



# 2013 Minerals Yearbook

---

## CHINA

---

# THE MINERAL INDUSTRY OF CHINA

By Pui-Kwan Tse

China was one of the world's leading mineral-producing and mineral-consuming countries. Its continued economic growth was the result of a combination of trade and investment, and this growth greatly affected the global commodity market. The country's demand for energy, metals, and minerals was particularly strong compared with that of other countries. China imported significant amounts of raw materials and transformed the materials into products for export. In 2013, China's economy remained strong compared with most of the developed countries in the West. When the country's gross domestic product (GDP) decreased to 7.6% in the first half of the year, the Chinese Government put in place a small fiscal stimulus package and adjusted its monetary policy and, as a result, the GDP increased by 7.8% in the third quarter of 2013. The country's economic growth increased by 7.7% for the year, which was the same as in 2012. The value of the service sector increased by 8.3%, and the share of services as a percentage of the GDP increased to 46.1% at current (2013) prices. The output value of the industrial sector—including construction, manufacturing, and mining—increased by 7.8% (driven largely by infrastructure projects and real estate development) and accounted for 43.9% of the GDP. The private sector registered higher growth than the public sector, as was also the case in 2012. Owing to the Government's preferential development program, the growth rates in the western and central parts of the country were higher than in the eastern and coastal areas (National Bureau of Statistics of China, 2014, p. 1–10).

## Minerals in the National Economy

China is rich in mineral resources and was the world's leading producer of aluminum, antimony, barite, bismuth, cement, coal, fluor spar, gold, graphite, iron and steel, lead, magnesium, mercury, molybdenum, phosphate rock, rare earths, salt, talc, tin, tungsten, and zinc in 2013. China ranked among the top three countries in the world in the production of many other mineral commodities. China was the world's leading exporter of antimony, barite, fluor spar, graphite, indium, rare earths, and tungsten. The country's consumption of bauxite, chromium, cobalt, copper, iron ore, manganese, nickel, petroleum, platinum-group metals, and potash exceeded domestic production, and imports were estimated to account for more than 40% of total domestic consumption. Mineral trade accounted for about 25% of the country's total trade. China was one of the few countries whose domestic supply of and demand for a variety of mineral commodities affected the world mineral market.

## Government Policies and Programs

In November 2012, the 18th National Congress of the Communist Party of China (CPC) convened and new leaders were elected. The CPC aimed to increase the GDP by 2020 to

double that of 2010 and to continue to transform China into a modern industrialized country. In November 2013, the Central Committee of the CPC approved a comprehensive reform plan, which emphasizes that the market should play a decisive role in allocating resources and that the planned reforms are to take place incrementally. The plan outlines 60 tasks that are intended to affect all segments of society, including its cultural, economic, environmental, institutional, political, and social aspects (United News Network, 2014).

The Government's planned reforms were focused mainly on "hukou" (household registration), state-owned enterprises, and real estate as well as on the balance between short-term growth and long-term development of the country's economy. The hukou reform would allow migrant workers to register at the place where they work and to receive benefits in their workplace rather than at the place where they were born. The hukou reform was expected to affect the market price of property in urban areas and speed up urbanization. Also, under this reform, the Government would allow local governments to allocate more land for urban settlement. The Government was concerned, however, that large additional demand for public services in urban areas might undermine the quality of service already being provided to existing urban residents and could aggravate social tensions. Urbanization was more likely to take place in coastal areas than inland China (World Bank, The, 2014, p. 11–20).

Land sales had been a large source of local government revenues during the past decade. Land policies determined whether farmers could sell their land. The Government planned to issue new regulations and guidelines on the requisitioning of land to protect the property rights of farmers. These changes could help narrow the gap between urban and rural incomes and reduce the wealth disparity between urban and rural areas. The Central Government planned to allow 10 local governments to issue their own bonds in 2014, which could lower borrowing costs and thus reduce local government debt and help compensate for the loss of revenue resulting from the new regulations. The Ministry of Finance (MOF) had been issuing bonds on behalf of local governments since 2009, and the repayment of the bonds was handled through the local governments' accounts with the MOF. These 10 local governments would be allowed to issue bonds within quotas approved by the State Council, but these quotas would not be able to be carried over to the next year (Citigroup Global Market Inc., 2013c, 2014a).

The state-owned enterprises reforms were to include the establishment of a new management scheme for state-owned assets and a restructuring of the state-owned enterprises sector. The reforms were intended to improve the operational efficiency of state-owned enterprises. The Government planned to form capital investment companies with mixed ownership (Government and private) and a revised governance structure. The capital investment companies would manage asset

portfolios and focus on capital return. Foreign investors would be allowed to buy shares in these companies and to be members of the Board of Directors. Details on the proposed company governance structure and the relationship between the company and the Government were expected to be announced in 2014. It would take 3 to 5 years for the state-owned enterprises reform to be completed (Citigroup Global Market Inc., 2014b, p. 15).

Because of the Government's adoption of a one-child policy in the 1980s, the size of China's labor force was expected to shrink during the next decade. In general in the past, a decrease in the labor force has tended to raise wage levels and increase social welfare costs. In China, the working-age population decreased by 3.5 million in 2012, whereas wages during the past several years had increased gradually. In 2013, the Government issued a revised family-planning policy that allows couples to have a second child if one of the parents has no siblings (Citigroup Global Market Inc., 2013e).

In 2013, the State Council approved the setting up of the Shanghai Free-Trade Zone (SFTZ). The establishment of the SFTZ indicated that the Government was planning to introduce a new round of economic reforms, perhaps similar to the startup of Shenzhen's Special Economic Zone in 1980. The Government suspended a few laws in the SFTZ for 3 years to make it easier for companies to do business in the zone. The suspended laws included those related to business, cultural, financial, professional, shipping, and social services. An important change is that non-Chinese flagged vessels that were wholly or partly owned by Chinese shipping companies were to be allowed to transport containers carrying goods for foreign trade between Shanghai and other domestic coastal ports. The new temporary policy allows Chinese shipping companies to have the benefit of flying their Flag of Convenience and gives them the option of using Shanghai as a transshipment port, which could lower their transportation costs and increase the use of the port. Residents in the SFTZ are also allowed to open free trade accounts to conduct new investment and finance businesses within the Chinese mainland and offshore (Citigroup Global Market Inc., 2013d).

The State Council decided to transfer approval authority for 133 types of projects; the projects were either to be exempt from the requirement for Central Governmental approval or the approving authority for them was to be delegated to the Provincial departments. These projects included oilfield development where the output capacity was expected to be less than 2 billion cubic meters per year and some Sino-foreign joint-venture projects related to coalbed methane, natural gas, and oil. The projects also included some petrochemical projects, such as those for the production of ethylene and polyester. The Government had tight price controls on the electricity, natural gas, oil, telecommunications, transportation, and water sectors but planned to remove these price controls (China Chemical Reporter, 2014).

Two of China's reform priorities were to improve the efficiency of resource allocation and boost economic growth. The Government understood that the unbalanced growth in consumption, investment, and net exports could not continue unabated forever. During the past several years, the Government had reduced the export tax rebates on ferrous and nonferrous

metal products, increased the export duties on energy-intensive metals, and encouraged producers to produce high-value-added products. Owing to increasing domestic and overseas demand, however, China's minerals and metals output was expected to continue to increase.

Owing to economic expansion, the output capacity of China's manufacturing industry had increased sharply during the past decade. According to a Government survey, the capacity utilization rates of the aluminum, cement, glass, iron and steel, and shipbuilding industries were 71.9%, 73.7%, 73.1%, 72.0%, and 75%, respectively, in 2012. In 2013, these industries continued to expand their output capacities. Excess capacity had caused chronic problems for these industries. Many companies in these industries were facing financial loss and could not repay their loans. Nonetheless, local governments continued to provide incentives to support the development of these sectors. In 2013, the State Council issued guidelines on how to reduce excess capacity in these industries. Ministries and agencies were not to approve any additional capacity expansions, greenfield or brownfield, in these industries. All approved projects were required to have land use and environmental approval permits in place before the start of construction. At yearend 2015, the Government planned to eliminate 200 million metric tons per year (Mt/yr) of glass-production capacity, 100 Mt/yr of cement-production capacity, and 15 Mt/yr each of ironmaking and steelmaking capacity. The Government would set energy consumption and gas emission guidelines for each industry that were expected to be lower than the current levels (China Steel, 2013).

In 2013, the Ministry of Land and Resources (MLR) set a production quota for antimony of 98,000 metric tons (t), of which 75,360 t was mined output and 22,640 t was byproduct recovery. The quota for rare earths was set at 93,800 t of rare-earth oxide (REO) equivalent, of which 75,900 t was light rare earths and 17,900 t was medium and heavy rare earths. The quota for tungsten was set at 89,000 t (with tungsten trioxide content of 65%), of which 71,000 t was mined output and 18,000 t was byproduct recovery. Provincial governments were responsible for managing their allocated quotas and assigning the output quotas to individual mining companies (Ministry of Land and Resources, 2013).

The Ministry of Industry and Information Technology issued industrial policy guidelines for the development of the aluminum sector. The guidelines identify practices that the companies are expected to follow. According to the guidelines, the Government prohibits the construction of aluminum refineries and smelters near environmentally protected areas, water resources, urban areas, and nonindustrial zones, and aluminum producers are advised to adopt advanced mining and processing technologies in their operations. The guidelines set the minimum output capacity of alumina refineries at 800,000 metric tons per year (t/yr). If domestic bauxite resources are used, the minimum domestic bauxite resource throughput for the alumina refinery is 85% of the total, and domestic bauxite resources are expected to be able to supply the alumina refinery for at least 30 years. If overseas bauxite resources are used, the producer of alumina must have a contract to supply 60% of the plant's needs for at least 5 years.

If producers use alumina from fly ash produced by a domestic coal-fired powerplant, the minimum output capacity of the alumina refinery must be 500,000 t/yr, and the producers should have a guaranteed minimum 30-year supply of alumina from the powerplant. According to the guidelines, 400-kiloampere prebaked cell technology is the standard for new and expansion aluminum smelters in China. Aluminum producers must shut down all potlines that use less than a 160-kiloampere prebaked cell. The guidelines also include the maximum energy consumption allowed for bauxite mining (open pit and underground) and the production of alumina and aluminum. The minimum output capacity of secondary aluminum smelters is 100,000 t/yr for new and expansion plants. The Government would shut down secondary aluminum plants that have less than 50,000-t/yr capacity (Ministry of Industry and Information Technology, 2013).

The State Council issued the air pollution control plan to address air pollution in China. The goal of the plan was to require the industrial sector, including cement, iron and steel, nonferrous metal, chemical, and petrochemical producers, to upgrade their production technologies in order to reduce gas emissions. The plan includes specific goals, such as that, by 2017, the volume of gas and particle emissions will be 30% less than in 2012; that the secondary production of iron and steel and nonferrous metal sectors will account for 40% of their outputs by 2017, and that coal consumption by the country's energy sector will account for 65% or less of the country's total energy consumption. Additional goals are that, by 2017, about 70% of the coal used in coal-fired powerplants will be washed coal; imports of high-ash and high-sulfur coal and high-sulfur petroleum tar will be restricted; and nonfossil energy sources will account for 17% of total energy consumption. The consumption of natural gas in energy was expected to increase, especially in the areas of Beijing-Tianjin, the Changjiang (Yangtze) Delta, and the Zhujiang Delta (State Council, The, 2013; National Energy Administration, 2014).

The National People's Congress approved amendments to China's environmental protection law of 1989; the amendments were to take effect on January 1, 2015. The revised law removes the limits on fines for polluting factories; the fines were previously so low that many enterprises preferred to pay the fine rather than reduce their emissions. The revisions to the law include expanded monitoring of environmental and health effects, including through surveys and risk-assessment mechanisms. The revised law requires local governments to incorporate an environmental protection plan into their overall economic development plan (National People's Congress of the People's Republic of China, The, 2014).

## Production

China was one of the world's leading producers of aluminum, antimony, barite, bismuth, cement, coal, copper, fluorspar, gold, graphite, indium, iron and steel, lead, lime, magnesium, manganese, mercury, molybdenum, phosphate rock, rare earths, salt, silver, talc, tin, tungsten, and zinc. The country's output quantities of these mineral commodities were sufficient to have a significant effect on world markets. In 2013, China's

production of alumina, aluminum, cement, coal, copper, gold, iron and steel, lead, phosphate rock, silver, titanium sponge, tungsten, and zinc increased compared with that of 2012 (table 1).

## Structure of the Mineral Industry

China's mining industry is highly fragmented and has had a relatively poor safety record. Several companies often mined in a single mining area. The State Council approved a mining consolidation plan that had been proposed jointly by the Ministry of Land and Resources (MLR), the National Development and Reform Commission (NDRC), and other agencies. Fifteen mineral commodities—antimony, bauxite, coal, copper, gold, iron ore, lead, manganese, molybdenum, phosphorus, potassium, rare earths, tin, tungsten, and zinc—were on the consolidation plan. The Central Government worked with local governments to implement the plan. Small-mine operators were targeted to be integrated into large-mine operators through such means as acquisition or joint-management agreements. The State-Owned Assets Supervision and Administration Commission would transfer state-owned assets of these small operators to the large operators. During the past decade, the Government enabled state-owned enterprises to diversify their core business into other sectors, such as by allowing Aluminum Corporation of China (Chinalco) to be a major shareholder of copper companies in the Provinces of Hebei and Yunnan and of rare-earth companies in Jiangsu Province, Guangxi Zhuang Autonomous Region, and Sichuan Province. Baoshan Iron and Steel (Group) Corp. invested in coal mining in Shanxi Province, and Jiangxi Copper Co. Ltd. took charge of the consolidation of rare-earth mining activities in Sichuan Province. China Minmetals Corp. took charge of consolidation of the Hunan Nonferrous Metal Co. and invested in rare-earth separation plants in Jiangxi Province. Minmetals also invested in mineral development in overseas countries, such as Australia and Peru.

## Mineral Trade

China was one of the leading mineral-producing and mineral-consuming countries in the world. According to customs statistics, China's total trade was valued at \$4.16 trillion in 2013, which was an increase of 7.6% compared with that of 2012. The value of exports increased by 7.9% to \$2.21 trillion. The United States was the leading destination for China's exports followed by Hong Kong and Japan. The value of China's imports increased by 7.3% to \$1.95 trillion in 2013. The European Union (EU) was China's leading source of imports followed by Japan, the Republic of Korea, and the United States. Imports of raw materials, such as chromite, coal, copper ore and concentrate, iron ore, nickel ore, and oil, increased sharply. In 2013, the total value of mineral and metal products trade was \$1.03 trillion, which accounted for 24.8% of the total trade. China's main exports were low-end and semimanufactured goods. Large amounts of capital, designs, technologies, and raw materials were coming from abroad. Consequently, China posted a trade surplus with countries that consumed manufactured goods, such as the United States and the countries



of the EU, and trade deficits with such countries as Australia, Brazil, Chile, and Indonesia, which produced and exported fuels and minerals. In 2013, imports of bauxite, coal, and ores and concentrates of chromium, copper, iron, manganese, and nickel increased significantly compared with those of 2012 (General Administration of Customs of the People's Republic of China, 2014; Ministry of Land and Resources, 2014, p. 12–13).

The Ministry of Commerce (MOC) issued circular No. 97, which lists the mineral commodity exports that the Government monitors. The commodities are ammonium paratungstate; bauxite and refractory clay; coal; coke; concentrates of antimony, cobalt, gold, molybdenum, silver, tin, tungsten, and zinc; dolomite; fluor spar; magnesite; oxides of antimony, magnesium, and tungsten; rare earths; silicon carbide; silver; talc; and unwrought metal and alloys of antimony, beryllium, bismuth, copper, gallium, germanium, nickel, niobium, platinum-group metals, tantalum, tin, and zirconium. Of these exported mineral commodities, the Government closely managed the imports and exports of antimony and its products, coal, petroleum and its products, silver, and tungsten and its products, including establishing quotas. The Government allowed the export of magnesite, which contained 70% or higher magnesium oxide and ferroalloys with rare-earth (middle and heavy) content higher than 30%. In 2013, the Government encouraged the import of raw materials, such as concentrates of chromite, nickel, niobium, tantalum, titanium, and uranium; antimony concentrates with antimony content higher than 30%; copper concentrates with copper content higher than 20%; cobalt concentrates with cobalt content higher than 6%; lead concentrates with lead content higher than 55%; molybdenum concentrates with molybdenum content higher than 51%; zinc concentrates with zinc content higher than 40%; and ferronickel (Ministry of Commerce, 2012a, p. 1–20).

The Government adjusted the 2013 export quota for magnesia to 1.67 million metric tons (Mt); phosphate rock, to 1.0 Mt; talc, to 750,000 t; antimony and antimony products (metal content), to 59,400 t; molybdenum, to 25,000 t; tin and tin products (metal content), to 17,000 t; tungsten and tungsten products (metal content), to 15,400 t; silver, to 5,387 t; and indium, to 231 t. Bauxite (alumina clay) and silicon carbide were not included in the export quota control system after the World Trade Organization's (WTO's) appellate body upheld the panel's decision that China's export restrictions on these raw materials in 2012 were inconsistent with its WTO obligations. The 2013 export quotas for magnesia and tin decreased compared with those of 2012. A planned reduction in the value-added tax rebate and reduced export quotas on energy-intensive products were expected to force producers to reduce their output, which, in turn, was expected to help protect and conserve mineral resources and minimize environmental damage. The MOC announced that the 2014 export quotas for antimony and antimony products (metal content), indium magnesia, molybdenum, phosphate rock, silver, talc, tin and tin products (metal content), and tungsten and tungsten products (metal content) would be the same as in 2013 (Ministry of Commerce, 2012b, 2013a).

The MOC approved 28 companies, which included 24 producers and 4 traders, to have the right to export rare-earth

products to overseas markets. The MOC allocated a total rare-earth export quota of 31,001 t (27,384 t of light and 3,617 t of middle and heavy rare earths) for 2013, which was a slight increase from the quota of 30,996 t (27,122 t of light and 3,874 t of middle and heavy) in 2012 and 30,184 t (without specification) in 2011. The Government specified how much light or middle and heavy rare earths each producer was allocated in 2013 as it had done in 2012. The Baotou Iron and Steel Group Co. (Baogang Group) was the leading producer and exporter followed by Minmetals Group Co. and Chinalco. The MOC announced a first-batch rare-earth export quota of 15,110 t for 2014, of which the quota for light rare earths was 13,314 t and that for middle and heavy rare earths was 1,796 t (Ministry of Commerce, 2012c; 2013b, c).

## Commodity Review

### Metals

**Aluminum and Bauxite and Alumina.**—China's aluminum production continued to increase in 2013, even though aluminum smelters, which were located in the central and southern areas of the country, reduced their output. The commissioning of newly built aluminum smelters in the northwestern part of the country was delayed because the construction of powerplants associated with the construction of smelters was postponed. About 1.7 Mt/yr of capacity was placed on care-and-maintenance status in 2013, but about 4.4 Mt/yr of new capacity was added. Provinces in the northwest and Shandong Province were the major contributors to the country's growth in aluminum production because Provinces in the northwest have rich coal resources and the price of electricity in the northwest was lower than it was in the central and southern Provinces. In 2013, China remained a net importer of primary aluminum. The net trade volume of unwrought aluminum was 255,487 t in 2013 compared with 392,913 t in 2012, 143,172 t in 2011, and 1.44 Mt in 2009. China's unwrought aluminum imports came mainly from (in descending order of tonnage) Russia, Australia, India, Oman, and the Republic of Korea, and the country's exports of unwrought aluminum went to (in descending order of tonnage) the Republic of Korea and Taiwan (Zheng, 2013; Alumina and Aluminum Monthly, 2014e; General Administration of Customs of the People's Republic of China, 2014).

The aluminum price trends in China resembled the London Metal Exchange price trends in 2013. The domestic market price of aluminum decreased to 14,365 yuan (\$2,394) per metric ton (tax included) in December 2013 from 15,075 yuan (\$2,512) per metric ton in January 2013, which was lower than an average price of 15,630 yuan (\$2,605) per metric ton in 2012. China's average production cost per metric ton of aluminum was about 16,000 yuan (\$2,580), and electricity accounted for about 43% of the total production cost. Each ton of aluminum output consumed about 1,400 kilowatthours (kWh) of electricity. In Xinjiang Uygur Autonomous Region, each kWh cost about 0.2 yuan (\$0.03), whereas in the Provinces of Henan and Shandong, the cost was 0.5 yuan (\$0.08) from company-owned powerplants. As a result, many aluminum

investors built their aluminum smelters in Qinghai Province and Xinjiang Uygur Autonomous Region. The country's aluminum output capacity reached 30.2 Mt/yr in 2013 and it was expected to increase to 34.3 Mt/yr in 2014. The construction sector was the leading consumer of aluminum and accounted for about 35% of total consumption followed by power and electronics, 14%; transportation, 13%; exports (semimanufactured products), 12%; household appliances, 11%; machinery, 6%; packaging, 5%; and others, 4%. China consumed about 24.8 Mt of aluminum in 2013 (Song, 2013; Alumina and Aluminum Monthly, 2013; 2014a, p. 16–20; 2014b, e).

China followed Australia and Indonesia as the third-ranked bauxite-producing country in the world. Owing to the expansion of alumina production during the past 10 years, the country required extensive imports of bauxite to meet the demand from its alumina refineries, and this dependence was expected to continue into the future. China imported 71.5 Mt of bauxite in 2013 compared with 40.0 Mt in 2012 and 45.2 Mt in 2011. Bauxite imports from Indonesia and Australia accounted for 68.0% and 20.0% of the total, respectively, compared with 70.8% and 23.8%, respectively, in 2012 and 79.9% and 18.6%, respectively, in 2011. The increase in bauxite imports in 2013 was the result of the Government of Indonesia's announcement of a ban on bauxite exports starting in January 2014. The restrictions on Indonesia's raw materials exports would affect the coastal Province of Shandong's alumina refineries in the future because these refineries produced alumina solely from imported bauxite. The amount of bauxite imported from Indonesia increased to 48.7 Mt in 2013 from 28.4 Mt in 2012 and 36.1 Mt in 2011. Also, the amount of bauxite imported from Australia increased to 14.3 Mt in 2013 from 9.5 Mt in 2012 and 8.4 Mt in 2011. The amount of imports from countries such as Brazil, Ghana, Guinea, and India also increased in 2013 compared with those of previous years. Many alumina refineries stockpiled a significant amount of bauxite to ensure a sufficient supply of bauxite for 2014. The Government encouraged enterprises to explore for bauxite resources in African countries and in Australia. The dependence on imported bauxite resources from overseas was expected to continue for the next decade (General Administration of Customs of the People's Republic of China, 2012, 2013, 2014).

China had a significant amount of bauxite resources; however, diasporic (orthorhombic hydrous aluminum oxide) accounted for more than 90% of China's bauxite deposits and the remaining 10% was of the gibbsite (monoclinic aluminum hydroxide) type. In 2010, China identified areas that had potential to contain additional bauxite resources; they were the Huoxi and Hedong (Liu Xian, Liulin, Baode, Xing Xian, Xiaoyi, and Huozhou) areas in Shanxi Province; the Minchi Lizhuangzhai and Pingdingshan (Shan Xian, Minchi, Xinan, Yanshi, and Yuzhou) areas in Henan Province; the Guangnan, Qiubi, and Yanshan areas in Yunnan Province; the Fusui and Longzhou areas in Guangxi Zhuang Autonomous Region; and the Wulong and Nanchuan areas in Chongqing City. Domestic geologists expected that about 1.2 billion metric tons (Gt) of bauxite resources would be discovered by 2015. Recently, geologists discovered 700 Mt of bauxite resources at the Wuchuan-Dozhen-Zhengan area in Guizhou Province and 200 Mt of

bauxite resources below a coal deposit at Caoyao in Minchi, Henan Province. In addition, about 100 Mt of bauxite resources was discovered at the Lizhuangzhai and Yingyangcuimiao-Yangshu areas in Henan Province. Two bauxite deposits—the Masonglin and the Maibalu deposits in Guizhou Province—were under development and would have a combined output capacity of 600,000 t/yr when these mines reach full production capacity. China bauxite mining capacity was estimated to be about 54.3 Mt/yr, and most of the bauxite mining activities were performed jointly by aluminum producers and local miners or solely by local miners (Wu, 2013).

China's output of alumina increased by more than 18% in 2013 compared with that of 2012, but China continued to have a shortage of alumina. To support the aluminum sector, the country imported large quantities of alumina to meet the demand. In 2013, China imported 3.9 Mt of alumina compared with 5.0 Mt in 2012 and 1.9 Mt in 2011, of which about 92% was from Australia. China consumed about 46.5 Mt of alumina in 2013, of which 44.2 Mt was for metallurgical use and 2.0 Mt was for nonmetallurgical use. The balance was about 300,000 t of surplus alumina. By yearend 2013, more than 3.1 Mt/yr of incremental alumina output capacity was installed, which increased the country's alumina output capacity to 60 Mt/yr. The additional alumina capacity was from greenfield and brownfield projects, including those of Shandong Weiqiao Bohai New Material Co. Ltd., Shanxi East Hope Jinzhong Chemical Engineering Co. Ltd., and Shanxi Tongde Aluminum Co. Ltd. (1 Mt/yr each); Shanxi Fusheng Aluminum Co. Ltd. (800,000 t/yr); and Liulin Shenze Coal and Aluminum Co. Ltd., Shanxi Jiaokou Feimei Aluminum Co. Ltd., Shanxi Xinfu Xiaoyi Alumina Plant, and Yunnan Aluminum Co. Ltd. (600,000 t/yr each). As a result, imports of alumina were expected to decrease in the future and bauxite imports were expected to increase because China's bauxite production could not support the rapid alumina capacity expansion (Huo and Guo, 2014).

In 2005, the State Council issued a development policy "in principle" for the aluminum sector and assigned the National Development and Reform Commission (NDRC) to work with relevant agencies to prepare a plan for sustainable aluminum development. According to the MIIT-issued 12th 5-year development plan for the aluminum sector, the country was projected to produce 24 Mt of primary aluminum in 2015, and the top 10 smelters would account for 90% of the total output. To take advantage of investment incentives offered by the Central and local governments, many aluminum companies, including Chinalco, China Power Investment Corp., Shandong Xinfu Group, Tiashan Aluminum-Power Co. Ltd., and Zhonghe Aluminum Co. Ltd., moved some of their operations to the northwestern part of the country. The government of Xinjiang Uygur Autonomous Region urged enterprises to develop an integrated coal-powered metallurgy industry in the Region. Domestic analysts estimated that Xinjiang had about 4.7 Mt of output capacity and produced 2.46 Mt of aluminum in 2013, which ranked it second behind Henan Province, which was China's leading aluminum-producing Province. Primary aluminum output capacity in Xinjiang was expected to reach 8.0 Mt/yr of its proposed capacity of 13 Mt/yr by yearend 2015. The MIIT approved nine aluminum producers to build a total

of 9.1 Mt of aluminum production capacity out of a proposed 19 Mt of new capacity in Xinjiang. In 2013, the combined aluminum output from three northwestern Provinces and Regions—Gansu, Qinghai, and Xinjiang—accounted for about 30% of the country's total aluminum output compared with less than 10% in 2010 (Alumina and Aluminum Monthly, 2014c).

In April, the MIIT and eight other Government agencies jointly issued a circular to convince local governments to stop providing preferential policies to aluminum producers and to allow aluminum producers to purchase electricity from powerplants directly. The rapid expansion of aluminum output capacity in the western part of country was thought likely to contribute to serious financial losses for existing producers in the country. It would also likely create infrastructure bottlenecks, as alumina would need to be transported from the eastern and southern parts of the country to the northwest, and finished products would need to be shipped to consumers in the coastal areas. About 1.7 Mt/yr aluminum output capacity was idled in 2013. The MIIT approved 36 aluminum producers that met the standardization conditions to produce alumina and aluminum in the country. The standardization conditions included quality, environmental protection, and energy consumption in their operations. The Government ordered aluminum producers to eliminate prebaked cells of less than 160 kiloamperes in the country (Ministry of Industry and Information Technology, 2013; Alumina and Aluminum Monthly, 2014d; China Nonferrous Metals Monthly, 2014b).

**Antimony.**—China was the leading antimony-producing country in the world. The Chinese Government considered antimony to be one of the protected and strategic minerals, and exploitation and production of antimony was strictly controlled. In 2013, the MLR allocated a total production quota of 98,000 t (metal content) of mined antimony, which was less than the 105,000 t quota in 2012. Of the total antimony production quota for 2013, 75,360 t was assigned to individual Provinces and 22,640 t was to be recovered as byproduct or coproduct, which the MLR did not assign to individual Provinces. The MLR accepted exploration and exploitation applications for antimony in 2013; the application process had been suspended for more than 5 years (Ministry of Land and Resources, 2013).

China's antimony resources are located in the Provinces of Guangdong, Hunan, Jiangxi, and Yunnan and in Guangxi Zhuang Autonomous Region. In 2013, Guangxi, Hunan, Jiangxi, and Yunnan were the top mined antimony-producing Provinces and (or) Regions in China and accounted for more than 90% of the country's total. Guangxi, Hunan, Jiangxi, and Yunnan were also the top antimony-metal-producing Provinces and (or) Regions in the country. Owing to the expansion of smelting capacity during the past decade, the supply of domestic antimony concentrates was insufficient to meet the smelters' demand; therefore, the country imported large quantities of antimony concentrates. In 2013, China imported 1,783 t of antimony concentrates, mainly from Australia, Burma, Kazakhstan, Russia, and Thailand, compared with 68,577 t in 2012. A decrease in imports of antimony concentrates in 2013 was the result of many antimony producers in Lengshuijiang, Hunan Province, and in Guangxi Zhuang Autonomous Region suspending their operations temporarily

in mid-year because of weak demand for metal and oxides. The country exported 31,565 t of antimony oxide, which was less than the assigned export quota of 55,900 t, mainly to Japan, Taiwan, and the United States. In 2013, 2,167 t of unwrought antimony was exported mainly to Japan, the Netherlands, and the United States. Exports of antimony oxide and unwrought antimony also decreased because of weak demand from EU countries and the United States, among others (Huang, 2014; Li, 2014; Minor Metals Monthly, 2014a).

During the past several years, owing to environmental and safety problems, the Government shut down many illegal mining and smelting activities in the Provinces of Hunan and Yunnan and in Guangxi Zhuang Autonomous Region. The Government also monitored illegal exporting activities through Vietnam to other countries.

In 2013, the State Reserve Bureau (SRB) purchased a total of 10,500 t of antimony metal at a price of 66,000 yuan (\$11,000) per metric ton from three producers. In 2012, the SRB also stockpiled about 4,500 t of antimony ingot. China consumed about 58,000 t of antimony in 2013, which was slightly less than in 2012. The flame retardant sector was the leading consumer of antimony and accounted for about 50% of the total followed by battery alloys, 17%; plastic stabilizers, 15%; glass, 10%; and others, 8% (China Metal Bulletin, 2013).

**Cobalt.**—China's demand for cobalt increased sharply during the past decade. China was one of the leading producers of mobile telephones in the world, and many of these telephones use cobalt batteries. The demand for cobalt batteries had driven a rapid expansion in cobalt-refining facilities in the past several years, despite the country's limited cobalt resources. Jinchuan Nonferrous Group expanded its refined cobalt output capacity to 10,000 t/yr in 2012 from 4,000 t/yr in 2005. Owing to increased demand from domestic cobalt salt producers, China's cobalt concentrates imports increased to 180,080 t in 2013, and imports of intermediate cobalt products from hydrometallurgical processing increased to 108,995 t. The Democratic Republic of the Congo [Congo (Kinshasa)] supplied more than 90% of China's total cobalt imports. Owing to policy changes in Congo (Kinshasa), China's imports of cobalt concentrates were expected to decrease and imports of intermediate products were expected to increase in the future. In 2013, China consumed about 35,000 t of cobalt, of which cobalt for use in batteries accounted for 67% of the total followed by cemented carbide, 7%; ceramics, magnetics, and petrochemicals, 5% each; superalloys and binder, 2% each; and other uses, 5% (Li, 2013; General Administration of Customs of the People's Republic of China, 2014; Minor Metals Monthly, 2014b).

**Copper.**—Because the country has limited copper resources, China imported a considerable amount of copper concentrates, scrap, anode, and refined metal from overseas markets. Domestic copper mines supplied less than 30% of the country's requirements for copper concentrates. In 2013, China imported 10.1 Mt of copper concentrates, which was 28.8% more than in 2012. Copper concentrates were imported from Chile (27.7%), Peru (19.0%), Australia (8.9%), Mexico and Mongolia (5.6% each), the United States (5.5%), Canada (4.8%), and others (22.9%). China imported 4.37 Mt of copper scrap, which was 10.6% less than in 2012. Copper scrap was imported from



the United States (21.9%), Hong Kong (10.8%), Malaysia (9.1%), Germany (8.6%), Australia (8.2%), Japan (6.3%), the Netherlands (6.1%), the United Kingdom (5.0%), and others (24.0%). China also imported 3.20 Mt of refined copper in 2013, which was 5.9% less than in 2012; the refined copper was imported from Chile (34.3%), India (8.3%), Australia (8.3%), Japan (7.6%), Zambia (5.2%), the Republic of Korea (4.6%), Belgium (4.6%), Peru (4.3%), and others (22.8%). During the same period, China exported 293,387 t of refined copper, which was 7.1% more than in 2012. The price of refined copper in the international market decreased to an average of \$7,196 per metric ton in 2013 from \$7,949 per metric ton in 2012 and \$8,823 per metric ton in 2011. Even though China's production of refined copper was at record-high levels and demand for refined copper in the domestic market was weak, the country continued to import a significant amount of refined copper in 2013, which was attributed to lower refined copper prices and the shortage of copper scrap on the world market. Therefore, many downstream copper products producers used refined copper instead of copper scrap as raw material. Also, China's State Reserve Bureau (SRB) purchased a significant undisclosed amount of refined copper from the domestic bond warehouse. Domestic analysts estimated that the SRB had about 900,000 t of refined copper in its warehouses (General Administration of Customs of the People's Republic of China, 2014; He, Pingchao, 2014; Lian, 2014).

The National Bureau of Statistics (NBS) reported that China produced 6.84 Mt of refined copper in 2013; however, domestic analysts believed that the figure was too high and suspected that there was an error of double counting in some regions and that the country's total refined copper output should be about 6.23 Mt in 2013. According to the NBS figure, the country's apparent refined copper consumption in 2013 was 9.75 Mt, whereas other domestic analysts estimated that the apparent consumption was 9.14 Mt. Domestic analysts estimated that China consumed about 8.2 Mt of refined copper, which was 6.8% more than in 2012. The power sector was the leading consumer of copper and accounted for about 48% of the total followed by household appliances, 15%; transportation, 10%; construction, 9%; electronics, 7%; and others, 11% (Copper Monthly, 2014a; He, Xiaohui, 2014).

Owing to domestic smelter and refinery expansions, China's copper output increased sharply during the past several years. China's copper production continued to expand despite the constrained supply of copper concentrates on the world market. In 2013, China's copper smelting and refining output capacities increased by 720,000 t/yr and 1.08 Mt/yr, respectively, and reached about 4.9 Mt/yr and 9.0 Mt/yr, respectively. The smelting and refining capacity was expected to continue to increase during the next several years. Several greenfield and brownfield copper projects were recently completed or were under construction. Zhongtiaoshan Nonferrous Metals Group Co. Ltd. planned to complete upgrading the smelting and refining capacity of its Yuanqu smelter to 100,000 t/yr in 2014. Jiangxi Copper Co. Ltd. intended to increase its refining capacity to 1.5 Mt/yr by 2015 and 1.8 Mt/yr by 2020. Zhangjiagang United Copper Co. started the construction of its capacity expansion project in 2012 and was expected to

add 100,000 t/yr of capacity in 2014. Jinchuan Nonferrous Metal Corp. completed the first phase of construction of its copper-nickel plant, which had an output capacity of 400,000 t/yr of refined copper and 110,000 t/yr of nickel products at Fangchenggang in Guangxi Zhuang Autonomous Region in 2013. Yantai Penghui Copper Co. Ltd. planned to build a 180,000-t/yr smelting and refining plant to replace its obsolete 120,000-t/yr plant. The new plant was designed to be equipped with a double flash-smelting furnace, and the company's total investment was estimated to be \$600 million. China Gold Nei Mongol Mining Co., which was a subsidiary of China National Gold Co., planned to start the construction of its 100,000-t/yr smelting and refining plant at Manzhouli in Nei Mongol Autonomous Region in 2014; the plant was scheduled to be completed in 2015 (Copper Monthly, 2014b, c).

The output of domestic mined copper was expected to increase. Copper resources discovered in the western part of the country in Xinjiang Uygur Autonomous Region and Xizang Autonomous Region were expected to be developed during the next several years. Copper resources in the Gangdise metallogenic belt in Xizang and the Tishan area in Xinjiang would be developed during the next several years. Significant copper resources were discovered recently in the southwestern part of the country and were expected to help replace depleted copper resources in the eastern part of the country (China Nonferrous Metals Monthly, 2014a).

The MIIT released a proposed standard for the copper sector in 2013. According to the proposal, greenfield copper smelting and refining projects and secondary copper projects were each expected to have a capacity of more than 100,000 t/yr. The existing secondary copper smelting and refining plants were required to have a capacity of more than 50,000 t/yr. Copper plants could not be located in urban and environmentally protected areas. For new copper projects to be approved, the plants must meet the following energy consumption limits: (a) For each ton of blister copper produced, the energy consumption of the copper smelter should be less than 180 kilograms (kg) of standard coal [5,500-kilocalorie (kcal) coal], and (b) for each ton of refined copper produced, the energy consumption of the copper refinery should be less than 100 kg of standard coal. The energy consumption of existing copper smelting and refining plants was set at a total of 300 kg of standard coal. For greenfield secondary copper smelting projects, the energy consumption should be less than 360 kilograms per metric ton (kg/t), and for greenfield secondary refining projects, the energy consumption should be less than 290 kg/t. For existing secondary copper smelting plants, the energy consumption should be less than 430 kg/t, and for existing secondary refining plants, the energy consumption should be less than 360 kg/t. Greenfield and existing copper plants were required to meet air- and water-pollution guidelines, which were set by the Ministry of Environmental Protection. The Government planned to release a list of copper producers that met these guidelines (Ministry of Industry and Information Technology, 2014c).

**Gallium.**—Gallium is a rare metal and it does not exist in free form in nature. It is found in association with bauxite, coal, and sphalerite. China's gallium occurs primarily in bauxite, tin,



and zinc ores, and the Provinces and (or) Regions of Guangxi, Guizhou, Henan, Shanxi, and Yunnan accounted for about 90% of these gallium resources. Chinese scientists have also discovered significant gallium resources at the Jungar coalfield in the Ordos basin in Nei Mongol Autonomous Region. In China, gallium is produced as a byproduct of the production of alumina and zinc. Electrolysis and hydrolysis of the amalgam with sodium hydroxide produces sodium gallate, and gallium metal is produced by further electrolysis. Production of high-purity gallium metal is carried out through a zone melting and single crystallization process. The semiconductor sector accounted for 90% of China's total gallium consumption. The major gallium producer in China was Chinalco from its aluminum facilities in the Provinces of Guizhou and Shandong. Chinalco's Pingguo Aluminum Co. in Guangxi had recently started the construction of a 40-t/yr gallium recovery plant that was scheduled to be put into operation in 2014. China's scientists at Shenhua Energy Co. Ltd. had developed an economically feasible method to extract gallium from fly ash and coal gangue. There was no reliable information to prepare an independent estimate of how much gallium was produced in China; however, domestic analysts estimated that China produced 270 t of gallium in 2012 (Li Shaopeng and others, 2013).

**Gold.**—China's gold market activity (production and consumption) was almost nonexistent in the 1990s, but by 2013, China had become the leading gold-producing and gold-consuming country in the world. In the 1990s, China's gold market was controlled by the People's Bank of China (Central Bank). The China's gold market started to develop when the Shanghai Gold Exchange (SGE) was established in 2002 and the Central Bank slowly retreated from daily operation activities, such as the setting of domestic gold prices, the purchasing of mined gold, the refining of gold, and the selling of refined gold to manufacturers. In 2013, the Chinese gold market remained under the indirect control of the state. Market mechanisms had been introduced to a large extent; however, private trade in gold was still strictly controlled because the Government exercised tight control on capital flows and the country's currency exchange mechanism has not been established (World Gold Council, 2014a, p. 4–10).

China's gold production was mainly from small-scale producers. The Government was seeking to merge these small-scale producers into larger groups so as to integrate their resources and eliminate outdated production capacity. The country's major gold-producing areas were Bouyei-Miao Autonomous Prefecture in Qianxinan, Guizhou Province; Lingbao in Henan Province; Tongguan in Shaanxi Province; and Zhaoyuan in Shandong Province. There were more than 700 legal gold mining companies in China. The top 10 gold producers accounted for 37% of the total output. Companies that mined less than 0.5 t/yr of gold accounted for 70% of the total. As of 2013, China's gold resources totaled 8,500 t. Gold output from gold mines accounted for 82% of the country's total, and gold content of output from nonferrous metal mines accounted for 18%. Shandong Province remained the leading gold-producing Province followed by the Provinces and (or) Regions of Henan, Jiangxi, Nei Mongol, Yunnan, Hunan, Gansu, Fujian, Hubei, and Xinjiang (Ministry of Industry and Information Technology, 2014a).

During the past decade, China's economic growth remained very strong, and the Government allowed private citizens to purchase gold bars. China had become the world's largest market for gold bullion. Owing to the limited options for investment available to Chinese citizens, the World Gold Council estimated that about 397 t of gold bars and coins were purchased by domestic investors in China in 2013. In 2013, China replaced India as the leading gold-consuming country in the world. The Government reported that the country consumed 1,176.4 t of gold in 2013, of which jewelry accounted for 716.5 t; bar, 375.7 t; industrial, 48.8 t; coin, 25 t; and others, 10.4 t. The country's rising disposable income levels were supporting gold demand growth in China. In 2009, the Central Bank reported that the Bank held 1,054 t of gold. The Chinese Government did not release any monetary gold trade information; however, based on trade data from other countries during the past several years, international and domestic gold analysts estimated that the Central Bank had gold holdings that might be five times higher than the 1,054 t reported in 2013. Unless the Central Bank releases information on its gold holdings, it is very difficult to determine how much gold was being held by the Central Bank (China Metal Bulletin, 2014a; Ministry of Industry and Information Technology, 2014a; Wang Jielei, 2014; World Gold Council, 2014a, p. 28; 2014b, p. 18).

The Central Bank planned to allow more banks to trade gold internationally and allow more overseas companies to gain access to China's domestic gold market. The SGE intended to establish an international trading board in the SFTZ, pending Government approval. Overseas investors could trade gold on the international board and the transactions and deliveries would be held in the SFTZ (Precious Metals Monthly, 2014).

**Iron Ore and Iron and Steel.**—China was the world's leading iron and steel producer and accounted for about 58% of the world's pig iron production and 48% of the world's crude steel production in 2013. The output of the country's iron and steel sector continued to increase in 2013. Production of pig iron and crude steel increased by about 7% and 8%, respectively, in 2013 compared with production in 2012. The rate of growth was one of the slowest of the past several years owing to weak demand for steel products in both the domestic and international markets. The ironmaking and steelmaking output capacity increased by 69 Mt/yr and 22 Mt/yr, respectively, in 2013. The steelmaking capacity reached 1 billion metric tons per year (Gt/yr) in 2013 and was expected to be slightly more than 1 Gt/yr by 2015 (China Metals, 2014a).

In 2013, the Government made plans to retire an additional 15 Mt/yr each of ironmaking and steelmaking capacity in 2015 and to reduce steelmaking capacity by 80 Mt during the next 5 years. The Provinces of Hebei, Jiangsu, and Liaoning ranked as the top three Provinces for fixed-asset investment in the iron and steel sector in the country. Other Provinces and cities, such as Chongqing, Henan, Hunan, and Shandong, also increased investments in the iron and steel sector. According to the MIIT, the country had eliminated a total of about 150 Mt/yr of ironmaking capacity and 100 Mt/yr of steelmaking capacity between 2006 and 2012. The Government had ordered steel producers to retire all 400-cubic-meter blast furnaces and 30-t converters in 2011. Iron and steel producers relocated

their iron and steel plants, however, and started constructing 1,000-cubic-meter or larger blast furnaces and larger converters. As a result, the total ironmaking and steelmaking capacities increased significantly during the same period.

State-owned companies relied on the Central Bank and state-owned banks to provide funds for their development; privately owned companies, on the other hand, thought that the expansion of output capacity would reduce production costs and make them more competitive with the state-owned companies. Private funds accounted for about 80% of the country's iron and steel investments. Also, local governments encouraged privately owned companies to expand their output capacities because it would help provide jobs for local residents and tax revenue for the local governments. Privately owned iron and steel producers normally produced long and construction steel, whereas state-owned iron and steel producers produced sheet and strip steel. During the past several years, the demand for sheet and strip steel was weaker than that for long and construction steel. Also, the slow recovery after the global financial crisis of the past several years caused a decrease in steel products exports from China. There was an excess of sheet and strip steel in domestic market. The market share of privately owned iron and steel producers increased to 48.2% in 2012 from 7.7% in 2000 (China Metals, 2013b).

In 2012, the MIIT amended the regulations issued in 2010 on the development of the iron and steel sector. The new regulations require iron and steel producers to produce products that are within the guidelines of the country's iron and steel products qualification standards. Iron and steel producers are forbidden to use obsolete technology to produce iron and steel products. The emissions of powder dust should total less than 1.19 kg; sulfur dioxide emissions, 1.63 kg; and water consumption, 4.1 cubic meters per metric ton of steel products produced. For each ton produced, the energy consumption of the blast furnace for ironmaking should be less than 446 kg of standard coal; sintering, 56 kg of standard coal; electric arc furnace (EAF), 92 kg of standard coal; EAF for specialty steel, 171 kg of standard coal; and coking, 155 kg of standard coal. The new regulations also specify the minimum capacities of equipment for iron and steel production, including blast furnace volume, which must be more than 400 cubic meters; EAF volume, 30 t (15,000 kiloamperes or higher); and EAF for ferroalloys, 10 t. The minimum required production capacity for an individual iron and steel production plant is 1 Mt/yr, and that for specialty steel plants is 300,000 t/yr. The new regulations took effect on October 1, 2012. The tougher regulations are intended to curb excess capacity and to force iron and steel producers to produce more high-quality and environmentally friendly products. In 2013, the MIIT released a list of 45 of iron and steel plants—mostly state owned—that met the regulation standard. The MIIT released for public comment a draft list of an additional 115 iron and steel plants that might meet steel industry standards. Iron and steel producers that meet the standards have an advantage in borrowing funds and applying for other production licenses. The Government planned to continue to release the names of additional iron and steel plants that have met the regulation standards. The Government would review the iron and steel plants on the approved list periodically (China Metals, 2013c).

In 2012, the NDRC finally gave permission for Baoshan Iron and Steel Group and Wuhan Iron and Steel Group to build iron and steel complexes in Guangdong Province and Guangxi Zhuang Autonomous Region, respectively. In July 2013, Baoshan started the construction of its iron and steel complex in Zhanjiang, Guangdong. At its initial designed capacity, the \$11 billion plant would produce 9.2 Mt/yr of pig iron, 10 Mt/yr of crude steel, and 9.4 Mt/yr of steel products. Baoshan decided to reduce the plant's output capacity to 8.71 Mt/yr of crude steel and 6.37 Mt/yr of steel products. Its major products would be sheet steel for such downstream sectors as automobile and machinery manufacturing, and shipbuilding. The construction of the complex was scheduled to be completed by yearend 2015. Wuhan would also invest about \$11 billion in the construction of its iron and steel complex at Fangchenggang, Guangxi, which also started in July 2013. The complex was designed to produce 8.5 Mt/yr of pig iron, 9.2 Mt/yr of crude steel, and 8.6 Mt/yr of steel products (mostly sheet steel). After construction of the complex is completed, Wuhan and Guangxi would retire 3.94 Mt/yr ironmaking capacity and 5.70 Mt/yr of steelmaking capacity. Most of the steel products from these two complexes would be high-value-added steel products, for which the country currently relied on imports to meet its demand (China Metals, 2013a).

**Lead and Zinc.**—China was the leading producer of lead and zinc in the world, and its production of refined lead and zinc continued to increase in 2013. Nei Mongol Autonomous Region was the leading area for the production of mined lead and zinc area in China. During the past 2 years, several greenfield and brownfield lead and zinc projects began operating, including those owned by Chihong Zinc and Germanium Co. Ltd., China Railway Resources Group Co. Ltd., Shandong Gold Group, and Zijin Mining Co. Ltd. Owing to the significant amount of cadmium discovered in Longjiang near the Hechi area in Guangxi, the Government ordered lead and zinc producers to shut down their operations in Hechi. As a result, the output of mined lead and zinc in Guangxi decreased by more than 30% compared with that of 2012. Henan replaced Guangxi as the second-ranked mined-lead-producing Province or Region followed by Sichuan, Yunnan, Qinghai, and Fujian. Even with the increased mine output, China continued to have a shortage of lead concentrates to meet domestic demand. In 2013, China imported 1.49 Mt of lead concentrates from Russia and the United States (14.4% each), Australia (9.7%), North Korea (7.9%), Peru (7.0%), and others (46.6%). Of China's Provinces and (or) Regions, Nei Mongol was the leading mined-zinc-producer followed by Hunan, Yunnan, Guangxi, Sichuan, Shaanxi, and Fujian. China imported 1.99 Mt of zinc concentrates from Australia (40.5%), Peru (18.5%), Mongolia (5.8%), Turkey (5.6%), and others (29.6%) (General Administration of Customs of the People's Republic of China, 2014; Lead, Zinc, and Tin Monthly, 2014).

Owing to the demand from downstream zinc consumers, China's output of refined zinc continued to increase in 2013. Domestic demand for refined zinc exceeded supply in the domestic market; therefore, the country posted net imports of 620,740 t of refined zinc from Kazakhstan (22.4%), Australia (19.4%), Belgium (12.5%), Spain (10.2%), Peru (8.8%), and

others (26.7%). In 2013, China's apparent consumption of refined zinc was about 6.0 Mt, which was about 11% more than that in 2012. The galvanizing sector accounted for 55.0%; diecasting alloys, 25.8%; oxides, 9.2%; brass, 5.7%; battery, 3.9%; and others, 0.4%.

In 2013, China recorded a net export of 21,087 t of refined lead. The apparent consumption of refined lead was about 4.4 Mt in 2013, which was about 5% more than in 2012. The battery sector accounted for more than 80% of the total lead consumption.

Chinese lead and zinc producers expected that domestic demand for lead and zinc would increase in the future. The Lianshanzhou zinc smelter planned to build a 100,000-t/yr-capacity zinc smelter in Lianshan, Sichuan Province. Yunnan Chihong Zinc and Germanium Co. Ltd. invested \$510 million to build a lead-zinc complex in Huize, Yunnan Province, that would have the capacity to produce 100,000 t/yr of refined zinc and 60,000 t/yr of crude lead. Yunnan Chihong also planned to build a lead-zinc complex in Hulumber, Nei Mongol Autonomous Region, that would have capacity to produce 140,000 t/yr of zinc and 60,000 t/yr of lead. Western Mining Co. Ltd. planned to increase its refined zinc output capacity to 160,000 t/yr in 2014 from 60,000 t/yr at Xining in Qinghai Province. Yunnan Tin Co. Ltd. planned to relocate its lead smelter in Gejiu, Yunnan, and to use updated smelting technology to increase its output capacity to 100,000 t/yr of lead and 10,000 t/yr of zinc (China Metal Bulletin, 2014b; China Metals, 2014b; Liu, Liu, and Fan, 2014; Xia and Zuo, 2014).

**Tin.**—China was the leading tin-producing country in the world. Owing to the slow economic recovery in Western countries after the financial crisis that began in 2008, demand for tin remained weak in 2013. The price of tin on the London Metal Exchange decreased to \$22,762 per metric ton in December from \$24,599 per metric ton in January. The Chinese tin spot price also decreased to 140,277 yuan (\$23,651) per metric ton in December from 158,300 yuan (\$25,950) per metric ton in January. The solder, chemical, and tinplate sectors were major tin-consuming sectors in China, which accounted for about 80% of total domestic tin consumption. Owing to the sluggish demand for electronic products from overseas markets, domestic tin consumption in the electronics sector was weak in 2013; however, the solder sector consumed about 100,000 t, which was the same as in 2012. The chemical sector was the second-ranked tin consumer, accounting for about 25,000 t, and the steel sector consumed about 12,000 t of tin (Li Shengchuan 2014).

During the past decade, the demand for tin in China increased rapidly, and tin producers expanded their output capacities to meet that need. China's mined tin could not meet the domestic needs, however, and the country depended on imports to fill the gap between production and consumption. China started importing a significant amount of tin concentrates in 2008. In 2013, China imported 96,568 t of tin concentrates, mainly from Burma (92.3%) and Bolivia (2.8%). The amount of tin concentrates from Burma increased significantly during the past several years but the tin content in the concentrates from Burma was lower than in the concentrates from Australia and Bolivia because most of Burma's tin concentrates had not been processed. Yunnan Tin planned to invest \$570 million to

relocate its tin-producing complex to the Mengzi Economic Development Zone in Yunnan Province and to increase its output capacity to 70,000 t/yr in the next 3 years (Shi Haidan, 2013; General Administration of Customs of the People's Republic of China, 2014).

**Tungsten.**—Even though China was the leading tungsten-producing country in the world and its output accounted for more than two-thirds of the world total, the country had difficulty holding tungsten prices stable in the domestic and international markets. Domestic tungsten concentrates (65% WO<sub>3</sub>) prices were quoted at between 110,000 yuan (\$18,032) per metric ton and 159,000 yuan (\$26,065) per metric ton in 2013. The rising price of tungsten concentrates was the result of the Government ordering Minmetals to stockpile about 8,800 t of tungsten concentrates in 2013. At the same time, large-scale tungsten producers and traders also purchased a significant supply of concentrates during the first half of the year. During the second half of the year, many tungsten producers faced financial difficulties and the demand for tungsten products in the domestic and international markets remained weak; as a result, many traders were forced to sell tungsten concentrates at a loss. In 2013, China exported a total 18,150 t (tungsten content) of tungsten products, which was 16.4% less than in 2012. Countries of the EU were the leading destinations for China's tungsten products followed by the United States, the Republic of Korea, and Japan. China's tungsten consumption increased to about 36,000 t in 2013 from 11,000 t in 2002, of which hard alloys and special steel accounted for 70% of the country total. The country stockpiled more than 15,000 t of tungsten in 2013. During the past several years, China's tungsten production exceeded demand, and domestic analysts estimated that the country had more than 40,000 t of tungsten stored at the Government or producers warehouses as of yearend 2013 (Zhu Yuanhong, 2013; Yang, 2014; Zhu Xiusheng, 2014).

### *Industrial Minerals*

**Cement.**—China was the leading cement-producing country in the world and accounted for about 50% of the world's total. Even with the Government's restricted-investment policy for the cement sector, cement output continued to increase. The Government was determined to tackle overcapacity and announced plans to shut down 75 Mt/yr of outdated capacity in 2013. Nevertheless, 72 new dry process kilns were put into operation in 2013, and a total of 94 Mt/yr of capacity was added compared with 160 Mt/yr of capacity added in 2012. From 2010 to 2012, China's cement output capacity increased by 626 Mt/yr, whereas the total amount capacity that was retired was only 200 Mt/yr. The Government's goal was to rebalance the economy so that production was more consumption driven than investment led. Many economists did not anticipate that the Government would invest heavily in infrastructure projects but would provide support for selected activities, such as railway construction and urban development. In 2013, the Ministry of Railways announced plans to invest \$85 billion to build 5,200 kilometers of railways in 2013 and would add about 7,000 kilometers per year in the next 2 years. The growth rate for consumption of cement during the next several years was



expected to be slower than in the previous several years, which had been close to 8% per year. Domestic cement producers estimated that consumption of cement was expected to increase by 5% per year during the next several years (Citigroup Global Market Inc., 2013a, p. 3–9).

More than 5,000 cement producers were registered, but analysts estimated that the actual number might be closer to 7,000 because of the fragmentation of the sector and the small size of many plants. The Government encouraged cement producers to consolidate the cement sector through mergers, takeovers, and regroupings, especially urging east coast producers to take over obsolete plants in the western area and to protect the environment in the west. China National Building Material Co. Ltd. (CNBM) was one of China's leading cement producers and had four subsidiaries—China United Cement Corp. Ltd., North Cement Co. Ltd., South Cement Co. Ltd., and Southwest Cement Co. Ltd. The total cement output capacity of CNBM was 335 Mt/yr, and its cement plants were located throughout the country. Anhui Conch Cement Co. Ltd. had a production capacity of 231 Mt/yr, and its cement plants were located in the Provinces and (or) Regions of Anhui, Gansu, Guangdong, Guangxi, Guizhou, Hunan, Jiangsu, Jiangxi, Shandong, Shanxi, Sichuan, Yunnan, Xinjiang, and Zhejiang, and in Chongqing City. Tangshan-based Tangshan Jidong Cement Co. Ltd. had the capacity to produce 125 Mt/yr of cement, and its plants were located in the cities of Beijing and Tianjin and in Provinces in northern China. China Resources Cement Co. Ltd. had about 74 Mt/yr of cement production capacity, and the company's plants were located mainly in the Provinces of Fujian, Guangdong, and Hainan, Shanxi and Yunnan. China Shanshui Cement Group Ltd. had 50 Mt/yr of cement production capacity and the company operated mainly in the Provinces of Liaoning and Shandong. Hebei-based Huaxin Cement Co. Ltd. had about 51 Mt/yr of capacity. Henan-based China Tianrui Group Cement Co. Ltd. had 42 Mt/yr of capacity, and its production plants were located in the Provinces of Henan and Liaoning. China National Materials Group Corp. Ltd.'s subsidiary, Sinoma Cement Co. Ltd., had a total output capacity of 25 Mt/yr, and its cement plants were located in southern China and in Xinjiang Uygur Autonomous Region. Domestic analysts estimated that the total capacity of these companies accounted for about 30% of the country's total cement production capacity (Citigroup Global Market Inc., 2013a, p. 16–39).

**Lithium.**—China has abundant salt lakes that contain lithium, and these lakes accounted for 80% of the country's total lithium resources. Most of the lakes are located in the western part of the country, however, and the infrastructure in these areas was relatively undeveloped. Spodumene resources were located mainly in the Altai and the Keketuohai areas in Xinjiang Uygur Autonomous Region and in the Kangding area in Sichuan Province. Lepidolite resources were found at the Yichun area in Jiangxi Province. Brine resources were found in salt lakes at the Qaidam Basin in Qinghai Province and Zabuye Lake in Xizang Autonomous Region. The country had lithium resources of 7.14 Mt. The Xinjiang lithium plant was built in 1958.

There were about 20 lithium producers in the country that produced lithium carbonate, lithium hydroxide, and (or) lithium salt from domestic and imported raw materials. These

compounds could be further processed into lithium metal or lithium cobalt oxide. In 2013, China's lithium carbonate output was estimated to be about 38,000 t, and its lithium hydroxide output was about 19,000 t. The country had a total output capacity of lithium salt of about 100,000 t/yr and was expected to produce about 60,000 t of lithium salt in 2014. In 2013, China consumed about 63,000 t of lithium, and about 50% of this total was from imported materials. The lithium ion battery sector accounted for about 43% of the total consumption followed by lubricating greases (18%), glass and ceramics (15%), pharmaceuticals (10%), air-treatment products (6%), catalysts (5%), and others (4%). In 2013, the Government announced that it would provide incentives for consumers to purchase electric automobiles and that it would build charge stations in urban cities. The demand for lithium was expected to increase, especially in the lithium ion battery sector (Luo Ningchuan and Wu Yanhua, 2014).

In 2012, Sichuan Tianqi Lithium Industry Co. Ltd. invested \$850 million to acquire the outstanding shares and stock options for Talison Lithium Ltd.'s Greenbushes lithium mine in Australia. In 2013, Galaxy Resources Ltd. of Australia agreed to sell its Jiangsu lithium processing plant in Jiangsu Province, China, to Tianqi for \$230 million. The Greenbushes Mine supplied spodumene to the Jiangsu lithium processing plant. Tianqi completed its expansion plan to increase its total output capacity of lithium carbonate, anhydrous lithium chloride, and lithium hydroxide to about 20,000 t/yr (Sichuan Tianqi Lithium Industries Inc., 2014, p. 13).

**Rare Earths.**—China was rich in rare-earth resources, and the country produced different kinds of rare-earth products. China's rare-earth production accounted for about 90% of the world total, and the volume of exports had a significant effect on the world markets. During the past several years, the Government had adjusted its rare-earth production and export quota to protect the domestic resources and the environment. In 2012, the State Council issued "Situation and Policies of China's Rare Earth Industry," which provided a plan for the development of the country's rare-earth industry during the next several years. The goal was to establish orderly rare-earth operations, including the development of rare-earth resources, followed by separation, smelting, and marketing. The Government would attempt to control unregistered exploitation, environmental damage, unapproved production-capacity expansion, and illegal trading. The MLR issued a total of 67 rare-earth mining licenses in 2012, which was 46 fewer than were issued in 2011. Jiangxi Province received 45 rare-earth mining licenses, of which Ganzhou Rare Earth (Group) Co. Ltd. received 43. The MLR assigned seven mining licenses to seven companies in Sichuan Province. Five mining companies in Fujian Province received a total five mining licenses. In Guangdong Province, subsidiaries of Guangdong Rising Group Co. Ltd. received three mining licenses. Baotou Iron and Steel was the only company to receive two mining licenses in Nei Mongol Autonomous Region. Yunnan Province received two mining licenses, and Guangxi, Hunan, and Shandong each received one. MLR required officials in each Province to manage the development of antimony, rare earths, tin, and tungsten according to regulations issued by the Central Government (Ministry of Industry and Information Technology, 2014b).



In 2013, the MLR-issued rare-earth mining production quota was 93,800 t (REO) and the MIIT-issued rare-earth separated products production quota was 90,400 t (REO). The MIIT reported that China produced 80,400 t of mined REO and 83,300 t of REO-separated products in 2013. The decrease in the production of mined REO and REO products was the result of the shutdown of mining activities in some rare-earth mines in Jiangxi Province because of environmental issues and because Minmetals shut down some of its rare-earth separation plants during the year because of weak rare-earth prices. Domestic analysts estimated that the country's rare-earth production was higher than the Government's reported data (Ministry of Industry and Information Technology, 2014b).

The consolidation of the rare-earth industry continued in 2013. The Chinese Government intended to have six state-owned or Province-owned companies control the country's rare-earth sector. Baotou Iron and Steel [through its subsidiary Baotou Rare Earth Hi-Tech Holding Co. Ltd. (Baotou Hi-Tech)] was the sole producer and manager of all rare-earth mining, separation, and trading activities in Nei Mongol Autonomous Region. The Provincial government of Fujian established an integrated rare-earth enterprise, Fujian Rare Earth Group Co. Ltd., in the Province in 2012. Province-owned Fujian Metallurgy Holdings Co. Ltd. transferred 33% of its shares in Xiamen Tungsten Co. Ltd. to Fujian Rare Earth. Xiamen Tungsten would be transformed into a leading company to perform prospecting, mining, smelting, and downstream product development. The Provincial government of Guangdong established the Guangdong Rare Earth Industry Group to manage the rare-earth sector in Guangdong. Guangdong-based Guangdong Rising Group Co. Ltd., which was the parent company of Guangdong Rising Nonferrous Metals Co. Ltd. and which had three rare-earth mining licenses in Guangdong, was a member of the Guangdong Rare Earth Industry Group. The Guangdong Rare Earth Industry Group would be in charge of the integration of exploration, mining, smelting, and development of high-value-added rare-earth products in the Province. The Guangdong Rare Earth Industry Group signed a cooperation agreement with Yunnan Rare Earth Co. Ltd. to develop rare-earth resources in Yunnan Province. Chinalco Rare Earth Co. Ltd., which was a subsidiary of Chinalco, consolidated most of domestic rare-earth producers in Jiangsu Province. Chinalco signed an agreement with the Government of Guangxi to have exclusive rights for the development of the rare-earth sector in the Region. Chinalco also signed an agreement to acquire a rare-earth producer in Shandong Province. In the 2000s, Minmetals had started to acquire rare-earth resources in the Provinces and (or) Regions of Guangdong, Guangxi, Hunan, and Jiangxi. After years of effort, Minmetals had acquired rare-earth resources only in Hunan; however, the company had acquired several rare-earth separation plants in Jiangxi, and the Ganzhou area in Jiangxi was rich in the ion-adsorption type of rare earths. Ganzhou Rare Earth Co. Ltd. was sole legal rare-earth mining company in Ganzhou. State-owned companies, such as Chinalco and Minmetals, had set up joint ventures with local rare-earth producers to acquire rare-earth resources in Jiangxi; however, none of them had been successful. The government of the

Province of Jiangxi and local governments intended to establish a new entity using Ganzhou Rare Earth as the basis. The new entity would manage rare-earth activity from mining to the production of value-added products. These six companies would have 59 rare-earth mining licenses and 200,000 t/yr of rare-earth separation capacity, or about 72% of the country's total capacity (Liu and Chen, 2014; Tong and Xia, 2014).

In 2012, the United States, the European Union (EU), and Japan requested that the World Trade Organization (WTO) schedule a dispute-settlement consultation regarding China's export restraints in the form of export quotas on molybdenum, rare earths, and tungsten. China had imposed additional requirements and procedures in connection with these materials, including restricting the right to export based on previous companies' export information. The parties maintained that the restraints were significant enough to distort the international market and provide preferential conditions for Chinese industries that used these materials. The Chinese Government's position was that these policies were to protect the environment and natural resources. Consultations were the first step in the resolution of a WTO dispute. A WTO dispute settlement panel was established to examine the dispute. In 2013, the panel ruled that China's restriction on exporting these raw materials was inconsistent with its obligations when the country was admitted to the WTO. China appealed the panel's decision to the WTO's appellate body, and the ruling was expected to be announced in 2014 (World Trade Organization, 2014, p. C1–C24).

### *Mineral Fuels*

**Coal.**—China had undergone significant economic reform and was one of the world's fastest growing economies. Coal consumption had increased to meet the high demand for industrial production and power generation. Coal was the country's primary source of energy—two-thirds of the country's electricity was produced by coal-fired powerplants. About 50% of the country's total coal output was consumed by the power sector. China's coal production continued to increase in 2013 because of an increase in demand for coal by every industrial sector. As a result, coal producers expanded their output capacities, especially in the Autonomous Regions of Nei Mongol and Xinjiang. During the past 10 years, coal output capacity had increased at a rate of 200 Mt/yr. In 2013, China produced about 3.7 Gt of coal; however, coal analysts estimated that the country's coal output capacity was about 4.6 Gt/yr. Coal producers had stockpiled about 84 Mt of coal at their warehouses as of yearend 2013. In addition, about 22 Mt of coal was stockpiled at four ports in the northern part of China.

In 2013, the country imported a total of 327 Mt of coal, which was an increase of 13% from that of 2012. Because production exceeded consumption, the price of coal in Shanxi Province decreased to 450 yuan (\$73.77) per metric ton in June 2013 from 656 yuan (\$107.54) per metric ton in May 2011. The increase in coal imports was the result of the price of coal on the international market being lower than that on the domestic market. Also, the Government gradually eliminated import tariff rates on coal during the past several years and imposed tariff rates on coal exports. Coal-fired powerplants, especially those

in the coastal Provinces, increased the use of imported coal to reduce their production costs (Csteelnews.com, 2013; General Administration of Customs of the People's Republic of China, 2014).

China's coal output capacity and production were targeted by the Government to be 4.1 Gt/yr and 3.9 Gt/yr, respectively, at yearend 2015. The Government identified 1,725 coal mines that would be shut down in 2014, which would eliminate 117 Mt/yr of production capacity.

In China, there was a two-tier system of coal prices—contract and market. The coal contract price was negotiated between coal producers and coal-fired powerplant producers at prices under conditions established by the Government. In 2012, the Government decided not to participate in the yearend coal contract meeting. The cancellation of this key coal contract meeting indicated the removal of Government intervention. The transportation cost and the government taxes and fees (environmental protection fund, industry development fund, price adjustment fund, resources tax, and sustainability fund) accounted for about 60% of the total costs (production, transportation, and taxes). In 2013, the Central Government decided to transfer its mining license approval authority to local governments and to reduce the taxes and fees that miners were required to pay. China's coal-fired powerplant producers were sensitive to overseas coal prices. Coal imports would increase if coal prices on the international market were lower than on the domestic market.

The volume of coal imports also depended on the railway transportation system. Major coal-producing provinces were located in the northern and northwestern parts of the country, and coal consumers were located in the southern and in the coastal Provinces. The Government planned to develop a more reliable coal transportation system during the next few years (Citigroup Global Market Inc., 2013b, p. 5–10).

## Outlook

China has replaced Japan as the second largest economy in the world behind the United States. China's economy is expected to continue to grow in the near future, although the economic growth rate is expected to increase in the future more slowly than in the past several years. The Government recognizes that the country cannot depend solely on exports to sustain its economic growth and that the country needs to increase domestic consumption and to have a more transparent financial and legal system (Zhonghua Renmin Gongheguo Guowuyuan Gongbao, 2012a, b). The expected continuation of China's economic growth implies that a strong demand for mineral commodities is likely to continue. China has shortages of supply of most major minerals, including bauxite, chromium, copper, iron, lead, manganese, nickel, oil, and potash, and it relies on imports to meet its demand. This trend is expected to continue. The Government, therefore, encourages enterprises to invest in such mineral-rich countries as Australia, Brazil, Burma, Chile, Indonesia, and Mongolia to secure minerals for domestic economic development and growth. The Government is expected to continue its effort to protect the country's resources of minerals, such as antimony, coal, molybdenum, rare earths, tin, and tungsten, and to avoid overexploitation.

China's imports of raw minerals have been increasing in recent years. As a result, the Chinese Government has been promoting reduced dependence on mineral commodity imports and encouraging the production of high-value-added and high-quality downstream products. The Government also promotes the secondary nonferrous metals industry to reduce energy consumption. The Government has not yet achieved great success in meeting these goals. As progress is made toward these goals, the country's dependence on most major mineral commodities could decline; however, China will likely continue to play an important role in the world's metal and mineral markets. Also, China's overseas investments will probably continue until the country becomes more resource independent. China's overall outward investment is expected to continue to increase and may soon exceed inward foreign direct investment.

The environmental, health, safety, and social performance of the mining and metal enterprises are of concern to the Government. The Government has set guidelines for the development of these enterprises in an attempt to improve protection of the environment, but progress has been slow. The Government plans to continue its effort to address the sustainable development of the mining and metal sectors through air and water pollution prevention and treatment, land protection, mine safety, and reclamation of mine sites.

## References Cited

- Alumina and Aluminum Monthly, 2013, Aluminum arithmetic average price on Chinese spot market: Beijing Antaika Information Development Co. Ltd., March, p. 18.
- Alumina and Aluminum Monthly, 2014a, 2013 aluminum market review and outlook for 2014: Beijing Antaika Information Development Co. Ltd., February, 22 p.
- Alumina and Aluminum Monthly, 2014b, Aluminum arithmetic average price on Chinese spot market: Beijing Antaika Information Development Co. Ltd., April, p. 27.
- Alumina and Aluminum Monthly, 2014c, Chinese primary aluminum output by region in December 2013: Beijing Antaika Information Development Co. Ltd., 2014 special issue, p. 21.
- Alumina and Aluminum Monthly, 2014d, Directly buying electricity policy to benefit aluminum smelters in Yunnan Province: Beijing Antaika Information Development Co. Ltd., May, p. 21.
- Alumina and Aluminum Monthly, 2014e, Imports and exports of Al products in December 2013: Beijing Antaika Information Development Co. Ltd., February, p. 22–23.
- China Chemical Reporter, 2014, New directions for China's petrochemical industry set by 9 key policies in 2013: China Chemical Reporter, v. 25, no. 2, p. 5.
- China Metal Bulletin, 2013, SRB purchases antimony ingot at 66,000 yuan per ton: China Metal Bulletin, no. 42, p. 21.
- China Metal Bulletin, 2014a, China Central Bank may hold 2,710 t of gold: China Metal Bulletin, no. 2, p. 14.
- China Metal Bulletin, 2014b, Metallurgical 14 completed Hulumbeier lead and zinc smelter: China Metal Bulletin, no. 4, p. 12.
- China Metals, 2013a, Baosteel slows down Zhanjiang project: China Metals, v. 19, no. 410, p. 13.
- China Metals, 2013b, Facts behind steel overcapacity in China: China Metals, v. 19, no. 416, p. 8.
- China Metals, 2013c, MIIT publishes 2nd list of qualified steelmaker: China Metals, v. 19, no. 420, p. 7.
- China Metals, 2014a, 69.2-Mt new steel capacities operational in '13: China Metals, v. 20, no. 424, p. 7.
- China Metals, 2014b, Zinc consumption improves in 2013: China Metals, v. 20, no. 423, p. 11.
- China Nonferrous Metals Monthly, 2014a, China's copper ore potential resource quantity reached 180 million tones: China Nonferrous Metals Monthly, March, p. 11.

- China Nonferrous Metals Monthly, 2014b, The MIIT published the name list of the first batch of enterprises conforming to the “standardization conditions for aluminum industry”: China Nonferrous Metals Monthly, May, p. 7.
- China Steel, 2013, The State Council issues guidelines to eliminate excess capacity: China Steel, no. 11, p. 13–16.
- Citigroup Global Market Inc., 2013a, China cement: New York, New York, Citigroup Global Market Inc., August 20, 51 p.
- Citigroup Global Market Inc., 2013b, China coal: New York, New York, Citigroup Global Market Inc., October 10, 44 p.
- Citigroup Global Market Inc., 2013c, China macro flash—China’s leaders pledge comprehensive but gradual reforms: New York, New York, Citigroup Global Market Inc., November 18, 8 p.
- Citigroup Global Market Inc., 2013d, China macro flash—Financial reforms in SFTZ puts emphasis on risk control: New York, New York, Citigroup Global Market Inc., December 2, 6 p.
- Citigroup Global Market Inc., 2013e, China macro flash—Relaxing population policy—Overdue but never too late: New York, New York, Citigroup Global Market Inc., October 16, 12 p.
- Citigroup Global Market Inc., 2014a, China macro flash—Ten local governments allowed to issue own bonds: New York, New York, Citigroup Global Market Inc., May, 21, 5 p.
- Citigroup Global Market Inc., 2014b, China macro view—Balance on the steep, narrow path between economic growth and structural reform: New York, New York, Citigroup Global Market Inc., July 16, 30 p.
- Copper Monthly, 2014a, Market commentary: Beijing Antaika Information Development Co. Ltd., February, p. 2–3.
- Copper Monthly, 2014b, Zhangjiagang Copper’s 200ktpa copper project is completed in H1 2014: Beijing Antaika Information Development Co. Ltd., February, p. 4.
- Copper Monthly, 2014c, Zhongtiaoshan Nonferrous’s 100ktpa copper project is completed in 2014: Beijing Antaika Information Development Co. Ltd., February, p. 4.
- Csteelnews.com, 2013, Five major coal producers in Jiangxi had 680 billion in red: Csteelnews.com, August 8. (Accessed February 20, 2014, at [http://www.csteelnews.com/xwzx/ylnc/201308/t20130808\\_210295.html](http://www.csteelnews.com/xwzx/ylnc/201308/t20130808_210295.html).)
- General Administration of Customs of the People’s Republic of China, 2012, China customs statistics 2011: Beijing, China, General Administration of Customs of the People’s Republic of China, annual, CD-ROM.
- General Administration of Customs of the People’s Republic of China, 2013, China customs statistics 2012: Beijing, China, General Administration of Customs of the People’s Republic of China, annual, CD-ROM.
- General Administration of Customs of the People’s Republic of China, 2014, China customs statistics 2013: Beijing, China, General Administration of Customs of the People’s Republic of China, annual, CD-ROM.
- He, Pingchao, 2014, State reserve helps resolve predicament caused by financing copper: China Metals, v. 20, no. 428, p. 3.
- He, Xiaohui, 2014, Oversupply of copper in domestic market: China Metal Bulletin, no. 4, p. 18–19.
- Huang, Yu, 2014, Future of antimony industry: China Metal Bulletin, no. 3, p. 20–22.
- Huo, Yunbo, and Guo, Qiuying, 2014, 2013 alumina market review and outlook for 2014: Beijing Antaika Information Development Co. Ltd. Special Report, 14 p.
- Lead, Zinc, and Tin Monthly, 2014, Lead: Beijing Antaika Information Development Co. Ltd., January, p. 10–14.
- Li Shaopeng, Wu Wenfen, Li Fei, Bao Weijun, and Li Huiquan, 2013, Extraction of gallium from high-alumina fly ash by method ion-exchange method: 2013 World of Coal Ash Conference, Lexington, Kentucky, April 22–25, 2013, abstract.
- Li Shengchuan, 2014, The perspective on tin: China Metal Bulletin, no. 4, p. 8–10.
- Li, Yanyan, 2013, Cobalt supply and prediction of future development 2013–2014: China Metal Bulletin, no. 46, p. 37–39.
- Li, Yanyan, 2014, Ten years of antimony market: China Metal Bulletin, no. 4, p. 34–35.
- Lian, Zheng, 2014, China copper scrap market study: China Metal Bulletin, no. 2, p. 16–20.
- Liu Fan, Liu Mengluan, and Fan Jiaqi, 2014, Zinc price expects to rebound: China Metal Bulletin, no. 4, p. 26.
- Liu, Hongji, and Chen, Jiazuo, 2014, Rare earth consumption may be increased: China Metal Bulletin, no. 8, p. 19.
- Luo Ningchuan and Wu Yanhua, 2014, About lithium battery: China Metal Bulletin, no. 5, p. 8–10.
- Ministry of Commerce, 2012a, 2013 export products monitoring list: Beijing, China, Ministry of Commerce, issue 97, December 31, 29 p.
- Ministry of Commerce, 2012b, 2013 export quota of agriculture and industrial products: Beijing, China, Ministry of Commerce, issue 74, October 31, 1 p.
- Ministry of Commerce, 2012c, The first batch rare-earth export quota: Beijing, China, Ministry of Commerce, issue 1012, December 13, 2 p.
- Ministry of Commerce, 2013a, 2014 export quota of agriculture and industrial products: Beijing, China, Ministry of Commerce, issue 76, October 30, 2 p.
- Ministry of Commerce, 2013b, The first batch rare-earth export quota: Beijing, China, Ministry of Commerce, issue 1158, December 27, 2 p.
- Ministry of Commerce, 2013c, The second batch rare-earth export quota: Beijing, China, Ministry of Commerce, issue 340, June 18, 3 p.
- Ministry of Industry and Information Technology, 2013, The guidelines for the aluminum sector: Beijing, China, Ministry of Industry and Information Technology, no. 36, July 18, 10 p.
- Ministry of Industry and Information Technology, 2014a, 2013 gold sector economic development: Beijing, China, Ministry of Industry and Information Technology press release, February 21, 2 p.
- Ministry of Industry and Information Technology, 2014b, The development of rare earths in 2013: Beijing, China, Ministry of Industry and Information Technology press release, February 21, 2 p.
- Ministry of Industry and Information Technology, 2014c, The guidelines for the copper sector: Beijing, China, Ministry of Industry and Information Technology, no. 29, April 14, 6 p.
- Ministry of Land and Resources, 2013, Announcement of rare-earths, tungsten, and antimony exploitation quota: Beijing, China, Ministry of Land and Resources, no. 100, September 4, 3 p.
- Ministry of Land and Resources, 2014, Zhongguo Guotu Ziyuan Gongbao 2013: Beijing, China, Ministry of Land and Resources, April, 49 p.
- Minor Metals Monthly, 2014a, Imports and exports of antimony products in Dec. 2013: Beijing Antaika Information Development Co. Ltd., February–March, p. 19.
- Minor Metals Monthly, 2014b, Imports and exports of cobalt products in Dec. 2013: Beijing Antaika Information Development Co. Ltd., February–March, p. 19.
- National Bureau of Statistics of China, 2014, 2013 national economic and social development statistics: Beijing, China, National Bureau of Statistics of China, February 20, 26 p.
- National Energy Administration, 2014, 2014 energy development plan: Beijing, China, National Energy Administration, no. [2014] 38, 6 p.
- National People’s Congress of the People’s Republic of China, The, 2014, Amendments to China’s environmental protection law: Beijing, China, The National People’s Congress of the People’s Republic of China, April 24. (Accessed May 3, 2014, at [http://www.npc.gov.cn/npc/xinwen/node\\_12488.htm](http://www.npc.gov.cn/npc/xinwen/node_12488.htm).)
- Precious Metals Monthly, 2014, SGE to establish international trading board in FTZ: Beijing Antaika Information Development Co. Ltd., March, p. 20.
- Shi Haidan, 2013, Tin may be at the bottom to move up: China Metal Bulletin, no. 32, p. 38–39.
- Sichuan Tianqi Lithium Industries Inc., 2014, 2013 annual report: Sichuan Tianqi Lithium Industries Inc., April 22, 178 p.
- Song, Xiaolong, 2013, Analysis of effects of aluminum price: China Metal Bulletin, no. 37, p. 38–41.
- State Council, The, 2013, Air pollution control program: Beijing, China, The State Council, no. [2013] 37, September 10, 9 p.
- Tong, Dongfeng, and Xia, Chao, 2014, Rare earth WTO defeated and it would affect rare-earth industry development: China Metal Bulletin, no. 9, p. 42–43.
- United News Network, 2014, Deep reform starts: United News Network, March 10. (Accessed March 10, 2014, at <http://udn.com/NEWS/MAINLAND/MA11/8537002.shtml>.)
- Wang Jielei, 2014, Can gold get out of the deflation: China Metal Bulletin, no. 4, p. 40–41.
- World Bank, The, 2014, Urban China—Toward efficient, inclusive, sustainable urbanization: Washington, DC, The World Bank, 439 p.
- World Gold Council, 2014a, China’s gold market: London, United Kingdom, World Gold Council, 60 p.
- World Gold Council, 2014b, Gold demand trends—First quarter 2014: London, United Kingdom, World Gold Council, 29 p.
- World Trade Organization, 2014, China—Measures related to the exportation of rare earths, tungsten, and molybdenum: Geneva, Switzerland, World Trade Organization, March 26, 120 p.
- Wu, Rongqing, 2013, Bauxite resources present and future development strategy: China Metal Bulletin, no. 39, p. 28–33.
- Xia Cong and Zuo Xichao, 2014, Lead—Difficult to overturn excess situation: China Metal Bulletin, no. 4, p. 24.

Yang, Zhaohui, 2014, Stockpile affects tungsten market: China Metal Bulletin, no. 4, p. 28–29.  
 Zheng, Chenxu, 2013, 2014 second-half aluminum investment possible: China Metal Bulletin, no. 43, p. 34–37.  
 Zhonghua Renmin Gongheguo Guowuyuan Gongbao, 2012a, Plan for development of the national strategic emerging industries during the period of the twelfth five-year plan: Beijing, China, Zhonghua Renmin Gongheguo Guowuyuan Gongba, no. 21, p. 11.

Zhonghua Renmin Gongheguo Guowuyuan Gongbao, 2012b, Plan for energy conservation and emissions reduction during the period of the twelfth five-year plan: Beijing, China, Zhonghua Renmin Gongheguo Guowuyuan Gongba, no. 25, p. 5.  
 Zhu, Xiusheng, 2014, 2014 tungsten products imports and exports: China Metal Bulletin, no. 2, p. 32–33.  
 Zhu, Yuanhong, 2013, Tungsten—High production cost and excess production capacity: China Metal Bulletin, no. 45, p. 40–41.

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

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2009	2010	2011	2012	2013	
<b>METALS</b>						
<b>Aluminum:</b>						
Bauxite, gross weight	thousand metric tons	40,000	44,000	45,000	47,000	46,000
Alumina	do.	23,800	29,000	34,100	37,700	44,400
<b>Metal, refined:</b>						
Primary	do.	12,900	16,200	18,100	20,300	22,100
Secondary	do.	3,100	4,000	4,100	4,200	5,200
Total	do.	16,000	20,200	22,200	24,500	27,300
<b>Antimony:</b>						
Mine, Sb content		140,000	150,000	150,000	136,000 <sup>r</sup>	120,000
Metal		168,000	193,000	200,000	240,000 <sup>r</sup>	300,000
<b>Bismuth:</b>						
Mine output, Bi content		6,000	6,500	7,000	7,500 <sup>r</sup>	7,500
Metal		12,300	14,000	15,000	15,000 <sup>r</sup>	15,500
Cadmium, smelter		7,050	7,360	6,670	7,270 <sup>r</sup>	7,000
Chromite, gross weight	thousand metric tons	200	200	200	200	200
<b>Cobalt:</b>						
Mine output, Co content		6,000	6,380	6,800	7,500 <sup>r</sup>	7,200
Metal		6,000	4,120	5,430	6,400 <sup>r</sup>	6,500
<b>Copper:</b>						
Mine output, Cu content		1,040,000	1,160,000	1,270,000	1,550,000	1,600,000
<b>Metal:</b>						
Smelter, primary	thousand metric tons	2,700	2,900	3,030	3,600 <sup>r</sup>	4,000
<b>Refined:</b>						
Primary	do.	2,750	2,950	3,390	3,930	4,340
Secondary	do.	1,400	1,700	1,850	1,950	2,200
Total	do.	4,150	4,650	5,240	5,880	6,540
Germanium		95	100	110	105	110
Gold, mine output, Au content		320	345	362	403	430
Indium, primary and secondary		340	330	380	405	430
<b>Iron and steel:</b>						
Iron ore, gross weight	thousand metric tons	880,000	1,070,000	1,330,000	1,330,000 <sup>r</sup>	1,450,000
Pig iron <sup>4</sup>	do.	552,830	597,330	640,510	663,500	708,970
Ferroalloys	do.	22,100	24,300	28,400	31,300	37,700
Steel, crude <sup>4</sup>	do.	572,180	637,230	685,280	723,880	779,040
Steel, rolled <sup>4</sup>	do.	694,050	802,760	886,190	955,780	1,067,620
<b>Lead:</b>						
Mine output, Pb content	do.	1,600	1,980	2,400	2,610 <sup>r</sup>	2,940
<b>Metal:</b>						
Smelter, primary	do.	2,630	2,800	3,110	3,120 <sup>r</sup>	3,200
<b>Refined:</b>						
Primary	do.	2,630	2,800	3,200	3,220 <sup>r</sup>	3,280
Secondary	do.	1,150	1,360	1,400	1,370 <sup>r</sup>	1,500
Total	do.	3,780	4,160	4,600	4,690 <sup>r</sup>	4,780
Magnesium, metal and alloy		501,000	654,000	675,000	698,000	770,000
<b>Manganese:</b>						
Ore, Mn content	thousand metric tons	2,400	2,600	2,800	2,900	3,000
Metal		1,310,000	1,370,000	1,480,000	1,200,000 <sup>r</sup>	1,300,000

See footnotes at end of table.



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

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2009	2010	2011	2012	2013
METALS—Continued					
Mercury, mine output, Hg content	1,430	1,600	1,500	1,350	1,600
Molybdenum, mine output, Mo content	93,500	96,600	103,000	120,000 <sup>r</sup>	115,000
Nickel:					
Mine output, Ni content	84,800	80,000	90,000	93,300	93,300
Matte	143,000	139,000	166,000	153,000 <sup>r</sup>	160,000
Smelter	165,000	159,000	175,000	197,000 <sup>r</sup>	245,000
Niobium and tantalum, mine output:					
Nb <sub>2</sub> O <sub>5</sub> content	30	32	25	20	21
Ta <sub>2</sub> O <sub>5</sub> content	90	86	75	80 <sup>r</sup>	72
Rhenium, Re content in NH <sub>4</sub> ReO <sub>4</sub> <sup>5</sup> kilograms	1,900	2,000	2,100	2,200	2,300
Silicon, metal thousand metric tons	993	1,140	1,350	1,130 <sup>r</sup>	1,300
Silver, mine output, Ag content	2,900	3,500	3,700	3,900	4,100
Tin:					
Mine output, Sn content	97,200	115,000	120,000	110,000	120,000
Metal	140,000	149,000	156,000	148,000	155,000
Titanium:					
Ilmenite, TiO <sub>2</sub> equivalent	550,000	700,000	850,000	800,000 <sup>r</sup>	850,000
Sponge	45,800	57,000	68,000	82,000	105,000
Tungsten, mine output, W content	51,000	59,000 <sup>r</sup>	61,800	64,000	68,000
Vanadium, V <sub>2</sub> O <sub>5</sub> in vanadiferous slag product	52,000	58,000	65,000	71,000 <sup>r</sup>	80,000
Zinc:					
Mine output, Zn content thousand metric tons	3,330	3,840	4,050	4,860 <sup>r</sup>	5,000
Refined:					
Primary do.	4,200	5,030	5,040	4,770 <sup>r</sup>	5,160
Secondary do.	90	175	173	120 <sup>r</sup>	140
Total do.	4,290	5,210	5,210	4,890	5,300
INDUSTRIAL MINERALS					
Asbestos	440,000	400,000	385,000 <sup>r</sup>	420,000	420,000
Barite thousand metric tons	3,400	4,000	3,030 <sup>r</sup>	4,200	4,000
Bentonite do.	3,400	3,400	3,500	3,500	3,600
Boron, mine output, B <sub>2</sub> O <sub>3</sub> equivalent	145,000	150,000	150,000	160,000	160,000
Bromine	93,000	100,000	100,000	105,000	110,000
Cement, hydraulic <sup>4</sup> million metric tons	1,644	1,882	2,099	2,210	2,416
Diatomite	440,000	400,000	440,000	420,000	420,000
Dolomite thousand metric tons	8,100	8,200	8,200	8,300	8,300
Feldspar do.	2,000	2,000	2,100	2,100	2,500
Fluorspar do.	3,800	4,600	4,200	4,400	4,400
Graphite	450,000	700,000	800,000	820,000	750,000
Gypsum thousand metric tons	126,000 <sup>r</sup>	126,000 <sup>r</sup>	127,000 <sup>r</sup>	128,000 <sup>r</sup>	129,000
Kaolin do.	3,000	3,260	3,200	3,300	3,300
Lime do.	185,000	190,000	200,000	220,000	230,000
Lithium, Li content, all types	5,500	6,000	7,200	9,500	10,500
Magnesite thousand metric tons	13,000	14,000	19,000	16,000	17,000
Mica	700,000	750,000	760,000	770,000	780,000
Nitrogen, N content of ammonia <sup>4</sup> thousand metric tons	42,290	40,870	43,250	45,520	47,310
Phosphate rock, P <sub>2</sub> O <sub>5</sub> equivalent do.	18,000	20,400	24,000	28,500	32,000
Potash, marketable, K <sub>2</sub> O equivalent do.	3,200	3,600	3,800	3,770 <sup>r</sup>	4,300
Rare earths, rare-earth oxide equivalent	129,000	120,000	105,000	100,000	95,000
Salt <sup>4</sup> thousand metric tons	66,630	70,380	67,420	69,120	64,600
Sodium compounds:					
Mirabilite do.	6,000	6,500	6,000	5,500	5,000
Soda ash, natural and synthetic <sup>4</sup> do.	19,450	20,350	22,940	24,010	24,350
Strontium carbonate	159,000	150,000	145,000	140,000	130,000

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2009	2010	2011	2012	2013	
INDUSTRIAL MINERALS—Continued						
Sulfur:						
Native	thousand metric tons	1,000	1,100	1,100	1,200	1,200
Content of pyrite	do.	4,370	4,400	5,300	5,400	5,900
Byproduct, all sources	do.	4,000	4,100	3,300	3,300	3,400
Total	do.	9,370	9,600	9,700	9,900	10,500
Talc and related materials	do.	2,300	2,000	2,200	2,100 <sup>f</sup>	2,200
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite	thousand metric tons	426,000	500,000	450,000	500,000	500,000
Bituminous	do.	2,320,000	2,420,000	2,800,000	2,830,000	2,850,000
Lignite	do.	256,000	320,000	270,000	330,000	330,000
Total	do.	3,000,000	3,240,000	3,520,000	3,660,000	3,680,000
Coke, all types <sup>4</sup>	do.	345,020	388,640	432,710	447,790	479,320
Gas, natural:						
Gross	billion cubic meters	85	95	102	107	117
Marketed	do.	73	83	90	95	100
Petroleum:						
Crude, including crude from oil shale	million 42-gallon barrels	1,370	1,480	1,480	1,510	1,520
Refinery products	do.	3,750	4,220	4,470	4,640	4,790

<sup>f</sup>Revised. do. Ditto.

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

<sup>2</sup>Table includes data available through October 29, 2014.

<sup>3</sup>In addition to the commodities listed, China also produces beryllium, diamond, gallium, iodine, platinum-group metals, selenium, stone, tellurium, uranium, and zirconium, but available information is inadequate to make reliable estimates of output.

<sup>4</sup>Reported by China's National Statistical Bureau.

<sup>5</sup>Includes rhenium from imported copper and molybdenum concentrates.

TABLE 2  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners <sup>1</sup>	Location of main facilities <sup>2</sup>	Annual capacity <sup>c</sup>
<b>Aluminum:</b>			
Alumina	Chongqing Aluminum Co. [Aluminum Corporation of China (Chinalco)]	Chongqing	800
Do.	Chongqing Dingtai Tuoyuan Alumina Co.	do.	150
Do.	Nanchuan Pioneer Alumina Co.	do.	200
Do.	Guangxi Huayin Aluminum Co. Ltd.	Guangxi, Bose	2,000
Do.	Pingguo Aluminum Co. [Aluminum Corporation of China (Chinalco)]	Guangxi, Pingguo	1,200
Do.	Guizhou Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Guizhou, Guiyang	1,200
Do.	Chalco Zunyi Aluminum Co. Ltd. [Aluminum Corporation of China (Chinalco)]	Guizhou, Zunyi	1,000
Do.	Luoyang Wanji Xiangjiang Aluminum Co. Ltd.	Henan, Luoyang	800
Do.	Sanmenxia Yixiang Aluminum Co. Ltd. (Henan Yima Coal Group)	Henan, Mianchi	600
Do.	Pingdingshan Huiyuan Chemical Co.	Henan, Pingdingshan	300
Do.	Yangquan Coalmine Aluminum (Sanmenxia) Co. Ltd.	Henan, Sanmenxia	1,200
Do.	Orient Hope (Sanmenxia) Aluminum Co. Ltd.	do.	1,200
Do.	Zhengzhou Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Henan, Zhengzhou	2,200
Do.	Zhongzhou Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Hunan, Zhongzhou	2,800
Do.	Shandong Huayu Alumina Co. Ltd. (Shandong Chiping Xinfu Aluminum and Electricity Group)	Shandong, Chiping	1,800
Do.	Longhou Donghai Alumina Co. Ltd. (Nanshan Group)	Shandong, Nanshan, Longkou	1,600
Do.	Shandong Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Shandong, Zibo	2,000
Do.	Bingzhou Weiqiao Aluminum Co.	Shandong, Zouping	1,600
Do.	Shanxi Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Shanxi, Hejin	2,700
Do.	Liulin Senze Group	Shanxi, Liulin	600
Do.	Coalmine Aluminum (Sanmenxia) Co. Ltd.	Shanxi, Sanmenxia	1,200
Do.	Shanxi Luneng Jinbei Aluminum Co. Ltd.	Shanxi, Yuanping	2,000
Do.	Wenshan Aluminum Co. Ltd. (Yunnan Aluminum Co.)	Yunnan, Wenshan	800
Metal	Baiyin Aluminum Plant	Gansu, Baiyin	500
Do.	Gansu Dongxing Aluminum Co. Ltd. (Jiuquan Iron and Steel Co. Ltd.)	Gansu, Jiayuguan	900
Do.	Lanzhou Aluminum Plant (Jiuquan Iron and Steel Co. Ltd.)	Gansu, Lanzhou	210
Do.	Liancheng Aluminum Plant	do.	235
Do.	Gansu Dongxing Aluminum Co. Ltd. (formerly Gansu Longxi Aluminum Plant) (Jiuquan Iron and Steel Co. Ltd.)	Gansu, Longxi	360
Do.	Yinhai Aluminum Co. Ltd.	Guangxi, Laibin	125
Do.	Pingguo Aluminum Co. [Aluminum Corporation of China (Chinalco)]	Guangxi, Pingguo	380
Do.	Guizhou Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Guizhou, Guiyang	400
Do.	Chalco Zunyi Aluminum Co. Ltd. [Aluminum Corporation of China (Chinalco)]	Guizhou, Zunyi	250
Do.	Henan Zhongfu Industry Co. Ltd.	Henan, Gongyi	180
Do.	Jiaozuo Wanfang Aluminum Co. Ltd.	Henan, Jiaozuo	420
Do.	Henan Wanji Aluminum Co. Ltd.	Henan, Luoyang	125
Do.	Henan Zhongmai Mianchi Aluminum Plant	Henan, Mianchi	400
Do.	Shangqiu Aluminum Smelter	Henan, Shangqiu	180
Do.	Yichuan Yugang Longquan Aluminum Co.	Henan, Yichuan	600
Do.	Shangqiu Shenhua Foguang Aluminum Co. Ltd.	Henan, Yongcheng	280
Do.	Hanjiang Danjiangkou Aluminum Co. Ltd.	Hubei, Danjiangkou	110
Do.	Hunan Chuanquan Aluminum Co. Ltd.	Hunan, Taoyuan	210
Do.	Fushun Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Liaoning, Fushun	340
Do.	Baotou Aluminum Plant	Nei Mongol, Baotou	250
Do.	Orient (East Hope) Aluminum Plant (Orient Group)	do.	800
Do.	Nei Mongol HMHJ Aluminum Electricity Co. Ltd.	Nei Mongol, Holin Gol	400
Do.	Qingtongxia Aluminum Plant (China Power Investment Corp. and Ningxia Qingtongxia Energy Group Co. Ltd.)	Ningxia, Qingtongxia	1,150
Do.	Qiaotou Aluminum Co. Electrolysis Branch	Qinghai, Datong	750
Do.	Qinghai Aluminum Smelter [Aluminum Corporation of China (Chinalco)]	Qinghai, Xining	560
Do.	Qinghai West Mining Baihe Aluminum Co. Ltd.	do.	112
Do.	Tongchuan Xingguang Aluminum Co. Ltd.	Shaanxi, Tongchuan	250

See footnotes at end of table.

TABLE 2—Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners <sup>1</sup>	Location of main facilities <sup>2</sup>	Annual capacity <sup>e</sup>
Aluminum—Continued:			
Metal—Continued	Shandong Chiping Xinfu Aluminum and Power Group	Shandong, Chiping	360
Do.	Taishan Aluminum-Power Co. Ltd.	Shandong, Fecheng	125
Do.	Shandong Nanshan Aluminum Co. Ltd. (Nanshan Group)	Shandong, Nanshan, Longkou	156
Do.	Shandong Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Shandong, Zibo	120
Do.	Bingzhou Weiqiao Aluminum Co.	Shandong, Zouping	250
Do.	Zouping Aluminum Co. Ltd.	do.	150
Do.	Huaze Aluminum and Power Co. Ltd.	Shanxi, Hejin	400
Do.	New Orient Aluminum Co. Ltd.	Shanxi, Taiyuan	75
Do.	Chalco Shanxi Huasheng Aluminum Co. Ltd. [Aluminum Corporation of China (Chinalco)]	Shanxi, Yongji	220
Do.	Shanxi Guanlv Aluminum Co. Ltd.	Shanxi, Yuncheng	210
Do.	Qient (East Hope) Aluminum Plant (Orient Group)	Xinjiang, Changji Prefecture	540
Do.	Xinjiang Qiya Aluminum Co. Ltd.	do.	450
Do.	Xinjiang Nongliushi Aluminum Co. Ltd.	Xinjiang, Wujiaqu	1,200
Do.	Yunnan Aluminum Plant	Yunnan, Kunming	500
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
Coal	Liuzhuang Mining Co. Ltd. coal mine (State Development and Investment Corp.)	Anhui, Bengbu	11,400
Do.	Xieqiao Coal Mine (Huainan Mining (Group) Co. Ltd.)	Anhui, Fuyang, Yingshang	9,600
Do.	Fengfeng Group Co. Ltd. coal mines (Jizhong Energy Group Co. Ltd.)	Hebei, Handan	20,000
Do.	Handan Mining Group Co. Ltd. coal mines (Jizhong Energy Group Co. Ltd.)	do.	11,000
Do.	Jixi Mining Group coal mines (Heilongjiang Longmay Mining Holding Group Co. Ltd.)	Heilongjiang, Jixi	16,000
Do.	Zhongguo Pingmei Shenma Energy Chemical Group Co. Ltd. coal mines (China Pingmei Shenma Group)	Henan, Pingdingshan	40,000
Do.	Buetai Coal Mine [(Shendong Coal Group Co. Ltd.) Shenhua Group Corp. Ltd.]	Nei Mongol, Erdos	20,000
Do.	Bulianta Coal Mine [(Shendong Coal Group Co. Ltd.) Shenhua Group Corp. Ltd.]	do.	25,000
Do.	Heidaigou Coal Mine [(Shenhua Group Zhungeer Energy Co. Ltd.) Shenhua Group Corp. Ltd.]	do.	25,000
Do.	Suancangou Coal Mine (Nei Mongol Yitai Coal Co. Ltd.)	Nei Mongol, Jungar Banner	12,000
Do.	Diliuta Coal Mine [(Shendong Coal Group Co. Ltd.) Shenhua Group Corp. Ltd.]	Shaanxi, Yulin	20,000
Do.	Hancheng Coal Mine [(Hancheng Coal Bureau) Shaanxi Coal and Chemical Industry Group Co. Ltd.]	Shaanxi, Hancheng	20,000
Do.	Chenghe Coal Mine [Chenghe Mining Bureau) Shaanxi Coal and Chemical Industry Group Co. Ltd.]	Shaanxi, Chengcheng	20,000
Do.	Yanzhou Coalfield [(Yanzhou Coal Mining Co. Ltd.) Yankuang Group Co., Ltd.]	Shandong, Jining	35,000
Do.	Antaibao Coal Mine [(Pingshuo Coal Industry Co., operator) China National Coal Group Corp.]	Shanxi, Pingshuo	20,000
Do.	Tongxin Coal Mine (Datong Coal Mine Group Co. Ltd.)	Shanxi, Datong	10,000

See footnotes at end of table.



TABLE 2—Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners <sup>1</sup>	Location of main facilities <sup>2</sup>	Annual capacity <sup>e</sup>
Coal—Continued		Xishan, Hedong, and Huoxi coalfields [Xishan Coal and Electricity Coking Coal Group Co., operator (Shanxi Coking Coal Group Co. Ltd.)]	Shanxi, Taiyuan	33,000
Do.		Lu'an Mining Group Co. Ltd.	Shanxi, Changzhi, Xiangyuaj	90,000
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	60
Do.		Zijin Copper Co. Ltd.	Fujian, Shanghang	200
Do.		Baiyin Nonferrous Metals Group Co. Ltd.	Gansu, Baiyin	100
Do.		Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	600
Do.		do.	Guangxi, Fangchenggang	400
Do.		Luoyang Copper Processing Factory	Henan, Luoyang	50
Do.		Daye Nonferrous Metals Co.	Hubei, Daye	400
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	100
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 Kumpeng 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	250
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
Do.	do.	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

See footnotes at end of table.

TABLE 2—Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners <sup>1</sup>	Location of main facilities <sup>2</sup>	Annual capacity <sup>e</sup>
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, Shaoguan	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	85
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.	Hsiukuangshan 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	10,000
Do.		Shoudu (Capital) Mining Co.	Beijing	20,000
Do.		Jiuquan Iron and Steel Co. Ltd.	Gansu, Jiayuguan	4,000
Do.		Hainan Iron Mine	Hainan, Changjiang	4,600
Do.		Handan Xingtai Metallurgical Bureau (Hebei Iron and Steel Group Co.)	Hebei, Handan	3,800
Do.		Tangshan Iron and Steel Co. (Hebei Iron and Steel Group Co.)	Hebei, Tangshan	3,000
Do.		Wuhan Iron and Steel (Group) Co. (Wugang)	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	13,700
Do.		Baotou Iron and Steel and Rare Earth Co.	Nei Mongol, Baotou	10,000
Do.		Taiyuan Iron and Steel Co.	Shanxi, Taiyuan	4,000
Do.		Dabaoshan Mining Co.	Guangdong, Qujiang	1,670
Do.		Panzhuhua Mining Co.	Sichuan, Panzhuhua	13,000
Do.		Kunming Iron and Steel Co.	Yunnan, Kunming	1,400
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 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners <sup>1</sup>	Location of main facilities <sup>2</sup>	Annual capacity <sup>c</sup>
<b>Iron and steel—Continued:</b>			
Crude steel	Ma'anshan Iron and Steel Co.	Anhui, Maanshan	10,000
Do.	Liuzhou Iron and Steel Group	Guangxi, Liuzhou	6,000
Do.	Shougang-Tangshan Iron and Steel Group Co. Ltd.	Hebei, Caofeidian	10,000
Do.	Handan Iron and Steel General Work (Hebei Iron and Steel Group Co.)	Hebei, Handan	12,000
Do.	Shougang Qianan Iron and Steel Co. Ltd. (Shougang)	Hebei, Qianan	7,800
Do.	Tangshan Iron and Steel Co. (Taigang) (Hebei Iron and Steel Group Co.)	Hebei, Tangshan	15,000
Do.	Wuhan Iron and Steel (Group) Co. (Wugang)	Hubei, Wuhan	12,000
Do.	Shagang Group Co. Ltd.	Jiangsu, Zhangjiagang	30,000
Do.	Anshan Iron and Steel (Group) Co. (Angang) (Anben Iron and Steel Group)	Liaoning, Anshan	16,000
Do.	Benxi Iron and Steel Co. (Bengang) (Anben Iron and Steel Group)	Liaoning, Benxi	6,000
Do.	Anshan Iron and Steel (Group) Co. (Angang) (Anben Iron and Steel Group)	Liaoning, Yingkou, Bayuquan	6,500
Do.	Baotou Iron and Steel and Rare Earth Co. (Baogang Group)	Nei Mongol, Baotou	10,000
Do.	Baoshan Iron and Steel (Group) Corp. (Baosteel) [Baogang Group]	Shanghai	19,000
Do.	Shanghai Iron and Steel Co. Ltd.	do.	6,000
Do.	Shandong Jinan Iron and Steel Group Co. (Shandong Iron and Steel Group)	Shandong, Jinan	10,000
Do.	Shandong Laiwu Iron and Steel Group Co. (Shandong Iron and Steel Group)	Shandong, Laiwu	10,000
Do.	Taiyuan Iron and Steel Co. (Taigang)	Shanxi, Taiyuan	5,000
Do.	Panzhuhua Iron and Steel (Group) Co. (Pangang)	Sichuan, Panzhihua	6,000
Do.	Xinjiang Biyi Iron and Steel Group (Baogang Group)	Xinjiang, Urumqi	6,000
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 Nonfermet Co.)	Guangdong, Shaoguan	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.	Shaaxi 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 <sub>3</sub>	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. (former Xinjiang Lithium Co.)	Xinjiang, Urumqi	5

See footnotes at end of table.

TABLE 2—Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners <sup>1</sup>	Location of main facilities <sup>2</sup>	Annual capacity <sup>e</sup>
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
Manganese, metal	Chongqing Tycoon Manganese Co. Ltd.	Chongqing	23
Do.	Guangxi Dameng Manganese Industry Co. Ltd.	Guangxi, Nanning	70
Molybdenum, concentrate	Luoyang Luanchuan Molybdenum Industry Group 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 Kumpeng 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
Palladium and platinum	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchang	3,500
Petroleum, crude	Shengli Administration	Hebei, Shengli	33,500
Do.	Daqing Administration	Heilongjiang, Daqing	55,000
Do.	Liaohe Administration	Liaoning, Liaohe	15,000
Do.	Bohai Offshore Oil Corp.	Bohai	4,000
Do.	Nanghai East Corp.	Nanghai	5,000
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	Fujian Changting Jinlong Rare Earth Co. Ltd.	Fujian, Changting	4
Do.	Gansu Rare Earths Co.	Gansu, Baiyin	32
Do.	Zhujiang Smelter	Guangdong, Guangzhou	5
Do.	Jiangyin Jiahua Advanced Material Resources Co. Ltd. (Neo Material Technologies)	Jiangsu, Jiangyin	3
Do.	Liyang Rhodia Rare Earth New Material Co. Ltd. (Rhodia Group)	Jiangsu, Liyang	12
Do.	Jiangsu Guosheng Rare Earth Co. Ltd.	Jiangsu, Taixing	5
Do.	Yixing Xinwei Leeshing Rare Earth Co. Ltd. (China Rare Earth Holdings Ltd.)	Jiangsu, Yixing	6
Do.	Dingnan Nanfang Rare Earth Co. Ltd.	Jiangxi, Ganzhou, Dingnan	4
Do.	Longnan Guangdong Rising Rare Earth Smelting Co. Ltd.	Jiangxi, Ganzhou, Longnan	4
Do.	Baotou Iron and Steel and Rare Earths Corp. (Baogang Group)	Nei Mongol, Baotou	55
Do.	Leshan Primet (Puruimei) New Materials Co. Ltd. (US Primet LLC)	Sichuan, Leshan	8
Do.	Sichuan Jiangxi Copper Rare Earth Co. Ltd. (Jiangxi Copper Co. Ltd.)	Sichuan, Mianning	18
Rhenium, rhenate	Guixi Smelter (Jiangxi Copper Co. Ltd.)	Jiangxi, Guixi	3,000
Do.	do. Western Xinxing Metal Materials Co. Ltd.	Shaanxi, Luonan	200
Salt	Shandong Haihua Group Co. Ltd.	Shandong, Weifang	1,400
Do.	Zigong Zhangjiaba Salt Chemical Plant	Sichuan, Zigong	250
Selenium	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchang	50
Do.	do. Guixi Smelter (Jiangxi Copper Co. Ltd.)	Jiangxi, Guixi	300

See footnotes at end of table.



TABLE 2—Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners <sup>1</sup>	Location of main facilities <sup>2</sup>	Annual capacity <sup>e</sup>
Silver	metric tons	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
Tungsten, concentrate		Ninghua Hangluoken Tungsten Mine (Amoi Tungsten Co. Ltd.)	Fujian, Ninghua	4
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

See footnotes at end of table.

TABLE 2—Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners <sup>1</sup>	Location of main facilities <sup>2</sup>	Annual capacity <sup>e</sup>
Zinc	Northwest China Lead-Zinc Smelter (Baiyin Nonferrous Metals Co. Ltd.)	Gansu, Baiyin	150
Do.	Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoguan	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

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Most companies are owned by either the Central Government or a Provincial government.

<sup>2</sup>Listed by Province or Autonomous Region, followed by locality.

TABLE 3  
CHINA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2013

Commodity	Quantity (metric tons)	Value (thousands)
METALS		
Aluminum:		
Alumina	186,301	\$95,076
Metal and alloys:		
Unwrought	572,280	1,280,005
Semimanufactures	3,070,000	10,406,851
Antimony, unwrought	2,167	21,225
Copper, metal and alloys:		
Unwrought	293,747	2,268,391
Semimanufactures	489,000	4,176,731
Iron and steel:		
Pig iron and cast iron	260,000	110,568
Steel:		
Bars and rods	17,110,000	10,363,836
Shapes and sections	4,230,000	2,680,566
Sheets and plates	27,640,000	22,307,912
Tube and pipe	1,560,000	4,040,859
Wire of steel or iron	1,840,000	2,057,383
Ferroalloys	580,000	1,193,798
Scrap	264	172
Manganese, unwrought	222,750	487,021
Molybdenum, ores and concentrates	6,550	88,327
Tin, metal and alloys, unwrought	3,002	70,334
Tungsten, tungstates	2,798	90,819
Zinc:		
Metal and alloys, unwrought	5,395	12,275
Oxide and peroxide	9,617	17,250
INDUSTRIAL MINERALS		
Barite	2,060,000	279,516
Cement	14,540,000	795,983
Fluorspar	450,000	137,637
Granite	7,370,000	3,774,560
Graphite, natural	250,000	276,619
Magnesia, fused	1,930,000	529,580
Rare-earth products	22,493	575,435
Talc	660,000	166,741
MINERAL FUELS AND RELATED MATERIALS		
Coal	7,510,000	1,061,863
Coke, semicoke	4,670,000	1,134,178
Petroleum:		
Crude oil	1,620,000	1,456,209
Refinery products	28,510,000	24,505,197

Source: General Administration of Customs of the People's Republic of China, 2013, China monthly exports and imports, no. 12.

TABLE 4  
CHINA: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2013

(Metric tons unless otherwise specified)

Commodity	Quantity	Value (thousands)
METALS		
Aluminum:		
Bauxite	71,530,972	\$3,838,575
Alumina	3,830,000	1,404,482
Metal and alloys, unwrought	481,401	1,010,148
Semimanufactures	481,722	3,026,275
Scrap	2,500,000	3,915,955
Chromium, chromite	12,090,000	2,390,668
Cobalt:		
Ore and concentrates	180,080	329,704
Unwrought and powder	5,362	66,556
Copper:		
Ore and concentrates	10,070,000	19,672,666
Metal and alloys, unwrought	3,891,790	28,961,356
Semimanufactures	650,035	6,446,058
Scrap	4,370,000	13,766,499
Iron and steel:		
Iron ore	819,410,000	105,728,071
Steel:		
Bars and rods	1,030,000	1,552,343
Seamless pipe	420,000	1,702,698
Shapes and sections	430,000	431,359
Sheets and plates	11,890,000	11,991,029
Scrap	4,460,000	2,598,523
Lead ore and concentrates	1,492,571	2,104,324
Manganese ore	16,610,000	3,191,716
Nickel:		
Ore and concentrates	71,181,991	5,169,943
Metal, refined greater than 99.95% Ni	3,034	49,274
Metal, other refined	165,156	2,610,817
Titanium dioxide	193,788	527,580
INDUSTRIAL MINERALS		
Diamond	kilograms 2,999	7,030,786
Nitrogen, phosphorus, and potassium fertilizers:		
Compound fertilizers	1,350,000	753,572
Diammonium phosphate	220,000	113,352
Potassium chloride	6,030,000	2,376,825
Potassium sulfate	110,000	57,616
Urea	30,443	10,903
MINERAL FUELS AND RELATED MATERIALS		
Coal	327,080,000	28,996,120
Liquefied natural gas	18,010,000	10,629,743
Petroleum:		
Crude oil	281,950,000	219,653,607
Refinery products	39,590,000	31,930,822

Source: General Administration of Customs of the People's Republic of China, 2013, China monthly exports and imports, no. 12.



TABLE 5  
CHINA: RESERVES OF MAJOR MINERAL COMMODITIES IN 2013<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodities	Reserves <sup>2</sup>
Antimony, Sb	460
Barite, ore	million metric tons 40
Bauxite	do. 983
Chromite, ore	4,000
Coal	billion metric tons 236
Copper, Cu	27,500
Fluorspar, ore	36,800
Gas, natural	billion cubic meters 4,640
Gold, Au	metric tons 1,870
Graphite, mineral	53,500
Iron ore, ore	million metric tons 19,900
Kaolin	92,700
Lead, Pb	15,800
Magnesite, ore	million metric tons 1,210
Manganese, ore	do. 215
Mirabilite, Na <sub>2</sub> SO <sub>4</sub>	do. 5,200
Molybdenum, Mo	8,060
Nickel, Ni	2,530
Petroleum	million metric tons 3,370
Phosphorus, ore	do. 3,000
Potash, KCl	do. 535
Pyrite, ore	do. 1,300
Salt, NaCl	billion metric tons 83
Silica, ore	million metric tons 1,900
Silver, Ag	37
Talc, ore	million metric tons 93
Tin, Sn	1,160
Titanium, ore	million metric tons 220
Tungsten, WO <sub>3</sub>	2,350
Vanadium, V <sub>2</sub> O <sub>5</sub>	9,100
Zinc, Zn	37,700

<sup>1</sup>Equivalent to "basic reserves" as defined by China's Ministry of Land and Resources.

<sup>2</sup>Rounded to three significant digits.

Source: China Statistical Yearbook 2014, p. 213.