

# THE MINERAL INDUSTRY OF CHINA

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Even though the Government took steps to “cool down” the strong growing sectors, such as aluminum, automobiles, cement, real estate, and steel, that the Government considered to be “overheated,” China’s economy continued to expand at a rapid pace. The gross domestic product (GDP) increased by 9.5% to \$1.65 trillion, and the per capita GDP rose to \$1,270 in 2004. The growth rate of the industrial sector fell to 11.1% in 2004 from 12.7% in 2003. Investment spending was the main engine of economic growth. Fixed asset investment grew by 25.8% to \$844 billion, of which about 4% was in the mining sector. Investment of manufacturing grew faster than that in agriculture and services. The rate of investment in manufacturing increased by 38.3%, and that of agriculture rose by 20.3%, which was a turnaround from negative growth in 2003. In 2004, the state-owned and state-controlled enterprises accounted for 48.1% of the total fixed asset investment. In 2004, the fixed investment rate in the cement and steel sectors increased by 43.3% and 32.3%, respectively, compared with 70.1% and 63.9%, respectively, in 2003 (State Development and Reform Commission, 2005; State Statistics Bureau, 2005).

In spite of strong growth, the inflation rate remained manageable at 3.9% in 2004. During the past several years, private consumption expanded at a slower rate than Government consumption and fixed asset investment. The growth of industry and consumption in rural areas was slower than in urban areas. China continued to receive significant foreign investment compared with other countries in Asia and the Pacific region. Actual foreign direct investment (FDI) rose to \$60.6 billion in 2004 from \$53.5 billion in 2003, and short-term foreign capital was about \$120 billion in 2004. The 276 Sino-foreign investment projects in the mining sector had a total value of \$1.16 billion; actual FDI, however, was \$540 million. Since China became a member of the World Trade Organization (WTO), its infrastructure has continued to strengthen, and its business environment has improved significantly. Multinational enterprises have accelerated their relocation of labor-intensive and export-oriented industries to China (Asian Development Bank, 2005, p. 1-200; State Statistics Bureau, 2005).

## Government Policies and Programs

China’s economic reforms have resulted in extraordinary growth in the past 2 decades. The GDP increased by an average of more than 8% in the past decade. The Government outlined its priorities in the next 5-year plan, which included increasing rural incomes, creating jobs, developing the private sector, strengthening the rule of law, developing more mechanisms for citizen participation, and financial and state-owned enterprise (SOE) reforms. The long-term goal of the Government was to raise per capita GDP to \$3,000 by 2020, which would require an annual economic growth rate of more than 7%. The Government predicted that the economic growth rate would

be 8% in the next 2 years (International Monetary Fund, 2005, p. 3-50; Citigroup Global Market Inc., 2005b, p. 1-10).

The Chinese Government continued its macroeconomic control policy to tighten credit and land supply until investment growth slowed to a more sustainable and manageable level. Public spending will be shifted from supporting investment to stimulating consumption. The Government planned to eliminate agriculture taxes in 26 of its 31 Provinces within 5 years so that 700 million farmer incomes would increase by 2%. This should help a steady consumption growth as investment grows. The Government also planned to improve the financial institution framework so that the foreign exchange markets can reflect the supply and demand for foreign currencies before the Government considers changing the exchange rate regime. Making the renminbi fully convertible and introducing greater flexibility to the exchange rate regime are the ultimate policy goals of Chinese monetary policy; China, however, will need to build sound financial institutions. It could be a multiyear task (Citigroup Global Market Inc., 2004b, p. 3-15; 2005a, p. 4-16). The Government issued detailed regulations on issuing of renminbi bonds by multilateral development organizations. The World Bank and similar agencies that have investments or loans of more than \$1 billion will be allowed to raise funds in the domestic debt market to finance projects in China (Hong Kong and Shanghai Banking Corp. Ltd., 2005b).

The Government took a number of policy measures to avert potential economic overheating. The People’s Bank of China (Central Bank) introduced tighter regulations on real estate lending in June 2003, but they were not effectively implemented because of resistance from local governments and interest groups. The Government believed that it would be more successful in cooling investment in such sectors as cement and steel if it reduced demand in end markets. At yearend 2004, the Central Government raised the downpayment ratio for home purchases to 30% from 20% and increased the interest rate of 5-year housing loans to 6.12% from 5.31%. The Government also replaced management officials in state-owned banks and convinced local governments to support the tightening measures. If these measures are not enforced, then excess capacity could be exacerbated in a number of sectors, and the bad debt problems that the bank system has been experiences could be increased. The Central Bank issued guidelines to prohibit or discourage investment and lending in more than 500 sectors and to tighten monetary policy through higher bank reserve requirements, open market operations, and increased interest rate (Gazette of the State Council of the People’s Republic of China, 2004).

The Government allowed domestic companies that were engaged in foreign trade to retain their foreign exchange earnings quotas for 90 days instead of 10 days. Companies that had large foreign trading volumes (not defined) will be allowed to retain 100% of their foreign exchange earnings instead of 50%.

This change could be seen as a step in the easing of China's foreign exchange control, which may be the way for a complete abolishment of the export-earnings surrender system (Hong Kong and Shanghai Banking Corp. Ltd., 2005a).

The coastal region remained the main engine of economic growth and accounted for 50% of fixed asset investment and more than 60% of industrial production. Because many of the economic activities were concentrated in the narrow coastal belt, more signs of overheating and overinvestment were present there. Most cities in the coastal area experienced shortages of electricity and labor. During the past several years, the Government invested heavily in infrastructure development in the central and western parts of the country. As a result, infrastructure facilities have improved significantly in the west. That major natural resources, such as bauxite, coal, copper, natural gas, lead, oil, tin, and zinc, are located in the central and western regions could reduce transaction costs for shipping raw materials to the coastal area. Production costs were lower in the west than those in the coastal area. The Government also provided investment incentive for developing the western region. Many western Provinces can also benefit from cross-border investment and trade activities with Central, South, and Southeast Asia (Citigroup Global Market Inc., 2004a, p. 16-25).

The Government set banking reform as one of its top priorities. One of the conditions of full WTO membership was to allow foreign financial institutions to participate fully in the financial system by 2006. In 2003, the Government launched a new banking reform program that shifted the regulatory focus to capital adequacy and prioritized ownership restructuring of large state-owned banks. The Government planned to allow one of the four major state-owned banks to be listed in the stock exchange in 2005. Nine foreign banks had taken stakes in domestic banks, and another nine banks were in the process of negotiations. On December 1, China allowed foreign banks to conduct renminbi business in Beijing, Kunming, Shenyang, Xiamen, and Xian; this made a total of 18 cities. The State Administration of Foreign Exchange issued a circular that limited short-term offshore borrowings by branches of domestic and foreign banks. The limits were set at \$34.8 billion for foreign banks and \$24.5 billion for domestic banks (Citigroup Global Market Inc., 2004c, p. 6-10).

China's rapid economic growth posed a major challenge for the management of its natural environment. Land degradation, deficiency in quality and distribution of the available water, high levels of air pollutants, and declining natural forests and mineral resources threatened the sustainability of long-term growth. China had shortages in most minerals, such as bauxite for producing alumina, chromium, copper, iron, manganese, nickel, and oil and relied on imports to meet the demand. Since the late 1990s, the Government has encouraged and provided information to companies on the exploitation of minerals in other countries. In 2004, the Government issued guidelines on how to apply state-supported funds to mineral development projects in other countries (Ministry of Commerce, 2004e; PricewaterhouseCoopers International Ltd., 2004a).

After 10 years of consultation, a draft Enterprise Bankruptcy Law was submitted to the National People's Congress Standing Committee for its consideration and approval at yearend 2004.

China did not have a unified bankruptcy law that covered all types of enterprises. Laws that govern enterprises include Civil Procedure Law, Company Law, Measures on Liquidation Procedures for Foreign Investment Enterprises, and the Law of the People's Republic of China on Enterprise Bankruptcy (for trial implementation). Since the Government allowed enterprises to declare bankruptcy in the late 1990s, an estimated 70,000 enterprises have gone bankrupt in China. The proposed legislation will help China transform into a more-transparent market economic country. The drafted Enterprise Bankruptcy Law will cover all types of debtor entities, such as private and state-owned enterprises. The draft law, if implemented, will allow distressed enterprises with no prospect of rehabilitation to terminate their operations and those with future prospects to start fresh through restructuring and conciliation. The draft law will provide foreign investors with a defined mechanism for direct investments in many insolvent enterprises in China (PricewaterhouseCoopers International Ltd., 2004b).

The Government has set up a task team from various Government agencies to draft a unified enterprises' income tax rate for domestic and foreign companies. The unified enterprises' tax rate will range between 24% and 26%. There will be a transitional period for foreign companies and a preferential period of 2 to 3 years for newly established foreign companies in China. These changes will provide fairness for domestic and foreign companies and will create a better investment environment for foreign investors (U.S. Embassy, Beijing, China, 2005b).

On December 29, the National People's Congress Standing Committee amended the Law on Solid Waste Pollution Prevention and Control, which was to become effective on April 1, 2005. The law clarified that manufacturers, importers, sellers, and consumers were all responsible for the prevention and control of solid waste pollution of the environment. The Government could force the manufacturers to recycle some categories of products and packaging. The State Council will issue the recycling list and methods for recycling these products. The Central and local governments will publish solid waste information on a regular basis, and polluters will be fined (U.S. Embassy, Beijing, China, 2005a).

## **Production**

Before 1998, regional statistical offices provided commodities production data to the National Statistical Bureau (NSB). In 1998, the NSB changed its statistical survey method to improve data reliability and requested companies that had sales revenues of more than \$605,000 to report their output. Many small producers were not included in the survey. Therefore, the actual output of mineral commodities, such as antimony, bauxite, copper, iron, lead, molybdenum, tin, tungsten, and zinc, was expected to be higher than the NBS-released data. In 2003, the NBS tried to include minor producers in its survey. As a result, outputs of iron and lead were much higher than in previous years (China Metals, 2005e).

During the past several years, China had fueled an expansion capacity to the extent that some formerly imported products, such as aluminum, were exported. The growth of pig iron,

crude steel, and steel products have expanded by an annual rate of 20% or more. Initially, the growth was generated by strong domestic demand. Recently, however, China has moved from being a net importer to a net exporter of some steel products. Because of China's shortage of raw materials, such as alumina and ores of chromium, copper, iron, manganese, and nickel, imports of these raw materials have been growing sharply (Menzie and others, 2004<sup>1</sup>). China searched for mineral resources in other countries to support its demand. Countries rich in mineral resources, such as Australia, Brazil, and Chile, have benefited from the strong demand for raw materials from China. Countries that produced high-technology products, such as Japan and the Republic of Korea, also benefited from China's investment-led growth.

In 2004, aluminum metal output continued to increase sharply. During the past 2 years, about 28 smelters that used Soderberg cells with a total output capacity of about 300,000 metric tons (t) were shut down. These smelters were forced to close because of shortage of alumina or electricity or both. Under the Government trade policy, only Aluminum Corporation of China Co. Ltd. (Chalco), China Minmetals Nonferrous Metals Co. (Minmetals), and several large smelters were allowed to import alumina directly. Others have to purchase it from Chalco or Minmetals. Owing to environmental issues, Chalco and Minmetals preferred to supply alumina to larger and pre-baked cell smelters. Larger aluminum smelters, however, expanded their output capacity in response to high demand in the international markets. Smelters, such as Danjiang, East Hope Baotou, Henan Zongfu, Hunan Chuangyuan, Nanshan, Shandong Xinfu, Qingtongxia Jianing, Yunnan, and Yanzhou Ke'ao, either expanded their output capacities or were being built. About 1.3 million metric tons per year (Mt/yr) of newly installed output capacity was added in 2004, and aluminum metal output capacity expanded to more than 8.8 Mt/yr at yearend 2004. According to the companies' expansion and greenfield plans submitted to the Government for approval, China will have an aluminum production capacity of about 10 Mt/yr in 2005. With the rapid increase of aluminum production, the ability of domestic alumina producers to meet demand will be much more difficult. In 2004, China imported about 5.9 million metric tons (Mt) of alumina, which accounted for about 45% of the total demand. The strong demand for alumina by aluminum smelters affected domestic and international market prices of alumina. With the shortage of electricity and the high price of alumina, many domestic aluminum smelters operated at a financial loss in 2004. To reduce production costs, aluminum smelters formed alliances with coal-power companies to ensure receipt of preferential electricity supplies and prices. Analysts anticipated that the power shortage throughout the country would continue until 2006 and would affect aluminum production in the eastern and northwestern parts of China.

In 2004, China consumed about 6 Mt of aluminum, and supply exceeded domestic demand. China was a net exporter of primary aluminum (707,843 t). China's aluminum metal

production was expected to increase in the next couple years and supply would continue to exceed demand. The supply/demand gap will be smaller because of the shortage of alumina and the Government's restriction of investment in the aluminum sector (China Metal Bulletin, 2005c).

Owing to economic expansion, the production and consumption of copper in China continued to increase. The macroeconomic policy on fixed investment set up by the Government had little effect on the consumption of copper. Copper consumption increased because the demand from the construction, electrical appliance, and power sectors increased. In 2004, China's copper consumption was estimated to be 3.5 Mt, which accounted for about 24% of the world total. China overtook the United States to become the leading copper-consuming country in the world. Even with the strict macroeconomic control policy owing to the shortage of power supply, the Government encouraged investment in the power sector, which accounted for about one-half of China's total copper consumption. As a result of increasing demand, copper prices at the Shanghai Metal Exchange rose to 31,000 yuan (\$3,748) per metric ton in December from 22,300 yuan (\$2,696) per ton in January. Owing to the tight supply of copper in the domestic market, copper stocks at the State Material Reserve Bureau and smelters' warehouses decreased sharply. Domestic analysts estimated that the Government sold more than 200,000 t of copper metal from its reserve warehouses. Per capita copper consumption remained low compared with other developed economies, such as Japan, the United States, and Western Europe; China's copper consumption, however, was expected to increase continuously in this decade. China's output of copper cathode was expected to increase in the future, although the output of domestic copper mines could meet only less than 45% the copper smelters' needs; therefore, China was required to import large quantities of copper concentrates from, in decreasing order of quantity imported, Mongolia, Chile, Australia, and Peru. In 2004, China imported 3.96 Mt of copper scrap, 2.88 Mt of copper concentrates, and 1.20 Mt each of refined copper and semimanufactured copper products. Refined copper was imported mainly from Chile, Japan, Kazakhstan, and Russia, and copper scrap was imported from Hong Kong (imported from other countries and re-exported to China), Japan, and the United States. With limited copper resources, China's copper mine output was not expected to be maintained at its current level. Before the end of this decade, China will probably overtake Japan as the leading copper concentrates importer in the world. China's six leading copper producers planned to expand their output capacities and to increase their production in next 2 years. With the availability of more copper concentrates in 2005, copper treatment charge and refining charge was expected to be higher in 2005 compared with those of 2004. China's refined copper output was expected to reach 2.4 Mt in 2005 (China Nonferrous Metals Monthly, 2005).

China was the world's leading producer of pig iron and crude steel. Its crude steel output was slightly less than the combined total production of Japan, the United States, and Russia, which ranked second, third, and fourth, respectively, in the world. The increase crude steel production was mainly from pig iron production from blast furnaces. Because of the

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<sup>1</sup>A reference that includes a section mark (§) is found in the Internet Reference Cited section.

shortage of steel scrap and higher electricity prices, production of crude steel from electric arc furnaces accounted for only about 15% of total steel output. Low-grade steel products made up a large share of output. Except for high-quality steel products, output of the domestic steel sector basically could meet the domestic market demand. Imports of steel billet, slab, and finished steel had declined gradually, and exports of these increased slowly in the past several years. Pig iron and crude steel outputs were expected to increase in 2005; because of the Government's macroeconomic policy on investment, however, the rate of increase could be slightly slower than that of the past 2 years. The rate of steel consumption was lower than the rate of production in 2004, and if this trend were to continue, then domestic analysts expect that China would become a net exporter in the near future. The outputs of China's steel, crude steel, and pig iron products were expected to reach 350 Mt, 340 Mt, and 300 Mt, respectively, in 2005 (China Metals, 2005h).

China was the world's leading producer of lead and zinc. The metal production of lead and zinc continued to increase in 2004. The shortage of concentrates in China forced lead and zinc metal producers to increase their reliance on imported raw materials and were expected to continue in the future. In 2004, China's lead and zinc concentrates imports were 830,560 t and 616,074 t, respectively. China's lead and zinc bases are located in the Provinces of Guangdong, Guangxi, Hunan, Sichuan, and Yunnan. China's major lead producers were Shenzhen Nonfemet Co. Ltd., Yubei Metal Co., Yuguang Gold-Lead Co. Ltd., and Zhuye Torch Metals Co. Ltd. The major zinc producers were Baiyin Nonferrous Metals Co. Ltd., Huludao Zinc Smelting Co., Shenzhen Nonfemet Co. Ltd., and Zhuye Torch Metals Co. Ltd.

Owing to the increase of demand and shortage of concentrates, imports of refined zinc increased to 239,450 t in 2004 from 136,025 t in 2003, and exports decreased to 224,164 t in 2004 from 451,028 t in 2003. China became a net importer on refined zinc. Besides increasing domestic demand, the price difference between the domestic and international markets was another reason for increasing imports. The domestic zinc price was about \$120 per ton higher than international zinc prices and the Government reduced the export VAT rebate to 11% in 2004 from 15% in 2003. Domestic zinc producers had less incentive to export their products. China was a net zinc importer of a total of 500,000 t (metal content). Imports of zinc concentrates were mainly from Australia, India, and Iran. China consumed about 2.6 Mt of zinc, and the demand for zinc was expected to increase in 2005 because of the construction of power-generating facilities and expansion of galvanized steel production (Lead, Zinc, and Tin Monthly, 2005b).

## Trade

According to the Customs statistics, total trade was value at \$1.15 trillion in 2004; this was an increase of 35.7% compared with that of 2003. Exports posted an increase of 35.4% to \$593.4 billion, and imports went up by 36.0% to \$561.4 billion. The United States remained the leading destination for China's exports, and Japan was China's leading importing country. Imports of raw materials, such as alumina, copper

concentrates, iron ore, and oil, increased sharply. Owing to price increases in the international markets, the value of exports of coke, coal, and steel products increased by 169.8%, 42.6%, and 19.4%, respectively. In the first quarter of the year, the percentage of value of imports increased sharply; in the fourth quarter, however, the combination of slowing domestic demand and rapidly rising excess capacity had pushed Chinese imports of raw materials down sharply. Imports of machinery and equipment were flat, which reflected the deceleration of domestic investment spending (General Administration of Customs of the People's Republic of China, 2004, p. 2-63).

When China joined the WTO in 2001, the country agreed to extensive changes of its trade regime at all levels of Government and to implement a set of sweeping reforms that required the country to lower trade barriers in nearly every sector of the economy. China also agreed to special rules regarding subsidies and the operation of state-owned enterprises. Implementation of the changes was substantially complete by December 11, 2007. Since 2002, China has revised or enacted more than 1,000 laws, regulations, and measures to bring its trading system into compliance with WTO standards. China also agreed to implement a tariff reduction program through its bilateral negotiations with interested WTO members. China had reduced the average tariff rate to 7% in 2002 from 25% in 1997; this included the construction equipment, chemicals, machinery, and medical and scientific equipment that were the main exported commodities to China from Europe and the United States (U.S. Trade Representative, 2005, p. 1-86).

The Ministry of Commerce (MOC) issued a circular on the management of export license regulation in 2004. The State Council issued Decree No. 416 on the regulations on the origin of import and export commodities. According to the regulations, the MOC issued a list of commodities, which included ferrous and nonferrous metals, that required export quota license control in 2005. Mineral commodities that were on the Government's monitor list were ammonium paratungstate; bauxite and refractory clay; coal; coke; concentrates of antimony, tin, tungsten, and zinc; fluorspar; oxides of antimony, magnesium, and tungsten; platinum; rare earths; silicon carbide; silver; talc; and unwrought and alloys of antimony, tin, and zinc. All antimony products must be registered and exported through the Ports of Beihai in Guangxi Zhuangzu Autonomous Region, Huangpo in Guangdong Province, and Tianjin. The Port of Dalian in Liaoning Province was designated as the port to issue export licenses for magnesite, which can be exported through the Ports of Changchun in Jilin Province, Dalian, Manshouli in Heilongjiang Province, and Qingdao in Shandong Province. The Government adjusted the 2005 export quota for coal to 80 Mt; coke, 14 Mt; oil products, 12 Mt; magnesite, 1.4 Mt; crude oil, 1 Mt; fluorspar, 750,000 t; talc, 650,000 t; zinc and zinc products (metal content) to 520,000 t; silicon carbide, 230,000 t; antimony and antimony products (metal content), 65,700 t; tin and tin products (metal content), 57,000 t; rare earths (rare-earth oxide equivalent), 50,000 t; tungsten and tungsten products (metal content), 16,300 t; and silver, 3,500 t. The import quota for ammonium phosphoric acid will be 6.56 Mt; complex fertilizer, 3.29 Mt, and urea, 2.8 Mt (Ministry of Commerce, 2004a-c).

With the approval of the State Council, the Ministry of Finance revoked the value-added tax (VAT) export rebate on aluminum and aluminum alloys, ferroalloys, nickel, phosphorus, and silicon carbide and imposed a 5% export tax on aluminum metal and refined copper and a 2% export tax on refined nickel beginning January 1, 2005. The tariff rate for aluminum scrap and waste, copper anode, scrap and waste will be levied at 10%. Starting on May 1, 2005, the VAT export rebate on products of antimony, coal, tin, tungsten, and zinc will be reduced to 8%. Also, the VAT export rebate on fluorspar, magnesite, molybdenum concentrates, rare-earth products, silicon metal, and talc will be reduced to zero. The export tax rate on yellow phosphorus will increase to 20% from 10%, and ferrosilicon, to 5% from 0% (Ministry of Finance, 2005).

China's General Administration of Quality Supervision Inspection and Quarantine required all scrap exporters to be licensed. Beginning on January 1, 2005, each exporter will have to demonstrate that it is an authorized operator and has a permanent office or plant. The exporter is required to be certified by local environmental authorities to qualify for a license to export scrap to China. Companies will have to submit to the Chinese authorities a document that explains which type of material is being shipped. The State Environmental Administration, State Customs, and the MOC banned the import of specific types of scrap and waste of aluminum, copper, steel, and vanadium for processing. Beginning on August 1, 2005, the Government will prohibit the import of iron ore, pig iron, steel ingot and scrap, rare-earth ore, and phosphate rock solely for export processing and required these commodities to be imported through normal trading (General Administration of Quality Supervision Inspection and Quarantine, 2004, p. 1-90; Ministry of Commerce, 2004d).

## Commodity Review

### *Metals*

**Aluminum.**—The State Environmental Protection Administration ordered five companies to halt the construction of their alumina plants in the Provinces of Henan and Shanxi because they failed to submit environmental appraisals. Henan Pingdingshan Huiyuan Chemical Industrial Co. completed the construction of its 300,000-metric-ton-per-year (t/yr) refinery in July 2004. Construction of the first 100,000-t/yr phase of Yixiang Aluminum Co.'s (a subsidiary of Henan Yimei Coal Group) 300,000-t/yr alumina project was completed at yearend 2004, and the trial run was expected to begin in 2005. The construction of a 400,000-t/yr plant for Shanxi Yangquan Coal Industry (Group) Co., a 300,000-t/yr plant for Shanxi Jiaokou Feimei Aluminum Co. (a Sino-foreign joint venture), and a 300,000-t/yr plant for Shanxi Tongde Aluminum Co. were underway in 2004. The Administration requested that these companies submit all required documents and be approved before resuming construction or operation (Alumina and Aluminum Monthly, 2005c; China Metals, 2005d).

The Government planned to allow more aluminum companies to import alumina for their own consumption. In addition to

Chalco and Minmetals, the Government issued alumina import licences to six smelters—Baotou Aluminum Plant, Jiaozuo Wanfang Aluminum Co. Ltd., Lanzhou Aluminum Plant, Qingtongxia Aluminum Plant, Shanxi Guanlu Aluminum Co. Ltd., and Yunnan Aluminum Plant. Other smelters could either import alumina under processing trade or purchase alumina from Chalco or Minmetals. Alumina imports under processing trade were free from the 8% import duty and the 17% VAT. The processing trade accounted for about 70% of the country's total aluminum exports. The Government was considering abolishing the aluminum-processing trade in 2005 and issuing more alumina import licenses to some aluminum smelters. Smelters that were under consideration must have output capacities of more than 100,000 t/yr and must receive Government approval before being put into operation. Ciping Huaxin Aluminum Co. Ltd. and Longkou Donghai Aluminum Co. Ltd. in Shandong Province; Wanji Aluminum Co. Ltd., Zongfu Industry Co. Ltd., and Sanmenxi Tianyuan Aluminum Co. Ltd. in Henan Province; Lanzhou Liancheng Aluminum Smelter and Baiyin Honglu Aluminum Co. Ltd. in Gansu Province; Qinghai Qiaotou Aluminum Power Co. Ltd. in Qinghai Province; Fushun Aluminum Smelter in Liaoning Province; Tongchuan Xinguang Aluminum Co. Ltd. in Shaanxi Province; and Qimingxing Aluminum Co. Ltd. and Qiya Aluminum Co. Ltd. in Sichuan Province received alumina import licenses (China Metals, 2005e).

China's sole metallurgical-grade alumina producer, Chalco, planned to increase alumina output to 7.2 Mt in 2005. The increase of alumina production will come from its refineries in the Provinces of Guangxi, Guizhou, Henan, Shandong, and Shanxi. The third-phase alumina expansion of Pingguo Aluminum Co. will increase its total output capacity to 1.2 Mt/yr. Guizhou Aluminum Plant (or Guizhou Co.) will add 300,000 t/yr to its current output capacity in 2005 and will expand to 1.2 Mt/yr in 2008. Part of a 700,000-t/yr production-capacity expansion will be commissioned at Zhengzhou Aluminum Plant (or Henan Co.) in October 2005. After completed expansion, Zhengzhou will have a total alumina output capacity of 2 Mt/yr. The second 300,000-t/yr bauxite dressing/Bayer process line at Zhongzhou Aluminum Plant will be completed in June 2005. The renovation of Shandong Aluminum Plant's (or Shandong Co.'s) refinery was completed in 2004; the company planned to add another 300,000-t/yr Bayer process line in 2005. The Government approved Chalco's joint-venture company, Guangxi Guixi Huayin Aluminum Co. Ltd.'s, plan to build a 1.6-Mt/yr alumina refinery in Debao County of Bose (Baise) City, Guangxi Zhuang Autonomous Region. The construction of the first-phase 800,000-t/yr refinery was scheduled to begin in 2004 and was expected to be completed in 2007 (China Metal Bulletin, 2004a).

To secure the supply of alumina, several companies either began or planned construction of alumina refineries in the Provinces of Henan, Shandong, and Shanxi. Chalco, the Xinzhou City Government, and the Luneng Group formed a joint venture, Luneng Jinbei Aluminum Industry Co. Ltd., to build a 2-Mt/yr refinery at Xinzhou, Shanxi Province. The first phase of the 1-Mt/yr refinery was scheduled to be completed in 2006. Chalco joined with Bosai Aluminum Co. and others to build a 800,000-t/yr refinery in Chongqing City. The East

Hope Group's 1.05-Mt/yr refinery was under construction in Minchi, Henan Province, and the first phase of 350,000 t/yr was scheduled to be completed in 2005. Xinan Aluminum Co.'s 800,000-t/yr refinery at Xinan, Henan Province, was scheduled to be commissioned in 2005. Baofeng Aluminum Co., which was a joint venture between the Shenhua Group and local companies, planned to build a 1.05-Mt/yr alumina refinery at Baofeng, Henan Province, and the first phase of 350,000-t/yr was scheduled to be put into operation in 2005. Kaili Aluminum Co. planned to expand its alumina output capacity to 600,000 t/yr by 2005. Lianyungang Aluminum Co., which was a joint venture of Liancheng Aluminum Plant, Shaanxi Changxin International Trade Co., the Lianyungang Port Administration, and Lianyungang Economic and Technology Development Zone, intended to build a 1.2-Mt/yr alumina refinery at Lianyungang, Jiangsu Province. The first-phase plan was to build a 500,000-t/yr refinery by 2007. The Shandong Nanshan Group planned to build a 1-Mt/yr alumina refinery at Longkou, Shandong Province, by 2007. Dengfeng Power Plant Group Co. Ltd. and Henan Wuzhou Aluminum Co. Ltd. planned to invest \$370 million to build a 1.2-Mt/yr alumina refinery at Dengfeng City, Henan Province; construction was to begin in 2005. The Central Government had not approved every individual project. In 2004, the National Development and Reform Commission issued a circular to local Development and Reform Committees and Aluminum Corporation of China (Chinalco) (the parent company of Chalco) that ordered them to shut down unapproved alumina projects in their regions. Development of alumina projects was subject to the guidance of the Central Government's development plan. State-owned banks were not allowed to provide loans, and the land administration departments were not to issue land-use licenses to the unapproved projects (Alumina and Aluminum Monthly, 2005b; China Metal Bulletin, 2005d).

In December 2004, Baiyin Nonferrous Metals Co. Ltd. started the construction of its aluminum fluoride plant at Baiyin, Gansu Province. Construction will take at least 2 years. The plant was designed to produce 30,000 t/yr of aluminum trifluoride through dry-processing technology and would replace wet-processing technology. The wet-processing route was energy intensive and polluted the environment. The Government planned to retire all aluminum fluoride production that used wet-processing technology (Interfax Information Services, 2004a).

In 2003, China and Vietnam signed a memorandum of understanding for the joint development of the bauxite resources in Dac Nong, Vietnam. In 2004, Chalco completed the feasibility study on the alumina project at Dac Nong and submitted it to the Vietnamese Government for approval. The feasibility study included the construction of a bauxite mine and a 1-Mt/yr alumina refinery at an estimated of \$870 million. Chalco and China Nonferrous Metal Mining and Construction Group Co. Ltd. will take part in the project (Alumina and Aluminum Monthly, 2004).

Chalco and Companhia Vale do Rio Doce (CVRD) of Brazil formed the 50/50 joint-venture Alumínio Brasil China Refinery to build an alumina refinery in Brazil. The initial 1.8-Mt/yr refinery will be located in Barcarena, State of Para, and the cost was estimated to be \$800 million. The refinery was

scheduled to put into operation in 2007, and all its output would be exported to China. CVRD planned to increase the refinery output capacity to 7.2 Mt/yr in the future (China Metals, 2004a).

The Government planned to close down Soderberg cell aluminum potlines by 2005. At yearend 2003, 64 smelters were using Soderberg cells to produce aluminum metal and had a total output capacity of 1.12 Mt. About 300,000 t of aluminum output capacity was closed in 2004. Liancheng and Qingtongxia Aluminum Plants will close down their Soderberg cell potlines in 2005 (China Metals, 2004c).

Shanglin Nannan Industry Co. Ltd., which was a joint venture of Guangxi Nannan Aluminum Co. Ltd., Nanning High-Technology Development and Investment Co. Ltd., Nanning Energy Development Corp., Shanglin Coal-Fire Power Plant, Shanglin Mushan Coal Mine, and Shanglin Coal Industry Co. Ltd., planned to build a 1.1-Mt/yr coal mine, a 100,000-t/yr aluminum smelter, and a 214,000-kilowatt powerplant in Shanglin County, Guangxi Zhuang Autonomous Region. Guangxi Nannan Aluminum had a 10,000-t/yr Soderberg cell smelter; owing to environmental problems, however, the smelter was ordered by the Government to close down. The local government approved a new prebaked cell smelter to be built by Guangxi Nannan Aluminum in another location (Alumina and Aluminum Monthly, 2005a).

**Antimony.**—Since the mine accident in Nandan and the crackdown on illegal exports in 2001, the world market price of antimony has increased by more than twofold from \$1,100 per metric ton at yearend 2001. Because of slow economic growth in Japan, Europe, and the United States, international antimony prices were maintained in the range of \$2,000 to \$2,400 per ton throughout 2003. As economic activities in Europe, Japan, and the United States slowly recovered in 2004, the antimony price in the world market increased to about \$3,000 per ton at yearend 2004. China's antimony metal production continued under the Government's tight control. Before 2001, mines in the Guangxi Zhuang Autonomous Region produced more than 50,000 t of antimony in concentrates; this total excluded production from illegal miners. Since then, mine output from this area has decreased by more than 50%. In 2003, the Government approved the reopening of five mines in the Nandan area, but only two mines, Chashan and Gaofeng, have antimony resources, and mine output from the Guangxi Zhuang Autonomous Region would unlikely reach the 2001 level. During the past 3 years, the official statistical data for antimony concentrates have been questionable. Reported antimony output from mines was lower than that of antimony metal output. To meet demand, the shortage of antimony concentrates was assumed to have come from the mine producers' stockpiles and to have been supplemented by imported concentrates. In 2004, the country imported 17,984 t antimony concentrates mainly from, in order of tonnage, Russia, Tajikistan, Kazakhstan, and Burma. Exports of antimony oxide increased by 28.2% to 49,251 t, but antimony ingot exports decreased by 14.9% to 21,488 t. Japan was the leading antimony-importing country followed by the Netherlands. Hunan Province replaced the Guangxi Zhuang Autonomous Region as the leading antimony-producing Province in China (Precious and Minor Metals Monthly, 2005b).

**Cobalt.**—China's demand for cobalt had increased sharply in the past decade. China was one of the leading mobile phone producers in the world. The demand for cobalt batteries has driven the rapid expansion of cobalt-refining facilities in China. Despite limited cobalt resources, China continued to expand its refined cobalt output capacity in the past several years. The Jinchuan Nonferrous Group expanded its refined cobalt output capacity to 4,000 t in 2005 and planned to increase it to 8,000 t in 2010. In 2004, Jinchuan produced about 2,280 t of cobalt (metal content) products, of which cobalt metal accounted for about 800 t. Owing to increased demand from cobalt salt producers, China's cobalt concentrates imports increased to 143,594 t in 2004 from 83,468 t in 2003; the Democratic Republic of the Congo accounted for 90% of the total imports. China consumed about 9,500 t of cobalt—the battery sector accounted for 57% of the total followed by the glazing sector, 14%; cemented carbide, 11%; magnetic, 8%; and others, 10%. Consumption of cobalt in the battery sector was expected to increase in the future (Precious and Minor Metals Monthly, 2005a).

**Copper.**—China's leading copper producer Jiangxi Copper Co. Ltd. planned to expand its copper cathode capacity by 400,000 t to 700,000 t and also planned to increase copper semimanufactured products to 370,000 t; silver, to 400 t; and gold, to 20 t in 2007. At yearend 2004, Jiangxi Copper had a designed copper-refining output capacity of 400,000 t and produced 415,051 t of copper cathode. Its mines' total output was 157,347 t copper in concentrate. The company planned to produce 450,000 t of copper cathode, 320 t of silver, 12 t of gold, and 1.0 Mt of sulfuric acid in 2005. The company also planned to expand the mining and processing output capacity at the Wujiawu, the Wushan, and the Yinshan Mines to increase copper concentrate supply from its own mines. Jiangxi Copper had to source more than 50% copper concentrates from domestic and overseas markets to meet its needs. Jiangxi Copper and the Bank of China signed an agreement to establish Jiangxi Copper Group Finance Management Co. Ltd. to strengthen capital management at Jiangxi Copper. Jiangxi Copper also signed a purchase agreement with China Metallurgical Construction Corp. (MCC). For 10 years starting in 2005, MCC will sell 16,000 t/yr of blister copper from its Saindak smelter in Pakistan to Jiangxi Copper. The Saindak smelter had an output capacity of 20,000 t/yr (China Metals, 2004b; Interfax Information Services, 2005c).

Xinjiang Jinyu Corp. at Alataw Shankou, Xinjiang Uygur Autonomous Region, and Kazakh Kazakhmys Corp. of Kazakhstan signed a cooperation agreement to develop the Aktogay-Aidarly copper mine in eastern Kazakhstan. The copper deposit was discovered in the 1930s, and on-property exploration, development, and initial exploitation were conducted in late 1950s. The Aktogay-Aidarly area has substantial copper reserves and also contains significant quantities of gold, iron, molybdenum, and silver. After prospecting and feasibility studies are completed, mine construction could begin in 2006. The total investment was estimated to be \$2 billion because the mine is located in a remote desert area, and infrastructure must be built before the mine is developed (Interfax Information Services, 2005e).

China's second ranked copper producer was Tongling Nonferrous Metals (Group) Co. Tongling's subsidiary Jinlong Copper Co., which was a joint venture with Sumitomo Metal Mining Co. Ltd. of Japan, completed a renovation/expansion project 3 months ahead of schedule. The smelting plant suspended production for more than 1 month, but the refining plant remained in operation. The copper cathode output capacity increased to 210,000 t/yr. Jinlong planned to produce 185,000 t of copper cathode in 2005. The construction of Tongling's Donguashan Mine was expected to be completed in September 2004. The mine was designed to produce 30,000 t/yr of copper in concentrates, which would be consumed by Tongling's subsidiary Tongdu Copper Co.'s smelters. In 2005, Tongling planned to produce about 400,000 t of copper cathode from its three smelters/refineries (Jingchang, Jinlong, and Zhangjiagang). Tongdu planned to issue \$120 million in convertible bonds to finance its two downstream projects with Viceroy Capital of Canada—60,000 t/yr of copper sheet/strip and 40,000 t/yr of electronic copper strip (China Metal Bulletin, 2005b; China Metals, 2005f).

The Government of Hubei Province signed agreement to sell its 85% share of Daye Nonferrous Metals Co. at Hunagshi, Hubei Province, to Chinalco. In 2004, Daye had a design output capacity of 200,000 t of blister copper and 160,000 t copper cathode and planned to increase copper cathode output to 200,000 t in 2006. Under the terms of the agreement, Daye will become a subsidiary of Chinalco, but it will operate independently in production, sales, and foreign trade. The Hubei Provincial Government will continue to provide preferential incentives to Daye. Chinalco will contribute at least 40% of the total investment in Daye's 100,000-t/yr high-precision copper sheet/strip project (Copper and Nickel Monthly, 2004a).

In August 2004, Rongda Copper Co. Ltd., which was a joint venture of Gunagxi Debao Copper Mine, Guangxi Huali Chemical Engineering Co. Ltd., and Zhangjiagang United Copper Co. Ltd. (a subsidiary of Tongling), completed its 5,000-t/yr copper smelter in Baise City, Guangxi Zhuang Autonomous Region. The construction cost was \$2.4 million. Copper ore was sourced from local copper mine producers. Rongda's output will be shipped to Zhangjiagang to be refined. The company planned to expand the output capacity to 20,000 t/yr in the future (Copper and Nickel Monthly, 2004b).

After 16 months of construction, Shandong Jinsheng Nonferrous Metals Corp., which was located at Linyi City, Shandong Province, completed its \$10.2 million copper expansion project in October 2004. The copper cathode output capacity increased by 80,000 t to 100,000 t/yr. Blister copper increased to 400 metric tons per day (t/d). The company planned to import a copper wire rod line from Germany, which was capable of producing 65,000 t/yr of high-quality copper wire (China Metal Bulletin, 2004b).

Zijin Mining Group Co. Ltd., which was a Fujian Province-based gold company, invested \$30 million in a joint venture to develop the Yulong copper deposit in Xizang Autonomous Region. Other investors included No. Geologic Team of Xizang Geology and Mining Survey Bureau, Western Mining Co. Ltd., and Xizang Changdu State-Owned Assets Administration. The

joint-venture company Xizang Yulong Copper Co. Ltd. will be established to oversee the development of the Yulong deposit, which has proven reserves of 6.5 Mt of copper. Western Mining held 41% of the shares of the company, and Zijin controlled 39% shares (Copper and Nickel Monthly, 2005c).

**Gold, Platinum-Group Metals, and Silver.**—China's gold production was controlled by the Government prior to 2002. Since then, gold producers could sell their gold through Shanghai Gold Exchange, but exports and imports of gold ingot remained under Government control. In 2004, the China Gold Association (CGA) reported that the country produced 212.35 t of gold and that gold mine producers produced 170.89 t. Previously, gold output from gold mines accounted for about 80% of the total, and nonferrous metal mines contributed about 20%. In recent years, the production of nonferrous metal mines, such as copper, lead, and zinc, gradually increased; therefore, the share of gold production from these mines might increase slightly. The NSB indicated that gold output reached 265.04 t in 2004. When the Gold Bureau was abolished in 2003, the CGA was established to take over the responsibility for collecting gold production data. China's gold ingot was produced from domestic and imported ore. In the past several years, imports of copper, lead, and zinc concentrates increased. The CGA might only collect production data on gold producers and large nonferrous metal producers; this could contribute to the difference between the CGA and the NSB data. Shandong Province remained the leading gold-producing Province in China followed by the Provinces of Henan, Fujian, Shaanxi, Liaoning, and Hebei. In the past several years, the World Gold Council reported that China consumed between 200 and 230 t/yr; domestic gold analysts, however, estimated that gold consumption in China reached 300 t. Because the Government published gold output data but withheld gold bullion import and export data, ascertaining reliable gold-consumption figures was difficult (China Gold Association, 2005; China Metal Bulletin, 2005e).

In 2004, Guoda Gold Refining (Group) Co. Ltd., which was located in Zhaoyuan City, Shandong Province, through its subsidiary, North Korea-Sino Guoda Mining Co., signed an agreement with the Foreign Trade and Economics Development Commission of North Korea to develop the Yunshan Gold Mine near Shang Nong Mountain in North Korea. Recoverable gold reserves were estimated to be 150 t. In the past several years owing to lacks of funding and equipment, mine operation had been suspended. Guoda planned to expand mining and processing output capacity to 1,000 t/d, and concentrate outputs would be shipped to Guoda's plant in China for smelting and refining (Interfax Information Services, 2004b).

Anglo American Plc of the United Kingdom signed an agreement with Sichuan Geology and Mining Co. (a subsidiary of Sichuan Provincial Bureau of Geology and Mineral Resources) to establish a joint-venture company to prospect for platinum resources in the Danba-Panxi area. Anglo American will invest \$20 million and will have 51% in the joint venture. The Danba-Panxi area is considered to be a large metallogenic region in China, and Anglo Platinum Co. (a subsidiary of Anglo American) thought that valuable platinum resources could be discovered in the area (Precious and Minor Metals, 2004).

Since 2000, China's silver output has increased sharply. Silver output from mines increased to more than 2,000 t in 2002 from 625 t in 1993. In 2003, when the Government decided to include secondary silver production in its survey, silver output increased to 4,305 t in 2003 and 6,087 t in 2004. The Provinces of Hunan, Henan, and Yunnan accounted for 58% of the total output. Silver from copper, lead, and zinc mines accounted for 60% to 70% of the total. In China, some smelters did not recover silver from anode slime and sold it to slime collectors. Smelters estimated the recoverable silver content in the slime and reported to the NSB; slime collectors also reported how much they recovered to the NSB. This might cause double counting in the NSB's survey data. The Government approved 37 silver producers and traders to export 3,500 t of silver in 2005, which was 450 t more than that 2004. China's silver consumption increased to 2,300 t in 2004 from 2,000 t in 2003. Electronics accounted for 35% of the total consumption followed by photosensitive material, 20%; jewelry, 10%; and others, 15% (China Metal Bulletin, 2005h).

**Indium.**—China was one the major indium-producing countries in the world. Indium was mainly recovered as a byproduct of zinc operations. In the past 2 years owing to mine closures, exhausted resources, and the shortage of electricity, China's indium output was unpredictable. The Government of Hunan Province, which accounted for one-third of the country's total output, ordered 12 local indium producers in the Zhuzhou area to shut down their operations temporarily because their discharged waste polluted the Xiangjiang (Xiang River) and threatened the potable water supply for Changsha City. The Hunan Government also closed down several small indium producers in the Province permanently. Owing to an inadequate supply of raw material, Liuzhou Zinc Products Co. Ltd. and Liuzhou High-Tech Zone Indium Smeltery Co. Ltd. shut down their refining facilities in late 2003 and early 2004. China's largest indium producer, Liuzhou Huaxi (China Tin) Tin Group Co. Ltd., planned to produce slightly more than 30 t in 2005, which was less than that of 2000. The Huludao Zinc Plant and the Zhuzhou Smelter planned to increase their indium output in 2005. Because demand exceeded supply in the world market, the spot price of indium increased to about \$800 per kilogram in December 2004 from \$300 per kilogram in January 2004. Analysts predicted that the indium price would be more than \$1,000 per kilogram in 2005 (China Metal Bulletin, 2005a; China Metals, 2005j).

**Iron and Steel.**—To curb rolled steel expansion and investment, the Government planned to abolish the export VAT rebate on slab and billet on April 1, 2005, and to reduce the export VAT rebate on other steel products to 11% and was considering the elimination of all rolled steel rebates in the coming year. The Central Government also ordered local governments to fund 25% of the VAT rebate as a way to relieve the Central Government's financial burden and to discourage local government support for local steel companies that expand their production. The State Council ordered the State Development and Reform Commission to draft a new policy and guidelines on the development of the steel sector and was scheduled to be released in the second half of 2005. The new policy will encourage consolidation through mergers and



acquisitions. Capacity expansion through technical renovation of existing facilities will be encouraged. The Government will not allow foreign investors to hold majority interests in steel companies in China (China Metals, 2005b).

In the past several years, the rates of pig iron and crude steel expansion were much faster than that of iron ore; therefore, China relied on iron ore imports to meet its demand. More than 700 registered and unregistered iron mines were active in China and had a total output capacity more than 300 Mt/yr. China was the leading iron-ore-producing country in terms of gross weight in the world; the average iron content in the ore, however, was 33%. China ranked behind Brazil and Australia in metal content weight. In the past decade, China's iron and steel producers expanded their output capacities through either technical renovation or replacement of old small furnaces with larger ones. By yearend 2004, the total pig iron output reached more than 300 Mt. Domestic iron ore output could not meet internal demands, and it contained higher impurities. Steel producers, which produced high-value-added steel products, such as automotive sheets, preferred imported ore. With the Government's encouragement and approval, China's iron and steel producers looked overseas to secure iron ore supplies. China's iron and steel producers, such as the Anshan Iron and Steel Group (Angang), the Baoshan Iron and Steel Group (Baogang), Shagang, the Shoudu Iron and Steel Group (Shougang), and Wuhan Iron and Steel Group (Wugang), signed joint-development agreements with companies in Australia and Brazil. In the next several years, iron mines, such as Gaocun and Longqiao in Anhui Province, Heigou in Gansu Province, Mengjiagou, Nanminghe, and Sijiayin in Hebei Province, Hujiamiaozi in Liaoning Province, Shuijigou in Nei Mongol Autonomous Region, Liguanji in Shandong Province, and Baima and Hongge in Sichuan Province, were scheduled to begin operations, but domestic iron ore output could not meet domestic demand. In 2005, the volume of China's iron ore imports was expected to exceed that of 2004. According to the Customs General Administration, more than 40 Mt of iron ore was stockpiled in ports at yearend 2004. In response to the widespread problem of substandard ore imports and excessive importing and to control bidding prices by domestic traders, the Government issued a series of policies to tighten control of iron ore importers. The MOC established an "automatic import licensing measures for management of cargo" system and issued 118 iron ore import licenses to domestic companies (China Metals, 2005a; Interfax Information Services, 2005d).

The demand for galvanized sheet has increased gradually in the past decade. Domestic steel producers expanded their output capacities to meet domestic needs. Galvanized sheet output increased to 2.7 Mt in 2003 from 62,000 t in 1997. At yearend 2004, galvanized sheet output capacity was 10 Mt. In 2003, China had imported 5.4 Mt and exported 60,000 t of galvanized sheet. In 2004, the country produced about 4.2 Mt and consumed about 9.0 Mt. Automobiles, construction, and electronic appliances were major consumers of galvanized sheet. Imported galvanized sheets were those that required high-quality control and the extra-thin coating sheets that China could not produce. Major cold-rolled galvanized sheet producers were Angang, Baogang, Benxi Iron and Steel Co.,

the Guangdong Iron and Steel Group's (Guanggang), Handan Iron and Steel General Work, Panzhihua Iron and Steel (Group) Co., Ma'anshan Iron and Steel Co., Shougang, and Wugang. Baogang was the only domestic producer of electrozinc coat sheet; other companies produced hot-dipped galvanized sheet. Production of galvanized sheet was expected to increase to 8 Mt in 2006 and 15 Mt in 2010. The demand for galvanized products was expected to reach 10 Mt in 2005 and 15 Mt in 2010 (China Metal Bulletin, 2004c).

Wugang and the Government of Guangxi Zhuang Autonomous Region signed an agreement to build a 10-Mt/yr iron and steel plant, a 5-Mt/yr coke plant, and a 2.4-megawatt thermal powerplant in Fangchenggang; Fangchenggang is located on the coast and is an ideal location for importing iron ore and exporting steel products. A 200,000-deadweight-ton (dwt) iron ore berth was under construction at the Port of Fangchenggang. The Committee of the Economic and Trade Commission approved the feasibility study of the iron and steel plant. The first-phase plan was designed to produce 7.17 Mt of steel products; construction cost was estimated to be \$7.15 billion. Steel products output capacity will expand to 10.78 Mt. Local steel demand in Guangxi reached 6 Mt and was expected to increase in the next several years, but Guangxi's largest steel producer Liuzhou Iron and Steel Group had only 4 Mt/yr of output capacity. Wuhan and the Government of Guangxi Zhuang Autonomous Republic signed a letter of intent to merge with Liuzhou. Liuzhou planned to expand its crude steel output capacity to 6 Mt/yr. The Government of Hubei Province transferred 51% of the Ercheng Steel Plant to Wugang. Wugang completed its sixth blast furnace in July to increase its total pig iron output capacity to more than 10 Mt and planned to expand its crude steel output capacity to 20 Mt by 2010 (China Metals, 2005i).

The Guangdong Provincial Government submitted a 10-Mt/yr steel project to the National Development and Reform Commission for approval. The steel plant will be located in Zhanjiang. The East Sea island of Zhanjiang had a 300,000-dwt ship dock and a 500,000-dwt oil tanker dock; a 200,000-dwt iron ore berth was under construction. Angang and Baogang showed interest in participating in the development of the project. The Guangdong Provincial Government planned for Guanggang to relocate iron and steel plants to the Nansha Industrial Zone from the urban area in Guangzhou and to expand its output capacity to 10 Mt. Guanggang and JFE Steel Corp. of Japan signed an agreement to build a hot-dip galvanized steel sheet plant as a part of the relocation project. Steel products consumption in Guangdong reached 28 Mt in 2004, but local steel producers could supply only about 7 Mt (Interfax Information Services, 2004d).

Because of environmental concerns and the 2008 Beijing Olympic Games, the Central Government and the Beijing City Government urged Shougang to reduce its output capacity in Shijingshan, Beijing, and to move production facilities to Hebei Province. Shougang had planned to close down its production facilities at Shijingshan completely in 2012. To replace the existing production facilities, Shougang built a 4.5-Mt/yr steel production plant in Qian'an, Hebei Province, and the first-phase 2 Mt/yr of steel output capacity was put into operation in 2004.

Shougang also planned to build a 15-Mt/yr greenfield iron and steel facility in Caofeidian and to expand its medium-plate mill in Qinhuangdao to 4 Mt/yr from 400,000 t/yr. The Port of Caofeidian had the capability to handle 30 Mt/yr of iron ore, 8 Mt/yr of coke, and 5 Mt/yr of steel products. Shougang and the Tangshan Iron and Steel Group jointly planned to build a 300,000-dwt iron ore berth in the Port of Qinhuangdao (China Metals, 2005g).

China's second ranked steel producer Angang planned to build a 10-Mt/yr greenfield steel facility in Bayuquan District, Yingkou City, Liaoning Province. Angang imported about 10 Mt/yr iron ore through the Ports of Dalian and Yingkou. Construction of a new plant in Yingkou will reduce transportation costs. The local government had allocated land for Angang to use. The construction of the first-phase 5-Mt/yr of steel output capacity was underway and was scheduled to be put into operation in October 2006. Angang also planned to add 5 Mt/yr of steel output capacity its production facility in Anshan (China Metals, 2005g).

**Lead and Zinc.**—The leading lead producer Yugang Gold-Lead Co. Ltd. postponed the startup of its 100,000-t/yr zinc smelter to May 2005 from the initially scheduled December 2004. The roasters of the electrolytic zinc production line were put on a trial run in December, but the electrolytic system had not been completely installed. The construction of the smelter began in August 2003; the total investment was \$104 million. Yuguang purchased two lead and zinc mines in the Nei Mongol Autonomous Region and Sichuan Province and also signed long-term purchase contracts with lead and zinc mines in the Provinces of Gansu and Sichuan and the Nei Mongol Autonomous Region. Because these mines were expected to supply only about 40% of its needs, the company intended to source remaining raw materials from overseas markets (China Metals, 2004d).

Xinlin Lead Co. (a subsidiary of Lingye Co. Ltd.) started construction of its 100,000-t/yr lead smelter in Lingbao City, Henan Province. The \$38 million smelter will use oxygen bottom blown smelting blast furnace reduction technology, which was designed by the China Nonferrous Engineering and Research Institute. Construction was scheduled to be completed in 2006. In addition to lead, the smelter will recover 100,000 t/yr of sulfuric acid (China Metals, 2005k).

In December 2004, China Nonferrous Metal Industry Foreign Engineering and Construction Co. (NFC) signed an agreement with the Government of Chifeng City, Nei Mongol Autonomous Region. According to the terms of the agreement, NFC will build a zinc smelter in the city to process zinc concentrates from NFC's zinc mine in Sukbataar Province, Mongolia. The partners will conduct geologic prospecting, mining, and smelting in the Chifeng area. NFC will provide capital and equipment to increase the city's zinc-smelting capacity to 100,000 t/yr and finally to 200,000 t/yr (Lead, Zinc, and Tin Monthly, 2005c).

**Magnesium.**—China was the leading magnesium-producing country in the world. Magnesium metal output accounted for more than 60% of the world total. The country exported more than two-thirds of its output. In 2004, China exported 383,738 t

of magnesium products, of which 228,350 t was metal. Since 2001, when several magnesium plants in Europe and North America shut down, China's magnesium filled in the gap of supply and demand for these two areas. China exported about 40% of its magnesium products to European countries followed by such Asian countries as Japan, the Republic of Korea, and Taiwan. During the past 5 years, China's magnesium producers expanded their output capacities. The total output capacity of alloy, granule, and metal increased to 700,000 t in 2004, and the output capacity was expected to expand in the next couple of years. During the past decade, the price of magnesium ingot decreased to about \$2,100 per ton in 2004 from \$4,000 per ton in 1995. With the increase of production costs and price decline, the profit margin for Chinese magnesium producers has become smaller in the past couple years. The Provinces of Shanxi, Henan, and Ningxia accounted for 94% of the country's total magnesium output (China Metal Bulletin, 2005f).

**Nickel.**—The stainless steel sector was the major consumer of nickel, which accounted for about 41% of total nickel consumption. In 2004, the output of stainless steel increased to about 2.36 Mt and was expected to grow at an average rate of more than 10% per year during the next several years. The electroplating sector was the second ranked nickel consumer and accounted for 32% of the total. Because China's demand for nickel exceeded its output, the country imported a large quantity of nickel to meet its demand. In 2004, China imported 65,460 t of refined nickel, 42,590 t of nickel concentrates, 34,034 t of ferronickel, and 12,247 t of nickel matte. China exported 15,420 t of refined nickel mainly from tolling trade. China consumed about 145,000 t of nickel in 2004. Because several stainless steel producers expanded their outputs during the past 2 years, nickel consumption was expected to increase to 170,000 t in 2005. China's steel producers and traders were actively sourcing nickel resources from such countries as Australia, Cuba, Papua New Guinea, and the Philippines (China Metal Bulletin, 2005g).

Baogang, Jinchuan Nonferrous Metal Corp. (Jinchuan), and Taiyuan Iron and Steel Co. (Taigang) formed a strategic alliance. The Government of Gansu Province transferred 10% of its shares of Jinchuan Group Ltd. to Baogang and Taigang; Baogang was the largest steel producer, and Taigang was the largest stainless steel producer in China. Baogang and Jinchuan signed a strategic cooperation agreement in 2003 and planned to explore for nickel resources in the Philippines. Taigang signed a long-term nickel supply agreement with Jinchuan in 2000 and a cooperation agreement in 2002. Jinchuan planned to increase refined nickel production to 150,000 t/yr in 2008 and to produce 90,000 t of refined nickel and 30,000 t nickel sulfate in 2005. Jinchuan had long-term nickel concentrates supply agreements with Fox Resources Ltd. of Australia, Glencore International AG of Switzerland, and Sally Malay Mining Ltd. of Australia (Copper and Nickel Monthly, 2005a).

Yunnan Tin Corp., which was the leading tin producer, and Yunnan Kunneng Co. Ltd. agreed to form the joint-venture company Yuanjiang Nickel Co. Ltd. Yunnan Tin will invest more than \$12 million and hold 57% of the shares in the joint venture. Yuanjiang will develop the lateritic deposit, Yuanjiang,

which has reserves of 530,000 t of nickel and is located in Yuxi, Yunnan Province. The company will use the pressure acid leaching method to extract nickel from the lateritic ore and will build a 5,000-t/yr smelter; capacity will be expanded to 100,000 t/yr in the future (Copper and Nickel Monthly, 2005b).

**Tin.**—China was the leading tin-producing country in the world. Because of strong domestic and international demand, tin prices in both markets increased. Because the supply of concentrates increased, output of tin metal increased in 2004 compared with that of 2003. Imports of tin concentrates increased to 8,912 t in 2004 from 2,739 t in 2003. China's refined tin exports, however, increased slightly to 32,032 t, and tin alloy exports decreased to 6,993 t. Because of the recovery of the global economy, domestic analysts predicted that tin metal prices would remain at 2004 levels. Owing to the increase in domestic demand for refined tin, the volume of tin exports from China could drop to less than 30,000 t in 2005. China's tin consumption increased to 83,000 t, of which tin solder accounted for 50%. Supply of tin concentrates from domestic mines was expected to remain tight, and imports of tin concentrates were expected to increase in 2005. China could become a net tin importer in the near future (Lead, Zinc, and Tin Monthly, 2005a).

### *Industrial Minerals*

**Cement.**—China was the leading cement-producing country in the world and accounted for more than 40% of the world's total. Even with the Government's restricted investment policy for the cement sector, cement output continued to increase. China's cement consumption was driven by infrastructure investment and residential and nonresidential construction. The Government's continued emphasis on large infrastructure projects included bridges, dams, roads, and utilities. In 2003, the Government restricted investment on residential construction to prevent overheating in the real estate market; nonresidential construction, however, was expected to be less affected. Low-grade cement (325 or lower) production accounted for 60% of the total. The output of medium-grade cement (425), which was used for high-rise buildings, roads, and bridges in China, was about 35%. High-grade cement (525), which was used for powerplants, had a market share of 5%. In China, for each metric ton of clinker produced, 728 kilograms (kg) of carbon dioxide was produced, and for each ton of cement produced, 1.58 kg of sulfur dioxide and 1.03 kg of nitrous oxide were emitted (Ministry of Commerce, 2005a). The Government encouraged cement producers to produce more medium- and high-grade cement to meet the demand. The Government stepped up its efforts to shut down plants that used obsolete technology and encouraged cement producers to use dry rotary kilns. Output of cement from dry rotary kilns accounted for about 14% of the total.

**Lithium.**—In May 2004, Jihai Lithium Ltd., which was a joint venture between Sterling Group Venture Inc. of Canada (75%) and Sichuan Province Mining Ltd. (25%), received a mining permit from the Bureau of Land and Resources of Sichuan Province. The Development and Reform Commission

of Sichuan Province also approved the establishment of the joint-venture company in August. Jihai planned to develop the Jiajika lithium deposit, which is located 70 kilometers (km) from Kangding County, Sichuan Province. The deposit was evaluated from 1959 to 1992 by several exploration teams in Sichuan Province. The deposit had 74 lithium-bearing veins and contained more than 450,000 t of lithium, 17,000 t of beryllium oxide, 4,500 t of niobium oxide, and 2,200 t of tantalum oxide. Initially, the company planned to process 240,000 t/yr of ore and to produce 47,320 t of lithium concentrates. The China Nonferrous Engineering and Research Institute received the contract to design and perform the feasibility study for this project. The Sichuan Research Academy of Environmental Science conducted the environmental impact and water preservation study of the deposit (Sterling Group Venture Inc., 2004).

**Magnesium.**—China was one of the leading magnesite-producing countries in the world. Although the demand for magnesite products from construction and steel sectors has increased in the past several years, production of magnesite products has decreased. China produced about 1.15 Mt of magnesite products, which was 18.2% less than that of 2003; the average price per metric ton, however, increased by 18.2% in 2004. Magnesite was mainly from Liaoning Province. After more than two decades of exploitation, the gradual depletion of high-grade ore has affected the quality of downstream products. The total impurity content, such as ferrous oxide and silicon oxide in grade 97 crystallized magnesite, had increased to 0.65% from 0.6%. Many domestic producers had difficulty maintaining a total impurity content of under 0.7%. The iron content in grade 94 light-burned magnesite increased to 0.55% from 0.40%. The Government encouraged magnesite producers to produce more high-value-added magnesium products and shut down 343 furnaces to reduce pollution in Liaoning Province in 2004 (Ministry of Commerce, 2005b).

### *Mineral Fuels*

**Coal.**—Mine safety continued to be a major problem for the Chinese Government. The State Administration of Coal Mine Safety Supervision and the State Administration of Safety in Production Supervision were established to oversee the country's coal mine production safety. The Government intensified its efforts to enforce coal mine safety regulations by closing down coal mines for safety violations. As the country became more industrialized, energy demand increased. In China, demand for electricity exceeded supply. Coal was the major energy source in China even though alternative indigenous fuel sources were being increasingly exploited. To meet the need, many coal mines produced much more than their designed capacities. Because the mines were employment sites and sources of revenue, local governments ignored overproduction and safety lapses. More than 6,000 coal miners died yearly. Most of these accidents were at county-level coal mines. Some local officials and their relatives even have personal stakes in coal mines. Many mines should not have received operation licenses but did because of the conflict

of interest between ownership and enforcement of the local government regulations (Interfax Information Services, 2004c; Financial Times, 2005; Washington Post, 2005).

With the Government's approval, China Shenhua Energy Corp. [a subsidiary of the state-owned Shenhua Group (Shenhua Coal Corp.)] planned to issue 3.06 billion shares of stock at prices between \$0.93 and \$1.18 on the Hong Kong Stock Exchange in 2005. Anglo American planned to buy \$150 million worth of shares in Shenhua's initial public offering. Besides Anglo American, Shenhua also signed agreements with another six investors for buying shares. About 92.5% of the listed shares will be offered to multinational companies, and the remaining will be offered to subscribers in Hong Kong. In an effort to improve coal transportation, Shenhua and the Tianjin Port Group agreed to build a \$440 million coal port at the Nanjiang Harbor in Tianjin City. The port will have one 150,000-dwt berth and two 70,000-dwt berths and was scheduled to be completed in 2006. The port was expected to handle 30 Mt/yr of coal in 2008. Shenhua also built a 67-km railway to link Huanghua, Hebei Province, with the Port of Wanjia in Tianjin City. After completion the berth, Shenhua will have a maximum loading capacity of 45 Mt/yr in Tianjin City. Shenhua and Dow Chemical Corp. of the United States planned a joint evaluation of the feasibility of coal-to-olefins projects at Yulin, Shaanxi Province (Chemical and Engineering News, 2005; Interfax Information Service, 2005a).

The Government planned to establish 13 large-scale coal regions, which included more than 40 coal bases that have total coal reserves of more than 700 billion metric tons. The intention for the establishment of these regions was to match coal resources with the development of the chemical, metallurgical, and power sectors. The first 19 of the coal bases were announced in September and are located in the Provinces of Shaanxi and Shanxi and the Nei Mongol Autonomous Region. In 2004, the production capacity of these 13 coal regions accounted for 50% of the total output and was expected to increase to 70% in 2010 (Ministry of Land and Resources, 2004).

Shanxi Province accounted for more than 20% of the country's total coal output, but powerplants in the Province experienced shortages of steam coal. Because of transportation bottlenecks, coal from mines could not be shipped to the powerplants. Construction of railways lagged behind other developments. Also, the coal-power pricing system contributed to the shortage of steam coal at powerplants. The Government allowed coal producers to sell their products at market prices in the 1990s; the price of steam coal for powerplants, however, was negotiated between coal producers and powerplant operators yearly under Government guidelines, which were known as "planned coal." The Government decided electricity prices. Although powerplants were supposed to be able secure the volume of coal at preferential prices, coal producers were reluctant to sell their coal below the market price. When the demand for coal was high and the coal price was high in international and domestic markets, coal producers preferred to sell to other domestic buyers or to export their coal. During the past 2 years, powerplant operators had difficulty in securing sufficient coal to meet their needs (Coal Industry News, 2004).

**Natural Gas and Petroleum.**—Because of rapid economic growth, China depended on oil imports to balance supply and demand even though oil output increased in the past several years. Imported crude oil accounted for more than one-third of the total supply. In an effort to facilitate oil imports, China National Petroleum Corp. signed agreements with Kazakhstan and Russia to finance pipelines and to expand shipping capacity from these countries to China. About 90% of Chinese oil output came from onshore wells. Daqing Oilfield in Heilongjiang Province was the leading producer, but oil output from Daqing has declined in the past 2 years. Oil output from the Xinjiang Uygur Autonomous Region was expected to increase in the future. China's oil output was expected to increase to 200 Mt in 2010 (Interfax Information Services, 2005b).

Chinese scholars asked the Government to consider building a pipeline from Burma to China. China's oil imports were mainly from Africa and the Middle East. The Strait of Malacca has become one of the most pirate-infested waterways in the world. The proposed pipeline will reduce the sea journey by about 3,000 km compared with the Malacca route. China was Singapore's leading oil trade partner in Asia and the Pacific region. The change of shipping route will affect trade partnerships with Singapore and other Southeast Asian countries. Another challenge for a proposed pipeline is to pass through Yunnan Province, which is located in the southwestern part of the country, to the eastern and southeastern consuming centers. Because the Province lacks oil infrastructure, the investment will need to be large to build refineries in the area or to lay down more pipelines to ship oil to consuming areas (Interfax Information Services, 2004e).

## References Cited

- Alumina and Aluminum Monthly, 2004, Alumina project at Dac Nong of Vietnam to be approved: Alumina and Aluminum Monthly, November, p. 12.
- Alumina and Aluminum Monthly, 2005a, Guangxi Nannan Al to build smelter at Shanglin County of Guangxi: Alumina and Aluminum Monthly, June, p. 11.
- Alumina and Aluminum Monthly, 2005b, NDRC calls for trimming unapproved alumina projects: Alumina and Aluminum Monthly, April, p. 1.
- Alumina and Aluminum Monthly, 2005c, Newly-added alumina capacity in China this year: Alumina and Aluminum Monthly, March, p. 7.
- Asian Development Bank, 2005, Asian development outlook 2005: Manila, the Philippines, Asian Development Bank, 292 p.
- Chemical and Engineering News, 2005, Dow Chemical and Chinese: Chemical and Engineering News, v. 83, no. 1, January 3, p. 12.
- China Gold Association, 2005, December 2004 gold production information: Beijing, China, China Gold Association press release, 4 p.
- China Metal Bulletin, 2004a, Expansion of current alumina output capacities: China Metal Bulletin, no. 38, p. 15.
- China Metal Bulletin, 2004b, Shandong Jinsheng expands Cu capacity to 100,000tpy: China Metal Bulletin, no. 44, p. 6.
- China Metal Bulletin, 2004c, 2005 galvanized sheet demand and outlook: China Metal Bulletin, no. 47, p. 26.
- China Metal Bulletin, 2005a, Indium price waiting to increase: China Metal Bulletin, no. 1, p. 18.
- China Metal Bulletin, 2005b, Shortage of copper supply and price issue: China Metal Bulletin, no. 18, p. 2.
- China Metal Bulletin, 2005c, 2004 aluminum review and 2005 forecast: China Metal Bulletin, no. 4 p. 1.
- China Metal Bulletin, 2005d, 2004 China's nonferrous metals industry development and outlook: China Metal Bulletin, no. 17, p. 2.
- China Metal Bulletin, 2005e, 2004 gold review and 2005 outlook: China Metal Bulletin, no. 7, p. 8.

- China Metal Bulletin, 2005f, 2004 magnesium market review and 2005 outlook: China Metal Bulletin, no. 8, p. 1.
- China Metal Bulletin, 2005g, 2004 nickel review and 2005 outlook: China Metal Bulletin, no. 7, p. 7.
- China Metal Bulletin, 2005h, 2004 silver review and 2005 outlook: China Metal Bulletin, no. 7, p. 17.
- China Metals, 2004a, CVRD and Chalco plan new JV construction: China Metals, v. 10, no. 213, p. 6.
- China Metals, 2004b, MCC and Jiangxi Copper signed agreement on blister supply: China Metals, v. 10, no. 217, p. 7.
- China Metals, 2004c, Phase-out of Soderberg capacity: China Metals, v. 10, no. 211, p. 5.
- China Metals, 2004d, Yuguang Gold & Lead's new smelter: China Metals, v. 10, no. 212, p. 8.
- China Metals, 2005a, China to adopt automatic license on iron ore imports: China Metals, v. 11, no. 221, p. 4.
- China Metals, 2005b, China to cut rolled steel export VAT rebate to 11%: China Metals, v. 11, no. 225, p. 3.
- China Metals, 2005c, China to import 235 Mt iron ore in 2005: China Metals, v. 11, no. 218, p. 1.
- China Metals, 2005d, Construction on 6 aluminum/alumina projects halted: China Metals, v. 11, no. 226, p. 3.
- China Metals, 2005e, More smelters approved to directly import alumina: China Metals, v. 11, no. 227, p. 9.
- China Metals, 2005f, Tongdu Copper plans to issue convertible bonds: China Metals, v. 11, no. 225, p. 11.
- China Metals, 2005g, Two more 10 mtpa steelworks along the coast: China Metals, v. 11, no. 220, p. 6.
- China Metals, 2005h, Will China become a net exporter of steel in 2005: China Metals, v. 11, no. 223, p. 1.
- China Metals, 2005i, Wuhan Steel plans to build a 10 mtpa steelworks in Guangxi: China Metals, v. 11, no. 218, p. 4.
- China Metals, 2005j, 12 indium producers in Hunan ordered to stop production: China Metals, v. 11, no. 220, p. 4.
- China Metals, 2005k, 100ktpa lead smelting project in Henan: China Metals, v. 11, no. 226, p. 8.
- China Nonferrous Metals Monthly, 2005, The present conditions of China's copper industry: China Nonferrous Metals Monthly, July, p. 4.
- Citigroup Global Market Inc., 2004a, Asia economic outlook and strategy: Hong Kong, China, Citigroup Global Market Inc., November 1, 52 p.
- Citigroup Global Market Inc., 2004b, Asia economics weekly: Hong Kong, China, Citigroup Global Market Inc., November 15, 23 p.
- Citigroup Global Market Inc., 2004c, Asia economics weekly: Hong Kong, China, Citigroup Global Market Inc., December 2, 34 p.
- Citigroup Global Market Inc., 2005a, Asia economics weekly: Hong Kong, China, Citigroup Global Market Inc., May 26, 28 p.
- Citigroup Global Market Inc., 2005b, Greater China insights: Hong Kong, China, Citigroup Global Market Inc., March 15, 51 p.
- Coal Industry News, State Council plan on coal work: Coal Industry News, no. 40, p. 1.
- Copper and Nickel Monthly, 2004a, Chinalco to acquire Daye Co.: Copper and Nickel Monthly, September, p. 8.
- Copper and Nickel Monthly, 2004b, 5,000tpy Cu blister project put into production at Guangxi Rongda: Copper and Nickel Monthly, September, p. 10.
- Copper and Nickel Monthly, 2005a, JNMC, Baosteel and Taisteel form: Copper and Nickel Monthly, March, p. 6.
- Copper and Nickel Monthly, 2005b, Ni laterite project launched at Yuxi Yuanjiang of Yunnan Province: Copper and Nickel Monthly, March, p. 9.
- Copper and Nickel Monthly, 2005c, Zijin Mining Group Co. Ltd. invests in Cu mining project in Yulong of Tibet: Copper and Nickel Monthly, May, p. 9.
- Financial Times, 2005, China's new coal capitalists rush to strike seam of rich: Financial Times, January 18, p. 16.
- Gazette of the State Council of the People's Republic of China, 2004, Circular of the General Office of the State Council on transmitting and issuing several opinions of the national development and reform commission and other departments on curbing irrational investment in steel, electrolytic aluminium and cement industries: Gazette of the State Council of the People's Republic of China, no. 6, p. 4.
- General Administration of Quality Supervision Inspection and Quarantine, 2004, General Administration of Quality Supervision Inspection and Quarantine announcement no. 75: Beijing, China, General Administration of Quality Supervision Inspection and Quarantine, October 28, 90 p.
- General Administration of Customs of the People's Republic of China, 2004, China monthly exports and imports: Beijing, China, General Administration of Customs of the People's Republic of China, no. 12, 67 p.
- Hong Kong and Shanghai Banking Corp. Ltd., 2005a, Another small step in improving FX market: Hong Kong, China, Hong Kong and Shanghai Banking Corp. Ltd., China Economic Insight, March, p. 9.
- Hong Kong and Shanghai Banking Corp. Ltd., 2005b, NPC meeting—Premier sets key policy agenda: Hong Kong, China, Hong Kong and Shanghai Banking Corp. Ltd., China Economic Insight, March, p. 8.
- Interfax Information Services, 2004a, Baiyin Nonferrous starts construction of a 30,000-ton aluminum fluoride production line: Interfax Information Services, China Metals, v. 3, no. 46, p. 27.
- Interfax Information Services, 2004b, Guoda Gold confident about investment in North Korea: Interfax Information Services, China Metals, v. 3, no. 42, p. 22.
- Interfax Information Services, 2004c, Local government allows illegal coalmine to continue operating: Interfax Information Services, China Energy, v. 3, no. 23, p. 22.
- Interfax Information Services, 2004d, South China's Guangxi and Guangdong compete for permission to build steel base: Interfax Information Services, China Metals, v. 3, no. 44, p. 2.
- Interfax Information Services, 2004e, Will Sino-Burma pipeline free from the Malacca Strait: Interfax Information Services, China Energy, v. 3, no. 31, p. 28.
- Interfax Information Service, 2005a, Anglo American to invest in Shenhua: Interfax Information Service, China Energy, v. 4, no. 20, p. 20.
- Interfax Information Services, 2005b, China's annual oil output forecast to reach up to 200 mln tons between 2010 and 2020: Interfax Information Services, China Energy, v. 4, no. 19, p. 17.
- Interfax Information Services, 2005c, Jiangxi Copper reveals 2005 output targets, long term plan: Interfax Information Services, China Metals, v. 4, no. 6, p. 14.
- Interfax Information Services, 2005d, Overview and prediction on China's iron ore market: Interfax Information Services, China Metals, v. 4, no. 15, p. 37.
- Interfax Information Services, 2005e, Xinjiang Jinyu Co. cooperates with Kazakhmys on major Kazakh copper mine: Interfax Information Services, China Metals, v. 4, no. 11, p. 6.
- International Monetary Fund, 2005, World economic outlook—globalization and external imbalances: Washington, D.C., International Monetary Fund, April 2005, 183 p.
- Lead, Zinc, and Tin Monthly, 2005a, Chinese imports and exports of tin products in December: Lead, Zinc, and Tin Monthly, February, p. 18.
- Lead, Zinc, and Tin Monthly, 2005b, Market commentary: Lead, Zinc and Tin Monthly, February, p. 1.
- Lead, Zinc, and Tin Monthly, 2005c, NFC to construct zinc smelting projects in Chifeng: Lead, Zinc, and Tin Monthly, January, p. 12.
- Ministry of Commerce, 2004a, Ministry of Commerce circular No. 28: Beijing, China, December 10, 8 p.
- Ministry of Commerce, 2004b, Ministry of Commerce 2004 announcement No. 68: Beijing, China, Ministry of Commerce, October 28, 2 p.
- Ministry of Commerce, 2004c, Ministry of Commerce 2004 announcement No. 97: Beijing, China, Ministry of Commerce, December 28, 2 p.
- Ministry of Commerce, 2004d, Ministry of Commerce, Environmental Administration, State Customs 2004 announcement No. 55: Beijing, China, Ministry of Commerce, October, 5 p.
- Ministry of Commerce, 2004e, Ministry of Finance and Ministry of Commerce 2004 announcement: Beijing, China, September 19, 5 p.
- Ministry of Commerce, 2005a, China's cement production and exports: Ministry of Commerce press release, April 19, 8 p.
- Ministry of Commerce, 2005b, 2004 China's magnesium products exports: Ministry of Commerce press release, April 12, 14 p.
- Ministry of Finance, 2005, Tax finance No. 75: Beijing, China, Ministry of Finance, 3 p.
- Ministry of Land and Resources, 2004, Ministry of Land and Resources and National Development and Reform Commission announcement 2004 No. 13: Beijing, China, Ministry of Land and Resources, September 21, 5 p.
- Precious and Minor Metals Monthly, 2004, Anglo American invests in venture prospecting of platinum in Sichuan: Precious and Minor Metals Monthly, October, p. 6.
- Precious and Minor Metals Monthly, 2005a, Review for antimony market in 2004 and forecast for the future: Precious and Minor Metals Monthly, March, p. 7.

Precious and Minor Metals Monthly, 2005b, World supply of cobalt to surplus in 2005: Precious and Minor Metals Monthly, February, p. 16.

PricewaterhouseCoopers International Ltd., 2004a, China tax/business new flash: Beijing, China, PricewaterhouseCoopers International Ltd., October, 6 p.

PricewaterhouseCoopers International Ltd., 2004b, Industry watch: Hong Kong, China, PricewaterhouseCoopers International Ltd., December, 11 p.

State Development and Reform Commission, 2005, Draft of economic and social development plan: State Development and Reform Commission, March 17, 8 p.

State Statistics Bureau, 2005, Statistical communiqué of the People's Republic of China on national economic and social development in 2004: Beijing, China, State Statistics Bureau press release, February 28, 13 p.

Sterling Group Ventures Inc., 2004, Update of Jiajika lithium project: Vancouver, British Columbia, Canada, Sterling Group Venture Inc. press release, October 14, 2 p.

U.S. Embassy, Beijing, China, 2005a, China revises law to resolve serious solid waste pollution challenges: China Commercial Brief, February 4, p. 2.

U.S. Embassy, Beijing, China, 2005b, China to unified enterprises' income tax on domestic and foreign firms: China Commercial Brief, March 25, p. 3.

U.S. Trade Representative, 2005, 2004 report to Congress on China's WTO compliance: Washington, DC, U.S. Trade Representative, 86 p.

Washington Post, The, 2005, 120 feared dead at mine linked to Chinese officials: The Washington Post, August 12, p. A10.

### Internet Reference Cited

Menzie, David, Tse, Pui-Kwan, Fenton, Mike, Jorgenson, John, and van Oss, Hendrik, 2004, China's growing appetite for minerals, U.S. Geological Survey Open-File Report 2004-1374, accessed July 12, 2005, at URL <http://pubs.usgs.gov/of/2004/1374>.

### Major Sources of Information

China Coal Industry Association  
21 Hepingli Bei Lu  
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37 Guanyingyuan Xiqu Xichang  
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Ministry of Commerce  
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Ministry of Land and Resources  
64 Funei Dajie  
Beijing 100812, China

Ministry of Science and Technology  
15 Fuxinglu Haidian District  
Beijing 100862, china

National Statistical Bureau  
75 Yuetannanjie Sanlihe  
Beijing 100826, china

People's Bank of China  
32 Chengfangjie Xicheng District  
Beijing 100800, China

State Development and Reform Commission  
38 Yuetannanjie Xicheng District  
Beijing 100824, China

State Environmental Protection Administration  
115 Xinei Nanxiaojie Xicheng District  
Beijing 100035, China

The Power Corp.  
137 Fuyoujie Xicheng District  
Beijing 100031, China

### Major Publications

Almanac of China's Economy, annual.

China Coal Industry Yearbook, annual, Beijing, China.

China Chemical Industry Yearbook, annual, Beijing, China

China National Chemical Information Center, 53, Xiaoguanjie, Andingmenwai, Beijing 100029, China.

China Coal News, Beijing, China.

China Daily, 15 Huixin Dongjie, Chaoyang District, Beijing, China.

China Gold News, Beijing, China.

China Metallurgical News, Beijing, China.

China Metals, China Features and Information Service, 57, Xuanwumen Xidajie, P.O. Box 522, Beijing 100803, China.

China Nonferrous Metals News, Beijing, China.

China's Customs Statistics, Economic Information and Agency, Hong Kong, 342 Hennessy Road 10/F, Wanchai, Hong Kong.

Economic Daily, Baizhifang, Xuanwuqu, Beijing, China.

Far Eastern Economic Review, 181 Gloucester Road, Hong Kong.

Oil News, Beijing, China.

Statistical Yearbook of China, State Statistical Bureau, Beijing, China.

The Yearbook of Iron and Steel Industry of China, annual, Beijing, China.

The Yearbook of Land and Resources of China, annual, Beijing, China.

The Yearbook of Mining of China, annual, Beijing, China.

The Yearbook of Nonferrous Metals Industry of China, annual, Beijing, China.

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

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2000	2001	2002	2003	2004	
<b>METALS</b>						
<b>Aluminum:</b>						
Bauxite, gross weight	thousand metric tons	9,000	9,800	11,000	13,000	15,000
Alumina	do.	4,330	4,650	5,450	6,110	6,990
Metal, refined, primary and secondary	do.	2,990	3,570	4,510	5,970	6,900
<b>Antimony:</b>						
Mine, Sb content		110,000	140,000	100,000	100,000	110,000
Metal		106,000	148,000	124,000	90,000	125,000
<b>Bismuth:</b>						
Mine output, Bi content		2,000 <sup>r</sup>	2,000 <sup>r</sup>	2,000 <sup>r</sup>	2,000 <sup>r</sup>	2,000
Metal		2,000 <sup>r</sup>	2,000 <sup>r</sup>	2,000 <sup>r</sup>	2,500 <sup>r</sup>	2,500
Cadmium, smelter		2,370	2,510	2,440	2,700 <sup>r</sup>	2,800
Chromite, gross weight	thousand metric tons	208	182	180	200	200
<b>Cobalt:</b>						
Mine output, Co content		90	150	1,000	700	800
Metal		410	680	980	990	1,200
<b>Copper:</b>						
Mine output, Cu content		593,000	587,000	568,000	610,000	610,000
<b>Metal:</b>						
Smelter, primary	thousand metric tons	1,020	1,150	1,180	1,380	1,400
<b>Refined:</b>						
Primary	do.	1,020	1,220	1,300	1,420	1,630
Secondary	do.	350	300	350	430	520
Total	do.	1,370	1,520	1,650	1,850	2,150
Gold, mine output, Au content		180	185	192	205	215
Indium		200	190 <sup>r</sup>	160 <sup>r</sup>	180 <sup>r</sup>	200
<b>Iron and steel:</b>						
Iron ore, gross weight	thousand metric tons	223,000	220,000	231,000	261,000	310,000
Pig iron	do.	131,010 <sup>4</sup>	155,540 <sup>4</sup>	170,850 <sup>4</sup>	213,670 <sup>4</sup>	251,850 <sup>4</sup>
Ferroalloys	do.	4,030	4,500	4,840	6,340	8,670
Steel, crude	do.	128,500 <sup>4</sup>	151,630 <sup>4</sup>	182,370 <sup>4</sup>	222,340 <sup>4</sup>	272,800 <sup>4</sup>
Steel, rolled	do.	131,460 <sup>4</sup>	160,680 <sup>4</sup>	192,520 <sup>4</sup>	241,080 <sup>4</sup>	297,230 <sup>4</sup>
<b>Lead:</b>						
Mine output, Pb content		660,000	676,000	641,000	955,000	950,000
<b>Metal:</b>						
Smelter, primary		830,000	840,000	916,000	1,250,000	1,400,000
<b>Refined:</b>						
Primary		998,000	984,000	1,100,000	1,290,000	1,500,000
Secondary		102,000	211,000	230,000	290,000	350,000
Total		1,100,000	1,200,000	1,330,000	1,580,000	1,850,000
Magnesium metal and alloy		190,000	200,000	230,000	342,000	426,000
<b>Manganese:</b>						
Ore, Mn content	thousand metric tons	700	860	900	920	900
Metal		120,000	150,000	190,000	320,000	350,000
Mercury, mine output, Hg content		200	190	495	610	425
Molybdenum, mine output, Mo content		28,800	28,200	29,300	31,000	29,000
<b>Nickel:</b>						
Mine output, Ni content		50,300	51,500	53,700	61,000	64,000
Matte		57,000	59,000	59,200	69,300 <sup>r</sup>	70,000
Smelter		50,900	49,500	52,400	64,700	72,000
Silicon, metal		480,000	500,000	580,000	680,000	700,000
Silver, mine output, Ag content		1,600	1,910	2,200	2,400	2,450
<b>Tin:</b>						
Mine output, Sn content		99,400	95,000	62,000	102,000	110,000
Metal		112,000	105,000	82,000	98,000	115,000

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2000	2001	2002	2003	2004	
METALS--Continued						
Titanium:						
Ilmenite, TiO <sub>2</sub> equivalent	125,000	150,000	375,000	400,000	420,000	
Sponge	1,900	2,470	3,650	4,120	5,000	
Tungsten, mine output, W content	37,000	42,100 <sup>r</sup>	55,100 <sup>r</sup>	55,500 <sup>r</sup>	67,000	
Vanadium, in vanadiferrous slag product	30,000	30,000	33,000	35,000	40,000	
Zinc:						
Mine output, Zn content	thousand metric tons	1,780	1,700	1,550	2,030	2,100
Refined, primary and secondary	do.	1,980	2,040	2,100	2,320	2,500
INDUSTRIAL MINERALS						
Asbestos	315,000	310,000	562,000 <sup>r</sup>	500,000 <sup>r</sup>	510,000	
Barite	thousand metric tons	3,500	3,600	3,100	3,600 <sup>r</sup>	3,900
Boron, mine, B <sub>2</sub> O <sub>3</sub> equivalent	145,000	150,000	145,000	130,000	135,000	
Bromine	42,000	40,000	42,000	42,000	4,300	
Cement, hydraulic	thousand metric tons	597,000 <sup>4</sup>	661,040 <sup>4</sup>	725,000 <sup>4</sup>	862,080 <sup>4</sup>	970,000 <sup>4</sup>
Diatomite	350,000	350,000	370,000	380,000	390,000	
Dolomite	thousand metric tons	6,700	6,700	7,000	7,300	7,500
Fluorspar	do.	2,450	2,450	2,450	2,650	2,700
Graphite	430,000	450,000	629,000	710,000	700,000	
Gypsum	thousand metric tons	6,800	6,800	6,850	6,850	7,000
Kaolin	do.	3,250 <sup>r</sup>	3,500 <sup>r</sup>	3,600 <sup>r</sup>	3,700 <sup>r</sup>	3,750
Lithium minerals, all types	16,000	16,000	16,000	17,000	18,000	
Magnesite	thousand metric tons	4,070	3,580	4,560 <sup>r</sup>	4,600 <sup>r</sup>	4,650
Nitrogen, N content of ammonia	do.	27,700 <sup>4</sup>	28,200 <sup>4</sup>	30,300 <sup>4</sup>	31,500 <sup>4</sup>	34,770 <sup>4</sup>
Phosphate rock, P <sub>2</sub> O <sub>5</sub> equivalent	do.	5,820	6,300	6,900	7,550	7,650
Potash, marketable, potassium oxide equivalent	do.	380	385	450	500	550
Rare earths, rare-earth oxide equivalent	73,000	81,000	88,000	92,000	98,000	
Salt	thousand metric tons	31,280 <sup>4</sup>	34,105 <sup>4</sup>	36,024 <sup>4</sup>	34,377 <sup>4</sup>	37,100 <sup>4</sup>
Sodium compounds:						
Mirabilite	do.	2,900	4,200	5,000	5,800	6,300
Soda ash, natural and synthetic	do.	8,342 <sup>4</sup>	9,144 <sup>4</sup>	10,330 <sup>4</sup>	11,336 <sup>4</sup>	13,024 <sup>4</sup>
Sulfur:						
Native	do.	290	290	290	290	300
Content of pyrite	do.	3,370	3,090	3,240	3,400	3,730
Byproduct, all sources	do.	1,900	2,000	2,200	2,400	2,600
Total	do.	5,560	5,380	5,730	6,090	6,630
Talc and related materials	do.	3,500	3,500	2,500	3,000 <sup>r</sup>	3,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite	do.	176,000	190,000	250,000	218,000	220,000
Bituminous	do.	781,000	965,000	1,110,000	1,470,000	1,690,000
Lignite	do.	42,000	47,800	53,000	52,000	50,000
Total	do.	999,000	1,200,000	1,410,000	1,740,000	1,960,000
Coke, all types	do.	121,840 <sup>4</sup>	131,310 <sup>4</sup>	142,800 <sup>4</sup>	138,800 <sup>4</sup>	177,480 <sup>4</sup>
Gas, natural:						
Gross	billion cubic meters	27	30	33	35	41
Marketed	do.	22	24	26	28	34
Petroleum:						
Crude, including crude from oil shale	million 42-gallon barrels	1,200	1,210	1,240	1,260	1,300
Refinery products	do.	1,470	1,460	1,530	1,600	1,650

<sup>r</sup>Revised.

<sup>1</sup>Table includes data available through August 30, 2005.

<sup>2</sup>Estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>3</sup>The country also produces diamond, gallium, germanium, platinum-group metals, and uranium; no reliable basis, however, is available for the estimation of output levels.

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



TABLE 2  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies <sup>1</sup>	Location of main facilities	Annual capacity <sup>e</sup>	
Aluminum:				
Alumina	Pingguo Aluminum Co. (Aluminum Corporation of China)	Guangxi, Pingguo	1,200	
Do.	Guizhou Aluminum Plant (Aluminum Corporation of China)	Guizhou, Guiyang	1,200	
Do.	Zhengzhou Aluminum Plant (Aluminum Corporation of China)	Henan, Zhengzhou	2,000	
Do.	Zhongzhou Aluminum Plant (Aluminum Corporation of China)	Hunan, Zhongzhou	1,100	
Do.	Shandong Aluminum Plant (Aluminum Corporation of China)	Shandong, Zibo	1,500	
Do.	Shanxi Aluminum Plant (Aluminum Corporation of China)	Shanxi, Hejin	2,200	
Metal	Baiyin Aluminum Plant	Gansu, Baiyin	150	
Do.	East Hope Aluminum Plant	Gansu, Baotou	500	
Do.	Lanzhou Aluminum Plant	Gansu, Lanzhou	210	
Do.	Liancheng Aluminum Plant	do.	235	
Do.	Pingguo Aluminum Co. (Aluminum Corporation of China)	Guangxi, Pingguo	380	
Do.	Guizhou Aluminum Plant (Aluminum Corporation of China)	Guizhou, Guiyang	400	
Do.	Jiaozuo Wanfang Aluminum Co. Ltd.	Henan, Jiaozuo	300	
Do.	Henan Wanji Aluminum Co. Ltd.	Henan, Luoyang	180	
Do.	Henan Huanghe Mianchi Aluminum Plant	Henan, Mianchi	115	
Do.	Sanmenxia Tianyuan Aluminum Co. Ltd.	Henan, Sanmenxia	110	
Do.	Shangqiu Aluminum Smelter	Henan, Shangqiu	115	
Do.	Yichuan Yugang Longquan Aluminum Co.	Henan, Yichuan	400	
Do.	Henan Shenhua Aluminum-Electricity Co. Ltd.	Henan, Yongcheng	200	
Do.	Hanjiang Danjiangkou Aluminum Co. Ltd.	Hubei, Danjiangkou	73	
Do.	Zhengzhou Aluminum Plant (Aluminum Corporation of China)	Hunan, Zhengzhou	60	
Do.	Jilin Aluminum Co.	Jilin, Panzhi	70	
Do.	Fushun Aluminum Plant	Liaoning, Fushun	175	
Do.	Baotou Aluminum Plant	Nei Mongol, Baotou	216	
Do.	Qingtongxia Aluminum Plant	Ningxia, Qingtongxia	400	
Do.	Qinghai Aluminum Smelter (Aluminum Corporation of China)	Qinghai, Xining	360	
Do.	Tongchuan Xingguang Aluminum Co. Ltd.	Shaanxi, Tongchuan	80	
Do.	Huaxin Aluminum Industry Co.	Shandong, Chiping	160	
Do.	Taishan Aluminum-Power Co. Ltd.	Shandong, Fecheng	125	
Do.	Shandong Aluminum Plant (Aluminum Corporation of China)	Shandong, Zibo	55	
Do.	Taiyuan Oriental Aluminum Co.	Shanxi, Taiyuan	75	
Do.	Shanxi Guanlu Aluminum Co. Ltd.	Shanxi, Yuncheng	210	
Do.	Yunnan Aluminum Plant	Yunnan, Kunming	300	
Antimony	Huaxi (China Tin) Group Industrial Co.	Guangxi, Hechi	25	
Do.	Xikuangshan Twinkling Star 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.	Shizhuyuan Nonferrous Metals Co. Ltd.	Hunan, Shizhuyuan	1,000
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.	Ningxia, Nei Mongol, and Shaanx	150,000
Cobalt	metric tons	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchang	1,200

See footnotes at end of table.

TABLE 2--Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies <sup>1</sup>	Location of main facilities	Annual capacity <sup>e</sup>
Copper, refined		Jinchang Smelter (Tongling Nonferrous Metals Co.)	Anhui, Tongling	130
Do.		Jinlong Smelter (Tongling Nonferrous Metals Co.)	do.	120
Do.		Wuhu Smelter (Hengxin Copper Industry Group Co.)	Anhui, Wuhu	60
Do.		Baiyin Nonferrous Metals Co.	Gansu, Baiyin	50
Do.		Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	120
Do.		Luoyang Copper Processing Factory	Henan, Luoyang	50
Do.		Daye Nonferrous Metals Co.	Hubei, Daye	160
Do.		Zhangjiagang United Copper Co. (Tongling Nonferrous Metals Co.)	Jiangsu, Zhangjiagang	100
Do.		Guixi Smelter (Jiangxi Copper Co. Ltd.)	Jiangxi, Guixi	400
Do.		Huludao Copper Smelter (Huludao Zinc Smelting Co.)	Liaoning, Huludao	100
Do.		Shandong Jinsheng Nonferrous Metals Corp.	Shandong, Linyi	100
Do.		Taiyuan Copper Industry Co.	Shanxi, Taiyuan	30
Do.		Zhongtiaoshan Nonferrous Metals Co.	Shanxi, Yuangu	80
Do.		Tianjin Copper Electrolysis Factory	Tianjin	25
Do.		Yunnan Smelter (Yunnan Copper Group Co. Ltd.)	Yunnan, Kunming	250
Gas, natural	billion cubic meters	China National Petroleum Corp.	Sichuan	10
Gold, refined	metric tons	China National Gold Corp.	Henan, Lingbao	10
Do.	do.	Jiangxi Copper Co. Ltd.	Jiangxi, Guixi	12
Do.	do.	Laizhou Gold Co.	Shandong, Laizhou	15
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	Laibin Smelter [Liuzhou Huaxi (China Tin) Group Co.]	Guangxi, Laibin	60
Do.	do.	Liuzhou Zinc Products Co.	Guangxi, Liuzhou	20
Do.	do.	Zhuzhou Smelter	Hunan, Zhuzhou	60
Do.	do.	Huludao Nonferrous Metals Group Co.	Liaoning, Huludao	30
Iron and steel:				
Iron ore		Maanshan Iron and Steel Co.	Anhui, Maanshan	10,000
Do.		Shoudu (Capital) Mining Co.	Beijing	20,000
Do.		Meishan Metallurgical Co.	Shanghai	2,000
Do.		Jiuquan Iron and Steel Co.	Gansu, Jiayuguan	4,000
Do.		Hainan Iron Mine	Hainan, Changjiang	4,600
Do.		Handan Xingtai Metallurgical Bureau	Hebei, Handan	3,800
Do.		Tangshan Iron and Steel Co.	Hebei, Tangshan	3,000
Do.		Wuhan Iron and Steel (Group) Co. (Wugang)	Hubei, Wuhan	5,100
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, Panzihua	13,000
Do.		Kunming Iron and Steel Co.	Yunnan, Kunming	1,400
Ferroalloys		Shoudu (Capital) Iron and Steel (Group) Co.	Beijing	35
Do.		Northwest Ferroalloy Co.	Gansu, Yongdeng	60
Do.		Zunyi Ferroalloy Co.	Guizhou, Zunhi	100
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 2004

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies <sup>1</sup>	Location of main facilities	Annual capacity <sup>e</sup>
<b>Iron and steel--Continued:</b>			
Steel, crude	Ma'anshan Iron and Steel Co.	Anhui, Maanshan	3,000
Do.	Shoudu (Capital) Iron and Steel (Group) Co. (Shougang)	Beijing	8,500
Do.	Liuzhou Iron and Steel Group	Guangxi, Liuzhou	6,000
Do.	Handan Iron and Steel General Work (Handan)	Hebei, Handan	2,400
Do.	Tangshan Iron and Steel Co. (Taigang)	Hebei, Tangshan	2,300
Do.	Wuhan Iron and Steel (Group) Co. (Wugang)	Hubei, Wuhan	12,000
Do.	Shagang Group Co. Ltd.	Jiangsu, Zhangjiagang	13,000
Do.	Anshan Iron and Steel (Group) Co. (Angang)	Liaoning, Anshan	11,000
Do.	Benxi Iron and Steel Co. (Bengang)	Liaoning, Benxi	2,700
Do.	Baotou Iron and Steel and Rare Earth Co.	Nei Mongol, Baotou	7,000
Do.	Baoshan Iron and Steel (Group) Corp. (Baosteel)	Shanghai	19,000
Do.	Shanghai Iron and Steel Co. Ltd.	do.	6,000
Do.	Taiyuan Iron and Steel Co. (Taigang)	Shanxi, Taiyuan	2,500
Do.	Panzhuhua Iron and Steel (Group) Co. (Pangang)	Sichuan, Panzhihua	3,000
Lead	Baiyin Nonferrous Metals Co. Ltd.	Gansu, Baiyin	50
Do.	Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoquan	100
Do.	Anyang Smelter (Yubei Metal Co.)	Henan, Anyang	150
Do.	Jiyuan Wangyang Nonferrous Smelter	Henan, Jiaozuo	45
Do.	Jiyuan Smelter (Yuguang Gold-Lead Co. Ltd.)	Henan, Jiyuan	200
Do.	Henan Lingye Co. Ltd.	Henan, Lingbao	100
Do.	Hanjiang Smelter	Hubei, Luhekou	50
Do.	Shuikoushan Nonferrous Metals Co. Ltd.	Hunan, Hengyang	80
Do.	Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	100
Do.	Kunming Smelter	Yunnan, Kunming	100
Lithium, LiCO <sub>3</sub>	Sichuan Shehong Lithium Co. Ltd.	Sichuan, Shehong	2
Do.	Xinjiang Lithium Co.	Xinjiang, Urumqi	5
Magnesium	Fushun Aluminum Plant	Liaoning, Fushun	5
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
Do.	Minhe Magnesium Plant	Qinghai, Minhe	7
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	13
Do.	Jinduichang Mining Corp.	Shaanxi, Huaxian	9
Nickel, refined	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	100
Do.	Chengdu Electro-Metallurgy Factory	Sichuan, Chengdu	5
Petroleum, crude	Shengli Bureau	Hebei, Shengli	33,500
Do.	Daqing Bureau	Heilongjiang, Daqing	55,000
Do.	Liaohe Bureau	Liaoning, Liaohe	15,000
Do.	Bohai Offshore Oil Corp.	Bohai	4,000
Do.	Nanghai East Corp.	Nanghai	5,000
Potash	Qinghai Yanhu Industry Group Co. Ltd.	Qinghai	40
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.	Nei Mongol, Baotou	25
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

See footnotes at end of table.

TABLE 2--Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies <sup>1</sup>	Location of main facilities	Annual capacity <sup>e</sup>
Silver	metric tons	Daye Nonferrous Metals Co.	Hubei, Daye	100
Do.	do.	Jiangxi Copper Co. Ltd.	Jiangxi, Guixi	400
Do.	do.	Great Wall Gold Silver Refinery	Sichuan, Chengdu	300
Talc		China National Nonmetallic Industry Corp.	Guangxi, Longshen	130
Do.		do.	Liaoning, Haicheng	50
Do.		do.	Shandong, Qixia	5
Tin, smelter		Laibin Smelter [Huaxi (China Tin) Group Co.]	Guangxi, Laibin	25
Do.		Pinggui Mining Bureau	Guangxi, Zhongshan	8
Do.		Yunnan Tin Industry Co.	Yunnan, Gejiu	55
Titanium, sponge		Zunyi Titanium Plant	Guizhou, Zunyi	6
Do.		Fushun Aluminum Plant	Liaoning, Fushun	1
Tungsten, concentrate		Shizhuyuan Nonferrous Metals Co.	Hunan, Chenzhou	5
Do.		Yaogangxian Tungsten Mine	Hunan, Yizhang	3
Do.		Nanchang Co.	Jiangxi, Nanchang	15
Zinc		Northwest China Lead-Zinc Smelter (Baiyin Nonferrous Metals Co. Ltd.)	Gansu, Baiyin	150
Do.		Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoguan	170
Do.		Liuzhou Zinc Products Factory	Guangxi, Liuzhou	100
Do.		Shuikoushan Nonferrous Metals Co. Ltd.	Hunan, Hengyan	60
Do.		Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	300
Do.		Huludao Zinc Smelting Co.	Liaoning, Huludao	330
Do.		Laibin Smelter	Yunnan, Laibin	60
Do.		Yunnan Jinding Zinc Co. Ltd. (Sichuan Hongda Group)	Yunnan, Lanping	100

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

<sup>1</sup>Companies are owned by either a State Government or a Provincial Government.

TABLE 3  
CHINA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2004

Commodity	Quantity (metric tons)	Value (thousands)
<b>METALS</b>		
<b>Aluminum:</b>		
Alumina	20,000	\$11,010
<b>Metal and alloys:</b>		
Unwrought	1,684,386	2,800,786
Semimanufactures	430,988	1,120,094
Antimony metal, unwrought	21,490	48,958
Barium sulfate	2,390,000	77,818
Bismuth, includes powder, unwrought, and waste	4,626	25,782
<b>Copper, metal and alloys:</b>		
Unwrought	126,276	345,094
Semimanufactures	390,023	1,496,828
<b>Iron and steel:</b>		
Ferrosilicon	930,000	675,657
Pig iron and cast iron	1,290,000	361,443
<b>Steel:</b>		
Bars and rods	4,470,000	1,948,333
Shapes and sections	540,000	273,818
Sheets and plates	5,780,000	3,346,013
Tube and pipe	700,000	842,921
Magnesium metal, unwrought	269,802	397,126
Manganese, unwrought	269,802	397,126
Tin, metal and alloys, unwrought	38,915	321,055
Tungsten, tungstates	5,909	38,531
<b>Zinc:</b>		
Metal and alloys, unwrought	263,149	269,113
Oxide and peroxide	67,063	60,283
<b>INDUSTRIAL MINERALS</b>		
Cement	7,040,000	230,394
Fluorspar	830,000	119,164
Granite	4,694,224	1,071,665
Graphite, natural	451,735	67,041
Magnesia, fused	392,736	110,202
Talc	640,000	65,954
<b>MINERAL FUELS AND RELATED MATERIALS</b>		
Coal	86,660,000	3,811,241
Coke, semicoke	15,010,000	3,948,769
<b>Petroleum:</b>		
Crude oil	5,490,000	1,324,692
Refinery products	11,460,000	3,960,202

Source: General Administration of Customs of the People's Republic of China, 2004, China monthly exports and imports, no. 12.

TABLE 4  
CHINA: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2004

(Metric tons unless otherwise specified)

Commodity	Quantity	Value (thousands)
<b>METALS</b>		
<b>Aluminum:</b>		
Alumina	5,870,000	\$2,043,563
Metal and alloys, unwrought	1,033,422	1,570,880
Semimanufactures	610,636	1,944,157
Scrap	1,200,008	1,074,771
Chromium, chromite	2,170,000	381,310
<b>Copper:</b>		
Ore and concentrates	2,880,000	2,238,422
Metal and alloys, unwrought	1,381,112	3,812,545
Semimanufactures	1,195,365	3,914,718
Scrap	3,957,604	2,454,969
<b>Iron and steel:</b>		
Iron ore	208,090,000	12,711,952
<b>Steel:</b>		
Bars and rods	1,380,000	922,021
Scrap	10,230,000	2,231,682
Seamless pipe	1,320,000	1,586,354
Shapes and sections	810,000	356,278
Sheets and plates	25,100,000	17,185,992
Manganese ore	4,650,000	585,646
Titanium dioxide	250,989	435,143
<b>INDUSTRIAL MINERALS</b>		
Diamond	kilograms 15,268	1,662,353
<b>Fertilizers:</b>		
Compound fertilizers	4,370,000	992,572
Diammonium phosphate	2,290,000	575,654
Potassium chloride	7,180,000	1,158,800
Potassium sulfate	170,000	30,028
Urea	40,000	5,487
Sodium carbonate	197,174	22,746
<b>MINERAL FUELS AND RELATED MATERIALS</b>		
Coal	18,610,000	886,723
<b>Petroleum:</b>		
Crude oil	122,720,000	33,912,468
Refinery products	37,880,000	9,248,352

Source: General Administration of Customs of the People's Republic of China, 2004, China monthly exports and imports, no. 12.