



2009 Minerals Yearbook

CHINA

THE MINERAL INDUSTRY OF CHINA

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China was one of the leading economic and trade powers in the world, one of the top destinations for foreign direct investment, and an export destination of choice. During the past several years, the Government's economic policy was to prevent economic slowdown and fight inflation. In the past 2 years, most developed countries in the world were in recession. As a result, the value of the country's exports of goods decreased by 16% in 2009 compared with that of 2008. Because of the Chinese Government's aggressive investment-led stimulus package, the country's economy grew by 8.7% in 2009. The stimulus was centered on infrastructure spending combined with consumer subsidies and tax cuts. Fixed-asset investment increased by more than 30% in 2009 following a 26% increase in 2008. The Government also announced a 4 trillion yuan (\$586 billion) fiscal stimulus package, and state-owned banks provided loans of more than 9.6 trillion yuan (\$1.4 trillion) for infrastructure projects, such as airports, railways, and city transportation networks, and renovation projects in the minerals and metals sector. State-owned enterprises received the majority of the funds. The Government provided incentives to car buyers and, as a result, the number of automobiles sold increased to 13.6 million in 2009. China became one of the top automobile producing countries in the world. The Government also provided subsidies for rural consumption of electronic appliances. The Government kept the yuan steady against the U.S. dollar in 2009 as part of the stimulus program to support exports. Real estate investment was very weak in early 2009; however, with massive liquidity, real estate investment increased rapidly in the second half of 2009 (National Bureau of Statistics of China, 2010, p. 1; World Bank, The, 2010, p. 2-6).

Industrial production increased by 8.3% compared with that of 2008. Because of lower oil prices, the consumer price index (a measurement of inflation) fell for most of the year. In the last 2 months of the year, the consumer price index recorded a year-on-year increase only. The consumer price index decreased by 0.7% in 2009 compared with an increase of 5.9% in 2008. The global financial crisis had only a limited direct effect on China's financial system but it affected the country's export market. At yearend 2009, the foreign exchange reserves increased by \$453 billion to \$2.3 trillion, which was a lower growth rate than during the past 5 years. The official urban unemployment rate increased by 0.1% to 4.3% in 2009; large sections of the working population, however, such as migrant workers, were not eligible to register as unemployed. An estimated 20 million had lost their jobs in early 2009 as demand for manufactured exports decreased. The labor market started to improve in the second quarter as a result of an increase in industrial production and construction. By yearend, enterprises in the eastern Provinces reported labor shortages as export orders increased and unemployed migrant workers moved to other regions that were benefiting from stimulus-funded infrastructure projects. Each year, an average of 24 million new job seekers entered the labor market (National Bureau of Statistics of China, 2010, p. 2).

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, fluorspar, gold, graphite, iron and steel, lead, phosphate rock, rare earths, salt, talc, tin, tungsten, and zinc in 2009. China ranked among the top three countries in the world in the production of many other mineral commodities. China was the leading exporter of antimony, barite, fluorspar, graphite, indium, rare earths, and tungsten in the world. The country's demand for chromium, cobalt, copper, iron ore, manganese, nickel, petroleum, platinum-group metals, and potash exceeded domestic supply, and imports were estimated to account for more than 30% of domestic consumption. Mineral trade, which accounted for 22.6% of the country's total trade, decreased by 24.3% in 2009. China was one of the few countries whose domestic supply and demand for a variety of mineral commodities affected the world mineral market. The labor force in the mining sector was 5.35 million, or 4.5% of the country's total workforce in 2008 (Ministry of Land and Resources, 2010c, p. 3-7).

Government Policies and Programs

China's rapid capital-intensive, export-oriented growth had been successful during the past three decades; however, the global markets it relied on were expected to be weaker in the future. The existing pattern of growth was energy- and natural resource-intensive and environmentally unsustainable. The Government expected the country's economy to grow by about 8% and the consumer price index to remain low during the next several years. The exchange rate of its currency, the "yuan," would be kept at an "appropriate and balanced" level. In 2009, the exchange rate was, on average, \$1.00 = 6.83 yuan. The Chinese Government declared that the country would cut its emission intensity by 40% in 2009 from the 2005 baseline and would support and build an energy-saving, ecologically friendly society. The carbon reduction would focus on the energy-intensive sectors, such as cement, chemicals, iron and steel, and nonferrous metals. The Government would issue a series of technological and fiscal support policies to promote the use of renewable energy in 2010 (Citigroup Global Market Inc., 2010).

The Government considered unifying the method of calculating the gross domestic product (GDP) throughout the country. Currently, local governments calculated their own GDP and reported their calculations to the National Bureau of Statistics for verification. Some local governments inflated their GDP figures because the growth of GDP figures was the yardstick by which local officials' performance was measured. Also, the calculating methods and standards adopted by national and local departments reached different results (China Daily, 2010a).

The Government established the National Energy Commission to strengthen decisionmaking for energy-related

issues. The Premier was the head of the new commission, and other commission members included the heads of China's 21 ministries and commissions. During the past 30 years, the management of the country has gone through many changes. In 2008, the reorganization of the Government structure aimed to eliminate overlapping of institutions and functions. Energy issues, however, such as those concerning coal, gas, oil, power, price reform, market access, and taxes remained spread among different agencies. Setting up the energy coordination mechanism might help in the formulation of the country's energy development strategy, the study of energy safety, and the coordination of international energy cooperation. The National Energy Administration of the National Development and Reform Commission (NDRC) was assigned to oversee the administration of the National Energy Commission (China Energy Report Weekly, 2010a).

After more than three decades of development, the existing structure of most industries no longer met the requirements of the modern business world. The Chinese enterprises were considered to be weak in independent innovation; they had low measures of competitiveness and productivity, depended heavily on external demand, and had undiversified product lines. The Government announced that 10 major industries in China—automobile manufacturing, electronic information, equipment manufacturing, iron and steel production, light industry, logistics, nonferrous metals production, petrochemicals, shipbuilding, and textile manufacturing—were to be reformed and upgraded. These industries accounted for more than 80% of the country's total industrial output value and about one-third of the GDP. The Government decided that the reform of these industries could help China compete more effectively with other developed countries. Under the reform guidelines, the Government planned to eliminate 74 million metric tons (Mt) of cement production capacity, 21 Mt of ironmaking capacity, 18 Mt of coking coal production capacity, 17 Mt of steelmaking capacity, 1.6 Mt of ferroalloy production capacity, and 314,000 metric tons (t) of aluminum production capacity in 2009. Provincial and city governments were required to eliminate all assigned quotas at yearend and to submit progress reports in February 2010. The Government planned to eliminate additional production capacity for cement (50 Mt), iron (25 Mt), steel (6 Mt), and aluminum (330,000 t) by the third quarter of 2010. The Government also committed \$2.9 billion to a special fund for the technology renovation program, and a total of \$22 billion of the Government's budget was allocated to reform these industries (Ministry of Industry and Information Technology, 2009).

Even though it had been amended several times, the Government considered the 1984 resource tax law usable to meet the need for conservation of natural resources and protection of the environment. Under the current regulations, the fuels and minerals tax was based on tonnage. The Government planned to change the fuels and minerals tax to be based on market prices. The tax rate proposed was between 3% and 5%. Another issue related to changing the resource tax was who would collect the tax revenue. Currently, local governments collected the resource tax revenue of mined minerals and fuels under their jurisdictions, except for offshore oil, which was

under the Administration of Taxation. The new resource tax for natural gas and oil based on price would start a trial run in Xinjiang Uygur Autonomous Region beginning on June 1, 2010. The tax rate for gas and oil was set at 5% in Xinjiang. Domestic analysts believed that the Government would announce the full implementation of the new resource tax in 2010 (China Metal Bulletin, 2010b; Ministry of Finance, 2010).

In 2007, the Government had discontinued the practice of giving preferential power rates to energy-intensive users, such as those that produced aluminum, ammonia, caustic soda, cement, copper, ferroalloys, yellow phosphorus, and zinc. In July 2008, the NDRC increased the price of electricity by 25 yuan per million watt-hours. Owing to the global financial crisis and the decrease in the demand for electricity, some local governments went against the policy of the Central Government and reinstated the preferential power rates for energy-intensive users as a way to stimulate the local economy. The Central Government again ordered local governments to discontinue preferential power rates for energy-intensive users, such as those that produce aluminum, cement, ferroalloys, iron and steel, soda ash, and yellow phosphorus. The power rate for these sectors would increase to 0.1 yuan per kilowatt-hour from 0.05 yuan in 2010. For producers that the Government ordered to be eventually shut down, the power rate would increase to 0.3 yuan from 0.2 yuan. Local governments were forbidden to change these power rates. The Ministry of Industry and Information Technology (MIIT) and other related agencies planned to issue guidelines describing how to close down energy-intensive producers in each Province and municipality (Magnesium Report, 2010).

In March, the State Electricity Regulatory Commission and the NDRC allowed 13 aluminum producers to purchase electricity from powerplants directly. Previously, these producers were required to purchase electricity from power grid (distribution) companies. Because of a lack of clarity in the policy, the aluminum producers and powerplant representatives could not reach an agreement on prices. The Government clarified that thermal powerplants with an installed capacity of more than 300 megawatts (MW) per generator and hydropower plants with an installed capacity of 100 MW per generator were allowed to sell electricity directly to industrial consumers (China Energy Report Weekly, 2009).

In 1988, the State Council declared gold to be a protected commodity for exploitation. The Government added antimony, rare earths, tin, and tungsten to the protected mining list in 1991 and included clay containing high alumina, fluor spar, and molybdenum to the list in 2010. China was either the leading or one of the three leading producers of these commodities in the world. The Government believed that these commodities were over-exploited during the past several decades, which threatened to deplete these resources. Therefore, the Government decided to regulate the production of these commodities and to protect the country's nonrenewable mineral resources to support sustainable development for future generations. In 2009, the Ministry of Land and Resources (MLR) set an exploitation quota for tungsten concentrate at 68,555 t (with tungsten trioxide content of 65%), of which 60,440 t was primary recovery and 8,115 t was byproduct recovery; antimony concentrate was set

at 90,180 t (metal content), of which 65,180 t was assigned to Provinces and 25,000 t was unassigned and was being held by the Ministry temporarily; and rare-earth concentrate was set at 82,320 t [rare-earth oxide (REO) equivalent], of which 72,300 t was light rare earths and 10,020 t was medium and heavy rare earths. In 2010, the MLR announced that the exploitation quota for tungsten concentrate would be set at 80,000 t, of which 66,480 t was primary and 13,520 t was byproduct; antimony concentrate, 100,000 t, of which 69,520 t was assigned and 30,480 t was on hold; rare-earth concentrate, 89,200 t (REO), of which 77,000 t was light rare earths and 12,200 t was medium and heavy rare earths; fluor spar (in ore), 11 Mt, of which 10 Mt was assigned and 1 Mt was on hold; and alumina clay, 4.5 Mt, of which 4.3 Mt was assigned and 0.2 Mt was on hold. The MIIT announced that the 2010 exploitation quota for molybdenum concentrate (contained 45% Mo) would be set at 185,000 t; tin concentrate (metal content), 65,000 t; and rare earths, 89,200 t of rare-earth concentrate (REO) and 86,000 t of rare-earth separated products. Unlike in 2009, the MIIT and MLR announced the same tonnage for the rare-earth quota in 2010. Provincial governments were responsible for managing their allocated quota and assigning the output quota to individual mining companies. The MLR announced that it would not accept applications for antimony, rare-earths, and tungsten exploration and mining licenses until June 30, 2011 (Ministry of Industry and Information Technology, 2010a; Ministry of Land and Resources, 2010a, b).

China's oil consumption ranked in the top five of the world, yet domestic oil production met less than 50% of the country's need. Higher prices of oil and mineral commodities had threatened sustainable economic development of the country. The Government decided to stockpile a strategic oil reserve with a capacity equivalent to 90 days of the country's oil consumption. In 2009, China completed the construction of four oil storage bases, all of which were located in coastal areas—Dalian in Liaoning Province, Huangdao in Shandong Province, and Zhenhai and Zhoushan in Zhejiang Province. The total storage capacity of the four bases was 16.4 million cubic meters, or 30 days of net imports. In the second phase, the Government planned to construct eight storage bases; four of the selected bases were to be located at Huangdao in Shandong Province, Jinzhou in Liaoning Province, and Huizhou and Zhanjiang in Guangdong Province. The Government considered locating one storage base at Duzhanzi in Xinjiang Uygur Autonomous Region to store oil imported from Kazakhstan. The country would have oil storage capacity of 44.6 million cubic meters in 2011 and 70 million cubic meters by 2015 (China Daily, 2010b).

The National People's Congress (NPC) amended the 2005 renewable energy law in 2009 to promote development and use of renewable energy. China's National Energy Agency planned to build a number of 10-MW wind farms in the Provinces of Gansu, Hebei, and Jiangsu, and the Nei Mongol Autonomous Region in the next 10 years. The Government also planned to develop guidelines to regulate the secondary metal sector. During the past decade, the output capacity of secondary metals increased rapidly. Nearly all secondary metal plants were privately owned. In 2009, the Government estimated that about 1.2 Mt of output capacity was added, of which

aluminum accounted for 500,000 t; copper, 400,000 t; and lead, 300,000 t. Most of these plants were small in size and used obsolete technology. The Government planned to set a minimum output capacity for each sector, and plants would need to meet environmental protection standards. The Government estimated that secondary nonferrous metal production would reach 11.1 Mt in 2015 (Resource Recycling, 2010).

In 2009, the Government carried out tax and price reforms for electricity, oil products, and water. The reforms were enacted to ensure that the prices of these products reflect the current market situation. The Government also lifted the restriction on the prices of chemical fertilizers. The prices of fertilizers from local factories would be determined by the market instead of being guided by the Government (China Chemical News, 2010b).

The NPC approved the law on state-owned assets of enterprises, which went into effect in late 2008. The law gives corporations and enterprises greater independence (authority) in decisionmaking and allows them to be listed on the stock exchange. State-owned enterprises under the supervision of the State-Owned Assets Supervision and Administration Commission had decreased to 128 from 151. The Commission planned to merge smaller and underperforming state-owned enterprises with other state-owned enterprises. The Commission's plan was to reduce the number of state-owned enterprises to between 30 and 50 by yearend 2010 (China Economic News, 2010).

Production

China was one of the world's leading countries in the production of aluminum, antimony, barite, bismuth, cement, coal, copper, fluor spar, gold, graphite, indium, iron and steel, lead, lime, magnesium, manganese, molybdenum, phosphate rock, rare earths, salt, silver, talc, tin, tungsten, and zinc. The output quantity of these mineral commodities could have significant effects on world markets. In 2009, production of such commodities as bismuth, coal, copper, gold, iron and steel, lead, mercury, molybdenum, nickel, phosphate rock, soda ash, tin, titanium, and zinc increased compared with that of 2008 (table 1). China's reform priorities were to improve the efficiency of resource allocation and to boost economic growth. The Government understood that the unbalanced growth of consumption, investment, and net exports could not continue unabated forever. During the past several years, the Government 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, the growth of China's minerals and metals output was expected to continue.

Structure of the Mineral Industry

China's mining industry is highly fragmented and had a poor safety record. Several companies often mined in a single mining area. As a result, miners searched for resources and ignored laws and regulations regarding safety and the environment. The State Council approved a mining consolidation plan that had been proposed jointly by the MLR, the 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 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. The Government would not allow any expansion of mining boundaries during the consolidation period. The Government would not issue mining operation permits to uncooperative mine operators. Local governments were required to submit their consolidation plans to the MLR for recording. During the past several years, the Government approved state-owned enterprises to diversify their core business into other sectors, such as Aluminum Corporation of China (Chinalco) to be a major shareholder of copper companies in the Provinces of Hebei and Yunnan, Baoshan Iron and Steel (Group) Corp. to invest in coal mining in Shanxi Province, and Jiangxi Copper Co. Ltd. to take charge of rare-earth mining in Sichuan Province (China Economic News, 2009b).

Mineral Trade

The global financial crisis had a severe effect on China's trade. China has become one of the most important production bases in the world. According to the customs statistics, China's total trade was valued at \$2.2 trillion in 2009; this was a decrease of 13.9% compared with that of 2008. Exports posted a decrease of 16.0% to \$1.2 trillion. The value of exports of foreign-invested enterprises also decreased to \$672.1 billion in 2009 from \$790.5 billion in 2008. Imports were down by 11.2% to \$1.0 trillion. Foreign-invested enterprises also decreased to \$545.2 billion in 2009 from \$619.4 billion in 2008. The United States remained the leading destination for China's exports followed by the European Union (EU), Hong Kong, and Japan. Japan was China's leading source of imports followed by the Republic of Korea and the EU. Imports of raw materials, such as bauxite, chromium ore, iron ore, manganese ore, potassium fertilizer, and oil increased sharply. In 2009, the total value of mineral and metal product trade was \$498.7 billion. China's main exports were concentrated in those middle- and low-end manufacturing products. A large amount of capital, technologies, designs, and even raw materials were coming from abroad. This was why China posted a trade surplus with Western countries and trade deficits with such countries as Australia, Brazil, Chile, and Indonesia, which produced fuels and minerals (General Administration of Customs of the People's Republic of China, 2009).

The Ministry of Commerce (MOC) issued Circular no. 125, which details the mineral commodities that are under the Government's monitoring list for export. 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; platinum; 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. In 2009, the Government encouraged the import of raw materials, such as concentrates of chromite, nickel, niobium, tantalum, titanium, and uranium; copper concentrates with metal content higher than 20%; cobalt concentrates with cobalt content higher than 6%; lead concentrates with lead content higher than 55%; zinc concentrates with zinc content higher than 40%; and ferronickel. Starting on February 1, 2010, the Government would reduce the tariff rate on imports of cobalt, copper, and nickel concentrates to zero and would reduce the tariff rate on exports of refined copper, unwrought aluminum, and nickel to zero. In November 2009, the Ministry of Finance (MOF) announced that the 17% value-added tax on gold that was contained in imported crude copper was eliminated (Ministry of Commerce, 2009d, p. 1-20; National Development and Reform Commission, 2009, p. 13-14).

The Government adjusted the 2010 export quotas for phosphate rock to 1.5 Mt, magnesia to 1.33 Mt, bauxite (alumina clay) to 930,000 t, talc to 610,000 t, silicon carbide to 216,000 t, antimony and antimony products (metal content) to 57,500 t, molybdenum to 25,500 t, tin and tin products (metal content) to 21,000 t, tungsten and tungsten products (metal content) to 14,300 t, silver to 5,100 t, and indium to 233 t. The first batch of export quotas for mineral products usually accounted for 60% of the total annual export quota. The MOC also issued guidelines for enterprises that had the right to supply and export antimony, coke, ferroalloys, indium, molybdenum, rare earths, silver, and tungsten. The import quota for ammonium phosphoric acid was set at 6.90 Mt; complex fertilizer, 3.45 Mt; and urea, 3.30 Mt. Imports of mined mineral products would be subject to a 17% mineral tax, as were domestic mined mineral products (Ministry of Commerce, 2009e).

Owing to an increase in domestic demand and in order to conserve domestic mineral resources, the Government reduced export quotas on key commodities. Although the export quotas for coal, coking coal, and rare earths were not publicly available, the announcement of the changes in the export allocations and an increase in tariffs for those commodities indicate that the export volume of the commodities would likely be the same in 2010 as in 2009. In 2009, the first batch export quota for coke was 5.78 Mt and the second batch was 6.13 t. The Government allocated a total of only 11.91 Mt in 2009, which was about 1% less than in 2008. In 2010, the total first batch coke export quota was 6.60 Mt; of that amount, 6.10 Mt was for domestic coke producers and 499,087 t was for Sino-foreign coke producers. The export quota for domestic rare-earth producers was 33,300 t (17,033 t for the first batch and 16,267 t for the second batch) and 16,845.1 t was for Sino-foreign joint-venture producers (6,685.1 t for the first batch and 10,160 t for the second batch) in 2009. The total rare-earth export quota was 50,145.1 t. The rare-earth export quota was in tonnage and was not in REO equivalent. The Government specified the kind of rare-earth products that Sino-foreign joint ventures were allowed to export, such as oxides, salts, or metal; however, there was no specification for domestic rare-earth producers. In 2010, the first batch export quota for rare earths was 16,304 t for

domestic rare-earth producers, and Sino-foreign joint-venture rare-earth producers were assigned a total of 5,978 t (Ministry of Commerce, 2009a-c, f, g; 2010).

In 2009, the EU, Mexico, and the United States requested that the World Trade Organization (WTO) schedule dispute-settlement consultations regarding China's export restraints in the form of export quotas on bauxite, coke, fluor spar, magnesium, manganese, silicon carbide, silicon metal, yellow phosphorus, and zinc. China imposed additional requirements and procedures in connection with the materials, including restricting the right to export based on prior export experience; establishing criteria that foreign-invested enterprises must satisfy in order to export that were different from those that domestic enterprises must satisfy; and requiring exporters to pay fees. The parties held 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 considered that these policies were to protect the environment and natural resources. Consultations are the first step in a WTO dispute. Under WTO rules, parties that do not resolve a matter through consultations within 60 days may request the establishment of a WTO dispute settlement panel (World Trade Organization, 2009).

In 2009, the Shanghai Futures Exchange announced a plan to launch copper, lead, nickel, and silver futures trading within the next 24 months. The Exchange would give priority to lead and silver first, followed by copper and nickel. Metal producers were expected to be the main participants; however, the Exchange believed that downstream enterprises would participate in futures trading. China's four commercial banks—China Industrial and Commercial Bank, Bank of Communication, Industrial Bank Co. Ltd., and China Minsheng Bank Corp. Ltd.—were members of the Exchange. The Exchange hoped that the Government would allow foreign investors to take part in domestic futures trading (China Mining and Metals Weekly, 2009a).

Commodity Review

Metals

Aluminum.—The global financial crisis reduced the demand for aluminum in China and the world. After more than two decades of positive growth, China's aluminum production decreased slightly, but the output of alumina increased slightly in 2009. China continued to experience a shortage of alumina, however. To support the aluminum sector, the country imported large quantities of alumina to meet the demand. In 2009, the volume of imported alumina was 5.14 Mt, which was about 11% higher than that of 2008. China's alumina imports were mainly from Australia, 89.7%, and India, 6.5%. China consumed about 26.7 Mt of alumina in 2009, of which 25.7 Mt was for metallurgical use and 1 Mt was for nonmetallurgical use. There was about 2.23 Mt of surplus alumina in the domestic market. During the past several years, about 23 alumina projects were either completed or under construction and more than 10 alumina projects were in the feasibility stage. By yearend 2010, China's alumina output capacity could reach 35 million metric

tons per year (Mt/yr) (Alumina and Aluminum Monthly, 2010; China Metal Bulletin, 2010c).

Owing to the gradual recovery of the aluminum market, the price per metric ton of alumina increased to about 2,800 yuan (\$410) at yearend from 2,000 yuan (\$293) at the beginning of 2009, which remained lower than the peak in 2008 of 4,200 yuan (\$615). Owing to an increase in production costs and demand, the domestic price per metric ton of aluminum increased to 16,500 yuan (\$2,420) in December from 11,600 yuan (\$1,700) in January. Owing to weak demand for alumina and aluminum at the end of 2008 and early 2009, Chinalco shut down about 30% of its alumina output capacity and 40% of its aluminum output capacity during the first quarter of the year. To prevent further decline in the price of aluminum on the domestic market, the State Reserve Bureau and the Provinces of Guangxi, Henan, Shaanxi, and Yunnan purchased a total of 1.73 Mt of aluminum from domestic aluminum producers in early 2009. Owing to the suspension of the domestic aluminum output capacity, weak international aluminum prices, and increased demand for aluminum from the domestic construction sector, China became a net importer of 1.4 Mt of aluminum in 2009, whereas it had been a net exporter of 12,000 t of aluminum in 2008, 49,000 t in 2007, and 548,000 t in 2006. Aluminum was imported mainly from Russia, 26.5%; Australia, 14.8%; India, 10.7%; and Tajikistan, 7.5%. China consumed about 13.3 Mt of aluminum, of which the construction sector accounted for about 40%; the transportation and power sectors, 18% each; appliances, 16%; and others, 8%. In 2009, total fixed investment by domestic aluminum producers was 36.9 billion yuan (\$5.40 billion); of that amount, about 31.6 billion yuan (\$4.63 billion) was in new projects. By yearend 2010, China's aluminum output capacity was expected to reach 25 Mt and production of aluminum metal was expected to be about 17 Mt (China Metal Bulletin, 2010d; China Mining and Metals Weekly, 2010c).

In 2009, China imported a total of 2.62 Mt of aluminum scrap; of that amount, Germany accounted for 18.8%; Spain and the United States, 15.7% each; Australia, 13.4%; Malaysia, 12.2%; Hong Kong, 4.8%; and others, 19.4%. Domestic analysts estimated that imported aluminum scrap contained about 70% aluminum. In 2009, the country produced about 3.1 Mt of secondary aluminum. Therefore, about 1.3 Mt of secondary aluminum output was produced from domestic aluminum scrap, including wastes from aluminum smelters and aluminum semimanufacturing, and from recycling used products. In 2009, the production of secondary aluminum accounted for about 19% of total aluminum output and was projected to increase to about 5.8 Mt, or 30% of total aluminum output, by 2015. Power consumption per ton of aluminum produced would be reduced sharply in 2015 compared with that of 2009 (Resource Recycling, 2009, 2010).

GAL Group's subsidiary Guizhou Guanglu Aluminum Co. started the construction of an 800,000-metric-ton-per-year (t/yr) alumina refinery in Qingzhen, Quizhou Province. GAL was an enterprise located in Guangdong Province. The Group was one of the leading manufacturers of aluminum extrusion products. The aluminum project was approved by NDRC in December 2008. The Bayer process would be employed to

produce metallurgical-grade alumina. The project included the construction of a 1.6-Mt/yr bauxite mine. The Qingzhen area had bauxite resources of 230 Mt. The company also planned to build an aluminum smelter and aluminum semimanufacturing plant in the area. The total investment was estimated to be \$3 billion. The alumina refinery was scheduled to be completed in 2012 (China Metals, 2009a).

Datang Group's subsidiary Datang International Power Generation Co. completed the construction of a 3,000-t/yr alumina pilot plant at Ordos (Erduosi), Nei Mongol Autonomous Region. Datang had developed an extraction technology to extract alumina from fly ash produced at the Datang Tuoketuo coal-fired powerplant; the fly ash contained nearly 42% alumina. The company demonstrated that the purity of alumina from the pilot plant met the industrial specifications. Each year, the coal-fired plant produced about 4 Mt of high-alumina fly ash. The alumina can be used for the production of aluminum-silicon-titanium alloy. The company decided to build an aluminum-silicon-titanium complex, which included a 373,000-t/yr calcium silicate plant, a 280,000-t/yr silicon-titanium alloy plant, a 100,000-t/yr alumina extraction plant, and a 45,000 t/yr silica plant. The construction of the complex started in mid-2009 and would take 3 years to complete (China Metal Bulletin, 2009b).

After 2 years of construction, Shanxi Luneng Jinbei Aluminum Co. Ltd. completed the second phase of its alumina expansion project, which included the expansion of its bauxite mines' output capacity in 2009. The company's alumina output capacity increased to 2 Mt/yr from 1 Mt/yr. Luoyang Wanji Xiangjiang Aluminum Co. Ltd. started the construction of its third phase alumina expansion project in 2009; the project was scheduled to be completed at the end of 2011. Wanji Xiangjiang also planned to expand its bauxite mines' output capacity. The company owned 12 bauxite mines/deposits in Xinan County of Luoyang, Henan Province. The renovation of Sanmenxia Yixiang Aluminum Co. Ltd.'s alumina project was completed in 2009. The alumina output capacity increased to 600,000 t/yr. Guangxi Huayin Aluminum Co. Ltd., which was a joint venture of Chinalco's subsidiary Aluminum Corp. of China Co. Ltd. (Chalco), China Minmetals Corp.'s subsidiary China Minmetals Nonferrous Metals Corp., and Provincially owned Guangxi Investment (Group) Corp., put its 1.6-Mt/yr alumina refinery, which was located in Debao county of Bose, Guangxi Province, into full operation in 2009. Construction of the refinery began in 2005, and the first 400,000 t/yr production line was completed in December 2007. The second stage of Huayia's alumina project was in the planning stage. It would add 1.6 Mt/yr of output capacity to the refinery (Alumina and Aluminum Monthly, 2009; China Metal Bulletin, 2009a; China Metals, 2010d).

The Government planned to phase out aluminum smelters that used 100-kiloampere prebake cell technology by yearend 2011. As a result, about 800,000 t of aluminum output capacity would be eliminated. Several aluminum expansion and greenfield projects were scheduled to be completed in 2011, however, including at the Aba Aluminum Plant, the Chalco Zunyi Aluminum Co. Ltd., the Chongqing Tiantai Aluminum Plant, the East Hope Aluminum Plant, the Huomei Hongjun Aluminum Plant, the Liancheng Aluminum Plant, the Pingguo

Aluminum Co., the Shanxi Zhaofeng Aluminum Co. Ltd., the Weiqiao Aluminum and Power Plant, the Xinfu Group's aluminum projects in Guangxi Province and Xinjiang Uygur Autonomous Region, and the Zunyi Jinlan Weiming Aluminum Plant (China Metals, 2010b).

Antimony.—China was the leading antimony producing country in the world. Changes in the volume of China's production and exports could affect prices of antimony in the world market. China's antimony resources are located in the Provinces of Guangdong, Guangxi, Hunan, Sichuan, and Yunnan. Hunan was the leading producing Province followed by Guangxi, Guizhou, and Guangdong. Hunan was the leading refined antimony producing Province followed by Guangxi, Yunnan, and Jiangxi. Owing to the expansion of smelting capacity during the past several years and to the Government's closure of many illegal mining activities in the Provinces of Guangxi, Hunan, and Yunnan, the supply of domestic antimony concentrates was insufficient to meet the smelters' demand; therefore, the country imported a large quantity of antimony concentrates mainly from Canada, Kazakhstan, and Turkmenistan. China imported 24,661 t of antimony concentrates in 2009, which was 28% higher than that of 2008. China exported 37,141 t of antimony oxide, which was 29% less than that of 2008. Owing to the global financial crisis, exports of unwrought antimony decreased to 4,579 t (about 51% less than that of 2008), mainly to Japan, the Republic of Korea, and the United States (Precious and Minor Metals Monthly, 2010).

The price of antimony ingot was in the range of \$5,100 per metric ton for a long period in 2009. In October 2009, an equipment failure in one of Xikwangshan Twinkling Star Antimony Co. Ltd.'s mines caused the deaths of 26 workers. The Government shut down Xikwangshan's mines for inspection. During the same period, the Hunan Provincial government closed down many antimony production facilities because of environmental issues in Lengshuijiang. The Lengshuijiang area accounted for more than 50% of the country's total antimony output. The Hunan Provincial government planned to close permanently mines and smelters that had output capacities of less than 5,000 t (metal content) in Lengshuijiang. Provinces in the southwestern part of China experienced severe drought, which affected antimony production in that region. The price of antimony increased to more than \$6,500 per metric ton at yearend and was expected to increase again in 2010 (China Metal Bulletin, 2010f).

Copper.—Owing to domestic smelter and refinery expansions, China's copper output increased sharply during the past several years. Many domestic analysts believed that the rate of China's copper production would be slower than that of previous years because of the constrained supply of copper concentrates on the world market. In 2010, Chinese copper smelters accepted a treatment charge/refining charge (TC/RC) of \$46.5 per metric ton/4.65 cents per pound (46.5/4.65) copper concentrate contract with BHP Billiton Ltd. of Australia and Freeport McMoRan Copper & Gold Inc. of the United States, which was lower than the TC/RC charges of 75/7.5 in 2009. The TC/RC was expected to remain low during the next 2 years. With low TC/RC fees, most of China's copper producers faced financial difficulties because of increased production costs;

they would rely on the recovery of such byproducts as gold, silver, and sulfuric acid to increase revenue. Strong copper prices in the international and domestic markets and increased copper demand in China encouraged China copper producers to expand their output capacity. China's copper smelting and refining output capacities were expected to reach 3.5 Mt/yr and 6.3 Mt/yr, respectively, in 2010, and the capacities were expected to increase to 5.5 Mt/yr and 8.0 Mt/yr, respectively, in 2015. Thus, the output of domestic mined copper was expected to increase to about 1 Mt/yr in 2010. In 2009, the top five refined copper producers were (in descending order of production) Jiangxi Copper Group, Tongling Nonferrous Metals Group, Jinchuan Nonferrous Metals Corp., Chinalco Yunnan Copper Group Co. Ltd., and Daye Nonferrous Metals Co. (China Metal Bulletin, 2010a; China Mining and Metals Weekly, 2009b, 2010d).

Each year, China imported a considerable amount of copper concentrates, scrap anode, and refined metal from overseas markets. Domestic copper mines supplied about 30% of the country's requirements for copper concentrates. In 2009, China imported 6.13 Mt of copper concentrates from the countries of Chile (22.5%), Peru (15.9%), Australia (11.5%), Mongolia (8.4%), Kazakhstan (5.6%), the United States (4.3%), and others (31.8%); 4.00 Mt of copper scrap from Japan (17.3%), Germany (13.7%), the United States (13.1%), Australia (11.5%), Spain (11.2%), Malaysia (6.6%), and others (26.6%); and 3.18 Mt of refined copper from Chile (45.5%), Japan (11.4%), Kazakhstan (5.2%), Australia (4.5%), Poland (3.9%), and others (30.5%). In 2009, imports of copper concentrates and refined copper increased by 18.2% and 118.7%, respectively, compared with those of 2008; however, imports of copper scrap decreased by 28.3%. During the first several months of the year, the Government enforced the crackdown on tax evasion activity by importers that led to slower clearance through Customs, and also the price gap between copper scrap and refined copper was reduced. As a result, imports of copper scrap decreased and imports of refined copper increased because semimanufacturing producers used refined copper as raw material instead of copper scrap (China Metal Bulletin, 2010e).

China was the leading copper consuming country in the world. In 2009, China's refined copper imports were more than double that of previous years. The Shanghai Metal Exchange's (SME's) refined copper stock increased by 77,000 t at yearend compared with that of the beginning of 2009. The apparent copper consumption of the country was 7.14 Mt in 2009, which was an increase of 38.7% from that of 2008, which was 5.15 Mt. Many analysts predicted that copper consumption would increase in 2009 because of the Government stimulus program that started in 2008. The production of copper semimanufacturing products increased to 8.9 Mt (an increase of 18.8% from the previous year), which was an indicator that the demand for copper in such sectors as electrical appliances, construction, power, and transportation had increased. The Government might restock its refined copper while prices of copper were weak in the international markets during the first half of 2009. Given the weak price, however, many domestic traders took advantage of price differences between the London Metal Exchange and the SME and imported a large quantity

of refined copper. Domestic analysts estimated that the Central Government, Provincial governments, and traders stockpiled more than 1.5 Mt of copper in their warehouses. The volume of copper at the coastal economic trade zone increased also. China's copper consumption was estimated to be less than 6.0 Mt in 2009. The copper consumption was projected to increase during the next several years because the global economy would improve and the Government stimulus projects would continue (China Metals, 2010c).

Chinalco Yunnan Copper Group Co. Ltd.'s subsidiary Kunpeng Copper Co. was scheduled to complete its 100,000-t/yr smelting plant in Liangshan, Sichuan Province, in mid-2010. Also, Yunnan Copper's subsidiary Dianzhong Nonferrous Metals Co. Ltd. was scheduled to complete the construction of its 100,000-t/yr smelting plant in mid-2010. Yunnan Copper planned to build a 500,000-t/yr refined copper plant in Qingyuan, Guangdong Province. The first phase construction of 100,000 t/yr of output capacity would be completed in 2010. Blister copper from the Chambishi operation in Zambia would be the source of raw material for the refinery. Chambishi would supply about 200,000 t/yr of blister copper; about 200,000 t/yr copper resources would be from Chinalco's Toromocho operation in Peru; and another 100,000 t/yr of material would be sourced from scrap (China Metals, 2009d; China Mining and Metals Weekly, 2010e).

Jiangsu Universal Copper Co. Ltd., which was a joint venture of Jiangsu Tiandilong Group, Pan Asia Oasis Group Ltd., and Universal Leader Copper Group, signed an agreement with the Lianyungang city government of Jiangsu Province to invest \$1.75 billion to build a 800,000-t/yr copper refining and processing project at the city. The first phase plan included a 400,000-t/yr copper refining facility and a 1.35-Mt/yr sulfuric acid facility. The construction was scheduled to begin in 2010 and to be completed in 2011 (China Metals, 2010a).

In 2009, China's copper producers continued to expand their metal output capacities to meet domestic demand. Xiangguang Copper Co. Ltd. started its second phase construction to increase refined copper output capacity to 400,000 t/yr from 200,000 t/yr in Shandong Province. It also had the capacity to produce 1.4 Mt/yr of sulfuric acid, 600 t/yr of silver, and 30 t/yr of gold. Zijin Mining Group's subsidiary Fujian Zijin Copper Co. Ltd. began the construction of its 200,000-t/yr smelting and refining project in Shanghang, Fujian Province, which was scheduled to be completed in 2 years. Xinjiang Wuxin Copper Co. Ltd. (a joint venture between Xinjiang Nonferrous Group and Zijin Mining Group) started the construction of a 100,000-t/yr-capacity refined copper plant in Fukang, Xinjiang Uygur Autonomous Region. After completion in 2 years, in addition to refined copper, the plant would have the capacity to produce 437,000 t/yr of sulfuric acid, 42 t/yr of silver, and 430 kg/yr of gold. Zhejiang Huada Group's subsidiary Jiangxi Jinhui Copper Co. Ltd. commissioned the construction of a 100,000-t/yr-capacity secondary copper plant at Qianshan, Jiangxi Province. Zhejiang Zhongwang Co. Ltd.'s subsidiary Fuwang Copper Co. began construction of a 100,000-t/yr secondary copper plant in Yushan, Jiangxi Province. Baiyin Nonferrous Metals Group Co. Ltd. completed its first-phase copper project in 2009 and commissioned the

second phase construction in September. After completion in 2010, Baiyin would have a refined copper output capacity of 200,000 t/yr. Guangxi Nonferrous Metals Group Co. Ltd. started the construction of a 300,000-t/yr-capacity secondary copper plant in Wuzhou, Guangxi Zhuang Autonomous Region; construction of the plant was expected to be completed in 18 months. Qiaoxing Group's subsidiary Chifeng Fubang Copper Co. Ltd. completed its smelting project to produce 100,000 t/yr of copper anode in Linxi County, Chifeng, Nei Mongol Autonomous Region, in late 2009. The company planned to start construction of a 100,000-t/yr-capacity refining plant in 2010 (Copper and Nickel Monthly, 2009a-c).

Iron and Steel.—According to the State Council's iron and steel stimulus guidelines, crude steel output capacity reached 660 Mt/yr in 2008. The National Statistical Bureau reported that the fixed-asset investment in the iron and steel sector was \$59.3 billion in 2009, which was 3.1% higher than that of 2008. Private-fund and domestic bank loans accounted for a majority of the sources of investment. The Provinces of Hebei, Jiangsu, and Liaoning ranked as the top three in fixed-asset investment Provinces in the country. Other Provinces and cities, such as Chongqing, Henan, Hunan, and Shandong, also increased investments in the iron and steel sector. Owing to the Government stimulus program introduced in late 2008, demand for steel products increased. In 2009, crude steel consumption reached 535 Mt, which was 14.4% higher than that of 2008. Because the global economy was slowly recovering, exports of steel products were likely to increase; therefore, crude steel consumption was also expected to increase in the next 2 years (China Metals, 2010e).

The Government continued its effort to curb fast growing output capacity in the country. The Government ordered iron and steel producers to phase out obsolete facilities, enhance energy conservation, and reduce the emission of waste gas. The Government planned to retire all 300-cubic-meter blast furnaces and 20-t converters and electric arc furnaces (EAF) at yearend 2010 and 400-cubic-meter blast furnaces and 30-t converters and EAF at yearend 2011. The MIIT identified a total of 125.4 Mt/yr of output capacity from small furnaces and small converters and 28.2 Mt/yr of output capacity from EAFs that would be eliminated in 2011. The Government planned to eliminate the value-added tax rebate on some hot- and cold-rolled steel products. Carbon steel producers would be required to have a minimum of 1 Mt/yr of output capacity and that of special steel producers would be more than 500,000 t/yr. The Government banned the construction of new steel projects, greenfield or brownfield, until the end of 2011. Coking coal consumption in blast furnaces was to be less than 411 kilograms per metric ton (kg/t) for pig iron output and 0.1 kg/t in converter and 92 kg/t in EAFs for steel production. The Government could have difficulty enforcing these policies in rural areas because local governments depended on revenues from these small iron and steel producers to support other projects (China Metals, 2010f).

The Government hoped that the consolidation would help the sector's efficiency, increase its bargaining power with suppliers of raw materials, and reduce competition within the sector. The Government also urged iron and steel producers to

create transregional enterprises, such as Baoshan Iron and Steel (Group) Corp.'s (Baogang Group) acquisition of Hangzhou Iron and Steel Co. and Ningbo Iron and Steel Co. Ltd. in Zhejiang Province and Bayi Iron and Steel Co. in Xinjiang Uygur Autonomous Region. Baogang Group joined with Guangdong Province's iron and steel enterprises to establish the Guangdong Iron and Steel Group Corp. The merger of Wuhan Iron and Steel (Group) Co. (Wugang) and iron and steel enterprises in Guangxi Zhuangzu Autonomous Region was another example. Anshan Iron and Steel Group Co. (Angang) and Panzhihua Iron and Steel (Group) Co. discussed a merger. Transregional mergers also faced many obstacles from local governments. The merger of Angang and Benxi Iron and Steel Co. (Bengang) to form Anben Iron and Steel Group was announced in 2005. Angang was state-owned and Bengang was Provincially owned. Because of revenue sharing issues, the two iron and steel producers remained operating independently in 2009. Baogang Group and Baotou Iron and Steel and Rare Earth Co. signed a letter of intent to become strategic partners in 2007. Baogang Group intended to acquire shares in Baotou but the government of Nei Mongol Autonomous Region objected to the transaction. Baogang Group and Taiyuan Iron and Steel Co. formed an iron and steel company in Taiyuan to produce high-value-added steel products. When the government of Shanxi Province decided to consolidate its iron and steel sector in 2008, Baogang Group was forced to withdraw from its joint venture. The consolidation within the region appeared to work more smoothly than a transregional merger (China Metals, 2009c).

China was the world's leading producer of pig iron and crude steel. Domestic iron ore production could not meet domestic demand; therefore, China depended on iron ore imports to fill the gap. Imports of iron ore increased to more than 627 Mt in 2009, which was 41% more than in 2008. Australia, Brazil, India, South Africa, and Canada, in descending order of amount imported, were China's key iron ore suppliers. The total of iron ore stockpiled at China's 22 major ports averaged more than 65 Mt in 2009. During the past 5 years, the volume of domestic iron ore output increased sharply; owing to the low iron content and high impurities of domestic ore, pig iron producers preferred imported ore. The iron ore supplied by domestic producers decreased to less than 50% of the demand in 2009 compared with 75% in the 1990s. About 50% of seaborne ore in the world was destined for China. Owing to China's increased demand for iron ore, the contract prices of iron ore increased in 4 consecutive years, by 71.5% in 2005, 19.0% in 2006, 9.5% in 2007, and between 65.0% and 96.5% in 2008 compared with each of the previous years; however, China's iron and steel producers and the three leading iron ore producers in the world—BHP Billiton, Rio Tinto Ltd. of Australia, and Vale S.A. of Brazil—could not reach contract agreement in 2009. Even though the Government encouraged domestic iron ore producers to increase their output, China's imports of iron ore were expected to continue to increase during the next 5 years (China Mining and Metals Weekly, 2010b).

China was one of leading shipbuilding countries in the world. In 2009, Chinese shipbuilders built vessels with a total displacement capacity of 42.4 million dead weight tons (dwt), which was an increase of 47% from that of 2008. Owing to the

global financial crisis, China's shipbuilders received orders for a total of 26 million dwt in 2009 compared with 58.2 million dwt in 2008. In 2008, the shipbuilding sector consumed about 12 Mt of steel products, of which 9.6 Mt was medium-thick plate. In 2008, China produced 20.4 Mt of medium-thick plate for shipbuilding and exported 8.97 Mt. The Republic of Korea, which received 6.31 Mt, was the leading destination for Chinese medium-thick plate; the remainder was shipped to Japan, Malaysia, Singapore, and Vietnam. At yearend 2009, the country had medium-thick plate output capacity of 71.3 Mt, of which 27 Mt was for shipbuilding. Domestic analysts estimated that the shipbuilding sector would consume about 15.2 Mt in 2011. During the past several years, the quality of Chinese shipbuilding plate had improved; however, the quality of steel products remained as good as such countries as Japan and the Republic of Korea. China would deliver its first super-large crude tanker, which could carry up to 308,000 t of crude oil, to Saudi Arabia in 2010 (China Steel, 2009a; Petroleum Economist, 2010).

In 2008, China's steel production from EAFs was 63.4 Mt, which accounted for about 12% of the total crude steel output. Average steel scrap consumption per metric ton of crude steel was 555 kg, and the remainder was mainly hot metal in 2008. China's steel scrap gradually increased to 72 Mt in 2008 from 29.2 Mt in 2000. Owing to a shortage of steel scrap, per tonnage steel scrap consumption decreased to 144 kg in 2008 from 227 kg in 2000 for each ton of crude steel output. In China, steel scrap came from three sources: steel producer waste, domestic recycling, and imports. In 2008, the domestic market supplied 70 Mt of steel scrap, which accounted for about 97% of total consumption, and imports accounted for 3% of the total consumption. In 2009, the world's economy remained in the recovery stage, and steel production in Japan and Western countries was in a downturn. As a result, plenty of steel scrap was available in the world markets. China imported 13.7 Mt of steel scrap, which was about 3.5 Mt more than in the previous peak year of 2004. The Government encouraged steel producers and society at large to recover more steel scrap to reduce the volume of iron ore imports and lessen the amount of energy consumed in steelmaking (China Steel, 2009b).

Lead and Zinc.—China was the leading producer of lead in the world. Refined lead output continued to increase in 2009. Owing to a shortage of lead concentrates and a weak refined lead price in the international markets, China's mine and smelter producers shut down their production and placed them on care-and-maintenance status during the first half of the year. As a result, primary lead output increased more slowly than that of secondary lead output. During the first half of 2009, the refined lead price in the domestic market was higher than that of international markets. China's traders imported a large volume of refined lead during that period, and China became a net importing country of refined lead in 2009. China imported a total of 1.6 Mt of lead concentrates from Peru, 20.0%; the United States, 17.0%; Australia, 9.2%; Russia, 7.5%; Mexico, 4.2%; North Korea, 3.4%; and others, 38.7%. The country imported 157,269 t of refined lead from the Republic of Korea, 28.5%; Japan, 12.7%; and others, 58.8%. China exported 23,029 t of refined lead to Thailand, 47.9%; Taiwan, 27.7%; and others, 24.4% (Lead, Zinc, and Tin Monthly, 2010a).

In mid-2009, there were reports of lead-in-blood poisoning incidents in the Provinces of Henan, Hunan, Shaanxi, and Sichuan, and the Government shut down a total of about 400,000 t of production capacity temporarily and 500,000 t permanently in these areas. China had refined lead (primary and secondary) capacity of 4.3 Mt in 2009. Chinese lead and zinc producers expected that domestic demand for lead and zinc would increase in the future. Yunnan Tin Co. Ltd. planned to expand its refined lead output capacity to 100,000 t/yr in 2010 from 20,000 t/yr. Jiangxi Copper started the construction of a 100,000-t/yr lead smelter and a 100,000-t/yr zinc smelter in Hukuo, Jiangxi Province. Dongling Group signed an agreement with Jinxin Lead and Zinc Mining Co. Ltd. to build a 100,000-t/yr lead and zinc smelter in Altay, Xinjiang Uygur Autonomous Region. Qinghai Xiyu Nonferrous Metals Co. Ltd., which was a joint venture between Western Mining Co. Ltd. and Yuguang Gold and Lead Co. Ltd., built a 100,000-t/yr lead smelter in Golmud (Geermu), Qinghai Province. Zhuzhou Smelter planned to expand its refined lead output capacity by 100,000 t/yr in 21 months. Tongling's subsidiary Tongguan Nonferrous Metals Co. Ltd. started construction of a 300,000-t/yr zinc smelter and a 200,000-t/yr lead smelter in Chizhou, Anhui Province. Ruifeng Lead Smelting Co. Ltd. renovated its refined lead plant to 80,000 t/yr from 50,000 t/yr. Zijin Mining Group subsidiary Zijin Bayannur Co. Ltd. expanded its zinc smelting output capacity to 220,000 t/yr in 2009 from 100,000 t/yr in Chifeng, Nei Mongol Autonomous Region. Xingan Copper and Zinc Smelter, which was a joint venture between Nei Mongol Geological Exploration Ltd. and CPI Mengdong Energy Group Co. Ltd., completed the construction of a 100,000-t/yr zinc smelter in Xilinuole, Nei Mongol Autonomous Region (China Metals, 2009b).

Tin.—China was the leading tin producing country in the world. China's tin resources were located mainly in the Provinces of Guangdong, Guangxi, Hunan, and Yunnan. Yunnan was the leading tin concentrates producing Province in China, and its refined tin output accounted for more than 50% of the country's total output followed by Guangxi, Hunan, and Jiangxi. Preliminary report data indicated that the country produced a total of 72,470 t of tin in concentrates; however, domestic analysts estimated that the output of tin concentrates was higher than the data reported by the China Nonferrous Metals Industry Association and the National Statistics Bureau. About 40,000 t of tin in concentrates was unaccounted for in the reported data. During the past decade, the demand for tin in China increased rapidly and tin producers expanded their output capacities to meet the needs. China's mined tin could not meet the domestic needs and the country depended on imports to meet the gap between production and consumption. China became a net tin importing country in 2008. In 2009, China imported a total of 10,073 t of tin concentrates from Bolivia, 55.3%; Burma, 17.9%; Australia, 12.1%; and others, 14.7%; and imported 24,284 t of refined tin from Indonesia, 54.8%; Bolivia, 9.5%; Singapore, 8.3%; the Republic of Korea, 5.3%; Taiwan, 4.7%; Thailand, 3.8%; and others, 13.6%. In 2009, China consumed about 122,000 t of tin, and the solder sector remained the leading consumer of tin followed by tinplate and packaging (Lead, Zinc, and Tin Monthly, 2010b).

Yunnan Tin Co. Ltd., which was the leading integrated tin producer in China, planned to expand its mining and smelting capacity in the Provinces of Hunan and Yunnan. The company intended to raise about \$200 million through issuing stocks to finance the expansion project. The project included the expansion of mining and dressing capacity of its Wuchangping Tin Mine in Chenzhen to 1,500 metric tons per day (t/d). It was designed to produce 1,388 t/yr of tin in concentrates and 3,933 t/yr of copper in concentrates. Tin concentrates would be smelted in its tin smelter in Chenzhen and copper concentrates would be sold in the domestic market. The mine had tin reserves of 48,900 t at a grade of 0.635% tin and had potential resources of up to 100,000 t. The company was expanding its Chenzhen smelter in Hunan Province and its Gejiu smelter in Yunnan Province to 20,000 t/yr and 70,000 t/yr, respectively. In the second phase of mine expansion, the company planned to increase mine output capacity to 3,000 t/d. The company continued to explore tin resources in the Gejiu area (China Metals, 2010g).

Industrial Minerals

Boron.—China's boron resources are located mainly in the Provinces of Hunan, Jilin, Liaoning, Qinghai, and Xizang. Ore with a boron trioxide content of less than 12% accounted for 90% of the total resources. Ore with a boron trioxide content of greater than 20% accounted for less than 9% of the total resources. In China, boron magnesite ore was the major raw material for producing boron products in China; however, boron magnesite ore accounted for 6.7% of the total resources. Paigeite ore, which occurs mainly in Liaoning Province, accounted for 58.5% of the total resources but the processing technology to produce boron products from paigeite ore had not been developed fully. Boron resources in salt lakes, which were located in Qinghai-Xizang Plateau, accounted for 33.1% of the total resources. Owing to transportation and environmental issues, boron in salt lakes had not been utilized. Other boron resources accounted for 1.7% of total resources. The demand for boron products increased steadily in China during the past decade. Owing to a shortage of boron resources, the production of boron was flat. As a result, imports of boric acid increased to about 200,000 t in 2008 from about 40,000 t in 2001, mainly from Chile, Turkey, and Russia (China Chemical Reporter, 2009, 2010b).

Cement.—China was the leading cement producing country in the world and accounted for almost 50% of the world's total production. Even with the Government's restricted investment policy for the cement sector, cement output continued to increase. Cement production was an energy-intensive industry, and the Government did not encourage exporting large amounts of cement. During the past several years, the Government ordered cement producers to close down plants that used obsolete technology and encouraged cement producers to reshuffle the cement sector through mergers, regroupings, and takeovers. The NDRC and MIIT jointly issued the guidelines to eliminate 600 Mt of small vertical kiln production capacity between 2010 and 2012. Domestic analysts estimated that it would eliminate 3,000 small cement producers. It aimed

to force cement producers to merge and to renovate their production process. The Government hoped that the top 10 cement producers would account for 50% of total output capacity by 2015. Under the Government's cement reform guidelines, Provinces with per capita clinker capacity exceeding 1,000 kilograms (kg) were banned from building additional production lines. In Provinces with per capita clinker capacity of less than 1,000 kg, the Provincial governments must follow the Central Government guidelines for approving any new cement production plants. For those Provinces in which 70% of their cement production came from a dry rotary kiln process, newly installed cement output capacity could be within 10% of their cement production in the previous year. The Government banned construction of any small vertical kilns and wet process kilns in the country (China Economic News, 2009a).

In 2009, China exported 15.6 Mt of cement mainly to African countries, 5.3 Mt; and to Taiwan, 2.0 Mt; Bangladesh, 1.6 Mt; and Saudi Arabia, 1.5 Mt. The country consumed about 1.6 billion metric tons (Gt) of cement. China's demand for cement was expected to increase by 6% per year through 2012. In 2009, China's clinker output capacity increased by 188 Mt to 1.4 Gt and the cement output capacity increased by 266 Mt to 2.3 Gt. By yearend 2010, China's cement output capacity was projected to exceed 2.7 Gt. The central and eastern parts of the country would remain the leading cement markets because of the increase in regional construction expenditures. The northwestern and southwestern parts of China were expected to grow faster than in previous years because of the Government's development strategy for the western part of the country. Nonresidential construction would continue to be the leading end use for cement (China Chemical Reporter, 2010a).

Potash.—China is a potassium-deficient country and must import a large quantity of potassium compounds to meet the needs of its fertilizer sector. China's potash resources are located mainly in the Provinces of Qinghai, Xinjiang, and Xizang. China's mined potash output capacity was about 3.3 Mt of potassium oxide equivalent in 2009. Most potassium chloride producers were located in the Charhan area of Qinghai Province. In 2008, China consumed about 5.9 Mt of potassium salt, of which about 3.5 Mt was from imports. Imports of potassium salt accounted for about 60% of total consumption in 2008 compared with 71% in 2007 and 90% in 2000. In May 2009, under the development guidelines released by the Government, the production target of potassium fertilizer would be 4 Mt of potassium oxide equivalent, or 6.4 Mt of potassium chloride in 2011; however, the demand for potassium chloride in the agriculture sector was expected to be between 6.4 Mt and 8.8 Mt, depending on the targeted potassium content in the fertilizer. According to the Government guidelines on compound fertilizer, the ratio of nitrogen:phosphorus:potassium was 1:0.42:0.3 but most of domestic compound fertilizer had potassium content of less than 0.16. To meet the Government's guidelines, the total demand for potassium chloride, which included the agriculture and chemical sectors, was expected to be 9.0 Mt. The country was expected to continue to depend on potassium imports to meet its demand in the next decade (China Chemical News, 2009b).

Rare Earths.—China was rich in rare-earth resources and the country produced different kinds of rare-earth products. During the past decade, China's rare-earth production accounted for about 90% of the world total. Rare-earth consumption in China had increased steadily. The country consumed about 73,000 t of rare earths in 2007, 68,000 t in 2008, and 73,000 t in 2009 compared with 19,300 t in 2000. The magnet sector accounted for about 30% of total rare-earth consumption followed by metallurgical, 15%; chemical and petroleum, 10%; ceramics and glass, 10%; agriculture and textile, 10%; hydrogen storage, 9%; and others, 16%. In China, rare-earth consumption in new material industry sectors, such as catalysts, magnets, phosphors, and polishing powder, was expected to increase faster than the traditional industry. In 1987, rare-earth consumption in the new material industry accounted for about 1% of the total; however, it increased to more than 53% in 2008. Rare earths was a strategic commodity in China. Foreign investors were prohibited from mining rare earths and were restricted from participating in rare-earth smelting and separation projects. Sino-foreign joint-venture rare-earth companies were allowed to export their separated rare-earth products under a licensing system (Chen Zhanheng, 2010; China Metal Bulletin, 2010h).

The dominant position of China's rare earths in the world was expected to become more important because of the wide range of cutting-edge environmental technology that depend on rare-earth metals, such as wind turbines, low-energy light bulbs, and hybrid cars. Owing to an increase in domestic demand, the Government gradually reduced the export quota during the past several years. In 2006, the Government allowed 47 rare-earth producers and traders to export rare-earth products. In 2009, only 23 domestic rare-earth producers and traders and 11 Sino-foreign rare-earth producers were allowed to export rare-earth products. The number of permitted exporters was reduced to 22 domestic rare-earth producers and traders and 10 Sino-foreign rare-earth producers in 2010. In 2008, China exported a total of 54,963 t (gross weight) of rare-earth products, of which rare-earth oxide accounted for 41,349 t; rare-earth salts, 5,739 t; rare-earth metal, 4,550 t; rare-earth alloys, 2,390 t; and others, 935 t. In 2009, owing to the global financial crisis, the demand for rare-earth products was weak, especially in Japan; therefore, China's rare-earth exports decreased to 43,918 t, which was equivalent to 32,084 t (REO); rare-earth salts, 6,082 t; rare-earth metals, 3,271 t; rare-earth alloys, 2,075 t; and others, 406 t (China Metal Bulletin, 2010g).

According to the draft of the Government's rare-earth development plan for 2009-15, annual rare-earth production would be limited to between 130,000 and 140,000 t (REO) during that period. Exports of rare-earth products would be limited to about 35,000 t (REO), and the Government would allow 20 domestic rare-earth producers and traders to export rare earths. The plan proposed to control the export of rare-earth primary products, such as rare-earth salts, and to encourage the export of rare-earth new material products. The Government would not ban the export of dysprosium and terbium but would limit the volume of exports. The Government would not approve any new rare-earth separation project before 2015. To protect rare-earth resources, rare-earth producers would be required to have a minimum mining output capacity of 300,000 t/yr of light

rare earths and 3,000 t/yr (REO) of ion adsorption rare earths. The Government would ban monazite mining if it contained radioactive elements. For rare-earth separation, producers would be required to have a separation output capacity of mixed rare earths, 8,000 t/yr (REO); bastnaesite, 5,000 t/yr (REO); and ion adsorption, 3,000 t/yr (REO). Metal smelting producers would be required to have an output capacity of 1,500 t/yr. Rare-earth producers would be required to meet the environmental emission standards; otherwise, they would be shut down. The government of Nei Mongol Autonomous Region authorized Baotou Iron and Steel and Rare Earths Corp. to stockpile up to 30,000 t of rare-earth concentrates in Baotou. It also allowed the company to increase the recovery of rare earths to 50% from 25% in the separation process at the Baotou facility for such commodities as coal and rare earths in 2010 (China Metal Bulletin, 2010i; Ministry of Industry and Information Technology, 2010b).

During the past several years, the Government continued to urge rare-earth producers to merge into several large groups and to eliminate duplicate projects. Rare-earth producers realized that the bitter competition among them was causing financial losses and that integrating the rare-earth producers could benefit the rare-earth sector in China. Dingnan Dahua New Materials Co. Ltd., Ganxian Hongjin Rare Earth Co. Ltd., and Minmetals Nonferrous Metals Co. Ltd. formed a joint-venture company, Minmetals Ganzhou Rare Earth Co. Ltd., to process rare-earth resources in Ganzhou, Jiangxi Province, in 2008. Most of China's ion-adsorption type of rare earth was located in Ganzhou Province. There were 88 rare-earth producers in Ganzhou, and 90% of them ceased their operations because of weak prices. Jiangxi Province had 2.3 Mt of reserves of an ion-adsorption type of rare-earth. Minmetals Ganzhou Rare Earth had a rare-earth separation capacity of 8,500 t/yr and planned to expand the separation capacity to 13,500 t/yr within 5 years. The joint venture also planned to develop value-added rare-earth products for the aerospace and electronics sectors. Chinalco signed an agreement with the government of the Province of Jiangxi to allow the company to consolidate the local nonferrous metals in the Province and to take shares of Jiangxi Rare Earth and Rare Metals Tungsten Group Co. Ltd. (JXTC). Chinalco and JXTC formed a joint-venture company (in which Chinalco held 51% of the shares) to manufacture nickel-cobalt products. JXTC was a leading producer of rare-earth products in Jiangxi Province. In 2003, Minmetals and JXTC formed a joint venture to produce tungsten products. Minmetals planned to acquire rare-earth resources in the Provinces of Guangdong and Hunan. Minmetals also planned to become the leading downstream rare-earth products producer in the country. It appeared that Chinalco and Minmetals would compete for Jiangxi rare-earth resources (China Mining and Metals Weekly, 2010a).

Salt.—China was the leading salt producer in the world. The country produced lake salt, marine salt, and rock salt. Lake salt was produced in the western Provinces, such as Nei Mongol, Qinghai, Xijiang, and Xizang. Marine salt was produced mainly in the Provinces of Hebei, Jiangsu, Liaoning, Shandong, and Tianjin. Rock salt was produced in the Provinces of Anhui, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, and

Yunnan. The country's total salt reserve was more than 10 Gt. In response to an increase in demand for salt from the chemical sector, salt production increased rapidly. Salt production was expected to reach 70 Mt in 2010. Owing to rapid economic development in the coastal areas, many of the salt production bases were converted into industrial development bases. With the limited production bases, the output of marine salt was expected to maintain the same volume in the future. Owing to transportation bottlenecks, environmental issues, and the limited demand for salt in the western part of the country, production expansion of lake salt was expected to be slow. During the past several years, the increase in salt output was mainly from well salt, and about 10 Mt/yr of well salt output capacity was under construction. China's salt production bases shifted from the eastern part to the central part of the country. In China, the alkali chloride and soda ash sectors accounted for about 73% of the total salt consumption. China salt producers concentrated on producing salt and ignored the recovery of such byproducts as magnesium, which caused major environmental problems (China Chemical News, 2009c).

Sodium Compounds.—China is the leading soda ash producer in the world. The growth rate of domestic soda ash output was higher than that of consumption. The more than 70 domestic producers had a total combined output capacity of more than 22 Mt/yr in 2008. About 10 Mt/yr of output capacity was either under construction or in the planning stage. By yearend 2010, total soda ash output capacity was expected to reach 32 Mt/yr. About 98% of soda ash was produced by the synthetic method, of which the Hou's process accounted for 40%, and the Solvay process, 58%. Soda ash produced through trona accounted for only 2%, mainly from Henan Province and the Nei Mongol Autonomous Region. Such sectors as alumina, fertilizer, glass, iron and steel, and paper were major consumers of soda ash. In 2009, China exported 2.32 Mt of soda ash mainly to India, Indonesia, the Republic of Korea, and Thailand (China Chemical News, 2010c).

In November, MIIT published "Entry requirements of the soda ash industry" to solicit comments from the public. The draft regulations required that any new or expanded soda ash plant must be located near supplies of raw material and meet environmental requirements. Existing plants, which were located at restricted and protected areas, must be relocated to other industrial areas. The Government required soda ash output capacity that used the Solvay process to be greater than 1.2 Mt/yr; Hou's process, 600,000 t/yr, and trona, 400,000 t/yr. The designed output capacity of dense soda ash must be greater than 80% for the Solvay process, 60% for Hou's process, and 80% for trona. Energy and raw material requirements also applied to new and expanded soda ash projects. The per-tonnage production of soda ash was expected to require no more than 400 kg of standard coal, 1,500 kg of salt, and 3.5 kg of ammonia. The Government gave existing soda ash producers until 2015 to meet these requirements (China Chemical News, 2009a).

Sulfur.—China has gradually become one of the leading sulfuric acid producing countries. Sulfuric acid was produced from native sulfur and pyrite, as a byproduct of oil and gas refining, and through the recovery of sulfur dioxide from nonferrous metal processing. By yearend 2008, China's sulfuric

acid output capacity was about 72 Mt/yr; of that amount, 32 Mt/yr was used sulfur as raw material; 22 Mt/yr was pyrite; and 18 Mt/yr was from smelting flue gas. In 2009, China produced less than 60 Mt of sulfuric acid. China has limited sulfur resources and could meet only 30% of its need. Therefore, China imported a significant quantity of sulfur to meet the demand, and imports of sulfur increased to 9.7 Mt in 2007 from 2.7 Mt in 2001. In 2008, imports of sulfur decreased to 8.4 Mt but increased to 12.2 Mt in 2009. Sulfur imports were mainly from Canada, Japan, Saudi Arabia, the United Arab Emirates, and the United States. In June 2009, the Government levied a 17% value-added tax on imported sulfur and aimed to control excess sulfur imports (China Chemical News, 2009d).

In China, the phosphate fertilizer sector accounted for about 70% of the total sulfuric acid consumption. The remainder was consumed by such sectors as manganese, rare earths, and titanium white. Domestic analysts estimated that the sectors would consume about 65 Mt of sulfuric acid in 2012; however, China's sulfuric acid output capacity was expected to reach 95 Mt/yr. China Sulfuric Acid Industry Association appealed to the Government to control the total output capacity of sulfuric acid and to restrict the construction of sulfur-based sulfuric acid plants of less than 200,000-t/yr capacity and pyrite-based sulfuric acid plants of less than 100,000-t/yr capacity. The Association also urged the Government to eliminate sulfuric acid facilities for which the output capacity was less than 100,000 t/yr and to require producers to reduce sulfur dioxide emissions by updating their production technology (China Chemical Reporter, 2010c).

Mineral Fuels

Coal.—China has undergone significant economic reform and has one of the world's fastest growing economies. Coal consumption has increased to meet the high demand for industrial production and power generation. Coal was the primary source of energy—two-thirds of the country's electricity was produced by coal-fired plants. About 50% of the country's total coal output was consumed by the power sector. Even though China's coal production continued to increase in 2009 because of an increase in demand for coal by every industrial sector, China became a net coal importing country. In 2009, the country imported a total of 125.8 Mt of coal, which accounted for less than 4% of total demand, from Australia, 35%; Indonesia, 24%; Vietnam, 19%; Russia, 9%; Mongolia, 5%; North Korea, 3%; and others, 5%. China exported a total of 22.4 Mt of coal to the Republic of Korea, 44%; Japan, 29%; Taiwan, 22%; and others, 5%. About 14.4 Mt of coal was stockpiled at transshipment ports and 21.5 Mt of coal was stored at powerplant warehouses (China Energy Report Weekly, 2010b).

Shanxi Province had been China's leading coal producing Province, and its coal output accounted for more than 20% of the country's total coal output. The Shanxi coal reserve ranked third after Xinjiang Uygur Autonomous Region and Nei Mongol Autonomous Region. During the past 2 years, the government of Shanxi Province consolidated state-owned coal producers into large enterprises and closed down small mines. As a result, coal output from Shanxi Province decreased to 615 Mt. Coal output from Nei Mongol Autonomous Region increased by 37%

to 637 Mt and it became the leading coal producing Province in China in 2009. Provincial governments of both Provinces planned to increase their coal output in 2010. It appeared that Nei Mongol would continue to be the leading coal producing Province in China in the future; however, Nei Mongol's coal had a higher ash content and a lower heating value than Shanxi's coal. The government of Henan Province also planned to complete the consolidation of its state-owned coal mines into three large enterprises in 2010. In 2009, Henan produced 235 Mt of coal and ranked fourth behind Nei Mongol, Shanxi, and Shaanxi (283 Mt). Other Provincial governments also planned to consolidate their coal mining operations in 2010 (China Chemical News, 2010a).

China was the leading coking coal producing and exporting country in the world. In 2009, owing to weak demand for coking coal in the international markets and the Government-levied 40% export duty, the country exported about 540,000 t of coking coal, which was a decrease of 95% from that of 2008. Owing to high coal and coking coal prices in the domestic market and weak international coal prices, coastal coking coal producers imported a large volume of coal. As a result, China imported 34.5 Mt coal for coking in 2009, which was 400% more than in 2008. In China, coking coal was produced mainly by iron and steel producers and coal producers. In 2005, the Government announced the criteria that had to be met by the coking coal producers. At yearend 2009, 257 producers met those criteria and, collectively, had a total output capacity of 291 Mt. It took about 1.4 t of coal to produce 1 t of coking coal. Coking coal was consumed mainly by the iron and steel sector. During the past decade, the output of iron and steel increased sharply and led to an increase in coking coal consumption. In 2009, the iron and steel sector consumed about 325 Mt of coking coal. With the upgrading of iron and steel production technology, the amount of coking coal required for each metric ton of steel produced decreased gradually during the past decade, especially for major iron and steel producers. The country's iron and steel output was nonetheless expected to increase in the future and, as a result, the demand for coking coal was expected to increase to 370 Mt in 2010 (Wang Jingan, 2010).

Outlook

China's economy is expected to continue to grow in the near future. The country is in line to replace Japan as the second largest economy in the world behind the United States in the next 3 years. The Government set the economic growth rate target at 8% for the next 2 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. The continuation of China's economic growth implies that a strong demand for mineral commodities is likely to continue. China has shortages in the supply of most major minerals, such as bauxite, chromium, copper, iron, lead, manganese, nickel, oil, and potash, and relies on imports to meet 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 will continue its effort to protect the country's rich minerals, such as antimony, coal, indium, molybdenum, tin, tungsten, and rare earths, and to avoid overexploitation. The Government has been promoting a reduction in resource dependency and the production of higher value-added and high-quality downstream products. The Government has not yet achieved great success in meeting this goal. As progress is made toward this goal, the country's dependence on most major mineral commodities could decline. For the near term, 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 become a major phenomenon until the transition to resource independence takes place. 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 is 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. Owing to ineffective enforcement through supervision and monitoring, however, 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.

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TABLE 1
CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	2005	2006	2007	2008	2009	
METALS						
Aluminum:						
Bauxite, gross weight	thousand metric tons	22,000	27,000	30,000	35,000	40,000
Alumina	do.	8,540	13,700	19,500	22,800	23,800
Metal, refined:						
Primary	do.	7,800	9,360	12,600	13,200	12,900
Secondary	do.	1,940	2,350	2,750	2,700	3,100
Total	do.	9,740	11,700	15,400	15,900	16,000
Antimony:						
Mine, Sb content		152,000	153,000	163,000	166,000	140,000
Metal		138,000	140,000	147,000	158,000 ^r	168,000
Bismuth:						
Mine output, Bi content		3,000	1,520	3,500	5,000	6,000
Metal		10,600	11,800	12,100	13,100 ^r	12,000
Cadmium, smelter		4,080	3,790	4,210	6,960 ^r	7,000
Chromite, gross weight	thousand metric tons	200	200	200	200	200
Cobalt:						
Mine output, Co content		2,100	1,840	6,100	6,630 ^r	6,000
Metal		7,150	8,200	7,580	6,700 ^r	7,700
Copper:						
Mine output, Cu content		762,000	873,000	928,000	940,000	970,000
Metal:						
Smelter, primary	thousand metric tons	1,750	1,920	2,110	2,500	2,650
Refined:						
Primary	do.	1,850	2,000	2,400	2,700	2,750
Secondary	do.	750	1,000	1,200	1,200 ^r	1,400
Total	do.	2,600	3,000	3,600	3,900 ^r	4,150
Gold, mine output, Au content		225	245	275	285	320
Indium, primary and secondary		370	400	370 ^r	340 ^r	280
Iron and steel:						
Iron ore, gross weight	thousand metric tons	420,000	601,000	707,000	824,000	880,000
Pig iron	do.	343,750 ⁴	412,450 ⁴	476,520 ⁴	470,670 ⁴	543,750 ⁴
Ferroalloys	do.	10,700	14,300	17,500	18,300	22,100
Steel, crude	do.	353,240 ⁴	419,150 ⁴	489,290 ⁴	500,490 ⁴	567,840 ⁴
Steel, rolled	do.	377,710 ⁴	468,930 ⁴	565,610 ⁴	584,770 ⁴	692,440 ⁴
Lead:						
Mine output, Pb content		1,140,000	1,330,000	1,410,000	1,550,000	1,600,000
Metal:						
Smelter, primary		1,790,000	2,090,000	2,040,000	2,430,000 ^r	2,500,000
Refined:						
Primary		1,850,000	2,130,000	2,140,000 ^r	2,350,000	2,480,000
Secondary		537,000	590,000	650,000 ^r	850,000	1,230,000
Total		2,390,000	2,720,000	2,790,000 ^r	3,200,000	3,710,000
Magnesium, metal and alloy		470,000	520,000	625,000	559,000	501,000
Manganese:						
Ore, Mn content	thousand metric tons	1,500	1,600	2,000	2,200	2,400
Metal		566,000	730,000	1,000,000	950,000	1,130,000
Mercury, mine output, Hg content		1,100	760	800	1,300 ^r	1,400
Molybdenum, mine output, Mo content		40,000	43,900	67,700	81,000	93,500
Nickel:						
Mine output, Ni content		72,700	82,100	67,000	72,000	81,000
Matte		83,500	99,800	105,000	114,000 ^r	120,000
Smelter		95,100	102,000	116,000	129,000	165,000
Niobium and tantalum, mine output:						
Nb ₂ O ₅ content		110	120	270	300	270
Ta ₂ O ₅ content		310	440	920	900	850

See footnotes at end of table.

TABLE 1—Continued
CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	2005	2006	2007	2008	2009
METALS—Continued					
Silicon, metal	840,000	900,000	950,000	980,000	950,000
Silver, mine output, Ag content	2,500	2,600	2,700	2,800	2,900
Tin:					
Mine output, Sn content	126,000	126,000	146,000	110,000	115,000
Metal	122,000	132,000	149,000	140,000 ^r	135,000
Titanium:					
Ilmenite, TiO ₂ equivalent	450,000	500,000	550,000	550,000	550,000
Sponge	9,160	18,100	45,200 ^r	57,000 ^r	61,500
Tungsten, mine output, W content	51,200	45,000	41,000	50,000 ^r	51,000
Vanadium, in vanadiferous slag product	42,500	42,500	45,200	46,000	52,000
Zinc:					
Mine output, Zn content	2,550	2,840	3,040	3,340 ^r	3,400
Refined, primary and secondary	2,780	3,170	3,740	4,000	4,360
INDUSTRIAL MINERALS					
Asbestos	400,000	360,000	390,000	380,000	380,000
Barite	4,200	4,400	4,400	4,600	3,000
Bentonite	3,100	3,200	3,300	3,300	3,400
Boron, mine, B ₂ O ₃ equivalent	140,000	145,000	145,000	140,000	145,000
Bromine	104,000	124,000	137,000 ^r	135,000	140,000
Cement, hydraulic	1,068,850 ⁴	1,236,770 ⁴	1,361,170 ^{4,r}	1,400,000 ⁴	1,629,000 ⁴
Diatomite	410,000	420,000	420,000	440,000	440,000
Dolomite	7,800	8,000	8,000	8,000	8,100
Feldspar	1,900	1,950	2,000	2,000	2,000
Fluorspar	2,800	3,000	3,200	3,250	3,200
Graphite	720,000	720,000	800,000	800,000	780,000
Gypsum	32,000	4,200	4,800	4,600	4,500
Kaolin	7,720	7,520	7,380	7,400 ^r	7,450
Lime	150,000	160,000	170,000	180,000 ^r	185,000
Lithium minerals, all types	19,000	20,000	22,000	25,000	26,000 [*]
Magnesite	6,600	6,700	14,000 ^r	15,600 ^r	15,000
Nitrogen, N content of ammonia	37,850 ⁴	40,660 ⁴	42,480 ⁴	41,140 ⁴	42,290 ⁴
Phosphate rock, P ₂ O ₅ equivalent	9,130	11,600	15,100	15,200	18,000
Potash, marketable, K ₂ O equivalent	1,500	1,800	2,600	2,750	3,000
Rare earths, rare-earth oxide equivalent	119,000	133,000	120,000	125,000	129,000
Salt	46,610 ⁴	56,630 ⁴	59,760 ⁴	59,520 ⁴	58,450 ⁴
Sodium compounds:					
Mirabilite	6,300	6,500	6,600	6,600	6,700
Soda ash, natural and synthetic	14,211 ⁴	15,600 ⁴	17,650 ^{4,r}	18,540 ⁴	19,350 ⁴
Strontium carbonate	300,000	320,000	330,000	335,000	336,000
Sulfur:					
Native	900	950	960	960	1,000
Content of pyrite	4,010	3,810	4,200	4,300	4,370
Byproduct, all sources	2,800	3,000	3,300	3,350	4,000
Total	7,710	7,760	8,460	8,610	9,370
Talc and related materials	2,300	2,400	2,000	2,200	2,300
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Anthracite	487,000	442,000	450,000	447,000 ^r	460,000
Bituminous	1,670,000	1,780,000	2,000,000	2,110,000 ^r	2,300,000
Lignite	98,000	105,000	100,000	196,000 ^r	200,000
Total	2,260,000	2,330,000	2,550,000	2,750,000 ^r	2,960,000
Coke, all types	232,820 ⁴	280,540 ⁴	335,530 ^{4,r}	323,590 ⁴	345,020 ⁴

See footnotes at end of table.

TABLE 1—Continued
 CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	2005	2006	2007	2008	2009
MINERAL FUELS AND RELATED MATERIALS—Continued					
Gas, natural:					
Gross	50	59	62	76	83
Marketed	42	51	52	66	72
Petroleum:					
Crude, including crude from oil shale	1,320	1,350	1,360	1,380	1,370
Refinery products	2,800	3,000	3,500	3,700 [†]	3,750

[†]Revised. do. Ditto.

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

²Table includes data available through June 30, 2010.

³China also produces diamond, gallium, germanium, platinum-group metals, stone, and uranium, but available information is inadequate to make reliable estimates of output.

⁴Reported by China's State Statistical Bureau.

*Corrected on February 28, 2012.

TABLE 2
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies ¹	Location of main facilities ²	Annual capacity ^e
Aluminum:			
Alumina	Chongqing Dingtai Tuoyuan Alumina Co.	Chongqing	150
Do.	Nanchuan Pioneer Alumina Co.	do.	200
Do.	Guangxi Huayin Aluminum Co. Ltd.	Guangxi, Bose	1,600
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.	Luoyang Wanji Xiangjiang Aluminum Co. Ltd.	Henan, Luoyang	800
Do.	Sanmenxia Yixiang Aluminum Co. Ltd. (Henan Yima Coal Group)	Henan, Mainchi	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	2,600
Do.	Zhongzhou Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Hunan, Zhongzhou	3,000
Do.	Shandong Huayu Alumina Co. Ltd. (Shandong Chiping Xinfu Aluminum and Electricity Group)	Shandong, Chiping	1,800
Do.	Shandong Nanshan Aluminum Co. Ltd. (Nanshan Group)	Shandong, Nanshan	1,200
Do.	Shandong Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Shandong, Zibo	1,500
Do.	Bingzhou Weiqiao Aluminum Co.	Shandong, Zouping	1,600
Do.	Shanxi Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Shanxi, Hejin	2,200
Do.	Coalmine Aluminum (Sanmenxia) Co. Ltd.	Shanxi, Sanmenxia	1,200
Do.	Shanxi Luneng Jinbei Aluminum Co. Ltd.	Shanxi, Yuanping	2,000
Metal	Baiyin Aluminum Plant	Gansu, Baiyin	150
Do.	Lanzhou Aluminum Plant	Gansu, Lanzhou	210
Do.	Liancheng Aluminum Plant	do.	235
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.	Guizhou, Zunyi	130
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	180
Do.	Henan Zhongmai Mianchi Aluminum Plant	Henan, Mianchi	400
Do.	Sanmenxia Tianyuan Aluminum Co. Ltd.	Henan, Sanmenxia	110
Do.	Shangqiu Aluminum Smelter	Henan, Shangqiu	180
Do.	Yichuan Yugang Longquan Aluminum Co.	Henan, Yichuan	600
Do.	Henan Shenhuo Aluminum-Electricity Co. Ltd.	Henan, Yongcheng	200
Do.	Zhengzhou Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Henan, Zhengzhou	60
Do.	Hanjiang Danjiangkou Aluminum Co. Ltd.	Hubei, Danjiangkou	110
Do.	Hunan Chuanquan Aluminum Co. Ltd.	Hunan, Taoyuan	210
Do.	Fushun Aluminum Plant	Liaoning, Fushun	190
Do.	Baotou Aluminum Plant	Nei Mongol, Baotou	250
Do.	East Hope Aluminum Plant	do.	330
Do.	Qingtongxia Aluminum Plant (China Power Investment Corp. and Ningxia Qingtongxia Energy Group Co. Ltd.)	Ningxia, Qingtongxia	850
Do.	Qiaotou Aluminum Co. Electrolysis Branch	Qinghai, Datong	350
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
Do.	Shandong Chiping Xinfu Aluminum and Power Group	Shandong, Chiping	360
Do.	Taishan Aluminum-Power Co. Ltd.	Shandong, Fecheng	125
Do.	Shandong Nanshan Industry Co. Ltd.	Shandong, Longkou	280
Do.	Shandong Nanshan Aluminum Co. Ltd. (Nanshan Group)	Shandong, Nanshan	580
Do.	Shandong Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Shandong, Zibo	120
Do.	Bingzhou Weiqiao Aluminum Co.	Shandong, Zouping	250

See footnotes at end of table.

TABLE 2—Continued
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies ¹	Location of main facilities ²	Annual capacity ^e
Aluminum—Continued:				
Metal—Continued:		Zouping Aluminum Co. Ltd.	Shandong, Zouping	150
Do.		Huaze Aluminum and Power Co. Ltd.	Shanxi, Hejin	400
Do.		New Orient Aluminum Co. Ltd.	Shanxi, Taiyuan	75
Do.		Shanxi Guanlv Aluminum Co. Ltd.	Shanxi, Yuncheng	210
Do.		Yunnan Aluminum Plant	Yunnan, Kunming	500
Antimony		Huaxi (China Tin) Group Industrial Co.	Guangxi, Hechi	25
Do.		Xikuangshan Twinkling Star Antimony Co. Ltd.	Hunan, Lengshuijiang	37
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.	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
Cadmium		Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	1
Coal		Hebei Provincial Government	Hebei	70,000
Do.		Heilongjiang Provincial Government	Heilongjiang	100,000
Do.		Henan Provincial Government	Henan	100,000
Do.		Liaoning Provincial Government	Liaoning	70,000
Do.		Nei Mongol Provincial Government	Nei Mongol	90,000
Do.		Shandong Provincial Government	Shandong	60,000
Do.		Shanxi Provincial Government	Shanxi	400,000
Do.		Sichuan Provincial Government	Sichuan	80,000
Do.		Shenhua Coal Corp.	Nei Mongol, Ningxia, and Shaanxi	150,000
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.		Baiyin Nonferrous Metals Group Co. Ltd.	Gansu, Baiyin	100
Do.		Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	400
Do.		Luoyang Copper Processing Factory	Henan, Luoyang	50
Do.		Daye Nonferrous Metals Co.	Hubei, Daye	200
Do.		Zhangjiagang United Copper Co. (Tongling Nonferrous Metals Group Holding Co. Ltd.)	Jiangsu, Zhangjiagang	200
Do.		Guixi Smelter (Jiangxi Copper Co. Ltd.)	Jiangxi, Guixi	900
Do.		Dongfang Copper Co. (Huludao Nonferrous Metals Group)	Liaoning, Huludao	100
Do.		Chifeng Jingeng Copper Co. Ltd.	Nei Mongol, Chifeng, Harqin Banner	100
Do.		Shandong Dongying Fangyuan Nonferrous Metals Co. Ltd.	Shandong, Dongying	200
Do.		Shandong Jinsheng Nonferrous Metals Corp.	Shandong, Linyi	100
Do.		Yanggu Xiangguang Copper Co. Ltd. (Shandong Fengxiang Group)	Shandong, Liaocheng, Yanggu	400
Do.		Yantai Penghui Copper Industry Co. Ltd.	Shandong, Yantai	200
Do.		Taiyuan Copper Industry Co.	Shanxi, Taiyuan	30
Do.		Zhongtiaoshan Nonferrous Metals Co.	Shanxi, Yuangu	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	Shandong Aluminum Plant	Shandong, Zibo	10

See footnotes at end of table.

TABLE 2—Continued
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies ¹	Location of main facilities ²	Annual capacity ^e
Gas, natural	billion cubic meters	China National Petroleum Corp.	Sichuan	10
Germanium	metric tons	Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoquan	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.	Lincang Xinyuan Germanium Co. Ltd.	Yunnan, Lincang	30
Do.	do.	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qujing	10
Gold, refined	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	18
Do.	do.	Laizhou Gold Co.	Shandong, Laizhou	15
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
Graphite		Jixi Aoyu Graphite Co. Ltd.	Heilongjiang, Jixi and Luo	60
Do.		Nei Mongol Xinghe Jingxin Graphite Co. Ltd.	Nei Mongol, Xinghe	10
Indium	metric tons	Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoquan	25
Do.	do.	Laibin Smelter [Liuzhou Huaxi (China Tin) Group Co.]	Guangxi, Laibin	100
Do.	do.	Liuzhou Zinc Products Co.	Guangxi, Liuzhou	20
Do.	do.	Yuguang Gold-Lead Co. Ltd.	Henan, Jiyuan	10
Do.	do.	Xiangtan Zhengtan Nonferrous Metal Co. Ltd.	Hunan, Xiangtan	75
Do.	do.	Zhuzhou Smelter	Hunan, Zhuzhou	60
Do.	do.	Huludao Nonferrous Metals Group Co.	Liaoning, Huludao	30
Do.	do.	Yunnan Chengfeng Nonferrous Metals Co. Ltd.	Yunnan, Gejiu	30
Do.	do.	Yunnan Mengzi Mining and Smelting Co. Ltd.	Yunnan, Honghe	50
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.	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, Panzhihua	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 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies ¹	Location of main facilities ²	Annual capacity ^e
Iron and steel—Continued:			
Crude steel	Ma'anshan Iron and Steel Co.	Anhui, Maanshan	10,000
Do.	Shoudu (Capital) Iron and Steel (Group) Co. (Shougang)	Beijing	4,000
Do.	Liuzhou Iron and Steel Group	Guangxi, Liuzhou	6,000
Do.	Handan Iron and Steel General Work (Hebei Iron and Steel Group Co.)	Hebei, Handan	10,000
Do.	Shougang Qianan Iron and Steel Co. Ltd. (Shougang)	Hebei, Qianan	4,500
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.	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.	Panzhihua 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 Nonfemet 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	160
Do.	Jinli Smelter (Jiyuan Jinli Smelting Co.)	Henan, Jiyuan	300
Do.	Jiyuan Smelter (Yuguang Gold-Lead Co. Ltd.)	do.	300
Do.	Henan Lingye Co. Ltd.	Henan, Lingbao	100
Do.	Hanjiang Smelter	Hubei, Luhekou	50
Do.	Shuikoushan Nonferrous Metals Co. Ltd.	Hunan, Hengyang	100
Do.	Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	100
Do.	Xuzhou Chunxing Alloy Co. Ltd.	Jiangsu, Xuzhou	150
Do.	Jiangxi Jinde Lead Co. Ltd.	Jiangxi, Shangrao	80
Do.	Huludao Nonferrous Metals Group Co. Ltd.	Liaoning, Huludao	30
Do.	Shaanxi Dongling Group	Shaanxi, Baoji	100
Do.	Kunming Smelter	Yunnan, Kunming	100
Do.	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qujing	100
Lithium, LiCO ₃	Baiyin Zabuye Lithium Co. Ltd. (Zabuye Lithium High-Tech Co. Ltd.)	Gansu, Baiyin	5
Do.	Sichuan Shehong Lithium Co. Ltd.	Sichuan, Shehong	2
Do.	Sichuan Tianqi Lithium Industry Co. Ltd. (Chengdu Tianqi Group Co. Ltd.)	Sichuan, Suining	7
Do.	Qinghai Yanhu Industry Group Co. Ltd.	Qinghai, Golmud	10
Do.	Xinjiang Lithium Co.	Xinjiang, Urumqi	5
Magnesium	Zunyi Titanium Co. Ltd.	Guizhou, Zunyi	24
Do.	Ningxia Huayuan Magnesium Group	Ningxia, Yinchuan	15
Do.	Huayu Interprises (Group) Ltd.	Shanxi, Jishan	35
Do.	Taiyuan Tongxiang Magnesium Metal Co. Ltd.	Shanxi, Taiyuan	45
Do.	Taiyuan Yiwei Magnesium Co. Ltd.	do.	21
Do.	Wenxi Biyun Magnesium Co. Ltd.	Shanxi, Wenxi	30
Do.	Wenxi Yinguang Magnesium Group	do.	40

See footnotes at end of table.

TABLE 2—Continued
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies ¹	Location of main facilities ²	Annual capacity ^e	
Manganese, metal	Chongqing Tycoon Manganese Co. Ltd.	Chongqing	23	
Do.	Guangxi Dameng Manganese Industry Co. Ltd.	Guangxi, Nanning	70	
Molybdenum, concentrate	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	120	
Do.	Guangxi Yulin Weinie Co. Ltd.	Guangxi, Bobai	18	
Do.	Jiangxi Jiangli New Type Material Co. Ltd.	Jiangxi, Fenyi	10	
Do.	Jilin Jien Nickel Industry Co. Ltd.	Jilin, Panshi	10	
Do.	Inco New Nickel Materials (Dalian) Co. Ltd.	Liaoning, Dalian	32	
Do.	Chengdu Electro-Metallurgy Factory	Sichuan, Chengdu	5	
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	
Petroleum, crude	Shengli Bureau	Hebei, Shengli	33,500	
Do.	Daqing Bureau	Heilongjiang, Daqing	55,000	
Do.	Liaohu Bureau	Liaoning, Liaohu	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 Lup Nur Potassic Salt Scientific and Technology Development Co.	Xinjiang, Ruoqiang	1,200	
Rare earths	Gansu Rare Earths Co.	Gansu, Baiyin	32	
Do.	Jiangxi Rare Earths Co.	Jiangxi, Nanchang	1	
Do.	Zhujiang Smelter	Guangdong, Guangzhou	5	
Do.	Baotou Iron and Steel and Rare Earths Corp. (Baogang Group)	Nei Mongol, Baotou	55	
Do.	Shanghai Yaolong Nonferrous Metals Co.	Shanghai	2	
Salt	Shandong Haihua Group Co. Ltd.	Shandong, Weifang	1,400	
Do.	Zigong Zhangjiaba Salt Chemical Plant	Sichuan, Zigong	250	
Silver	metric tons	Laibin Smelter [Huaxi (China Tin) Group Co.]	Guangxi, Laibin	80
Do.	do.	Daye Nonferrous Metals Co.	Hubei, Daye	100
Do.	do.	Jiyuan Smelter (Yuguang Gold-Lead Co. Ltd.)	Henan, Jiyuan	600
Do.	do.	Jiangxi Copper Co. Ltd.	Jiangxi, Guixi	415
Do.	do.	Huludao Nonferrous Metals Group Co. Ltd.	Liaoning, Huludao	80
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 Smelter (Yunnan Copper Group Co. Ltd.)	Yunnan, Kunming	450
Strontium, carbonate	Chongqing Chonglong Strontium Co. Ltd.	Chongqing	20	
Do.	Chongqing Tongliang Redbutterfly Strontium Co.	do.	120	
Do.	Hebei Xinji Chemical Group	Hebei, Xinji	130	
Do.	Nanjing Jinyan Strontium Co. Ltd.	Jiangsu, Lishui	20	
Talc	China National Nonmetallic Industry Corp.	Guangxi, Longshen	130	
Do.	do.	Liaoning, Haicheng	50	
Do.	do.	Shandong, Qixia	5	
Tin, smelter	Guihuacheng Smelter (Guangxi Pinggui PGMA Co. Ltd.)	Guangxi, Hezhou	8	
Do.	Laibin Smelter (Liuzhou 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	

See footnotes at end of table.

TABLE 2—Continued
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies ¹	Location of main facilities ²	Annual capacity ^e
Titanium, sponge	Guizhou Southwest Titanium Co. Ltd.	Guizhou, Guiyang	3
Do.	Zunyi Titanium Co. Ltd.	Guizhou, Zunyi	14
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.	3
Do.	Fushun Titanium Co. Ltd.	Liaoning, Fushun	5
Do.	Jinzhou Huashen Nonferrous Metals Plant	Liaoning, Jinzhou	4
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, Gangzhou	15
Zinc	Northwest China Lead-Zinc Smelter (Baiyin Nonferrous Metals Co. Ltd.)	Gansu, Baiyin	150
Do.	Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoguan	180
Do.	Hechi Nanfang Nonferrous Metal Smelting Co. Ltd.	Guangxi, Hechi	200
Do.	Liuzhou Nonferrous Metal Smelting Co. Ltd. (former Liuzhou Zinc Products Factory)	Guangxi, Liuzhou	100
Do.	Yugang Gold-Lead Co. Ltd.	Henan, Jiyuan	250
Do.	Shuikoushan Nonferrous Metals Co. Ltd.	Hunan, Hengyan	60
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, Bayannar League	220
Do.	Xingan Copper and Zinc Smelter	Nei Mongol, Xilinuole	100
Do.	Dongling Zinc Industry Co. Ltd. (Dongling Group)	Shaanxi, Baoji	250
Do.	Laibin Smelter	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

^eEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

¹Most companies are owned by either the central Government or a Provincial government.

²Listed by Province or Autonomous Region, followed by locality.

TABLE 3
CHINA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2009

Commodity	Quantity (metric tons)	Value (thousands)
METALS		
Aluminum:		
Alumina	68,581	\$28,785
Metal and alloys:		
Unwrought	310,240	506,693
Semimanufactures	1,390,000	4,596,491
Antimony:		
Metal, unwrought	4,579	20,579
Oxide	37,141	167,729
Barium sulfate	1,770,000	122,163
Copper, metal and alloys:		
Unwrought	73,142	440,760
Semimanufactures	455,136	2,718,665
Indium, unwrought, including powder	45	16,362
Iron and steel:		
Pig iron and cast iron	237,051	86,255
Steel:		
Bars and rods	12,620,000	11,540,374
Shapes and sections	1,320,000	845,001
Sheets and plates	11,840,000	8,604,476
Tube and pipe	950,000	1,947,254
Wire of steel or iron	1,220,000	1,094,630
Ferroalloys	920,000	1,233,618
Scrap	9,088	2,799
Magnesium, metal and alloy:		
Unwrought, Mg not less than 99.8%	117,429	303,997
Other unwrought	63,619	192,660
Manganese, unwrought	94,946	234,748
Molybdenum, ores and concentrates	8,913	129,369
Rare-earth products	43,918	310,076
Silver, unwrought	764,402	263,435
Tin, metal and alloys, unwrought	686	11,328
Tungsten, tungstates	3,671	62,125
Zinc:		
Metal and alloys, unwrought	29,287	58,683
Oxide and peroxide	16,423	23,171
INDUSTRIAL MINERALS		
Cement	15,610,000	687,193
Fluorspar	270,000	67,335
Granite	7,640,000	2,362,180
Graphite, natural	460,000	134,118
Magnesia, fused	1,310,000	275,764
Talc	400,000	71,874
MINERAL FUELS AND RELATED MATERIALS		
Coal	22,400,000	2,375,367
Coke, semicoke	540,000	201,187
Petroleum:		
Crude oil	5,070,000	2,155,729
Refinery products	25,040,000	12,549,938

Source: General Administration of Customs of the People's Republic of China, 2009, China monthly exports and imports, no. 12.

TABLE 4
CHINA: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2009

(Metric tons unless otherwise specified)

Commodity	Quantity	Value (thousands)
METALS		
Aluminum:		
Bauxite	19,691,930	\$704,981
Alumina	5,140,000	1,303,851
Metal and alloys, unwrought	1,739,433	2,742,584
Semimanufactures	581,368	2,602,586
Scrap	2,630,000	2,751,825
Chromium, chromite	6,760,000	1,310,704
Cobalt:		
Ore and concentrates	282,955	554,899
Unwrought and powder	13,655	228,763
Copper:		
Ore and concentrates	6,130,000	8,478,684
Anode	228,082	1,202,109
Metal and alloys, unwrought	3,466,406	17,125,927
Semimanufactures	823,854	5,499,313
Scrap	4,000,000	6,090,205
Iron and steel:		
Iron ore	627,780,000	50,140,397
Steel:		
Bars and rods	860,000	1,120,055
Seamless pipe	630,000	2,828,433
Shapes and sections	400,000	327,591
Sheets and plates	15,270,000	13,950,913
Scrap	13,690,000	5,095,518
Manganese ore	9,620,000	1,772,832
Nickel:		
Ore and concentrates	16,420,893	1,056,566
Metal, refined greater than 99.95% Ni	3,712	50,974
Metal, other refined	239,269	3,491,667
Titanium dioxide	244,850	537,638
INDUSTRIAL MINERALS		
Diamond	kilograms 2,651	2,559,022
Fertilizers:		
Compound fertilizers	1,310,000	526,870
Diammonium phosphate	430,000	168,044
Potassium chloride	1,980,000	1,177,907
Potassium sulfate	90,000	46,687
Urea	38,798	7,704
MINERAL FUELS AND RELATED MATERIALS		
Coal	125,830,000	105,736,666
Liquefied natural gas	5,530,000	1,279,439
Petroleum:		
Crude oil	203,790,000	89,255,587
Refinery products	36,960,000	16,983,958

Source: General Administration of Customs of the People's Republic of China, 2009, China monthly exports and imports, no. 12.