



# 2010 Minerals Yearbook

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## JAPAN

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# THE MINERAL INDUSTRY OF JAPAN

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Japan was a producer and consumer of nonferrous metals. The country imported ores and concentrates to produce copper, lead, nickel, and zinc. It also imported intermediate products and refined them into other metals, such as molybdenum, tin, and tungsten. Copper concentrate and iron ore together with rare-earth elements (REE) were the most valuable mineral commodity imports for Japan. The country remained the second ranked producer of steel in the world after China. In recent years, the Japanese automobile industry had decreased its production of gasoline-powered cars and increased its production of electric cars. As a result, the automobile industry's demand for metals moved away from mainly base and platinum-group metals, which were used in auto catalysts and some other uses, to primarily specialty metals, such as lithium and REE, which were used to make components for high-performance batteries and motors.

## Minerals in the National Economy

In 2010, Japan's gross domestic product based on purchasing power parity was \$5.47 trillion, which was an increase of 32% from that of 2009 and showed signs of a slow economic recovery from the past several years. Japan has relatively few mineral resources, and it imported raw materials and energy for its industrial production and use. Imported mineral commodities were mostly bauxite, coke, copper concentrate, and iron ore, whereas imported energy included coal, liquefied natural gas (LNG), and petroleum. The mineral industry played an important role in supplying industrial raw materials to Japan's manufacturing and construction industries. In particular, the mineral processing industry was large and included processing of chemicals, fabricated metal products, industrial mineral products, iron and steel, nonferrous metals, and petroleum products.

## Government Policies and Programs

A stable supply of raw materials to feed base-metal smelters was the objective of exploration and mine development pursued by Japanese mining and multicommodity trading companies. Most exploration was financed either by the companies themselves or by their banking institutions. The Government established a system for providing subsidies and financing to support these private sector efforts in addition to funding the activities of its own Japan Oil, Gas and Metals National Corp. (JOGMEC) (Y. Kita, Director, Rare Metals Stockpile, Japan Oil, Gas and Metals National Corp., written commun., February 23, 2011).

To access seabed mineral resources, the Government assumed the lead in robotic deep-sea mining technology research by commissioning JOGMEC to develop the technology to extract minerals, which would be piped to a support ship. The project

would begin in 2011 with a goal of commercial application in 10 years. Test areas were hydrothermal vent deposits in the Okinawa trough and the Bayonnaise submarine caldera, which were rich in such minerals as gold, rare earths, rare metals, and silver. The cost of developing the technology, including the support vessel, was estimated to be between \$241 million and \$361 million. JOGMEC planned to deploy the robotic underwater vehicles at a depth of up to 2,000 meters for exploration and reconnaissance (Mineweb.com, 2011).

## Production

The country's output of nonferrous metals, such as high-purity aluminum and secondary aluminum, antimony, cadmium, cobalt, molybdenum, tin, and tungsten, increased owing to the country's economic recovery. Output of gold increased by 11%, but production of palladium and platinum decreased by 9% and 6%, respectively. In the iron and steel sector, owing to an increased demand for steel products, Japan's production of crude steel, ferroalloys, and pig iron increased by 25%, 24%, and 23%, respectively, compared with the output in 2009. Production of rare-earth oxides and titanium dioxide increased significantly owing to increased imports of rare earths and titanium minerals. Because of a construction slowdown, output of cement decreased; however, production of iodine, nitrogen, and quicklime increased for industrial use. Production of carbon black and coke also increased, but Japan's output of natural gas and crude petroleum was in decline owing to depleted reserves (table 1).

## Structure of the Mineral Industry

Japan's mineral industry is characterized by small-scale, low-tonnage mining operations and high-value-added mineral and metal processing and manufacturing activities. Its mining industry is not significant to the economy, and the country consumes more minerals and metals from imports than it produces. In 2010, mining and quarrying of industrial minerals, including dolomite, iodine, limestone, pyrophyllite, silica sand, and silica stone, was still being done but at a lower level of production than in previous years. Operating mines and employment in the mining industry had been in decline because of depleted ore reserves, high mining costs, and the availability of cheaper imports. Japan had, however, a world-class metallurgical industry for nonferrous metals. Mining and mineral-processing businesses were owned and operated by private companies (table 2).

## Mineral Trade

In 2010, Japan imported about 1.3 million metric tons (Mt) of copper, 505,000 metric tons (t) of zinc, and 94,000 t of lead, all

in concentrates. The country imported 46,000 t of refined copper and exported 528,000 t. Japan imported 32,000 t of refined zinc and 11,000 t of refined lead and exported 98,000 t and 40,000 t, respectively. The country also imported 2,088,000 kilograms (kg) of silver and exported 2,733,000 kg. Japan imported a total of 255,000 kg of cadmium metal mainly from the Republic of Korea and exported a total of 854,000 kg of cadmium metal to China (60%), India (25%), and Belgium (11%) (Japan Mining Industry Association, 2011, p. 5, 10, 11–13, 28).

Japan depended heavily on imported energy and tried to diversify its energy sources and to maintain high levels of energy efficiency. Important energy sources were coal, hydropower, LNG, nuclear power, and petroleum.

## Commodity Review

### Metals

**Aluminum.**—In 2010, Japan produced 126,000 t of secondary aluminum and 4,700 t of primary aluminum, which was an increase of 13.2% and a decrease of 7.9%, respectively, compared with that of 2009. The country exported 337,000 t of rolled aluminum products and 16,500 t of unwrought aluminum and imported 2.74 Mt of unwrought aluminum, 76,900 t of aluminum waste and scrap, and 76,100 t of rolled aluminum products. Demand for aluminum increased by 21.1% to 3.94 Mt, of which transportation accounted for 40%; building and construction, 13%; fabricated metal, 12%; food, 11%; and other uses, 10% (Japan Aluminum Association, 2011).

**Cadmium.**—At the beginning of 2010, Japan had stocks of 174,000 kg of cadmium metal. With production of 2,142,000 kg and imports of 255,000 kg, the country's supplies increased to 2,571,000 kg. With an apparent consumption of 1,455,000 kg and exports of 854,000 kg for a total demand of 2,309,000 kg, Japan's stocks increased to 262,000 kg at the end of 2010 (Japan Mining Industry Association, 2011, p. 28).

**Copper.**—The country produced about 1.38 Mt of anode and blister copper from primary sources and 260,000 t from scrap. It also produced about 1.55 Mt of refined copper primarily from imported ore (86%), scrap (7.9%), and other sources (6%). Consumption of refined copper was reported to be about 1.1 Mt. Refined copper was used in the manufacturing of wire (61%), brass (38%), and miscellaneous products (1%), such as copper alloy and copper alloy casting (table 3; Japan Mining Industry Association, 2011, p. 11).

A joint venture of Mitsubishi Corp. (50%), JX Nippon Mining & Metals Corp. (40%), and Mitsubishi Materials Corp. (MMC) (10%) reached agreement with the World Bank's International Finance Corp. (IFC) to acquire the IFC's 2.5% ownership interest in Minera Escondida Limitada (MEL) of Chile. MEL was the owner of the Escondida Mine, which produced 3.2 million metric tons per year (Mt/yr) of copper concentrate and 330,000 metric tons per year (t/yr) of copper cathode. The mine had ore reserves of 4.16 Mt at a grade of 0.76% copper. MMC had been an active participant in resource development projects and investments in the country's prime copper deposits. MMC owned 1% of MEL indirectly through JECO Corp. (Mitsubishi Materials Corp., 2010a).

MMC signed project finance agreements for \$322 million to redevelop the Similco copper mine in British Columbia, Canada. MMC, through a wholly owned Canadian subsidiary, owned a 25% equity interest in the mine's operating company, Similco Mines Ltd. (SML), and Copper Mountain Mining Corp. of Canada owned the remaining 75% equity interest. Construction activities had been ongoing at the mine site, and startup of the operation was scheduled for June 2011 (Mitsubishi Materials Corp., 2010c).

Nippon Mining Holdings, Inc. and Nippon Oil Corp. formed a holdings group, JX Holdings, Inc., in which JX Nippon Mining & Metals became a subsidiary. JX Nippon Mining & Metals conducted copper smelting and refining operations at the Saganoseki smelter and refinery and at the Hitachi works through its subsidiary Nikko Smelting & Refining Co. Ltd. (which produced 450,000 t/yr of refined copper). A hydrometallurgical process at Saganoseki was also used to recover the precious and minor metals contained in copper concentrates from the anode slime. JX Nippon Mining & Metals also conducted copper smelting and refining operations at the Tamano smelter through its subsidiary Hibi Kyoto Smelting Co. Ltd. (which produced 260,000 t/yr of copper) (JX Nippon Mining & Metals Corp., 2010).

**Gallium, Germanium, and Indium.**—Japan imported an estimated 420,000 kg of indium from, in descending order of amount imported, China, the Republic of Korea, the United Kingdom, Canada, Taiwan, and other countries, in 2010. Production of indium tin oxide was the leading end use of indium. Other end uses included solders and alloys, compounds, electrical components, and semiconductors. The country also imported an estimated 92,000 kg of gallium from the United States, Taiwan, Kazakhstan, China, the Republic of Korea, and Germany, in descending order of amount imported. Gallium was used in electronic components, integrated circuits, and optoelectronic devices. Japan imported about 8,000 kg of germanium metal from mainly Canada, China, and the United States in 2009 (the latest year for which data were available). Germanium metal was used in semiconductors, infrared sensor lens, and solar cell devices (Y. Kita, Director, Rare Metals Stockpile, Japan Oil, Gas and Metals National Corp., written commun., February 23, 2011).

**Gold and Silver.**—In 2010, Japan produced about 136,000 kg of gold from imported ore, other sources, scrap, and domestic ore, which accounted for 66%, 17%, 11%, and 6%, respectively. The country also produced about 1,898,000 kg of silver from imported ore, other sources, scrap, and domestic ore, which accounted for 59%, 26%, 1.4%, and 0.6%, respectively. Silver was used for miscellaneous applications (37%), in photographic materials (27%), in extension materials (11%), as a nitrate for other uses (10%), in point connectors (8%), and for silver solder (6%) (table 3; Japan Mining Industry Association, 2011, p. 10).

**Iron and Steel.**—JFE Steel Corp. planned to expand the production capacity of its idled Fukuyama No. 3 blast furnace by 1 Mt/yr of pig iron beginning in January 2011. The projected repair and expansion cost of \$317 million was in line with the company's target to boost its production capacity of crude steel to 33 Mt/yr in March 2012 from the current 30 Mt/yr. In addition, a new single-strand continuous slab casting machine

(No. 7 continuous caster) and a new slab scarfing machine were in operation (Mineweb.com, 2010).

JFE Steel's Chiba Works No. 6 blast furnace was shut down after a December 28, 2009, fire, which started following a coke oven leakage. Pig iron production was restarted on January 5, 2010, at below capacity. In the Kurashiki Works, the company began operating a second battery (Battery B) of its No. 6 coke oven in December 2010. The facility employed a special reduced-impact technology, which was a low-nitrous-oxide combustion system. In 2009, JFE shut down one of its blast furnaces owing to the massive slump in demand for steel (Metal Bulletin, 2010).

Kobe Steel, Ltd.'s iron and steel business consisted of steel products produced by the Kakogawa Works; steel castings and forgings, titanium, and steel powder produced by the Takasago Works; and wholesale power supply. The Shinko Kobe powerplant, which had a generating capacity of 1,400 megawatts (MW), was Japan's leading wholesale supplier of electricity. Nittetsu Shinko Metal Refine Co. Ltd., which was a joint venture of Nippon Steel Corp. (70%) and Kobe Steel (30%), planned to build a plant to recycle steel mill dust and iron ore fines into direct-reduced iron (DRI) briquets and to recover zinc. The joint-venture company was to promote steel dust recycling and zero emissions in the region. The plant would be located at Nippon Steel's Hirohata Works in Himeji, Hyogo Prefecture. The technology used was Kobe Steel's FASTMET process, and the DRI would be supplied to both companies and to Nippon Steel's Sanyo Special Steel Co. Ltd. The steel mill dust would come from Sumitomo Metal Industries, Ltd. (Sumitomo Metals) and Nisshin Steel Co. Ltd. The production capacity would be 220,000 t/yr, and the plant was expected to start operating in October 2011 (Kobe Steel, Ltd., 2010).

Sumitomo Metals (Kokura), Ltd., which was a wholly owned subsidiary of Sumitomo Metals, announced that it had completed several innovations in its steelmaking process. These innovations included separating the manufacturing processes for two types of specialty steel (super clean steel and super functional steel) and implementing a "simple refining process," which uses two different converters (a dephosphorization furnace and a decarburization furnace) to remove phosphorus and carbon from pig iron. According to the company, use of this simple refining process achieves three goals—quality enhancement (80 parts per million or less phosphorus), high efficiency (a blowing time of 9 minutes), and reduction in environmental load (significant reduction in slag and carbon dioxide emission) (Sumitomo Metal Industries, Ltd., 2010).

Nippon Steel and Sumikin Stainless Steel Corp. developed the world's first tin-added (0.1%), low-chrome, low-interstitial ferritic stainless steel. The steel exhibits improved corrosion resistance and increased workability compared with other steels. The steel consists of 14% chromium with no added nickel or molybdenum, but has a corrosion resistance level equivalent to 18% chromium stainless steel. Because of the steel's high level of workability and surface quality, it can be used for a wide range of applications. The company planned to market and to distribute this type of stainless steel beginning in July 2010 (Nippon Steel and Sumikin Stainless Steel Corp., 2010).

In 2010, Japan produced 3.08 Mt of stainless steel, which was 31% more than in 2009, of which nickel-based steel accounted for 1.58 Mt (51%) and chrome-based steel accounted for 1.5 Mt (49%). Production of these two types of stainless steel increased by 17% and 52%, respectively, owing to strong demand for big-ticket items, such as automobiles and appliances (Japan Mining Industry Association, 2011, p. 4).

Nippon Steel and Nippon Denko Co. Ltd. agreed to strengthen their alliance further through trade in manganese ferroalloy. The goals were to stabilize procurement of raw materials (including manganese ore) for Nippon Denko; help Nippon Denko develop its overseas business; jointly research and develop methods to optimize production and use of manganese ferroalloy; reduce costs of raw materials procurement and product distribution; and conclude a long-term sales and purchase agreement for ferromanganese produced by Nippon Denko (Nippon Steel Corp., 2010).

**Lead and Zinc.**—Japan produced a total of 267,200 t of lead in 2010. Of this amount, 216,000 t was refined lead made from 102,000 t of primary ore (which included imported ore and domestic ore) and 114,000 t of scrap and material from other sources. The remaining 51,200 t was remelted lead. Consumption of refined lead was reported to be 193,000 t. Refined lead was used in batteries (89%), other miscellaneous applications (5%), chemicals (3%), and pipe and sheet (1%). The country produced a total of about 610,600 t of zinc. Of this amount, 574,000 t was refined zinc made from 470,000 t of primarily imported ore (82%) and 104,000 t of scrap (0.6%) and other sources (17%). The remaining 36,600 t was remelted zinc. Consumption of refined zinc was reported to be 389,000 t. Refined zinc was used mainly in galvanized sheet (49%), other types of galvanized products (15%), brass (14%), die-casting alloy (9%), and chemicals (9%) (table 3; Japan Mining Industry Association, 2011, p. 12–15).

**Nickel.**—Japan produced 40,228 t of refined nickel and 123,349 t of nickel in ferronickel and nickel oxide for a total of 163,577 t of nickel. The country also produced 2,497 t of nickel chemicals. At the end of 2010, stocks of refined nickel, which totaled 13,922 t, and those of ferronickel, which totaled 3,087 t, remained with the producers (Japan Mining Industry Association, 2011, p. 7).

Mitsui & Co. Ltd., Nickel Asia Corp. (NAC) of the Philippines, and Sumitomo Metal Mining Co. Ltd. (SMM) reached an agreement under which Mitsui and NAC would participate in the \$1.3 billion Taganito nickel project in the Philippines. The project was being developed by Taganito HPAL Nickel Corp., which was a wholly owned subsidiary of SMM. The final shareholdings would be SMM (62.5%), NAC (22.5%), and Mitsui (15%). The project called for construction of a low-grade oxide ore processing plant, which would apply high-pressure acid leaching (HPAL) technology to produce 30,000 t/yr of nickel/cobalt mixed sulfide with nickel content of 57%. SMM already produced nickel/cobalt mixed sulfide based on HPAL technology at Rio Tuba, Palawan, in the Philippines through its subsidiary Coral Bay Nickel Corp. When the Taganito operation comes onstream in 2013, SMM would have a production capacity of 100,000 t/yr of nickel (Sumitomo Metal Mining Co. Ltd., 2010b).

SMM (70%) accepted equity financing by JOGMEC (30%) in SMM's exploration subsidiary Sumiko Solomon Exploration Co. Ltd. to develop nickel mining in the Solomon Islands. SMM acquired exploration rights on the Islands of Choiseul and Santa Isabel in 2005 and 2007, respectively. The eastern sections of both islands had deposits of limonite ore (laterite nickel) and saprolite ore. SMM's plan for the long-term was to have a nickel production capacity of 150,000 t/yr, and the Solomon Islands' exploration project was part of the company's strategy for achieving that goal. Subsequently, Sumiko acquired exploration rights for nickel at Jejevo, San Jorge, and Takata in Isabel Province (Sumitomo Metal Mining Co. Ltd., 2010a).

**Silicon.**—MMC temporarily suspended operations at its Yoksichi plant to undergo modifications to comply with the High Pressure Gas Safety Act in April. Operations resumed in August to produce 1,000 t/yr of polycrystalline silicon from its new plant and in September to produce 1,850 t/yr from its existing plant. In addition, production and shipment of byproduct silicon tetrachloride also resumed in August (Mitsubishi Materials Corp., 2010b).

### **Industrial Minerals**

**Cement.**—In response to a sharp decline in domestic demand for cement, Taiheiyo Cement Corp. implemented a structural reorganization, including ending production at three plants. This would reduce the company's production capacity by 3.1 Mt/yr. The affected plants included the Oita plant (1.2 Mt/yr) at Saiki, Oita Prefecture; the Tosa plant (1.1 Mt/yr) at Kochi, Kochi Prefecture; and the Chichibu plant (800,000 t/yr) at Chichibu, Saitama Prefecture (Taiheiyo Cement Corp., 2010).

**Magnesium Compounds.**—Shinagawa Refractories Co. Ltd., which was Japan's leading refractories producer, merged with JFE Refractories Corp. in 2010. The group's key customers included JFE Steel, Kobe Steel, Nippon Steel, and Sumitomo Metals. Harima Krosaki was 50% owned by Nippon Steel. In 2010, the company, through its wholly owned Spanish subsidiary AMR Refractories S.A.u., planned to build a new refractories plant at Hemani in Spain to supply the region's steel and cement markets (Industrial Minerals, 2010b).

**Rare Earths.**—China, which produced 97% of the world's rare-earth metals, curbed its exports to Europe, Japan, and the United States and cut its total rare-earths export quota by 70% in the second half of 2010 to about 8,000 t. Japan accounted for 56% of China's exports of rare earths. Japan currently stockpiled rare-earth metals and was considering recycling of rare earths, including stepping up its rare-earths recycling research and development program. Because cost effectiveness is a factor in recovering rare earths, increases in the prices of rare earths could justify the cost of recycling. Japan was reported to have a company engaged in discovering a technology to recycle and recover rare earths from scrap. Research was being conducted on separating neodymium from magnets and recovering minor metals from scrap (Reuters, 2010).

Toyota Tsusho Corp. planned to build a rare-earth processing plant in the State of Orissa in India and to ship 3,000 to 4,000 t/yr of light rare earths, such as cerium, lanthanum, and neodymium, to Japan in 2012. The plant would produce rare-earth concentrates

from byproducts of the process of extracting uranium and thorium from monazite by Indian Rare Earths Ltd. Shin-Eysu Chemical Co. would provide technical support (Economic Times, The, 2010).

Japan's other sources of rare earths outside of China were expected to be Lynas Corp.'s new Mt. Weld project in Western Australia, Australia, in the third quarter of 2011 and MolyCorp Mining LLC's Mountain Pass operation in California thereafter. In addition, two advanced rare-earth projects included Arafura Resources Ltd.'s Nolans project in Northern Territory, Australia, and Alkane Resources Ltd.'s Dubbo zirconia-rare-earth project in New South Wales, Australia. Arafura Resources intended to build a refining plant at Whyalla to produce 20,000 t/yr of rare-earth oxides, which could supply 10% of the world's needs. Construction of the plant would begin in 2011 and was expected to be completed in 2 to 3 years (Industrial Minerals, 2010a).

### **Mineral Fuels**

**Natural Gas.**—Japan reiterated its opposition to China's development of the disputed Chunxiao gasfield in the East China Sea. China began drilling in the contentious area despite a 2008 agreement between the two countries to prevent unilateral development of the reserves. Japan indicated that it would also begin unilateral development of the area unless China ceased its activities there (Petroleum Economist, 2010).

**Petroleum.**—Japan's oil refining industry had excess distillation capacity owing to decreased domestic demand for petroleum products. The Government introduced new mandates for upgrading capacity. By March 2014, Japanese refiners must increase their heavy-crude upgrading capacity to 13% of distillation capacity from the current 10%. As a result, industry consolidation and restructuring was in progress and could accelerate (Oil & Gas Journal, 2010b).

Idemitsu Kosan Co. planned to cut 10,000 barrels per day (bbl/d) of refining capacity by March 2014. Its 3-year program would reduce the combined capacity of four refineries to 540,000 bbl/d from the current 640,000 bbl/d. The company planned to reduce its Iranian crude oil imports by 50% to 10,000 bbl/d from the previous 20,000 bbl/d. Japan's oil consumption continued to decrease in the past several years owing to the use of more-energy-efficient technologies and a shift to cleaner burning natural gas (Oil & Gas Journal, 2010a).

### **Reserves and Resources**

Japan has large reserves of industrial minerals, including dolomite, iodine, limestone, pyrophyllite, silica sand, and silica stones. Limestone is the most abundant indigenous mineral resource. The country's reserves of nonferrous metals, such as lead, silver, and zinc, are small, with the exception of gold; gold deposits had been found and were being mined on a small scale in Kagoshima Prefecture on Kyushu Island. The country's coal reserves are reaching depletion. Japan's reserves of gas and oil are negligible (table 4).

## Outlook

In line with its mineral policy to secure and diversify its long-term supply of raw materials, Japan is expected to continue its active search (through JOGMEC) for direct investment in joint exploration and development of minerals (particularly natural gas, nonferrous metals, and petroleum) in developed and developing countries. The country is expected to remain an important player in international mining because of the investments its mining and trading companies are making to secure the importation of ores and concentrates for the smelting, refining, and fabricating industries; coal for powerplants; and end-use metals for the manufacturing industries.

In the near future, Japan's mineral production is expected to increase gradually to meet the increasing demand for mineral products, particularly production of minor metals and rare earths for high-technology applications. Owing to capacity expansions and strong demand for steel products and major appliances in the domestic markets, the country's output of crude steel and stainless steel is expected to increase modestly.

## References Cited

- Economic Times, The, 2010, Toyota Tsusho to build rare earth plant in India; *The Economic Times*, December 8. (Accessed December 11, 2010, at <http://economictimes.indiatimes.com/news/news-by-industry/auto/automobiles>.)
- Industrial Minerals, 2010a, Japan investigates China rare earth embargo: *Industrial Minerals*, no. 517, October, p. 13.
- Industrial Minerals, 2010b, Recession impacts Japanese refractory sales: *Industrial Minerals*, no. 508, January, p. 21.
- Japan Aluminum Association, 2011, Aluminum statistics: Tokyo, Japan, Japan Aluminum Association, February, 6 p.
- Japan Mining Industry Association, 2011, Monthly statistics: Tokyo, Japan, Japan Mining Industry Association, August 1, 29 p.
- JX Nippon Mining & Metals Corp., 2010, Business segments—Smelting and refining: JX Nippon Mining & Metals Corp. (Accessed March 31, 2011, at [http://www.nmm.jx-group.co.jp/english/industry/ind\\_02.html](http://www.nmm.jx-group.co.jp/english/industry/ind_02.html).)
- Kobe Steel, Ltd., 2010, Nippon Steel and Kobe Steel commence joint business for recycling steel mill dust into direct reduced iron: Kobe Steel, Ltd. news release, May 25. (Accessed August 10, 2010, at [http://www.kobelco.co.jp/english/topics/2010/05/1183275\\_10474.html](http://www.kobelco.co.jp/english/topics/2010/05/1183275_10474.html).)
- Metal Bulletin, 2010, World news in iron and steel: *Metal Bulletin*, no. 9134, February 1, p. 18.
- Mineweb.com, 2010, JFE Steel to expand Fukuyama production capacity: Mineweb.com, June 16. (Accessed June 16, 2010, at <http://www.mineweb.com/mineweb/view/mineweb/en/page504?oid=106392&sn=detail&pid=92730>.)
- Mineweb.com, 2011, Japanese Govt. to subsidize robotic deep-sea mining research: Mineweb.com, January 10. (Accessed January 10, 2011, at <http://www.mineweb.com/mineweb/view/mineweb/en/page72068?oid=118124&sn=detail&pid=92730>.)
- Mitsubishi Materials Corp., 2010a, Acquisition of 2.5% ownership interest in Escondida from International Finance Corp.: Mitsubishi Materials Corp. news release, April 14. (Accessed August 15, 2010, at <http://www.mmc.co.jp/corporate/en/news/news20100414.html>.)
- Mitsubishi Materials Corp., 2010b, Resumption of operations at Yokkaichi plant: Mitsubishi Materials Corp. press release, September 7, 1 p.
- Mitsubishi Materials Corp., 2010c, Signing of project finance agreements for Copper Mountain project in BC, Canada: Mitsubishi Materials Corp. news release, May 31. (Accessed August 15, 2010, at <http://www.mmc.co.jp/corporate/en/news/news20100531.html>.)
- Nippon Steel Corp., 2010, A strategic alliance between Nippon Steel Corp. and Nippon Denko Co. Ltd.: Nippon Steel Corp. news release, February 10. (Accessed August 31, 2011, at [http://www.nsc.co.jp/cgi/news/whatsnew\\_detail.cgi?section=11&seq=00020653](http://www.nsc.co.jp/cgi/news/whatsnew_detail.cgi?section=11&seq=00020653).)
- Nippon Steel and Sumikin Stainless Steel Corp., 2010, NSSC launches world's first Sn-added ferritic stainless steel grades: Nippon Steel and Sumikin Stainless Steel Corp. news release, July 22, 2 p.
- Oil & Gas Journal, 2010a, Japan's Idemitsu Kosan to reduce refining capacity: *Oil & Gas Journal*, April 29. (Accessed May 3, 2010, at [http://www.ogj.com/index/article-tools-template/\\_printarticle/articles/oil-gas-journal/processing-2/refining/capacities/2010/04](http://www.ogj.com/index/article-tools-template/_printarticle/articles/oil-gas-journal/processing-2/refining/capacities/2010/04).)
- Oil & Gas Journal, 2010b, Mandates add pressure on Japanese refiners: *Oil & Gas Journal*, July 14. (Accessed July 14, 2010, at [http://www.ogj.com/index/article-tools-template/\\_printarticle/articles/oil-gas-journal/processing-2/refining/2010/07](http://www.ogj.com/index/article-tools-template/_printarticle/articles/oil-gas-journal/processing-2/refining/2010/07).)
- Petroleum Economist, 2010, News in brief: *Petroleum Economist*, v. 77, no. 2, February, p. 37.
- Reuters, 2010, Japan and Germany seek rare earth recycling as hedge: Thomson Reuters, November 10. (Accessed November 29, 2010, at <http://uk.reuters.com/assets/print?aid=uklne6a901k20101110>.)
- Sumitomo Metal Industries, Ltd., 2010, Sumitomo Metals Group completes investments in innovative steelmaking process: Sumitomo Metal Industries, Ltd. press release, October 22, 2 p.
- Sumitomo Metal Mining Co. Ltd., 2010a, SMM accepts equity financing by JOGMEC in new subsidiary undertaking nickel exploration in the Solomon Islands: Sumitomo Metal Mining Co. Ltd. press release, March 1, 2 p.
- Sumitomo Metal Mining Co. Ltd., 2010b, Stockholders agreement concluded on Taganito project: Sumitomo Metal Mining Co. Ltd. press release, September 15, 2 p.
- Taiheiyo Cement Corp., 2010, Domestic production reorganization: Taiheiyo Cement Corp. press release, February 23, 2 p.

TABLE 1  
JAPAN: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2006	2007	2008	2009	2010
<b>METALS</b>					
<b>Aluminum:</b>					
Alumina <sup>e</sup> thousand metric tons	330	300	320	310	300
Aluminum hydroxide <sup>e</sup> do.	720	700	700	710	700
<b>Metal:</b>					
<b>Primary:</b>					
Regular grades do.	7	6	7	6 <sup>e</sup>	5 <sup>e</sup>
High-purity do.	50	51	52	33	49
Secondary <sup>2</sup> do.	149	153	149	111	126
<b>Antimony:</b>					
Oxide	7,778	7,939	6,954	4,884 <sup>r</sup>	6,846
Metal	275	270	325	239	304
Arsenic, trioxide <sup>e</sup>	40	40	40	40	40
Bismuth	425	408	480	423	454
Cadmium, refined	2,286	1,939	2,126	1,824	2,142
Chromium, metal <sup>c</sup>	700	500	600	650	700
Cobalt, metal	920	1,084	1,071	1,332	1,935
<b>Copper, metal:</b>					
<b>Blister and anode:</b>					
Primary	1,409,087	1,367,310	1,366,310	1,297,943	1,382,655
Secondary	219,203	245,208	259,060	243,859	260,245
Total	1,628,290	1,612,518	1,625,370	1,541,802	1,642,900
<b>Refined:</b>					
Primary	1,342,350	1,369,814	1,328,157	1,238,012	1,333,787
Secondary	189,705	207,004	211,681	201,831	214,901
Total	1,532,055	1,576,818	1,539,838	1,439,843	1,548,688
<b>Gallium, metal:<sup>e</sup></b>					
Primary	8	8	7	7	6
Secondary	93 <sup>3</sup>	90	85	80	78
<b>Germanium:<sup>e</sup></b>					
Oxide	50	50	50	50	50
Metal, polycrystal kilograms	1,682 <sup>3</sup>	1,700	1,720	1,730	1,750
<b>Gold:</b>					
Mine output, Au content do.	8,904	8,869	6,868	7,708	8,544
<b>Metal:</b>					
Primary do.	144,164	117,529	81,399	89,281	98,398
Secondary <sup>4</sup> do.	23,952	38,331	43,433	43,979	37,413
Total do.	168,116	155,860	124,832	133,260	135,811
Indium, metal <sup>c</sup> do.	55,000	60,000	65,000	67,000	69,000
<b>Iron and steel, metal:</b>					
Pig iron thousand metric tons	84,270	86,771	86,171	66,943	82,283
<b>Electric-furnace ferroalloys:</b>					
Ferrochrome	13,056	12,016	13,888	7,698	16,208
Ferromanganese	406,162	420,151	431,181	361,375	453,265
Ferronickel	335,884	351,503	301,361	284,884	348,420
Silicomanganese	59,424	52,901	58,884	49,205	49,865
Ferromolybdenum	4,229	4,573	4,554	3,598	4,615
Ferrovandium	2,042	3,205	3,477	2,560	4,190
Unspecified	13,123	13,982	14,478	12,957	16,374
Total	833,920	858,331	827,823	722,277	892,937
Steel, crude thousand metric tons	116,226	120,203	118,739	87,534	109,599
<b>Semimanufactures, hot-rolled:</b>					
Ordinary steels do.	83,139	86,704	84,000 <sup>e</sup>	68,000 <sup>e</sup>	67,000 <sup>e</sup>
Special steels do.	20,982	21,498	21,000 <sup>e</sup>	16,000 <sup>e</sup>	15,000 <sup>e</sup>

See footnotes at end of table.

TABLE 1—Continued  
JAPAN: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2006	2007	2008	2009	2010
METALS—Continued					
Lead:					
Mine output, Pb content	777	--	--	--	--
Metal, refined:					
Primary	108,271	104,527	107,005	96,794	101,610
Secondary including remelted	171,743	171,795	172,454	150,871	165,613
Total	280,014	276,322	279,459	247,665	267,223
Magnesium, metal, secondary <sup>c</sup>	12,000	12,000	13,000	13,000	14,000
Manganese, oxide <sup>c</sup>	45,500	45,000	45,000	44,000	43,000
Molybdenum, metal	1,253	1,172	1,217	695 <sup>r</sup>	1,154
Nickel metal:					
Refined	29,254	30,402	34,861	29,351	40,228
Ni content of nickel oxide sinter	53,800	60,151	60,000 <sup>e</sup>	58,000 <sup>e</sup>	59,000 <sup>e</sup>
Ni content of ferronickel	66,058	68,346	59,259	54,491	64,349
Ni content of chemical	2,531	2,270	2,333	1,669	2,497
Total	151,643	161,169	156,000 <sup>e</sup>	144,000 <sup>e</sup>	166,000 <sup>e</sup>
Platinum-group metals:					
Palladium, metal kilograms	6,224 <sup>r</sup>	6,505 <sup>r</sup>	7,526 <sup>r</sup>	6,675 <sup>r</sup>	6,107
Platinum, metal do.	859 <sup>r</sup>	1,000 <sup>r</sup>	1,442 <sup>r</sup>	1,417 <sup>r</sup>	1,331
Selenium, metal	730	806	754	709	754
Silicon, multicrystalline	6,987	7,364	7,471	8,633	8,700 <sup>e</sup>
Silver:					
Mine output, Ag content kilograms	11,463	5,300	2,043	1,500 <sup>e</sup>	1,200 <sup>e</sup>
Metal:					
Primary do.	2,253,203	2,263,009	2,042,604	1,865,936	1,898,208
Secondary <sup>4</sup> do.	228,000	391,869	253,374	326,487	313,931
Total do.	2,481,203	2,654,878	2,295,978	2,192,423	2,212,139
Tantalum, metal <sup>c</sup>	95	95	95	95	95
Tellurium, metal	35	41	40 <sup>e</sup>	38 <sup>e</sup>	35 <sup>e</sup>
Tin, metal, smelter	854	879	956	757	841
Titanium:					
Dioxide	239,916	245,976	225,228	161,928	207,561
Metal <sup>c</sup>	39,000	42,000	45,000	35,000	38,000
Tungsten, metal	3,566	3,813	3,446	1,400	3,361
Vanadium, metal <sup>c,6</sup>	560	560	560	560	560
Zinc:					
Mine output, Zn content	7,169	--	--	--	--
Oxide	77,234	77,102	77,000 <sup>e</sup>	75,000 <sup>e</sup>	72,000 <sup>e</sup>
Metal:					
Primary	504,532	495,632	502,910	435,905	470,057
Secondary, including remelted	148,715	143,063	147,957	136,844	140,597
Total	653,247	638,695	650,867	572,749	610,654
Zirconium, oxide <sup>c</sup>	10,800	11,000	11,000	12,000	13,000
INDUSTRIAL MINERALS					
Bromine <sup>c</sup>	20,000	20,000	20,000	20,000	20,000
Cement, hydraulic thousand metric tons	69,942	67,685	62,810	54,800	51,526
Clays: <sup>c</sup>					
Bentonite	425,000	430,000	435,000	432,000	430,000
Fire clay, crude	460,000	450,000	450,000	440,000	440,000
Kaolin	10,500	11,000	11,000	12,000	12,000
Diatomite <sup>c</sup>	130,000	120,000	115,000	110,000	110,000
Feldspar and related materials <sup>c</sup>	800,000	750,000	700,000	700,000	650,000
Gypsum thousand metric tons	5,796	5,850	5,800 <sup>e</sup>	5,750 <sup>e</sup>	5,700 <sup>e</sup>

See footnotes at end of table.



TABLE 1—Continued  
JAPAN: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2006	2007	2008	2009	2010	
INDUSTRIAL MINERALS—Continued						
Iodine	8,724	9,282	9,500 <sup>e</sup>	8,232 <sup>r</sup>	9,216	
Lime, quicklime	thousand metric tons	9,014	9,359	9,528	6,746	8,547
Nitrogen, N content of ammonia	do.	1,091	1,114	1,244	1,021	1,178
Perlite <sup>e</sup>	240,000	230,000	230,000	220,000	210,000	
Rare-earth oxides <sup>5</sup>	8,243	8,561	8,435	5,121	10,699	
Salt, all types	thousand metric tons	1,166	1,190	1,200 <sup>e</sup>	1,200 <sup>e</sup>	1,250 <sup>e</sup>
Silica:						
Sand	do.	4,593	4,314	3,664	2,856	3,078
Stone, quartzite	do.	12,936	12,258	10,682	9,189	9,159
Sodium compounds, n.e.s.: <sup>e, 7</sup>						
Soda ash	400,000	400,000	400,000	400,000	400,000	
Sulfate, anhydrous	138,000	140,000	140,000	142,000	142,000	
Stone, crushed:						
Dolomite	thousand metric tons	3,695	3,655	3,370	3,122	3,438
Limestone	do.	166,621	165,982	156,813	132,350	133,974
Sulfur:						
Byproduct of metallurgy	do.	1,343	1,250	1,300 <sup>e</sup>	1,350 <sup>e</sup>	1,400 <sup>e</sup>
Byproduct of petroleum	do.	1,950	1,966	2,034	1,864	1,892
Talc and related materials: <sup>e</sup>						
Talc	25,500	26,000	26,000	25,000	24,000	
Pyrophyllite	350,000	345,000	350,000	340,000	340,000	
Vermiculite <sup>e</sup>	6,000	6,000	6,000	6,000	6,000	
MINERAL FUELS AND RELATED MATERIALS						
Carbon black	thousand metric tons	827	835	821	575	729
Coal, bituminous <sup>e, 8</sup>	do.	1,341 <sup>3</sup>	1,340	1,300	1,100	1,000
Coke, including breeze, metallurgical	do.	38,543	38,707	38,568	32,587	37,447
Gas, natural:						
Gross <sup>9</sup>	million cubic meters	3,302	3,708	3,735	3,539	3,396
Marketed <sup>c</sup>	do.	3,494 <sup>3</sup>	3,900	3,900	3,700	3,600
Petroleum:						
Crude	thousand 42-gallon barrels	5,643	6,041	6,200	5,795	5,491
Refinery products: <sup>c</sup>						
Gasoline:						
Aviation	do.	50	50	50	50	50
Other	do.	364,070 <sup>3</sup>	365,000	360,000	362,000	360,000
Asphalt and bitumen	do.	32,777 <sup>3</sup>	33,000	33,000	32,000	31,000
Distillate fuel oil	do.	251,311 <sup>3</sup>	247,000	250,000	245,000	242,000
Jet fuel	do.	76,390 <sup>3</sup>	80,000	82,000	78,000	76,000
Kerosene	do.	167,779 <sup>3</sup>	175,000	170,000	165,000	166,000
Liquefied petroleum gas	do.	55,696 <sup>3</sup>	57,000	58,000	56,000	55,000
Lubricants	do.	16,706 <sup>3</sup>	16,500	17,000	16,000	14,000
Naphtha	do.	136,140 <sup>3</sup>	138,000	139,000	136,000	135,000
Paraffin, wax	do.	824 <sup>3</sup>	850	800	800	750
Petroleum coke	do.	4,810 <sup>3</sup>	4,600	4,500	4,400	4,300
Refinery fuel and losses <sup>10</sup>	do.	150,000	150,000	150,000	150,000	150,000
Residual fuel oil	do.	373,047 <sup>3</sup>	350,000	330,000	300,000	320,000
Unfinished oils	do.	50,000	50,000	50,000	50,000	50,000
Total	do.	1,680,000	1,670,000	1,640,000	1,600,000	1,600,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. do. Ditto. -- Zero.

<sup>1</sup>Table includes data available through October 26, 2011.

<sup>2</sup>Includes alloyed and unalloyed aluminum ingot.

<sup>3</sup>Reported figure.

<sup>4</sup>Includes gold metal recovered from scrap and waste.

<sup>5</sup>Includes oxide of cerium, europium, gadolinium, lanthanum, neodymium, praseodymium, samarium, terbium, and yttrium.

TABLE 1—Continued  
JAPAN: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

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<sup>6</sup>Represents metal content of vanadium pentoxide recovered from petroleum residues, ashes, and spent catalysts.

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

<sup>8</sup>All major coal mines had closed by January 2002, but eight smaller mines were still in operation in 2010.

<sup>9</sup>Includes output from gas wells and coal mines.

<sup>10</sup>May include some additional unfinished oils.

TABLE 2  
JAPAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement		Aso Cement Co., Ltd.	Tagawa and Kanda, Fukuoka Prefecture	2,400
Do.		Daiichi Cement Co., Ltd.	Kawasaki, Kanagawa Prefecture	1,169
Do.		Denki Kagaku K.K.	Omi, Niigata Prefecture	2,762
Do.		Hachinohe Cement Co., Ltd.	Hachinohe, Aomori Prefecture	1,533
Do.		Hitachi Cement Co., Ltd.	Hitachi, Ibaraki Prefecture	941
Do.		Mitsubishi Materials Corp.	Higashidori, Shimokita-gun, Apmori Prefecture; Higashiyama, Higashiiwai-gun, Iwate Prefecture; Yokoze, Saitama Prefecture; Kurosaki, Kyushu, and Higashitani, Fukuoka Prefecture	13,467
Do.		Mitsui Mining Co. Ltd.	Togawa, Fukuoka Prefecture	2,075
Do.		Myojo Cement Co., Ltd.	Itoigawa, Niigata Prefecture	2,482
Do.		Nippon Steel Chemical Co., Ltd.	Tobata, Kitakyushu, Fukuoka Prefecture	855
Do.		Nittetsu Cement Co., Ltd.	Muroran, Hokkaido Prefecture	1,589
Do.		Ryukyu Cement Co. Ltd.	Yabu, Nago, Okinawa Prefecture	722
Do.		Sumitomo Osaka Cement Co. Ltd.	Tamura, Fukushima Prefecture; Aso, Tochigi Prefecture; Motosu, Gifu Prefecture; Sakata, Shiga Prefecture; Ako, Hyogo Prefecture; and Susaki, Kochi Prefecture	14,402
Do.		Taiheiyō Cement Corp.	Ofunato, Iwate Prefecture; Kumagaya and Saitama, Saitama Prefecture; Fujiwara, Mie Prefecture; Tsukumi, Oita Prefecture; and Kamiiso, Hokkaido Prefecture	25,700
Do.		Tokuyama Cement Co. Ltd.	Nanyo, Yamaguchi Prefecture	5,936
Do.		Tosoh Corp.	Shin Nanyo, Yamaguchi Prefecture	2,869
Do.		Tsuruga Cement Co. Ltd.	Tsuruga, Fukui Prefecture	1,710
Do.		Ube Industries Ltd.	Ube and Isa, Yamaguchi Prefecture, and Kanda, Fukuoka Prefecture	10,736
Coal		Kushiro Coal Mine Co. Ltd. <sup>1</sup>	Kushiro, Hokkaido Prefecture	750
Cobalt, refined	metric tons	Sumitomo Metal Mining Co. Ltd. (SMM)	Niihama, Ehime Prefecture	1,000
Copper, refined	do.	Mitsubishi Materials Corp.	Naoshima, Kagawa Prefecture	225,600
Do.	do.	Onahama Smelting and Refining Co. Ltd. (Mitsubishi Materials Corp., 49.29%; Dowa Mining Co. Ltd., 31.15%; Furukawa Co. Ltd., 8.31%; Furukawa Electric Co. Ltd. and Mitsubishi Cable Industries Ltd., 4.17% each; others, 2.91%)	Onahama, Fukushima Prefecture	258,000
Do.	do.	Pan Pacific Copper Co., Ltd. (JX Nippon Mining & Metals Co., Ltd., 66%, and Mitsui Mining and Smelting Co., Ltd., 34%)	Saganoseki, Oita Prefecture; Hitachi, Ibaraki Prefecture; and Tamano, Okayama Prefecture <sup>2</sup>	710,000
Do.	do.	Sumitomo Metal Mining Co. Ltd. (SMM)	Besshi/Toyo (Saijyo), Ehime Prefecture	410,000
Do.	do.	Kosaka Smelting and Refining Co. Ltd. (wholly owned subsidiary of Dowa Mining Co. Ltd.)	Kosaka, Akita Prefecture	72,000
Gold:				
In concentrate	kilograms	Sumitomo Metal Mining Co. Ltd. (SMM)	Hishikari, Kagoshima Prefecture	9,000
Refined	do.	Kosaka Smelting and Refining Co. Ltd. (wholly owned subsidiary of Dowa Mining Co. Ltd.)	Kosaka, Akita Prefecture	24,000
Do.	do.	Mitsui Mining and Smelting Co., Ltd.	Takehara, Hiroshima Prefecture	22,000
Do.	do.	Mitsubishi Materials Corp.	Naoshima, Kagawa Prefecture	60,000
Do.	do.	JX Nippon Mining & Metals Co., Ltd.	Hitachi, Ibaraki Prefecture	30,000
Do.	do.	Sumitomo Metal Mining Co. Ltd. (SMM)	Niihama, Ehime Prefecture	36,000

See footnotes at end of table.

TABLE 2—Continued  
JAPAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Iodine, crude	metric tons	Ise Chemical Industries Co. Ltd. (Asahi Glass Co. Ltd., 52.4%, and Mitsubishi Corp., 11.2%)	Oami-Shirasato, and Ichinomya, Chiba Prefecture; and Sadowara, Miyazaki Prefecture	3,600
Do.	do.	Godo Shigen Sangyo Co. Ltd. (Kanto Natural Gas Development Co. Ltd., 11%, and Mitsui & Co. Ltd., 10%)	Chosei, Chiba Prefecture	2,400
Do.	do.	Kanto Natural Gas Development Co. Ltd. (Mitsui Chemicals, Inc., 21.9%, and Godo Shigen Sangyo Co. Ltd., 14.3%)	Mobara, Chiba Prefecture	1,200
Do.	do.	Nihon Tennen Gas Co. Ltd. (Kanto Natural Gas Development Co. Ltd., 50%, and Tomen Corp., 41%)	Shirako and Yokoshiba, Chiba Prefecture	1,200
Do.	do.	Toho Earthtech, Inc. (Itochi Corp., 34.1%; Mitsubishi Gas Chemical Co. Ltd., 32.2%; Nippon Light Metal Co. Ltd., 31.1%)	Kurosaki, Niigata Prefecture	720
Do.	do.	Nippon Chemicals Co. Ltd. (Nippon Shokubai Co. Ltd., 17%; Takeda Chemical Industries Ltd., 16.4%; Chugai Boyeki Co. Ltd., 13.6%)	Isumi, Chiba Prefecture	720
Lead, refined	do.	Kamioka Mining and Smelting Co. Ltd.	Kamioka, Gifu Prefecture <sup>3</sup>	33,600
Do.	do.	Mitsui Mining and Smelting Co., Ltd.	Takehara, Hiroshima Prefecture	43,800
Do.	do.	Toho Zinc Co. Ltd.	Chigirishima, Hiroshima Prefecture	120,000
Do.	do.	Sumitomo Metal Mining Co. Ltd. (SMM)	Harima, Hyogo Prefecture	30,000
Do.	do.	Kosaka Smelting and Refining Co. Ltd.	Kosaka, Akita Prefecture	25,200
Do.	do.	Hosokura Smelting and Refining Mining Co. Ltd. (wholly owned subsidiary of Mitsubishi Materials Corp.)	Hosokura, Miyagi Prefecture <sup>3</sup>	22,200
Limestone		Mitsubishi Materials Corp.	Higashitani, Fukuoka Prefecture	10,000
Do.		Nittetsu Mining Co., Ltd.	Torigatayama, Kochi Prefecture; Oita, Oita Prefecture; and Shiriya, Aomori Prefecture	23,000
Do.		Sumikin Mining Co., Ltd.	Hachinohe Sekkai, Aomori Prefecture	5,500
Do.		Sumitomo-Osaka Cement Co. Ltd.	Ibuku, Shiga Prefecture, and Karazawa, Tochigi Prefecture	4,000
Do.		Shuho Mining Co., Ltd.	Sumitomo Cement Shuho, Yamaguchi Prefecture	8,200
Do.		Taiheiyo Cement Co. Ltd.	Ofunato, Iwate Prefecture; Ganji and Tsukumi, Oita Prefecture; Garo, Hokkaido Prefecture; Kawara, Fukuoka Prefecture, Tosayama, Kochi Prefecture; Taiheiyo Buko, Saitama Prefecture; and Shigeyasu, Yamaguchi Prefecture	46,000
Do.		Todaka Mining Co. Ltd.	Todaka-Tsukumi, Oita Prefecture	12,000
Do.		Ube Kosan Co. Ltd.	Ube Isa, Yamaguchi Prefecture	9,000
Manganese, electrolytic dioxide		Mitsui Mining and Smelting Co., Ltd.	Takehara, Hiroshima Prefecture	24
Do.		Tosoh Corp.	Hyuga, Miyazaki Prefecture	34
Nickel:				
In ferronickel	metric tons	Hyuga Smelting Co. Ltd. [wholly owned subsidiary of Sumitomo Metal Mining Co. Ltd. (SMM)]	do.	22,000
Do.	do.	Yakin Oheyama Co. Ltd.	Oheyama, Kyoto Prefecture	12,720
Do.	do.	Pacific Metals Co. Ltd.	Hachinohe, Aomori Prefecture	40,800
In oxide	do.	Tokyo Nickel Co. Ltd.	Matsuzaka, Mie Prefecture	60,000
Refined	do.	Sumitomo Metal Mining Co. Ltd. (SMM)	Niihama, Ehime Prefecture	36,000

See footnotes at end of table.

TABLE 2—Continued  
JAPAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Pyrophyllite		Goto Kozan Co. Ltd.	Goto, Nagasaki Prefecture	204
Do.		Ohira Kozan Co. Ltd.	Ohira, Okayama Prefecture	132
Do.		Sankin Kogyo Co. Ltd.	Otsue, Hiroshima Prefecture	72
Do.		Shinagawa Shirenga Co. Ltd.	Mitsuishi, Okayama Prefecture	180
Do.		Shokozan Kogyosho Co. Ltd.	Yano-Shokozan, Hiroshima Prefecture	180
Do.		Showa Kogyo Co. Ltd.	Showa-Shokozan, Hiroshima Prefecture	60
Steel, crude		JFE Steel Corp. (wholly owned subsidiary of JFE Holdings Inc.)	Chiba, Chiba Prefecture; Kawasaki (Keihin), Kanagawa Prefecture; Nishinomiya, Hyogo Prefecture; Handa Aichi Prefecture; Fukuyama, Hiroshima Prefecture; and Kurashiki, Okayama Prefecture	33,835
Do.		Kobe Steel Ltd.	Kakogawa and Kobe, Hyogo Prefecture	8,943
Do.		Nippon Steel Corp.	Oita, Oita Prefecture; Kawata, Fukuoka Prefecture; Kimitsu, Chiba Prefecture; and Nagoya, Aichi Prefecture	33,199
Do.		Sumitomo Metal Industries, Ltd.	Kashima, Ibaraki Prefecture; Kokura, Fukuoka Prefecture; and Wakayama, Wakayama Prefecture	12,820
Do.		Nisshin Steel Co. Ltd.	Kuri, Hiroshima Prefecture; Osaka City; Shunan, Yamaguchi Prefecture; and Toyo, Ehime Prefecture	4,000
Tantalum	metric tons	Japan New Metals Co. Ltd.	Akita, Akita Prefecture	95
Do.	do.	Mitsui Mining and Smelting Co. Ltd.	Miyama, Fukuoka Prefecture	NA
Titanium:				
In sponge metal		Sumitomo Titanium Corp. (Sumitomo Metal Industries, Ltd., 75.2%, and Kobe Steel Ltd., 24.8%)	Amagasaki, Hyogo Prefecture	24
Do.		Toho Titanium Co. Ltd. (JX Nippon Mining & Metals Co., Ltd., 47%; Mitsui & Co. Ltd., 20%; others, 33%)	Chigasaki, Kanagawa Prefecture	15
In dioxide	metric tons	Fuji Titanium Industry Co. Ltd. (Ishihara Sangyo Kaishia Ltd., 24.8%, and others, 75.2%)	Kobe, Hyogo Prefecture	17,400
Do.	do.	Ishihara Sangyo Kaisha Ltd.	Yokkaichi, Mie Prefecture	154,800
Do.	do.	Sakai Chemical Industries Co. Ltd.	Onahama, Fukushima Prefecture	60,000
Do.	do.	Tayca Corp.	Saidaiji, Okayama Prefecture	60,000
Do.	do.	Titan Kogyo Kabushiki Kaisha	Ube, Yamaguchi Prefecture	16,800
Zinc, refined	do.	Akita Smelting Co. Ltd. [Dowa Mining Co. Ltd., 57%; JX Nippon Mining & Metals Co., Ltd., 24%; Sumitomo Metal Mining Co. Ltd. (SMM), 14%; Mitsubishi Materials Corp., 5%]	Iijima, Akita Prefecture	200,400
Do.	do.	Hachinohe Smelting Co. Ltd. (Mitsui Mining and Smelting Co. Ltd., 57.7%; JX Nippon Mining & Metals Co., Ltd., 27.8%; Toho Zinc Co. Ltd. and Nisso Smelting Co. Ltd., 14.5%)	Hachinohe, Aomori Prefecture	117,600
Do.	do.	Hikoshima Smelting Co. Ltd.	Hikoshima, Yamaguchi Prefecture	84,000
Do.	do.	Kamioka Mining and Smelting Co. Ltd.	Kamioka, Gifu Prefecture	72,000
Do.	do.	Toho Zinc Co. Ltd.	Annaka, Gunma Prefecture	139,200
Do.	do.	Sumitomo Metal Mining Co. Ltd. (SMM)	Harima, Hyogo Prefecture	90,000

Do., do. Ditto. NA Not available.

<sup>1</sup>Coal mining operations continued following the establishment of Kushiro Coal Mine Co. Ltd. in 2002.

<sup>2</sup>Saganoseki Smelter and Refinery and Hitachi Refinery (Nikko Smelting & Refining Co. Ltd.) [450,000 metric tons per year (t/yr)] and Tamano Smelter and Refinery (Hibi Kyoto Smelting Co. Ltd.) (260,000 t/yr).

<sup>3</sup>Secondary lead smelter and refinery.

TABLE 3  
JAPAN: SUPPLY AND DEMAND FOR SELECTED NONFERROUS METALS

(Metric tons unless otherwise specified)

	Refined copper			Refined lead		
	2008	2009	2010	2008	2009	2010
Stocks at the beginning of the year	101,931	124,379	104,409	14,224	22,134	17,303
Production	1,539,838	1,439,843	1,548,688	224,905	192,196	215,828
Imports	90,470	42,256	45,912	25,497	9,144	11,126
Total supply	1,732,239	1,606,478	1,699,009	264,626	223,474	244,257
Exports	423,455	626,685	528,384	26,246	55,521	40,461
Reported consumption	1,219,740	907,929	1,104,614	211,261	159,093	192,685
Total demand	1,643,195	1,534,614	1,632,998	237,507	214,614	233,146
Stocks at the end	124,379	104,409	110,279	22,134	17,303	16,521
Apparent consumption	1,184,405	875,384	1,060,346	216,246	150,650	187,275
	Refined zinc			Silver (kilograms)		
	2008	2009	2010	2008	2009	2010
Stocks at the beginning of the year	82,069	94,521	73,600	881,919	959,905	872,325
Production	615,533	540,604	574,008	2,042,604	1,865,936	1,898,208
Remelting	NA	NA	NA	253,374	326,487	313,931
Imports	45,287	27,533	31,855	2,098,409	1,343,705	2,087,621
Total supply	742,889	662,658	679,463	5,276,306	4,496,033	5,172,085
Exports	84,505	155,985	97,745	1,978,353	1,696,462	2,733,284
Reported consumption	450,010	318,922	388,692	1,868,883	1,392,946	1,854,798
Total demand	534,515	474,907	486,437	3,847,236	3,089,408	4,588,082
Stocks at the end	94,521	73,600	65,555	959,905	872,325	1,062,722
Apparent consumption	563,863	433,073	516,163	2,338,048	1,927,246	1,376,079

NA Not applicable.

Source: Japan Mining Industry Association.

TABLE 4  
JAPAN: RESERVES OF MAJOR MINERAL COMMODITIES IN 2010

(Thousand metric tons unless otherwise specified)

Commodity	Exploitable reserves
Coal <sup>1</sup>	773,000
Dolomite	913,000
Gold ore, Au content	kilograms 159,000
Iodine	5,000 <sup>e</sup>
Limestone	40,400,000
Pyrophyllite	59,700
Silica sand	73,600
Silica stone, white	462,000

<sup>e</sup>Estimated.

<sup>1</sup>Recoverable reserves, including brown coal.

Source: Natural Resources and Fuel Department, Agency of Natural Resource and Energy.