



# 2010 Minerals Yearbook

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SILICON

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By Lisa A. Corathers

Domestic survey data and tables were prepared by Maria Arguelles, statistical assistant.

In 2010, domestic ferrosilicon production increased by 27% from that of 2009 to 176,000 metric tons (t) of contained silicon (table 1). On a gross-weight basis, ferrosilicon production increased by 26% from 229,000 t produced in 2009 (table 2). Domestic statistics for silicon metal were withheld to avoid disclosing company proprietary data. On the basis of contained silicon, U.S. exports of silicon products increased by 73%, and imports increased by 79%. The increase in exports was primarily associated with increases in the “more than 99.99% silicon” metal and the “more than 55% silicon” ferrosilicon trade categories (table 5). The increase in imports was primarily attributable to increases in the “55% to 80%, other” ferrosilicon and the “99.00% to 99.99%” and “other” silicon metal trade categories (table 6). Apparent consumption for ferrosilicon increased by 51% compared with the revised amount in 2009. Year-average import prices for the 50% and 75% ferrosilicon grades increased by 42% and 41%, respectively, and those for silicon metal increased by 20% compared with those in 2009 (table 1).

Silicon is a light chemical element with metallic and nonmetallic characteristics. Silicon is rarely found free in nature. Silicon combines with oxygen and other elements to form silicates, which comprise more than 25% of the Earth’s crust. Silica (SiO<sub>2</sub>) as quartz or quartzite is used to produce silicon ferroalloys for the iron and steel industries and silicon metal for the aluminum and chemical industries. Silicon metal that is refined into semiconductor-grade metal for use in making computer chips is crucial to modern technology, but the quantity is less than 5% of total silicon metal demand (Roskill’s Letter from Japan, 2000). Silicon metal also may either be used directly in an upgraded metallurgical form or refined into wafers to power solar batteries. The U.S. Geological Survey (USGS) does not survey the ultrahigh-purity silicon industry for production and related data; therefore, the only information in this report about these high-purity grades is from foreign trade statistics and from published sources.

## Production

**Silicon Ferroalloys.**—Domestic production data for silicon ferroalloys are derived from monthly and annual voluntary surveys and estimates for nonrespondents by the USGS. The data in table 2 were obtained from all operations listed in table 3 that are canvassed by means of the USGS “Silicon Alloys” survey. In terms of gross weight and compared with that of 2009, domestic ferrosilicon gross production and net shipments increased by 26% and 29%, respectively. Producer stocks of ferrosilicon at yearend 2010 increased by 39% compared with those at yearend 2009. Data for ferrosilicon reflected adjustments in inventory and in-plant consumption

of ferrosilicon to produce magnesium ferrosilicon and other miscellaneous alloys.

In April, Globe Specialty Metals, Inc. (GSM; owner of U.S.-based silicon producer Globe Metallurgical, Inc.) acquired Coraopolis, PA-headquartered Core Metals Group, LLC for \$52 million in cash from Ospraie Funds. Core Metals Group had the capacity to produce 42,000 metric tons per year (t/yr) of silicon alloys at its Bridgeport, AL, plant (Globe Specialty Metals, Inc., 2010a).

**Silicon Metal.**—Production-related statistics for silicon metal were withheld to avoid disclosing company proprietary data. In February, GSM reopened its 27,000-t/yr silicon metal plant in Selma, AL (Globe Specialty Metals, Inc., 2010b).

**Semiconductor- and Solar-Battery-Grade Silicon.**—U.S. production capacity for polycrystalline silicon used in semiconductor and solar cells was reported to have increased by 26% to 60,500 t in 2010 from that in 2009. The United States led the world in polycrystalline production capacity with 37% of the total, followed by Germany and the Republic of Korea each with 16%. Total annual domestic polycrystalline production capacity by company was as follows: Hemlock Semiconductor Corp., 36,000 t; REC Group (includes REC Advanced Silicon Materials LLC and REC Solar Grade Silicon LLC), 15,000 t; MEMC Electronic Materials, 8,000 t; and Mitsubishi Materials Group, 1,500 t (Roskill’s Letters from Japan, 2010b, p. 4).

**Upgraded-Metallurgical-Grade Silicon Metal.**—Upgraded-metallurgical-grade silicon metal (UMG-Si) is used in silicon-based photovoltaic (solar) cells. UMG-Si does not require as much additional refinement as does polycrystalline silicon, which has been traditionally used in solar panel wafers. GSM did not produce UMG-Si commercially in 2010; rather, the company focused on research and development projects to improve UMG-Si production. GSM’s UMG-Si production capacity was 360 t/yr at its Solsil plant in Beverly, OH (Globe Specialty Metals, Inc., 2010c, p. 7, 13).

## Consumption

**Silicon Ferroalloys and Metal.**—Most ferrosilicon (including miscellaneous silicon alloys) was used to produce steel (69%) (table 4). Silicon metal was used mainly to produce chemicals—silanes, silicones, and others—and silica fume (77%). Metallurgical-grade silicon carbide can substitute for ferrosilicon, especially in iron foundries. Data on North American production and U.S. imports of silicon carbide are reported in the Manufactured Abrasives chapter of the 2010 USGS Minerals Yearbook, volume I, Metals and Minerals.

In 2010, apparent consumption of ferrosilicon and miscellaneous silicon alloys increased by 51% to 312,000 t compared with the revised amount of 207,000 t in 2009

(table 1). Increases in domestic production and net imports for consumption contributed to the rise in ferrosilicon apparent consumption. Silicon metal apparent consumption was withheld to avoid disclosing company proprietary data.

Reported consumption of ferrosilicon, which includes miscellaneous silicon alloys, was 44% of apparent consumption (content basis). This percentage was derived based on the typical silicon content of these materials noted in table 4.

Consumption of ferrosilicon and silicon metal was estimated by CRU International Ltd. to have each increased throughout the western world in 2010. In terms of contained silicon, ferrosilicon consumption increased to 1.99 Mt in 2010 from 1.41 Mt (revised) in 2009, and silicon metal consumption increased to 1.49 Mt from 1.03 Mt. Areas with the largest year-to-year increase in consumption of ferrosilicon, in terms of volume, were Europe, Japan, and the United States. Areas with the largest year-to-year increase in silicon metal consumption, in terms of volume and as categorized by CRU International, were the European Union (EU) and other western world countries (excluding the EU and all Asian countries), and the United States. In decreasing order of consumption, Europe, other Asian countries (excluding China, Japan, and North Korea), and Japan accounted for 72% of the ferrosilicon consumption in 2010. Also in decreasing order of consumption, the EU, the United States, and other Asian countries (excluding China, Japan, and North Korea) accounted for 72% of the silicon metal consumed in 2010 (CRU Bulk Ferroalloys Monitor, 2011a, b).

## Prices

Ferrosilicon and silicon metal prices (excluding those of ultrahigh-purity silicon) tend to vary in response to changes in supply to, and consumption requirements by, the aluminum, chemical, ferrous foundry, and steel industries. There were significant increases in silicon material prices in 2010 from those in 2009 because of increased consumption in the United States as market conditions improved following the economic downturn that began during the third quarter 2008 and lasted through 2009. The year-average spot prices given by Platts Metals Week were 97.2 cents per pound for 75% ferrosilicon and 140.1 cents per pound for silicon metal; these prices were 41% and 20% higher, respectively, than those of 2009. The year-average North American transaction price for 50% ferrosilicon as calculated from Ryan's Notes listings was 109.3 cents per pound, a 42% increase from that of 2009. Average monthly ferrosilicon and silicon metal spot prices were at their lowest in January 2010 before generally trending upward until hitting a high in November—159 cents per pound for silicon metal, 122.3 cents per pound for 50% ferrosilicon, and 112 cents per pound for 75% ferrosilicon. The range for spot market prices, in cents per pound, ended the year as follows: silicon metal, 155 to 160; 50% ferrosilicon, 115 to 120; and 75% ferrosilicon, 106 to 110.

## Foreign Trade

Trade volumes discussed are based on gross weight. U.S. ferrosilicon exports increased by 79% to 25,400 t, and their value increased by 76% to \$29.6 million from those of 2009.

In decreasing order of quantity, Canada and Mexico accounted for 77% of the total 2010 ferrosilicon exports (table 5). Exports of silicon metal increased by 74% to 65,900 t, and their value increased by 31% to \$2.7 billion from that of 2009. In decreasing order of quantity, China, Japan, and Germany accounted for 69% of silicon metal exports. Shipments of high-purity silicon containing more than 99.99% silicon accounted for 76% of total silicon metal exported and 76% of the total value of combined ferrosilicon and silicon metal exports.

U.S. ferrosilicon imports increased by 123% to 229,000 t, and the value of those imports increased by 171% to \$342 million compared with that in 2009. These imports increased primarily because of an increase in the “55% to 80% silicon, other” ferrosilicon trade category. Imports of standard 75% ferrosilicon (ferrosilicon category of “55% to 80% silicon, other”) accounted for 83% of total ferrosilicon imports by gross weight and 85% of total ferrosilicon value (table 6). Russia (47%) was the leading source of ferrosilicon imports, followed by China (25%) and Canada (13%).

Silicon metal imports (175,000 t) increased by 51% from those in 2009, and increased by 57% in value to \$748 million from \$477 million in 2009. The increase in silicon metal imports was attributable to increases in the “99.00% to 99.99% silicon” (38,800 t) and “silicon, other” (18,400 t) trade categories. Brazil was the leading source of “99.00% to 99.99% silicon” silicon metal imports at 46%, followed by South Africa at 24% and Australia at 8%. Canada was the leading source of “silicon, other” silicon metal imports at 42%, followed by Brazil at 35% and France at 9%. Silicon metal in the “99.00% to 99.99% silicon” trade category accounted for 81% of the quantity, and 50% of the value, respectively, of all silicon metal imported in 2010. The quantity of silicon metal imports in this trade category increased by 38% compared with that of 2009.

The estimated U.S. net import reliance for ferrosilicon in 2010 as a percentage of apparent consumption decreased to 53% from 54% (revised) in 2009. Silicon metal import reliance was withheld to avoid disclosing company proprietary data.

**Antidumping Duty Administrative Reviews.**—Final antidumping duty rates assessed in 2010 on imports of silicon materials to the United States are listed in table 7. Results of appeals of import antidumping duty reviews made in 2010 are listed in table 8.

**Foreign-Trade Zone Designations.**—On December 20, the Foreign-Trade Zones Board of the U.S. Department of Commerce granted foreign-trade zone (FTZ) subzone status with restrictions to Dow Corning Corp.'s silicone manufacturing plants in Carrollton, Elizabethtown, and Shepherdsville, KY, and REC Silicon Inc.'s polysilicon (polycrystalline silicon) and silane gas manufacturing facility in Moses Lake, WA. The FTZ status would allow for antidumping duty deferral, inverted tariffs, and scrap and export savings on imported silicon metal. However, the companies would not be allowed to import silicon metal duty free if those imports were covered by an antidumping duty or countervailing duty order, such as silicon metal imports from China and Russia (Jennemann, 2010; U.S. Department of Commerce, Foreign-Trade Zones Board, 2010a, b).

**U.S.-World Trade Organization (WTO) Chinese Raw Material Export Dispute Settlement Proceedings.**—On March 29, panel representatives were appointed to the WTO Dispute Settlement Body (DSB) that was formed in response to requests from the EU, Mexico, and the United States regarding curbs placed by China in 2009 on exports of various materials, including a 15% tax on silicon metal exports. The DSB panel was expected to finalize proceedings in April 2011 (Office of the United States Trade Representative, 2009; American Metal Market, 2010a; World Trade Organization Dispute Settlement Body, 2010).

## World Industry Structure

Data on annual world production of ferrosilicon and silicon metal by country from 2006 through 2010 are provided in the Ferroalloys chapter of the 2010 USGS Minerals Yearbook, volume I, Metals and Minerals. World production of ferrosilicon, on a gross-weight basis, was estimated to have been 7.89 Mt in 2010 compared with 7.32 Mt (revised) in 2009. The major ferrosilicon producers in 2010 were, in decreasing order, China, Russia, the United States, Norway, and Ukraine; they accounted for 87% of total world production listed in table 1.

World production of silicon metal, excluding that from the United States, was estimated to have been 2.18 Mt in 2010 compared with 1.79 Mt (revised) in 2009 (table 1). China was by far the leading producer of silicon metal in the world in 2010 with an estimated 1.5 Mt; this was 69% of the world total. Other major producers of silicon metal in 2010 were, excluding the United States and in decreasing order, Norway, Brazil, and France; they accounted for 19% of world production reported in table 1. New ferrosilicon and silicon metal projects scheduled for completion around the world from 2010 through 2014 are listed in table 9.

## World Review

**European Union.**—In May, the Council of the European Union assessed new, lower antidumping duties on silicon metal imports from China and the Republic of Korea effective during the next 5 years. An antidumping duty rate of 19% would apply to all silicon metal imports except those from Datong Jinneng Industrial Silicon Co. Ltd., which would be 16.3%. A 49% antidumping duty rate had been in place on silicon metal imports from China and the Republic of Korea since 1990 and 2007, respectively (Official Journal of the European Union, 2010, p. 21).

**Bhutan.**—Starting in 2008, Bhutan became a new ferrosilicon-producing country. By 2010, there were six ferrosilicon producers in the country—Bhutan Ferro Alloys Ltd. (BFAL); Bhutan Ferro Industries Ltd.; Druk Ferro Alloys Ltd.; Druk Wang Alloys Ltd.; SD Eastern Bhutan Ferro Silicon Pvt. Ltd.; and Ugen Ferroalloys Pvt. Ltd. The country's total ferrosilicon production capacity was estimated to be 100,000 t/yr; BFAL had the largest capacity with 34,000 t/yr. According to the United Nations trade statistics, Bhutan exported most of its ferrosilicon to India (United Nations Statistics Division, unpublished data, August 2011; Wangdi, 2011).

**Canada.**—In October, Timminco Ltd. and Dow Corning formed a joint venture, dubbed Quebec Silicon, to produce silicon metal at Timminco's wholly owned Becancour Silicon Inc. plant in Becancour, Quebec. Timminco retained 51% ownership in, and operational control of, the plant. Production, initially set at 47,000 t/yr, would be split proportionally between the two companies. Timminco continued to hold 100% equity in UMG-Si production at Becancour under the new name of Timminco Solar. Timminco Solar facilities remained closed in 2010 pending recovery in the solar market, but Quebec Silicon operated at full production capacity to meet the needs of the aluminum and chemical industries (Timminco Ltd., 2010; 2011, p. 2, 10, 14).

**China.**—China's exports of silicon materials in 2010 were significantly higher than those in 2009 because of improved global economic conditions, despite continued high export tariffs and reduced energy consumption and carbon dioxide (CO<sub>2</sub>) emission targets imposed by the Central Government of China in September 2010. China's exports of ferrosilicon increased by 77% to about 735,000 t from the amount exported in 2009. The leading countries of destination for Chinese ferrosilicon were Japan (45%), the Republic of Korea (21%), the United States (6%), and Taiwan (4%). China's exports of silicon metal were also significantly higher in 2010 compared with those in 2009; they were up 50% to 633,464 t from 421,610 t. The leading countries of destination for Chinese silicon metal were Japan (29%), the Republic of Korea (13%), the United Kingdom (7%), and Thailand (6%) (TEX Report, The, 2011a, b).

Chinese export tariffs in 2010 for ferrosilicon and silicon metal remained at 25% and 15%, respectively (Metal-Pages, 2011). With these duties, the Chinese Government aimed to reduce exports of these materials from the country so more material would be available for the domestic market.

The Central Government of China imposed electricity and CO<sub>2</sub> emission restrictions on energy-intensive industries in the fourth quarter of 2010; CO<sub>2</sub> emissions were to be reduced by 20%. Electricity supply on the national grid was cut mainly in the so-called Silicon Land—the area comprised of Gansu Province, Inner Mongolia Autonomous Region, Ningxia Hui Autonomous Region, and Qinghai Province. As a result, Chinese ferrosilicon and silicon metal production fell, and spot-market prices rose sharply at the end of the year (TEX Report, The, 2011c, d).

**France.**—In late March, Grupo FerroAtlántica S.L. (Ferroatlantica) restarted production at its five French silicon plants as aluminum and chemical market conditions improved. The plants included the following with their associated products and capacities: Anglefort, silicon metal (36,000 t/yr); Château Feuillet, silicon metal (12,000 t/yr); Laudun, ferrosilicon (25,000 t/yr) and silicon (14,000 t/yr); Les Clavaux, silicon metal (35,000 t/yr); and Montricher, silicon metal (30,000 t/yr) (Metal-Pages, 2010b).

**Kazakhstan.**—Eurasian Natural Resources Corp. PLC produced 48,000 t of ferrosilicon in 2010 at its Aksu plant in Kazakhstan and its Serov plant in Russia (Eurasian Natural Resources Corp. PLC, 2010a, p. 13; b, p. 12; c, p. 6; 2011, p. 6).

**Macedonia.**—Ownership in the Silmak doel silicon materials plant located in Jegunovce changed twice during 2010. In February, Paris-registered metal trader Société Commerciale de Métaux et Minéraux sold the plant to Metal Invest EFT, the Macedonian unit of international energy trading company The EFT Group. Metal Invest then sold 90% of the plant to Hong Kong-based Camelot Group in July. The plant, renamed Jugohrom Ferroalloys, resumed ferrosilicon production in July at a rate of 4,500 metric tons per month (t/mo) with the restart of four of its eight ferrosilicon furnaces; the plant had been shut down since early November 2009. The company was reportedly upgrading the remaining four ferrosilicon furnaces to produce silicon metal (Metal-Pages, 2010e; SeeNews, 2010).

**Norway.**—Norwegian producers of silicon-materials ramped-up production considerably during 2010 in response to improved market conditions and low inventories. Fesil AS reported full capacity utilization at its two-furnace Rana Metall ferrosilicon plant after May. The Rana Metall ferrosilicon plant production capacity was 90,000 t/yr. Fesil held majority interest (51%) in Fesil Sunergy AS, which started construction in 2010 on a fully financed UMG-Si pilot plant at Fesil's idled Lilleby silicon-materials plant. Fesil Sunergy's goal would be to produce 6,800 t/yr of UMG-Si (Fesil AS, 2011, p. 3–4, 10, 20).

By the third quarter, Finnfjord Smelteverk was operating all three furnaces, up from two in 2009, at its 100,000-t/yr ferrosilicon plant near Finnsnes. Virtually all of Finnfjord's production was exported to the European Union. Construction also began on Finnfjord's energy-recovery plant to capture waste heat from its ferrosilicon furnaces. The energy the company would save, estimated to be 340 gigawatt-hours, would be equivalent to the annual electricity requirements of 12,000 single family homes (Metal-Pages, 2010d; Norske Energi, 2011, p. 4).

Orkla ASA (2010, p. 6) reported its Elkem AS silicon-related businesses were operating at close to full capacity by the end of September. In the third quarter of 2010, average capacity utilization was 91% compared with 57% in the third quarter of 2009. Elkem had total ferrosilicon production capacity of 76,000 t/yr; 40,000 t/yr at the Bjolvefossen plant and 36,000 t/yr in Bremanger. Elkem's silicon metal capacity was as follows: Salten, 65,000 t/yr; Thamshavn, 40,000 t/yr; and Bremanger, 28,000 t/yr.

German chemical producer Wacker Chemie AG acquired the 50,000-t/yr Holla Metall silicon metal plant from Fesil in June for €66.5 million (\$80 million). As a result, the plant would supply Wacker with one-third of its annual silicon metal needs, and up to 20% of silicon metal would be removed from the European spot market (American Metal Market, 2010b; Wacker Chemie AG, 2011, p. 2).

**Poland.**—In March, Poland's sole ferrosilicon producer Huta Laziska doubled production to 5,000 t/mo to meet increasing iron and steel industry requirements. The company's total ferrosilicon production capacity was 96,000 t/yr (Metal-Pages, 2010a).

**Russia.**—Russia exported 412,892 t of ferrosilicon in 2010, an increase of 30% from that in 2009. This was an alltime high for the country, as Russian producers filled the void left by a decrease in Chinese ferrosilicon exports to Europe and Asia. The leading destinations for Russian ferrosilicon exports were the

Netherlands (115,822 t), Japan (103,372 t), and the Republic of Korea (76,639 t) (TEX Report, The, 2011e, f).

Mechel OAO reported an increase in ferrosilicon production at its Bratsk ferroalloys plant in Eastern Siberia to 89,920 t in 2010 from 86,010 t in 2009. The company planned to increase the plant's ferrosilicon production capacity to 122,000 t/yr from 87,200 t/yr by 2013 (Mechel OAO, 2011, p. 104–105, 107).

**Spain.**—During the year, Ferroatlantica operated only one furnace at reduced capacity at its Sabon silicon metal plant. The Sabon plant had a total production capacity of 40,000 t/yr (Metal Pages, 2010c).

**Ukraine.**—Ferrosilicon production in the Ukraine increased by 30% to 195,500 t from 150,300 t in 2009. Stakhanov Ferroalloy Works produced 136,100 t of ferrosilicon, up 22.6% from that of 2009, and Zaporizhiya Ferroalloy Works produced 59,400 t of ferrosilicon, up 51% from that of 2009 (Interfax Russia & CIS Metals & Mining Weekly, 2011).

## Outlook

Domestic and global consumption for ferrosilicon was expected to follow closely the trend in steel production, for which the annual growth rate has been typically in the range of 1% to 2% in the United States. Details of the outlook for the steel industry are discussed in the Outlook section of the Iron and Steel chapter of the 2010 USGS Minerals Yearbook, volume I, Metals and Minerals. According to the World Steel Association (2011), raw steel production, compared with that in 2009, increased by 38.5% to 80.6 Mt in the United States and by 15% worldwide to slightly more than 1.4 billion metric tons (Gt). Raw steel production in China, the leading world producer of raw steel, increased by 9.3% to about 627 Mt. MEPS (International) Ltd. (2011) forecast world raw steel production would increase by 5% to 1.49 Gt in 2011 from that in 2010, and then by 4.4% in 2012.

Demand for silicon metal comes primarily from the aluminum and chemical industries. Consumption of silicon metal by the U.S. aluminum castings industry was expected to mirror the short-term growth rate of 14.9% from 2010 through 2013 in aluminum casting sales, and the long-term growth rate of 10.9% from 2010 through 2019 (Modern Casting, 2011). U.S. chemical production was expected to increase by 3% in 2011 (by 2.7% when excluding pharmaceuticals) compared with that in 2010. Deloitte LLP forecast that China would overtake the United States as the world's largest chemical market in 2011 (Bomgardner, 2011a, b).

World production capacity for polycrystalline silicon can be used as a rough indicator of ultrahigh-purity silicon consumption. Compared with the revised amount of 95,000 t in 2009, world polycrystalline silicon output increased by 53% to 145,000 t in 2010. Of that amount, the solar cell market accounted for 83% and the semiconductor market 17%. World production capacity for polycrystalline silicon was forecast to increase by 30% to 213,600 t in 2011 from that in 2010; by 2013, world polycrystalline silicon production capacity would increase to 242,600 t (Roskill's Letters from Japan, 2010a, p. 3; b, p. 1, 4).

## References Cited

- American Metal Market, 2010a, China dismisses WTO remarks on export curbs: American Metal Market, June 2. (Accessed September 27, 2010, via <http://www.amm.com/>.)
- American Metal Market, 2010b, Fesil silicon plant sale could squeeze European market: American Metal Market, June 10. (Accessed September 27, 2010, via <http://www.amm.com/>.)
- Bomgardner, M.M., 2011a, Chemical industry poised for more growth in 2011: Chemical & Engineering News, v. 89, no. 26, June 27, p. 16. (Accessed July 5, 2011, at <http://pubs.acs.org/subscribe/journals/cen/89/i26/html/8926busc1.html>.)
- Bomgardner, M.M., 2011b, U.S. weak domestic demand will be offset by strong exports, low natural gas prices: Chemical & Engineering News, v. 89, no. 2, January 10, p. 10. (Accessed January 10, 2011, at <http://pubs.acs.org/cen/coverstory/89/8902cover17.html>.)
- CRU Bulk Ferroalloys Monitor, 2011a, Ferrosilicon—Ferrosilicon supply/demand balance: CRU Bulk Ferroalloys Monitor, March, p. 6.
- CRU Bulk Ferroalloys Monitor, 2011b, Silicon metal—Silicon metal supply/demand balance: CRU Bulk Ferroalloys Monitor, March, p. 10.
- Eurasian Natural Resources Corp. PLC, 2010a, May 2010 interim management statement and production report for the first quarter ended 31 March 2010: London, United Kingdom, Eurasian Natural Resources Corporation PLC press release, May 13, 19 p. (Accessed July 25, 2011, at <http://www.enrc.com/Documents/Reports/2010Q1IMS.pdf>.)
- Eurasian Natural Resources Corp. PLC, 2010b, November 2010 interim management statement and production report for the third quarter ended 30 September 2010: London, United Kingdom, Eurasian Natural Resources Corp. PLC press release, November 11, 17 p. (Accessed July 25, 2011, at <http://www.enrc.com/Documents/Reports/2010Q3IMS.pdf>.)
- Eurasian Natural Resources Corp. PLC, 2010c, Production report for the second quarter ended 30 June 2010: London, United Kingdom, Eurasian Natural Resources Corp. PLC press release, August 4, 12 p. (Accessed July 25, 2011, at <http://www.enrc.com/Documents/Reports/2010Q2IMS.pdf>.)
- Eurasian Natural Resources Corp. PLC, 2011, Production report for the fourth quarter ended 31 December 2010: London, United Kingdom, Eurasian Natural Resources Corp. PLC press release, February 2, 11 p. (Accessed July 25, 2011, via <http://www.enrc.com>.)
- Fesil AS, 2011, Fesil annual report 2010: Trondheim, Norway, Fesil ASA, 88 p. (Accessed August 6, 2011, via <http://www.fesil.no/index.php/financial-figures>.)
- Globe Specialty Metals, Inc., 2010a, Globe Specialty Metals acquires Core Metals Group: New York, NY, Globe Specialty Metals, Inc. press release, April 1. (Accessed September 29, 2010, at <http://investor.glbsm.com/releasedetail.cfm?ReleaseID=456275>.)
- Globe Specialty Metals, Inc., 2010b, Globe Specialty Metals reopens Selma, Alabama facility: New York, NY, Globe Specialty Metals, Inc. press release, February 3. (Accessed July 23, 2010, at <http://investor.glbsm.com/releasedetail.cfm?ReleaseID=442659>.)
- Globe Specialty Metals, Inc., 2010c, U.S. Securities and Exchange Commission (SEC) annual report for period ended June 30, 2010: New York, NY, Globe Specialty Metals, Inc. SEC Form 10—K, September 28, 119 p. (Accessed June 23, 2011, at <http://files.shareholder.com/downloads/ABEA-3CRU4N/1300695626x0xS1140361-10-38818/1383571/filing.pdf>.)
- Interfax Russia & CIS Metals & Mining Weekly, 2011, Ukraine boots ferroalloy output 38% in 2010: Interfax Russia & CIS Metals & Mining Weekly, v. XXI, issue 1, December 31, 2010–January 13, 2011, p. 22.
- Jennemann, Tom, 2010, Silicon FTZ restrictions will favor Globe: American Metal Market, June 14. (Accessed September 27, 2010, via <http://www.amm.com/>.)
- Mechel OAO, 2011, U.S. Securities and Exchange Commission Form 20—F: Moscow, Russia, Mechel OAO, April 12, 369 p. (Accessed July 26, 2011, at [http://www.mechel.com/media/for\\_investors/20f/form\\_20f.pdf.pdf](http://www.mechel.com/media/for_investors/20f/form_20f.pdf.pdf).)
- MEPS (International) Ltd., 2011, Record high steel production forecast for 2011—Further growth in 2012: Sheffield, United Kingdom, MEPS Steel News, January 21. (Accessed July 5, 2011, at <http://www.meps.co.uk/CrudeProductionNews2011.htm>.)
- Metal-Pages, 2010a, European ferro-silicon production to jump in Q2: Metal-Pages, March 25. (Accessed November 1, 2010, via <http://www.metal-pages.com/>.)
- Metal-Pages, 2010b, European silicon market cements gains, eyes more: Metal-Pages, April 20. (Accessed January 6, 2011, via <http://www.metal-pages.com/>.)
- Metal-Pages, 2010c, European silicon market edges up on tight supplies: Metal-Pages, October 14. (Accessed July 26, 2011, via <http://www.metal-pages.com/>.)
- Metal-Pages, 2010d, Finnffjord set to boost ferro-silicon production: Metal-Pages, March 24. (Accessed October 6, 2010, via <http://www.metal-pages.com/>.)
- Metal-Pages, 2010e, Macedonia bulk alloys plant ramps up production: Metal-Pages, October 26. (Accessed January 6, 2011, via <http://www.metal-pages.com/>.)
- Metal-Pages, 2011, Duties & taxes—Chinese export tariffs: Metal-Pages, undated. (Accessed August 6, 2011, via <http://www.metal-pages.com/>.)
- Modern Casting, 2011, Casting sales to increase as economy recovers: Schaumburg, IL, Modern Casting, January. (Accessed July 5, 2011, via <http://www.moderncasting.com/>.)
- Norsk Energi, 2011, Annual report 2010: Oslo, Norway, Norsk Energi, 24 p. (Accessed August 6, 2011, via <http://www.energi.no/this-is-norsk-energi/info-in-english.html>.)
- Office of the United States Trade Representative, 2009, WTO dispute settlement proceeding regarding China—Measures related to the exportation of various raw materials: Federal Register, v. 74, no. 232, December 4, p. 63812–63814.
- Official Journal of the European Union, 2010, Council implementing regulation (EU) No. 467/2010 of 25 May 2010, imposing a definitive anti-dumping duty on imports of silicon originating in the former People's Republic of China, as extended to imports of silicon consigned from the Republic of Korea, whether declared as originating in the Republic of Korea or not, following an expiry review pursuant to Article 11(2) and a partial interim review pursuant to Article 11(3) of Regulation (EC) No. 1225/2009: Official Journal of the European Union, L 131, v. 53, May 29, p. 1–21.
- Orkla ASA, 2010, Third quarter 2010 report: Oslo, Norway, Orkla ASA, October 27, 14 p. (Accessed August 6, 2011, at <http://www.orkla.com/dav/aa50d4f18d.pdf>.)
- Roskill's Letter from Japan, 2000, Silicon metal—Japanese consumption forecast to rise by 9% in 2000: Roskill's Letter from Japan, no. 286, June, p. 15–17.
- Roskill's Letters from Japan, 2010a, Multi-crystalline silicon—50% rise in 2010 world production: Roskill's Letters from Japan, no. 421, September, p. 1–5.
- Roskill's Letters from Japan, 2010b, Multi-crystalline silicon—World production capacity forecast to rise by 10%py through 2013: Roskill's Letters from Japan, no. 411, November, p. 1–6.
- SeeNews, 2010, EFT's Macedonian unit acquires local ferroalloys plant Silmak for 5.6 mln euro: Austria, Vienna, SeeNews, February 17. (Accessed January 6, 2011, at [http://seenews.com/news/latestnews/macedonia\\_smetalinvesttaquiresferroalloysplantsilmakfor5\\_6mlneuro--162748/](http://seenews.com/news/latestnews/macedonia_smetalinvesttaquiresferroalloysplantsilmakfor5_6mlneuro--162748/).)
- TEX Report, The, 2011a, China exported 735,000 tons of ferro-silicon in CY 2010 as recovered: The TEX Report, v. 43, no. 10152, February 21, p. 3–4.
- TEX Report, The, 2011b, China exported 633,500 tons of silicon metal in CY 2010: The TEX Report, v. 43, no. 10138, January 31, p. 8–9.
- TEX Report, The, 2011c, General review of ferro-silicon in 2010 and its outlook for new year: The TEX Report, v. 43, no. 10150, February 17, p. 6–7.
- TEX Report, The, 2011d, General review of silicon metal in 2010 and its outlook for new year: The TEX Report, v. 43, no. 10126, January 13, p. 2–3.
- TEX Report, The, 2011e, Russia exported 944,000 tons of ferro-alloys in CY 2010 as highest record in its history: The TEX Report, v. 43, no. 10153, February 22, p. 4.
- TEX Report, The, 2011f, Russia's exports of ferro-silicon in CY 2010 increased to 412,900 tons: The TEX Report, v. 43, no. 10152, February 21, p. 5.
- Timminco Ltd., 2010, Timminco to form joint venture with Dow Corning at Becancour silicon metal facilities: Toronto, Ontario, Canada, Timminco Limited press release, August 10. (Accessed July 25, 2011, at <http://www.timminco.com/PressRelease.aspx?id=24&prID=1302837>.)
- Timminco Ltd., 2011, Annual report 2010: Toronto, Ontario, Canada, Timminco Limited, March 26, 99 p. (Accessed July 25, 2011, at <http://www.timminco.com/docs/Timminco Annual Report.pdf>.)
- U.S. Department of Commerce, Foreign-Trade Zones Board, 2010a, Grant of authority for subzone status, Dow Corning Corporation (silicones)—Carrollton, Elizabethtown and Shepherdsville, KY: Federal Register, v. 76, no. 4, January 6, p. 771.
- U.S. Department of Commerce, Foreign-Trade Zones Board, 2010b, Grant of authority for subzone status, REC Silicon (polysilicon and silane gas)—Moses Lake, WA: Federal Register, v. 76, no. 1, January 3, p. 88.

Wacker Chemie AG, 2011, Wacker remains on growth course after a record year in 2010: Munich, Germany, Wacker Chemie AG press release, March 16, 7 p. (Accessed July 9, 2011, at [http://www.wacker.com/cms/en/press\\_media/press-releases/pressinformation-detail\\_26304.jsp?](http://www.wacker.com/cms/en/press_media/press-releases/pressinformation-detail_26304.jsp?))

Wangdi, Phuntsho, 2011, Government lifts embargo—Ferro-silicon rush now open: Thimphu, Bhutan, Business Bhutan, July 23. (Accessed August 15, 2011, at [http://www.businessbhutan.bt/?p=6784.](http://www.businessbhutan.bt/?p=6784))

World Steel Association, 2011, World crude steel output increases by 15.0% in 2010: Brussels, Belgium, World Steel Association, January 21. (Accessed July 5, 2011, at [http://www.worldsteel.org/?action=newsdetail&id=319.](http://www.worldsteel.org/?action=newsdetail&id=319))

World Trade Organization Dispute Settlement Body, 2010, China—Measures related to the exportation of various raw materials: Geneva, Switzerland, World Trade Organization Dispute Settlement Body summary, November 8. (Accessed January 6, 2011, at [http://www.wto.org/english/tratop\\_e/dispu\\_e/cases\\_e/ds394\\_e.htm.](http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds394_e.htm))

Silicon. Ch. in Mineral Commodity Summaries, annual.  
Silicon. Mineral Industry Surveys, monthly.

### Other

Company news releases and reports.  
Platts Metals Week.  
Roskill Information Services Ltd. (London; last reported on silicon and ferrosilicon in 2011).  
Ryan's Notes.  
Silicon. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.  
United Nations commodity trade statistics.

## GENERAL SOURCES OF INFORMATION

### U.S. Geological Survey Publications

Silicon. Ch. in Metal Prices in the United States Through 1998, 1999.

TABLE 1  
SALIENT SILICON STATISTICS<sup>1</sup>

(Contained silicon, unless otherwise noted)

	2006	2007	2008	2009	2010	
<b>United States:</b>						
<b>Production:</b>						
Ferrosilicon	thousand metric tons	146	155	180	139	176
Silicon metal	do.	W	W	W	W	W
<b>Exports:</b>						
Ferrosilicon	do.	5	7	10	9	15
Silicon metal	do.	27	28	35	38	65
<b>Imports for consumption:</b>						
Ferrosilicon	do.	223	208	190	70	157
Silicon metal	do.	146	147	168	113	171
<b>Apparent consumption:</b>						
Ferrosilicon	do.	363	359	352	207 <sup>r</sup>	312
Silicon metal	do.	W	W	W	W	W
<b>Price, average:</b>						
Ferrosilicon, 50% Si <sup>2</sup>	cents per pound	62.93	73.96	115.86	76.93	109.33
Ferrosilicon, 75% Si <sup>3</sup>	do.	54.87	65.62	108.71	68.91	97.18
Silicon metal <sup>4</sup>	do.	79.29	112.69	162.29	116.37	140.05
<b>World production, gross weight:</b>						
Ferrosilicon	thousand metric tons	6,410 <sup>r</sup>	7,310 <sup>r</sup>	7,430 <sup>r</sup>	7,320 <sup>r</sup>	7,890
Silicon metal <sup>5</sup>	do.	1,490 <sup>r</sup>	1,600 <sup>r</sup>	1,680 <sup>r</sup>	1,790 <sup>r</sup>	2,180

<sup>r</sup>Revised. do. Ditto. W Withheld to avoid disclosing company proprietary data.

<sup>1</sup>Data are rounded to no more than three significant digits.

<sup>2</sup>Ryan's Notes North American transaction prices based on weekly averages.

<sup>3</sup>Platts Metals Week mean import prices based on monthly averages.

<sup>4</sup>Platts Metals Week dealer import prices based on monthly averages.

<sup>5</sup>Excluding the United States.

TABLE 2  
 PRODUCTION, SHIPMENTS, AND STOCKS OF SILICON ALLOYS AND METAL IN THE UNITED STATES<sup>1,2</sup>

(Metric tons)

Material	Silicon content		2009	2010		Producers' stocks, December 31 (gross weight)
	Range	Typical	Producers' stocks, December 31 (gross weight)	Gross	Net	
				production <sup>3</sup> (gross weight)	shipments (gross weight)	
Ferrosilicon <sup>4</sup>	25–65 <sup>5</sup>	48	11,000 <sup>r</sup>	153,000	113,000	12,700
Do.	56–95	76	11,300 <sup>r</sup>	135,000	138,000	18,300
Silicon metal, excluding semiconductor grades	96–99	98	W	W	W	W

<sup>r</sup>Revised. Do. Ditto. W Withheld to avoid disclosing company proprietary data.

<sup>1</sup>Data are rounded to no more than three significant digits.

<sup>2</sup>Data for silvery pig iron (less than 25% silicon) withheld to avoid disclosing company proprietary data.

<sup>3</sup>Ferrosilicon production includes material consumed in the production of miscellaneous silicon alloys.

<sup>4</sup>Includes miscellaneous silicon alloys.

<sup>5</sup>25% to 55% for ferrosilicon; 32% to 65% for miscellaneous silicon alloys.

TABLE 3  
 PRINCIPAL PRODUCERS OF SILICON ALLOYS AND (OR) SILICON METAL IN THE UNITED STATES IN 2010

Producer	Plant location	Product
CC Metals and Alloys, Inc.	Calvert City, KY	Ferrosilicon.
Globe Metallurgical, Inc. <sup>1</sup>	Alloy, WV	Ferrosilicon and silicon metal.
Do.	Beverly, OH	Do.
Do.	Niagara Falls, NY	Silicon metal.
Do.	Selma, AL	Do.
Core Metals Group <sup>2</sup>	Bridgeport, AL	Ferrosilicon.
Simcala, Inc. <sup>3</sup>	Mt. Meigs, AL	Silicon metal.
Do. Ditto.		

<sup>1</sup>Owned by Globe Specialty Metals, Inc. (GSM).

<sup>2</sup>Acquired by GSM in April 2010.

<sup>3</sup>Owned by Dow Corning Corp.



TABLE 4  
REPORTED CONSUMPTION, BY END USE, AND STOCKS OF SILICON FERROALLOYS AND METAL IN THE  
UNITED STATES IN 2010<sup>1,2</sup>

(Metric tons, gross weight)

End use	Silvery pig iron <sup>3</sup>	Ferrosilicon, 50% <sup>4</sup>	Ferrosilicon, 75% <sup>5</sup>	Silicon metal <sup>6</sup>	Miscellaneous silicon alloys <sup>7</sup>	Silicon carbide <sup>8</sup>
Steel:						
Carbon and high-strength, low-alloy	(9)	(10)	35,700	(11)	1,490	(10)
Stainless and heat-resisting	--	(10)	46,300	285	(10)	(10)
Full alloy	--	5,070	7,980	(11)	(10)	--
Electric and tool	--	--	(10)	--	--	(10)
Unspecified	--	24,400	20,100	(11)	456	5,910
Total	--	29,400	110,000	285	1,940	5,910
Cast irons	4,540	25,700	22,900	(11)	14,300	20,800
Superalloys	--	(9)	(11)	(11)	(9)	--
Alloys, excluding superalloys and alloy steel	(9)	(9)	(11)	52,200 <sup>12</sup>	--	--
Miscellaneous and unspecified	--	(9)	922	176,000 <sup>13</sup>	(9)	(9)
Grand total	4,540	55,100	134,000	228,000	16,300	26,700
Consumers' stocks, December 31	359	1,110	9,050	2,200	783	740

-- Zero.

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

<sup>2</sup>Includes U.S. Geological Survey estimates.

<sup>3</sup>Typically 18% silicon content but ranges between 5% to 24% silicon content.

<sup>4</sup>Typically 48% silicon content but ranges between 25% to 55% silicon content; includes briquets.

<sup>5</sup>Typically 76% silicon content but ranges between 56% to 95% silicon content; includes briquets.

<sup>6</sup>Typically 98% silicon content but ranges between 96% to 99% silicon content.

<sup>7</sup>Typically 48% silicon content. Primarily magnesium-ferrosilicon but also includes other silicon alloys.

<sup>8</sup>Typically 64% silicon content but ranges between 63% to 70% silicon content. Does not include silicon carbide for abrasive or refractory uses.

<sup>9</sup>Included with "Cast irons," to avoid disclosing company proprietary data.

<sup>10</sup>Included with "Steel: Unspecified," to avoid disclosing company proprietary data.

<sup>11</sup>Included with "Miscellaneous and unspecified," to avoid disclosing company proprietary data.

<sup>12</sup>Primarily aluminum alloys.

<sup>13</sup>Primarily silicones, fumed silica, and other chemicals.

TABLE 5  
U.S. EXPORTS OF FERROSILICON AND SILICON METAL,  
BY GRADE AND COUNTRY, IN 2010<sup>1, 2</sup>

Country	Gross weight (metric tons)	Contained weight (metric tons)	Value
<b>Ferrosilicon:</b>			
More than 55% silicon:			
Brazil	550	333	\$983,000
Canada	14,000	8,430	9,330,000
Ecuador	78	59	109,000
Germany	40	31	58,900
Italy	65	50	128,000
Japan	138	104	286,000
Mexico	1,870	1,140	3,820,000
Netherlands	1,750	1,250	2,990,000
Turkey	43	28	91,400
United Kingdom	107	75	113,000
Other (12 countries)	148	105	306,000
Total	18,800	11,600	18,200,000
Other ferrosilicon:			
Belgium	356	165	639,000
Canada	1,550	773	1,840,000
Colombia	94	43	149,000
Japan	841	419	1,430,000
Korea, Republic of	648	288	621,000
Luxembourg	139	71	117,000
Mexico	2,040	941	4,810,000
Netherlands Antilles	63	31	169,000
Turkey	480	216	905,000
United Kingdom	110	49	197,000
Other (12 countries)	270	115	538,000
Total	6,590	3,110	11,400,000
Total ferrosilicon	25,400	14,700	29,600,000
<b>Metal:</b>			
More than 99.99% silicon:			
China	19,500	XX	910,000,000
France	339	XX	15,200,000
Germany	5,670	XX	256,000,000
Hong Kong	683	XX	23,900,000
Japan	10,000	XX	635,000,000
Korea, Republic of	2,450	XX	168,000,000
Norway	5,240	XX	269,000,000
Singapore	1,650	XX	107,000,000
Taiwan	3,270	XX	181,000,000
Ukraine	288	XX	13,700,000
Other (55 countries)	838	XX	80,200,000
Total	49,900	49,900 <sup>e</sup>	2,660,000,000
99.00%–99.99% silicon:			
Belgium	169	168	320,000
Egypt	300	297	825,000
Germany	927	919	2,690,000
Indonesia	135	133	190,000
Israel	50	50	90,000
Japan	1,180	1,170	3,210,000
Mexico	83	83	149,000
Singapore	149	147	209,000
Spain	43	42	107,000
United Kingdom	111	110	271,000

See footnotes at end of table.

TABLE 5—Continued  
 U.S. EXPORTS OF FERROSILICON AND SILICON METAL,  
 BY GRADE AND COUNTRY, IN 2010<sup>1,2</sup>

Country	Gross weight (metric tons)	Contained weight (metric tons)	Value
Metal—Continued:			
99.00%–99.99% silicon—Continued:			
Other (19 countries)	184	182	\$327,000
Total	3,330	3,300	8,390,000
Other silicon:			
Canada	2,250	2,180	6,840,000
China	351	341	569,000
Germany	64	62	248,000
Hong Kong	1,030	1,000	1,570,000
Japan	7,650	7,380	20,600,000
Mexico	434	421	712,000
South Africa	57	56	115,000
Taiwan	246	235	1,830,000
United Arab Emirates	52	50	152,000
United Kingdom	264	259	474,000
Other (20 countries)	210	204	576,000
Total	12,600	12,200	33,700,000
Total silicon metal	65,900	65,400	2,700,000,000

<sup>6</sup>Estimated. XX Not applicable.

<sup>1</sup>Countries listed are the leading exporters in terms of year-to-date quantities (gross weight).

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

Source: U.S. Census Bureau.

TABLE 6  
U.S. IMPORTS OF FERROSILICON AND SILICON METAL,  
BY GRADE AND COUNTRY, IN 2010<sup>1,2</sup>

Country	Gross weight (metric tons)	Contained weight (metric tons)	Value
<b>Ferrosilicon:</b>			
55%–80% silicon, more than 3% Ca:			
Argentina	113	76	\$256,000
Brazil	1,640	987	4,010,000
Canada	1	1	2,680
China	1,570	1,150	2,020,000
France	1,030	667	2,620,000
Israel	38	23	82,000
Norway	15	10	44,500
Total	4,410	2,910	9,040,000
55%–80% silicon, other:			
Brazil	1,340	1,020	2,300,000
Canada	11,300	8,340	23,700,000
China	41,600	31,500	57,300,000
France	1,800	1,320	4,930,000
Germany	709	520	3,500,000
Hong Kong	500	375	855,000
India	323	238	844,000
Norway	219	163	644,000
Russia	108,000	82,600	159,000,000
Venezuela	23,200	14,400	38,300,000
Other (3 countries)	173	117	612,000
Total	189,000	144,000	292,000,000
80%–90% ferrosilicon, Germany	186	151	311,000
<b>Magnesium ferrosilicon:</b>			
Argentina	566	225	1,500,000
Brazil	1,630	736	2,710,000
Canada	11,300	5,110	20,100,000
China	395	180	736,000
France	525	220	774,000
Japan	31	14	125,000
Norway	5	2	17,300
South Africa	19	8	18,900
Total	14,500	6,500	26,000,000
<b>Other ferrosilicon:</b>			
Brazil	35	16	13,700
Canada	6,990	1,730	8,450,000
China	13,600	1,960	7,050,000
France	9	5	22,500
Singapore	4	2	7,170
Total	20,700	3,710	15,500,000
<b>Total ferrosilicon</b>	<b>229,000</b>	<b>157,000</b>	<b>342,000,000</b>
<b>Metal:</b>			
More than 99.99% silicon:			
Brazil	56	XX	8,950,000
Canada	363	XX	6,990,000
China	151	XX	6,240,000
Germany	2,530	XX	166,000,000
Italy	295	XX	20,500,000
Japan	468	XX	46,200,000
Korea, Republic of	628	XX	35,100,000
Norway	256	XX	8,470,000
Russia	55	XX	3,980,000

See footnotes at end of table.

TABLE 6—Continued  
 U.S. IMPORTS OF FERROSILICON AND SILICON METAL,  
 BY GRADE AND COUNTRY, IN 2010<sup>1,2</sup>

Country	Gross weight (metric tons)	Contained weight (metric tons)	Value
Metal—Continued:			
More than 99.99% silicon—Continued:			
Taiwan	46	XX	\$3,260,000
Other (11 countries)	26	XX	4,140,000
Total	4,870	4,870 <sup>c</sup>	309,000,000
99.00%–99.99% silicon:			
Australia	10,900	10,900	29,200,000
Brazil	64,800	63,400	172,000,000
Canada	7,490	7,330	20,000,000
France	1,280	1,280	4,320,000
Laos	7,280	7,250	15,300,000
Norway	8,300	8,250	31,800,000
Philippines	436	433	1,020,000
South Africa	33,800	33,600	83,500,000
Spain	2,420	2,410	6,340,000
Thailand	3,490	3,480	7,930,000
Other (9 countries)	426	141	1,020,000
Total	141,000	138,000	372,000,000
Other silicon:			
Australia	240	237	727,000
Brazil	10,100	9,840	19,800,000
Canada	12,200	11,900	29,000,000
China	353	220	767,000
France	2,710	2,650	6,680,000
Germany	156	43	199,000
Japan	282	228	759,000
Norway	2,650	2,060	6,890,000
Philippines	205	202	492,000
Sweden	148	108	186,000
Other (5 countries)	193	168	436,000
Total	29,200	27,600	66,000,000
Total silicon metal	175,000	171,000	748,000,000

<sup>1</sup>Presentation of monthly data is based on the year-to-date quantities (gross weight) of the leading countries.

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

TABLE 7  
 SILICON MATERIALS: FINAL ANTIDUMPING DUTY RATES ASSESSED IN 2010<sup>1</sup>

(Listed in order of date assessed)

Date	Imported material	Country of origin	Period of investigation	Producer and duty rate
January 12	Silicon metal	China	6/1/07–5/31/08	All imports (139.49%), except those from: Jiangxi Gangyuan (50.02%) and Shanghai Jinneng (23.16%)
March 29	Do.	do.	6/1/05–5/31/06	Jiangxi Gangyuan (71.57%) and Shanghai Jinneng (50.41%)
April 21	Do.	Brazil	7/1/96–6/30/97	Eletrosilex S.A. (67.93%)
Do., do. Ditto.				

<sup>1</sup>Antidumping duties are assessed by the International Trade Commission.

Source: Federal Register notices, unless otherwise noted.

TABLE 8  
SILICON MATERIALS: APPEALS OF IMPORT ANTIDUMPING DUTY ADMINISTRATIVE REVIEWS IN 2010, BY DECISION DATE

Imported material	Country of origin	Period of investigation	U.S. court	Decision	Decision date	Source
Silicon metal	China	6/1/06–5/31/07	CIT	Upheld ITC's remand determination of April 8, 2010, that an administrative review was not the proper venue to pursue silicon metal transshipment allegations against Canadian distributor Ferro-Alliages et Mineraux. Ferro-Alliages was suspected of transshipping Chinese silicon metal through Canada into the United States to circumvent U.S. antidumping duties on Chinese silicon metal imports. ITC found no evidence that Ferro-Alliages exported any silicon metal into the United States during the period of investigation and therefore no further review of the company was warranted.	September 1	Globe Metallurgical Inc. v. United States, Court No. 08–00290, CIT Slip Opinion 10–100.

CIT, Court of International Trade. ITC, International Trade Commission.

TABLE 9  
SILICON MATERIALS: PROJECTS SCHEDULED FOR COMPLETION, BY YEAREND 2014<sup>1, 2, 3, 4</sup>

(Metric tons, gross weight, unless otherwise specified)

Projected year of first production	Country	Project and company	Project type	Incremental annual production capacity	Total annual production capacity	Silicon product <sup>5</sup>
2010	China	ERDOS Qipanjiang Plant ERDOS Group	ferroalloys plant expansion	100,000	650,000	FeSi.
2010	Do.	Henan Sunshine Silicon Plant Henan Sunshine Silicon Technology Development	silicon plant expansion	80,000	120,000	Si.
2010	Do.	Qinghai Wutong Plant Qinghai Wutong (Group) Industry Co., Ltd.	ferroalloys plant expansion	25,000	400,000	FeSi.
2010	Kazakhstan	Silicium Kazakhstan Silicon Plant Silicium Kazakhstan LLP	silicon plant expansion	12,500	25,000	Si.
2010	Russia	Yurga Plant JSC <sup>6</sup> Kuznetsk Ferroalloys	do.	19,500	41,400	FeSi.
2010	Thailand	Ratchaburi Silicon Plant G.S. Energy Co., Ltd.	new silicon plant	NA	25,000	Si.
2011	Australia	Simcoa Silicon Plant Simcoa Operations Pty., Ltd.	silicon plant expansion	16,000	48,000	Do.
2011	China	ERDOS Qipanjiang Plant ERDOS Group	ferroalloys plant expansion	350,000	1,000,000	FeSi.
2011	Do.	Ferroatlantica Sichuan Silicon Plant Grupo FerroAtlántica, S.L.	new silicon smelter	NA	50,000	Si.
2011	Do.	Qinghai Wutong Plant Qinghai Wutong (Group) Industry Co., Ltd.	ferroalloys plant expansion	25,000	450,000	FeSi.
2011	Kazakhstan	Silicium Kazakhstan Silicon Plant Silicium Kazakhstan LLP	silicon plant expansion	12,500	37,500	Si.
2011	Russia	Yurga Plant JSC <sup>6</sup> Kuznetsk Ferroalloys	do.	41,400	80,000	FeSi.
2011	Thailand	Ratchaburi Silicon Plant G.S. Energy Co., Ltd.	do.	20,000	45,000	Si.
2012	Australia	Simcoa Silicon Plant Simcoa Operations Pty., Ltd.	do.	16,000	64,000	Do.
2012	China	ERDOS Qipanjiang Plant ERDOS Group	ferroalloys plant expansion	1,000,000	2,000,000	FeSi.
2012	Kazakhstan	Ekibastuz Silicon Plant Pohang Iron and Steel Company (POSCO, 60%) and Zaman Group (40%)	new ferrosilicon aluminum smelter plant	NA	45,000	FeSiAl.
2012	Zambia	Kafue Ferroalloys Plant Universal Mining and Chemical Industries Ltd. (Umcil)	new ferroalloys plant <sup>7</sup>	NA	80,000	FeSi.
2013	China	Ferroatlántica Sichuan Silicon Plant Grupo FerroAtlántica, S.L.	silicon plant expansion	50,000	100,000	Si.
2013	Iceland	Icelandic Silicon Corporation Plant Globe Specialty Metals (85%) and Tomhawk Development (15%)	new silicon smelter	NA	40,000	FeSi.
2013	Russia	Bratsk Ferroalloy Plant Mechel OAO	ferroalloys plant expansion	34,800	122,000	Do.
2013	Do.	Chelyabinsk Electrometallurgical Integrated Plant Chelyabinsk Group	do.	300,000	500,000 <sup>e</sup>	Do.
2013	Do.	Yurga Plant JSC <sup>6</sup> Kuznetsk Ferroalloys	ferroalloys plant expansion	70,000	150,000	Do.

See footnotes at end of table.

TABLE 9—Continued  
SILICON MATERIALS: PROJECTS SCHEDULED FOR COMPLETION, BY YEAREND 2014<sup>1, 2, 3, 4</sup>

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<sup>0</sup>Estimated. Do., do. Ditto. NA Not available.

<sup>1</sup>Estimated data are rounded to no more than three significant digits.

<sup>2</sup>Excludes silicon metal containing more than 99.99% silicon.

<sup>3</sup>Projects in feasibility or later stages of development in 2010. Actual startup dates may be postponed, owing to economic or other factors. Additional projects might produce silicon materials by 2014, but not enough information was available to include them.

<sup>4</sup>No projects were scheduled for startup in 2014.

<sup>5</sup>FeSi Ferrosilicon. FeSiAl Ferrosiliconaluminum. Si Silicon metal (containing 99.99% or less Si).

<sup>6</sup>JSC joint-stock company.

<sup>7</sup>Plant also scheduled to produce ferromanganese and silicomanganese. Plant may also produce ferronickel.

Sources: Company annual reports, presentations, and press releases; unpublished personal communications; and trade publications.