Copper Electrolysis Factory)	Tianjin	200
Do.		Yunnan Smelter (Chinalco Yunnan Copper Group Co. Ltd.)	Yunnan, Kunming	500
Do.		Hangzhou Fuchunjiang Smelting Co. Ltd.	Zhejiang, Fuchunjiang	100
Gallium	metric tons	Chalco Zunyi Aluminum Co. Ltd. [Aluminum Corporation of China (Chinalco)]	Guizhou, Zunyi	40
Do.	do.	Pingguo Aluminum Co. [Aluminum Corporation of China (Chinalco)]	Guangxi, Pingguo	40
Do.	do.	Shandong Aluminum Plant	Shandong, Zibo	20
Gas, natural	billion cubic meters	China National Petroleum Corp.	Sichuan	10
Germanium	metric tons	Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoguan	30
Do.	do.	Nanjing Germanium Co. Ltd.	Jiangsu, Nanjing	30
Do.	do.	Nei Mongol Xilingol Tongtai Germanium Refine Co. Ltd.	Nei Mongol, Xilinhot	20
Do.	do.	Shanghai Lontai Copper Co. Ltd.	Shanghai	10
Do.	do.	Yunnan Lincang Xinyuan Germanium Industrial Co. Ltd.	Yunnan, Lincang	50
Do.	do.	Yunnan Chihong Zinc and Germanium Industrial Co. Ltd.	Yunnan, Qujing	50
Gold, refined	do.	Zijin Copper Co. Ltd.	Fujian, Shanghang	5
Do.	do.	China National Gold Corp.	Henan, Lingbao	10
Do.	do.	Zhongyan Gold Smelter (Zhongjin Gold Co. Ltd.)	Henan, Sanmenxia	30
Do.	do.	Jiangxi Copper Co. Ltd.	Jiangxi, Guixi	20

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners[1]	Location of main facilities[2]	Annual capacity[e]
Gold, refined—Continued	metric tons	Laizhou Gold Co.	Shandong, Laizhou	15
Do.	do.	Yanggu Xiangguang Copper Co. Ltd. (Shandong Fengxiang Group)	Shandong, Liaocheng, Yanggu	20
Do.	do.	Shandong Yanggu Xiangguang Co. Ltd.	Shandong, Yanggu	20
Do.	do.	Yantai Penghui Copper Industry Co. Ltd.	Shandong, Yantai	5
Do.	do.	Zhaoyuan Gold Co.	Shandong, Zhaoyuan	15
Do.	do.	Great Wall Gold Silver Refinery	Sichuan, Chengdu	100
Do.	do.	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qujing	130
Graphite		Jixi Aoyu Graphite Co. Ltd.	Heilongjiang, Jixi and Luo	60
Do.		Nei Mongol Xinghe Jingxin Graphite Co. Ltd.	Nei Mongol, Xinghe	10
Indium	metric tons	Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoquan	25
Do.	do.	Guangxi Tanghan Zinc & Indium Co. Ltd.	Guangxi, Hechi	30
Do.	do.	Laibin Smelter [Liuzhou Huaxi (China Tin) Group Co.]	Guangxi, Laibin	50
Do.	do.	Guangxi Debang Technology Co. Ltd.	Guangxi, Liuzhou	120
Do.	do.	Liuzhou Zinc Products Co.	do.	20
Do.	do.	Yintai Technology Co. Ltd.	do.	40
Do.	do.	Yuguang Gold-Lead Co. Ltd.	Henan, Jiyuan	10
Do.	do.	Hsikuangshan Twinkling Star Antimony Co. Ltd. (China Minmetals Group)	Hunan, Lengshuijiang	7
Do.	do.	Xiangtan Zhengtan Nonferrous Metal Co. Ltd.	Hunan, Xiangtan	75
Do.	do.	Zhuzhou Smelter	Hunan, Zhuzhou	60
Do.	do.	Nanjing Germanium Co. Ltd.	Jiangsu, Nanjing	150
Do.	do.	Nanjing Sanyou Electronic Material Co. Ltd.	do.	50
Do.	do.	Huludao Nonferrous Metals Group Co.	Liaoning, Huludao	50
Do.	do.	Yunnan Chengfeng Nonferrous Metals Co. Ltd.	Yunnan, Gejiu	10
Do.	do.	Yunnan Mengzi Mining and Smelting Co. Ltd.	Yunnan, Honghe	30
Iron and steel:				
Iron ore		Ma'anshan Iron and Steel Co.	Anhui, Maanshan	1,200
Do.		Shoudu (Capital) Mining Co.	Beijing	5,000
Do.		Jiuquan Iron and Steel Co. Ltd.	Gansu, Jiayuguan	4,000
Do.		Dabaoshan Mining Co.	Guangdong, Qujiang	1,670
Do.		Hainan Iron Mine	Hainan, Changjiang	4,600
Do.		Hebei Iron and Steel Group Co.	Hebei, Tangshan	7,000
Do.		Baowu Steel Group Corp. Ltd.	Hubei, Wuhan	5,100
Do.		Meishan Metallurgical Co.	Jiangsu, Nanjing	2,000
Do.		Banshigou Iron Mine Mining Co.	Jilin, Hunjiang	1,400
Do.		Anshan Mining Co.	Liaoning, Anshan	30,000
Do.		Benxi Iron and Steel Co.	Liaoning, Benxi	7,000
Do.		Baotou Iron and Steel and Rare Earth Co.	Nei Mongol, Baotou	10,000
Do.		Shandong Iron and Steel Co.	Shangdong, Jinan	3,000
Do.		Taiyuan Iron and Steel Co.	Shanxi, Taiyuan	12,000
Do.		Panzhihua Mining Co.	Sichuan, Panzhihua	13,000
Do.		Kunming Iron and Steel Co.	Yunnan, Kunming	2,500
Ferroalloys		Shoudu (Capital) Iron and Steel (Group) Co.	Beijing	35
Do.		Qingshan Holding Group Co. Ltd.	Fujian, Fu'an	300
Do.		Desheng Nickel Industry Co. Ltd.	Fujian, Luoyuanwan	920
Do.		Northwest Ferroalloy Co.	Gansu, Yongdeng	60
Do.		Zunyi Ferroalloy Co.	Guizhou, Zunhi	100
Do.		Zhejiang Huaguang Smelting Group	Jiangxi, Hengfeng	50
Do.		Jilin Ferroalloy Co.	Jilin, Jilin	250
Do.		Jinzhou Ferroalloy Co.	Liaoning, Jinzhou	90
Do.		Liaoyang Ferroalloy Co.	Liaoning, Liaoyang	70
Do.		Shanghai Iron and Steel Co. Ltd.	Shanghai	180
Do.		Emei Ferroalloy Co.	Sichuan, Emei	70
Do.		Hengshan Ferroalloy Co.	Zhejiang, Jiande	70

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners[1]	Location of main facilities[2]	Annual capacity[e]
Iron and steel:—Continued			
Crude steel	Ma'anshan Iron and Steel Co.	Anhui, Maanshan	27,000
Do.	Shougang Iron and Steel Co. Ltd.	Beijing	40,000
Do.	Beijing Jianlong Heavy Industry Group Co. Ltd	Beijing	21,000
Do.	Shougang-Tangshan Iron and Steel Group Co. Ltd.	Hebei, Caofeidian	18,000
Do.	Hebei Iron and Steel Group Co.	Hebei, Handan	55,000
Do.	Shagang Group Co. Ltd.	Jiangsu, Zhangjiagang	48,000
Do.	Anshan Iron and Steel (Group) Co.	Liaoning, Anshan	46,000
Do.	Benxi Iron and Steel Co.	Liaoning, Benxi	21,000
Do.	Shandong Iron and Steel Group	Shandong, Jinan	31,000
Do.	Baowu Steel Group Corp. Ltd.	Shanghai and Hubei, Wuhan	65,000
Do.	Tianjin Bohai Iron and Steel Group Co. Ltd	Tianjin	23,000
Lead	Jiuhua Smelter (Tongling Nonferrous Metals Group Holding Co. Ltd.)	Anhui, Chizhou	80
Do.	Baiyin Nonferrous Metals Co. Ltd.	Gansu, Baiyin	80
Do.	Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoquan	100
Do.	Laibin Smelter [Huaxi (China Tin) Group Co.]	Guangxi, Laibin	100
Do.	Hechi Nanfang Nonferrous Metals Smelting Co. Ltd.	Guangxi, Hechi	80
Do.	Anyang Smelter (Yubei Metal Co.)	Henan, Anyang	160
Do.	Jiyuan Wangyang Smelter (Jiquan Wangyang Smeltery Group Co. Ltd.)	Henan, Jiaozuo	200
Do.	Jinli Smelter (Jiyuan Jinli Smelting Co.)	Henan, Jiyuan	300
Do.	Jiyuan Smelter (Yuguang Gold-Lead Co. Ltd.)	do.	300
Do.	Henan Lingye Co. Ltd.	Henan, Lingbao	100
Do.	Hanjiang Smelter	Hubei, Luhekou	50
Do.	Shuikoushan Nonferrous Metals Co. Ltd.	Hunan, Hengyang	100
Do.	Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	100
Do.	Xuzhou Chunxing Alloy Co. Ltd.	Jiangsu, Xuzhou	150
Do.	Jiangxi Jinde Lead Co. Ltd.	Jiangxi, Shangrao	80
Do.	Huludao Nonferrous Metals Group Co. Ltd.	Liaoning, Huludao	30
Do.	Shaanxi Dongling Group	Shaaxi, Baoji	100
Do.	Yunnan Tin Co. Ltd. (Yunnan Tin Corp.)	Yunnan, Gejiu	100
Do.	Kunming Smelter	Yunnan, Kunming	100
Do.	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qujing	100
Lithium, $LiCO_3$	Tibet Mineral Development Co. Ltd.	Gansu, Baiyin	5
Do.	Jiangxi Ganfeng Lithium Co. Ltd.	Jiangxi, Xinyu	3
Do.	Sichuan Ni/Co Guorun New Material Co. Ltd.	Sichuan, Pengshan	2
Do.	Sichuan Shehong Lithium Co. Ltd.	Sichuan, Shehong	2
Do.	Sichuan Tianqi Lithium Industry Co. Ltd. (Chengdu Tianqi Group Co. Ltd.)	Sichuan, Suining	10
Do.	Sichuan Aba Guangsheng Lithium Industrial Co. Ltd.	Sichuan, Wenchuan	2
Do.	Qinghai Yanhu Industry Group Co. Ltd.	Qinghai, Golmud	10
Do.	Qinghai CITIC Guoan Technology Development Co. Ltd.	do.	20
Do.	Qinghai Lithium Industry Co. Ltd.	Qinghai, Xining	20
Do.	Xinjiang Haoxin Lithium Salt Development Co. Ltd. (formerly Xinjiang Lithium Co.)	Xinjiang, Urumqi	5
Magnesium	Zunyi Titanium Co. Ltd.	Guizhou, Zunyi	24
Do.	Ningxia Huayuan Magnesium Group	Ningxia, Yinchuan	15
Do.	Huayu Enterprises (Group) Ltd.	Shanxi, Jishan	35
Do.	Taiyuan Tongxiang Magnesium Metal Co. Ltd.	Shanxi, Taiyuan	45
Do.	Taiyuan Yiwei Magnesium Co. Ltd.	do.	21
Do.	Wenxi Biyun Magnesium Co. Ltd.	Shanxi, Wenxi	30
Do.	Wenxi Yinguang Magnesium Group	do.	40

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners[1]	Location of main facilities[2]	Annual capacity[e]
Manganese, metal		Chongqing Tycoon Manganese Co. Ltd.	Chongqing	23
Do.		Guangxi Dameng Manganese Industry Co. Ltd.	Guangxi, Nanning	70
Molybdenum, concentrate		China Molybdenum Co. Ltd.	Henan, Luanchuan	30
Do.		Jinduicheng Molybdenum Industry Group Co. Ltd.	Shaanxi, Huaxian	30
Nickel, refined		Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	130
Do.		Guangxi Yinyi Science and Technic Mine	Guangxi, Yulin, Bohai	10
Do.		Guangxi Yulin Weinie Co. Ltd.	Guangxi, Bobai	18
Do.		Jiangxi Jiangli Science and Technology Co. Ltd.	Jiangxi, Fenyi	50
Do.		Jilin Jien Nickel Industry Co. Ltd.	Jilin, Panshi	10
Do.		Inco New Nickel Materials (Dalian) Co. Ltd.	Liaoning, Dalian	32
Do.		Schaanxi Huaze Nickel and Cobalt Metal Co. Ltd.	Shaanxi, Xian	5
Do.		Chengdu Electro-Metallurgy Factory	Sichuan, Chengdu	5
Do.		Huili Kunpeng Co. Ltd.	Sichuan, Huili	10
Do.		Sichuan Ni/Co Guorun New Material Co. Ltd.	Sichuan, Pengshan	10
Do.		Xinjiang Fukang Smelter	Xinjiang, Fukang	15
Do.		Xinjiang Xinxin Mining Co. Ltd.	Xinjiang, Fuyun	7
Do.		Yuanjiang Nickel Industry Co. Ltd.	Yunnan, Yuxi	5
Niobium and tanlatum, concentrate, gross weight	metric tons	Jiangxi Tungsten Industry Group Co. Ltd. (China Minmetals Co.)	Mine in Jiangxi, Yichun	500
Do.	do.	Jiangxi Jiangte Mining Development Co. Ltd.	Mine in Jiangxi, Yichun	35
Do.	do.	Jiangxi Jinhui Renewable Resources Co. Ltd.	Plant in Jiangxi, Yichun	20
Palladium and platinum	kilograms	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchang	3,500
Do.	do.	Danba County Yangliuping Mining Co. Ltd.	Sichuan, Yangliuping	1,000
Petroleum, crude	thousand 42-gallon barrels	Shengli Administration	Hebei, Shengli	246,000
Do.	do.	Daqing Administration	Heilongjiang, Daqing	403,000
Do.	do.	Liaohe Administration	Liaoning, Liaohe	110,000
Do.	do.	Bohai Offshore Oil Corp.	Bohai	29,300
Do.	do.	Nanhai East Corp.	Nanhai	36,700
Potash		Qinghai Yanhu Industry Group Co. Ltd.	Qinghai, Charhan	2,000
Do.		Xinjiang Lop Nur Potassic Salt Scientific and Technology Development Co.	Xinjiang, Ruoqiang	1,200
Rare earths, rare-earth oxide:				
Mine output	metric tons	China Minmetals Co.	Mines in Hunan, Fujian, Guangdong, Jiangxi, and Yunnan	3,500
Do.	do.	Aluminum Corporation of China (Chinalco)	Mines in Guangxi, Jiangsu, Shandong, and Sichuan	20,000
Do.	do.	China North Rare Earth (Group) High Technology Co. Ltd.	Mines in Gansu and Inner Mongol	100,000
Do.	do.	Guangdong Province Rare Earth Industry Group Co. Ltd.	Mines in Guangdong	3,000
Do.	do.	Xiamen Tungsten Co. Ltd.	Mines in Fujian	3,000
Do.	do.	China Southern Rare Earth Group Co. Ltd.	Mines in Jiangxi	40,000
Smelter	do.	China Minmetals Co.	Plants in Hunan, Fujian, Guangdong, Jiangxi, and Yunnan	14,000
Do.	do.	Aluminum Corporation of China (Chinalco)	Plants in Guangxi, Jiangsu, Shandong, and Sichuan	45,000
Do.	do.	China North Rare Earth (Group) High Technology Co. Ltd.	Plants in Gansu and Inner Mongol	140,000
Do.	do.	Guangdong Province Rare Earth Industry Group Co. Ltd.	Plants in Guangdong	28,000
Do.	do.	Xiamen Tungsten Co. Ltd.	Plants in Fujian Province	7,000
Do.	do.	China Southern Rare Earth Group Co., Ltd.	Plants in Jiangxi	42,000
Rhenium, rhenate	kilograms	Guixi Smelter (Jiangxi Copper Co. Ltd.)	Jiangxi, Guixi	3,000
Do.	do.	Western Xinxing Metal Materials Co. Ltd.	Shaanxi, Luonan	200
Do.	do.	Luoyang Luanchuan Molybdenum Industry Group Co. Ltd.	Henan, Luanchuan	200
Do.	do.	Jinduicheng Molybdenum Industry Group Co. Ltd.	Shaanxi, Huaxian	1,000

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners[1]	Location of main facilities[2]	Annual capacity[e]
Salt		Shandong Haihua Group Co. Ltd.	Shandong, Weifang	1,400
Do.		Zigong Zhangjiaba Salt Chemical Plant	Sichuan, Zigong	250
Selenium	metric tons	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchang	50
Do.	do.	Guixi Smelter (Jiangxi Copper Co. Ltd.)	Jiangxi, Guixi	300
Silver	do.	Zijin Copper Co. Ltd.	Fujian, Shanghang	125
Do.	do.	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchang	150
Do.	do.	Laibin Smelter [Huaxi (China Tin) Group Co.]	Guangxi, Laibin	80
Do.	do.	Daye Nonferrous Metals Co.	Hubei, Daye	300
Do.	do.	Jiyuan Wangyang Smelter (Jiquan Wangyang Smeltery Group Co. Ltd.)	Henan, Jiaozuo	1,600
Do.	do.	Jinli Smelter (Jiyuan Jinli Smelting Co.)	Henan, Jiyuan	800
Do.	do.	Jiyuan Smelter (Yuguang Gold-Lead Co. Ltd.)	do.	730
Do.	do.	Jiangxi Copper Co. Ltd.	Jiangxi, Guixi	430
Do.	do.	Huludao Nonferrous Metals Group Co. Ltd.	Liaoning, Huludao	80
Do.	do.	Yanggu Xiangguang Copper Co. Ltd. (Shandong Fengxiang Group)	Shandong, Liaocheng, Yanggu	600
Do.	do.	Yantai Penghui Copper Industry Co. Ltd.	Shandong, Yantai	80
Do.	do.	Great Wall Gold Silver Refinery	Sichuan, Chengdu	300
Do.	do.	Yunnan Chengfeng Nonferrous Metals Co. Ltd.	Yunnan, Gejiu	150
Do.	do.	Yunnan Tin Co. Ltd. (Yunnan Tin Corp.)	do.	160
Do.	do.	Yunnan Smelter (Yunnan Copper Group Co. Ltd.)	Yunnan, Kunming	450
Do.	do.	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qujing	150
Strontium, carbonate		Chongqing Chonglong Strontium Co. Ltd.	Chongqing	20
Do.		Chongqing Tongliang Redbutterfly Strontium Co.	do.	40
Do.		Shijiazhuang Zhengding Xian Jinshi Chemical Co. Ltd	Hebei, Shijiazhuang	3
Do.		Hebei Xinji Chemical Group	Hebei, Xinji	2
Do.		Nanjing Jinyan Strontium Co. Ltd.	Jiangsu, Lishui	2
Talc		China National Nonmetallic Industry Corp.	Guangxi, Longshen	130
Do.		do.	Liaoning, Haicheng	50
Do.		do.	Shandong, Qixia	5
Tellurium, concentrate	metric tons	Jiangxi Copper Co. Ltd.	Jiangxi, Guixi	50
Tin, smelter		Guihuacheng Smelter (Guangxi Pinggui PGMA Co. Ltd.)	Guangxi, Hezhou	8
Do.		Laibin Smelter (Guangxi China Tin Group Co. Ltd.)	Guangxi, Laibin	25
Do.		Chenzhou Smelter (Yunnan Tin Co. Ltd.)	Hunan, Chenzhou	20
Do.		Nanshan Tin Co. Ltd.	Jiangxi, Nankang	10
Do.		Yunnan Chengfeng Nonferrous Metals Co. Ltd.	Yunnan, Gejiu	20
Do.		Yunnan Tin Co. Ltd. (Yunnan Tin Corp.)	do.	70
Do.		Yunnan Gejiu Zili Metallurgy Co. Ltd.	Yunnan, Huogudu	20
Titanium, sponge		Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	15
Do.		Guizhou Southwest Titanium Co. Ltd.	Guizhou, Guiyang	3
Do.		Zunbao Titanium Co. Ltd.	Guizhou, Tongzi	10
Do.		Zunyi Titanium Co. Ltd.	Guizhou, Zunyi	20
Do.		Tangshan Tianhe Titanium Co. Ltd.	Hebei, Tangshan	10
Do.		Luoyang Sun Rui Wanji Titanium Industry Co. Ltd.	Henan, Xinan	10
Do.		Chaoyang Baisheng Zirconium Co. Ltd.	Liaoning, Chaoyang	8
Do.		Chaoyang Jintai Titanium Co. Ltd.	do.	7
Do.		Fushun Titanium Co. Ltd.	Liaoning, Fushun	5
Do.		Jinzhou Huashen Nonferrous Metals Plant	Liaoning, Jinzhou	10
Do.		Baoti Titanium Industry Co. Ltd.	Shaanxi, Baoji	10
Do.		Gangqi Xinyu Titanium Co. Ltd.	Sichuan, Panzhihua	5
Do.		Hengwei Titanium Co. Ltd.	do.	5
Do.		Panzhihua Iron and Steel (Group) Co. (Pangang)	do.	15
Do.		Yunnan Metallurgical Group	Yunnan, Lufeng	10

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners[1]	Location of main facilities[2]	Annual capacity[e]
Tungsten, concentrate, WO_3 content		Ninghua Hangluoken Tungsten Mine (Xiamen Tungsten Co. Ltd.)	Fujian, Ninghua	5
Do.		Luoyang Luanchuan Molybdenum Industry Group Co. Ltd.	Henan, Luanchuan	11
Do.		Shizhuyuan Nonferrous Metals Co.	Hunan, Chenzhou	5
Do.		Yaogangxian Tungsten Mine	Hunan, Yizhang	3
Do.		Jiangxi Tungsten and Rare Earth Co. Ltd.	Jiangxi, Ganzhou	15
Uranium	metric tons	CNNC Shaoguan Jinhong Uranium Industry Co. Ltd.	Guangdong, Shaoguan	300
Do.	do.	CNNC Ganzhou Jinrui Uranium Co. Ltd.	Jiangxi, Chongyi	300
Do.	do.	CNNC Fuzhou Jin'an Uranium Co. Ltd.	Jiangxi, Fuzhou	500
Do.	do.	CNNC North Uranium Co. Ltd.	Liaoning, Benxi	120
Do.	do.	do.	Liaoning, Qinglong	200
Do.	do.	Xi'an CNNC Lantian Uranium Co. Ltd.	Shaanxi, Lantian	100
Do.	do.	CNNC Tianshan Uranium Co.	Xinjiang, Yining, Mengqiguer	800
Zinc		Northwest China Lead-Zinc Smelter (Baiyin Nonferrous Metals Co. Ltd.)	Gansu, Baiyin	150
Do.		Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoquan	270
Do.		Hechi Nanfang Nonferrous Metal Smelting Co. Ltd.	Guangxi, Hechi	200
Do.		Liuzhou Nonferrous Metal Smelting Co. Ltd. (formerly Liuzhou Zinc Products Factory)	Guangxi, Liuzhou	100
Do.		Yugang Gold-Lead Co. Ltd.	Henan, Jiyuan	300
Do.		Shuikoushan Nonferrous Metals Co. Ltd.	Hunan, Hengyang	60
Do.		Hsikuangshan Twinkling Star Antimony Co. Ltd. (China Minmetals Group)	Hunan, Lengshuijiang	40
Do.		Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	500
Do.		Huludao Zinc Smelting Co. (Huludao Nonferrous Metals Group. Co. Ltd.)	Liaoning, Huludao	390
Do.		Zijin Bayannur Co. Ltd. (Zijin Mining Group)	Nei Mongol, Bayannur League	220
Do.		Chifeng NFC Kumba Hongye Zinc Co. Ltd. (China Nonferrous Metals Mining Group Co. Ltd.)	Nei Mongol, Chifeng	230
Do.		Xingan Copper and Zinc Smelter	Nei Mongol, Xilinuole	100
Do.		Dongling Zinc Industry Co. Ltd. (Dongling Group)	Shaanxi, Baoji	250
Do.		Laibin Smelter (Guangxi China Tin Group Co. Ltd.)	Yunnan, Laibin	60
Do.		Yunnan Jinding Zinc Co. Ltd. (Sichuan Hongda Group)	Yunnan, Lanping	120
Do.		Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qujing	280

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1]Most companies are owned by either the central Government or a Provincial government. Not all facilities are listed here either because the available information was inadequate to provide a complete list for the mineral commodity or because there were too many facilities to list.

[2]Listed by Province or Autonomous Region, followed by locality. Only headquarter locations are provided for some companies that have numerous facilities throughout the country.

TABLE 3
CHINA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2016

Commodity	Quantity (metric tons)	Value (thousands)
METALS		
Aluminum:		
Alumina	104,209	$65,190
Metal and alloys:		
Unwrought	511,586	941,266
Semimanufactures	4,070,000	11,429,053
Antimony, unwrought	5,817	35,704
Copper, metal and alloys:		
Unwrought	428,512	2,081,220
Semimanufactures	452,253	3,065,420
Iron and steel:		
Pig iron and cast iron	130,000	27,915
Steel:		
Bars and rods	41,260,000	13,881,939
Shapes and sections	5,190,000	2,183,975
Sheets and plates	48,030,000	24,674,887
Tube and pipe	1,560,000	3,635,058
Wire of steel or iron	2,270,000	1,866,535
Ferroalloys	350,000	723,466
Scrap	1,045	331
Manganese, unwrought	331,115	528,413
Molybdenum, ores and concentrates	6,177	46,010
Tin, metal and alloys, unwrought	736	11,544
Tungsten, tungstates	3,023	95,095
Zinc:		
Metal and alloys, unwrought	22,598	47,180
Oxide and peroxide	15,731	29,111
INDUSTRIAL MINERALS		
Barite	1,600,000	185,511
Cement	17,780,000	683,562
Fluorspar	370,000	88,262
Granite	7,170,000	4,300,227
Graphite, natural	240,000	225,896
Magnesia, fused	1,890,000	456,065
Rare-earth products	46,749	341,572
Talc	760,000	184,720
MINERAL FUELS AND RELATED MATERIALS		
Coal	8,790,000	698,024
Coke, semicoke	10,120,000	1,432,102
Petroleum:		
Crude	2,940,000	943,491
Refinery products	48,310,000	19,366,884

Source: General Administration of Customs of the People's Republic of China, 2016, China monthly exports and imports, no. 12.

TABLE 4
CHINA: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2016

(Metric tons unless otherwise specified)

Commodity	Quantity	Value (thousands)
METALS		
Aluminum:		
Bauxite	51,779,251	$2,504,288
Alumina	3,030,000	871,961
Metal and alloys, unwrought	255,532	488,811
Semimanufactures	390,384	2,419,079
Scrap	1,920,000	2,201,238
Chromium, chromite	10,580,000	1,619,025
Cobalt:		
Ore and concentrates	148,889	215,112
Smeltering intermediate products	162,854	796,919
Copper:		
Ore and concentrates	16,960,000	20,673,933
Metal and alloys, unwrought	4,390,000	21,570,386
Semimanufactures	562,198	4,808,404
Scrap	3,350,000	6,175,278
Iron and steel:		
Iron ore	1,024,120,000	57,656,681
Steel:		
Bars and rods	1,180,000	1,425,491
Seamless pipe	390,000	1,463,060
Shapes and sections	350,000	269,172
Sheets and plates	11,080,000	8,885,464
Scrap	2,160,000	929,834
Lead ore and concentrates	1,410,000	1,479,259
Manganese ore	17,050,000	2,072,332
Nickel:		
Ore and concentrates	32,096,165	1,528,615
Unwrought, nonalloy	353,648	3,340,864
Titanium dioxide	199,843	494,401
INDUSTRIAL MINERALS		
Diamond kilograms	2,048	7,688,108
Nitrogen, phosphorus, and potassium fertilizers:		
Compound fertilizers	1,130,000	554,261
Diammonium phosphate	30,000	14,259
Potassium chloride	6,820,000	1,726,640
Potassium sulfate	50,000	17,075
Urea	65,794	15,947
MINERAL FUELS AND RELATED MATERIALS		
Coal	255,510,000	14,151,221
Liquefied natural gas	26,060,000	8,935,344
Petroleum:		
Crude	381,010,000	116,468,685
Refinery products	27,840,000	11,141,169

Source: General Administration of Customs of the People's Republic of China, 2016, China monthly exports and imports, no. 12; Non-ferrous Metals Statistics, 2017, no. 1, p. 6, 15–16.

TABLE 5
CHINA: RESERVES OF MAJOR MINERAL COMMODITIES IN 2016

(Thousand metric tons unless otherwise specified)

Commodities		Reserves[1, 2]
Antimony, Sb content		521
Barite, ore	million metric tons	36
Bauxite	do.	1,010
Chromite, ore		4,070
Coal	billion metric tons	249
Copper, Cu content		26,200
Fluorspar, ore		42,300
Gas, natural	billion cubic meters	5,440
Gold, Au content	metric tons	2,020
Graphite, mineral		73,200
Iron ore, ore	million metric tons	20,100
Kaolin	do.	693
Lead, Pb content		18,100
Magnesite, ore	million metric tons	1,010
Manganese, ore	do.	310
Mirabilite, Na_2SO_4 content	do.	5,500
Molybdenum, Mo content		8,310
Nickel, Ni content		2,770
Petroleum	million 42-gallon barrels	25,700
Phosphorus, ore	do.	3,240
Potash, KCl content	do.	562
Pyrite, ore	do.	1,280
Salt, NaCl content	billion metric tons	84
Silica, ore	million metric tons	1,960
Silver, Ag content		41
Talc, ore	million metric tons	82
Tin, Sn content		1,160
Titanium, ore	million metric tons	231
Tungsten, WO_3 content		2,430
Vanadium, V_2O_5 content		9,520
Zinc, Zn content		44,400

[1]Rounded to three significant digits.

[2]The National Bureau of Statistics of China categorizes these as "basic reserves."

Source: China Statistical Yearbook 2017.