



2009 Minerals Yearbook

GYPSUM [ADVANCE RELEASE]

GYPSUM

By Robert D. Crangle, Jr.

Domestic survey data and tables were prepared by Paula R. Neely, statistical assistant, and the world production table was prepared by Glenn J. Wallace, international data coordinator.

In 2009, the United States ranked fourth worldwide in the production of crude gypsum, with 10.4 million metric tons (Mt) of production and a reported value of \$77.4 million. China was the world's leading producer and consumer of gypsum, with estimated production of 45 Mt of crude gypsum. As a result of the continued economic recession in the United States, especially in the residential construction sector, 2009 production tonnage decreased by approximately 15% from that of 2008, with a corresponding decrease in value of 15% (table 1). Calcined gypsum production decreased by 23% to 13.8 Mt in 2009 compared with 17.9 Mt produced in 2008.

The sale of synthetic gypsum decreased by 16% to 8.1 Mt in 2009 from 9.7 Mt in 2008. The long-term use of synthetic gypsum from flue gas desulfurization (FGD) will likely continue to increase as more coal-fired electric powerplants convert their desulfurization processes to produce marketable gypsum. Most coal-burning powerplants in the United States are required by the U.S. Environmental Protection Agency to install sulfur dioxide scrubbing systems. This created a significant source of gypsum, at a lower price than the cost of its mined counterpart, which led to the construction of wallboard production facilities adjacent to coal-fired powerplants.

Domestic Data Coverage

Gypsum industry data for this report are collected by the U.S. Geological Survey (USGS) from semiannual and annual surveys of gypsum operations and from monthly data provided by the Gypsum Association. In 2009, the USGS annual survey canvassed 112 gypsum production operations that accounted for all known domestic output of crude, calcined, and byproduct gypsum. Data were available for all of the operations through this survey, the Gypsum Association, the American Coal Ash Association, or other Federal and State agencies. Some production was estimated on the basis of employment records published by the Mine Safety and Health Administration (MSHA).

Production

The United States was the fourth leading producer of gypsum in 2009, accounting for 6% of reported global output (table 8). During 2009, crude gypsum in the United States was mined by 30 companies at 48 mines in 16 States (table 2). The leading crude gypsum-producing States were, in descending order, Oklahoma, Iowa, Texas, Indiana, and Nevada, which together accounted for 67% of total domestic output.

The U.S. gypsum industry consisted primarily of a few large, vertically integrated companies that mined gypsum and manufactured wallboard, plaster, and other gypsum products. Companies with the most mines were USG Corp. (USG) with

nine mines; National Gypsum Co. (NGC) with seven mines; Georgia Pacific LLC (GP) with six mines; Harrison Gypsum Co. with three mines; CertainTeed Corp. with four mines; and Temple Inland Inc. (TI) with three mines. For 2009, these eight companies produced 71% of the total U.S. crude gypsum.

During 2009, gypsum was calcined (partially dehydrated by heating) at 31 plants operated by 8 companies in 17 States, principally to produce feedstock for wallboard and plaster manufacturing plants (table 3). The leading gypsum calcining States in 2009 were, in descending order, Texas, Pennsylvania, Indiana, Arkansas, and Kansas (table 3). These 5 States had 14 plants that produced approximately 8.9 Mt of calcined gypsum and together accounted for about 65% of national output. In 2009, domestic output of calcined gypsum decreased by 23% to 13.8 Mt valued at more than \$486 million (table 1).

In addition to mined gypsum production, synthetic gypsum was generated as a byproduct of various industrial processes. The primary source of synthetic gypsum was FGD from coal-fired electric powerplants. Smaller amounts of synthetic gypsum were derived as a byproduct of chemical processes, such as acid neutralization processes, citric acid production, sugar production from sugar beets, and titanium dioxide production. Synthetic gypsum was used as a substitute for mined gypsum, principally for wallboard manufacturing, cement production, and agricultural purposes, in descending order of importance.

Synthetic gypsum producers sold 8.12 Mt of synthetic gypsum from their FGD systems during 2009, with an estimated value of \$12.2 million. Of the total synthetic gypsum sold and used, 81% was used for wallboard production, 7% was used in cement and concrete manufacture, 5% for structural fills or embankments, 3% for agricultural, and the remaining amount for other miscellaneous applications. Approximately 50% of synthetic gypsum produced in 2009 was neither sold, nor used, and in most cases was landfilled (American Coal Ash Association, 2011).

For 2009, gypsum-derived products, including agricultural products, cement, plasters, and wallboard totaled 14.0 Mt with a value of \$1.92 billion. This represented a production decrease of 28% from the 19.6 Mt produced in 2008, and a 26% decrease in value from \$2.6 billion (table 4).

During 2009, eight companies manufactured gypsum wallboard products at 31 plants in the United States. Wallboard product shipments were approximately 1.83 billion square meters (17.0 billion square feet), a decrease of about 27% compared with those of 2008 (table 5).

The years between 2003 and 2006 marked a period of rapid expansion in the wallboard industry. American Gypsum, BPB, Lafarge North America Inc. (Lafarge NA), National Gypsum, and USG expanded their existing wallboard operations or

opened new ones during this time, increasing their wallboard production capacities by more than 1 billion square feet. The decline in the U.S. housing market began in 2007 and continued through 2009. This resulted in flat and declining sales for most gypsum producers, coupled with layoffs and the idling of wallboard production plants (Crangle, 2011).

Consumption

In 2009, U.S. apparent domestic gypsum consumption was more than 22.6 Mt, a 25% decrease compared with that of 2008. Domestic sources (mined crude plus an estimated 8.12 Mt of synthetic gypsum produced) met approximately 82% of domestic consumption requirements; imports, totaling 4.22 Mt, satisfied the remaining need. In 2009, approximately 36% of the gypsum consumed in the United States came from synthetic sources, slightly more than that which was reported in 2008. An industry-wide shift toward the use of more synthetic gypsum continued in 2009. This was largely the result of the lower costs associated with the purchase and transportation of FGD gypsum, which is often available near the same urban centers where wallboard production facilities are located.

Gypsum output is categorized as either calcined or uncalcined (table 4). Calcined gypsum was produced domestically from crude gypsum to manufacture wallboard and plaster products. Uncalcined gypsum, used for portland cement production and agriculture, accounted for virtually all remaining consumption during the year. Miscellaneous uses, such as athletic field markings, accounted for only a fraction of 1% of consumption.

In 2009, about 88% of the calcined gypsum used to manufacture wallboard was consumed in the production of regular ½-inch gypsum board (table 5). This product represented 42% of total calcined gypsum consumption. Type X gypsum board, so named because of extra fire retardation qualities, consumed 38% of calcined gypsum. Other regular gypsum board, from ¼- to 1-inch thick, consumed 6% of the total. Other wallboard, including lath, mobile-home wallboard, predecorated wallboard, sheathing, veneer base, and water- and moisture-resistant wallboard, composed most of the balance. Metropolitan areas in the South Atlantic, East North Central, Middle Atlantic, West South Central, and West North Central (in decreasing order) were the leading sales areas for gypsum wallboard products.

As a result of the economic downturn and the associated reduction in the construction industry's demand for concrete, uncalcined gypsum consumed in the United States decreased by 36% in 2009 to 1.34 Mt. About 992,000 t, or 74%, of the uncalcined gypsum consumed in the United States was for Portland cement production (table 4). Gypsum is added to cement to retard its setting time and makes up about 2% to 4% by weight of cement output (Roskill Information Services Ltd., 2009, p. 320). Most of the remainder of the uncalcined gypsum consumed, about 352,000 metric tons (t), was used primarily for agricultural purposes. Agricultural use of gypsum decreased by 43% from that of 2008. Finely ground gypsum rock was used in agriculture and other industries to neutralize acidic soils, to improve soil permeability, to add nutrients, to stabilize slopes, and to provide catalytic support for maximum fertilizer benefits. Small amounts of high-purity gypsum are also used in a wide

range of industrial applications, including the production of foods, glass, paper, and pharmaceuticals.

Recycling

Gypsum waste generated by the wallboard manufacturing process can be recycled. The gypsum core and paper covering are separated, then reinjected with new material into the manufacturing stream.

Several million tons of gypsum waste is generated every year by building demolition, wallboard installation, and wallboard manufacturing. Because labor expenses are higher than wallboard prices, construction costs are lowered when full pieces of uncut wallboard are used in place of multiple, smaller remnants. As a result, between 10% and 12% of the wallboard used in new construction and renovation is discarded as scrap. Only a small portion of this waste has been recycled. In 2006, two wallboard manufacturers in the United States began to use recycled material to supplement natural gypsum at plants in New England. As landfill space becomes more scarce, recycling is expected to increase. In addition to recycling scrap in wallboard plants, wallboard scrap may also be ground and used as a soil conditioner.

International gypsum-recycling efforts were more robust. As a result of legislation enacted in November 2008 in the United Kingdom, gypsum-based products are prohibited from being placed in landfills (Global Gypsum Magazine, 2009a, c). On a lesser scale, similar efforts were observed in India, where waste gypsum was used to manufacture building panels (Global Gypsum Magazine, 2009c).

Wallboard manufacturers and the construction industry have been exploring ways to return scrap wallboard and waste wallboard to plants for recycling. Other potential markets for recycled gypsum include cement production, as a stucco additive, sludge drying, water treatment, grease absorption, and for marking athletic fields. Until costs and legislation associated with landfilling scrap gypsum become more restrictive, recycling will likely continue to remain a low priority within the industry.

Prices

In 2009, the average values (free on board, mine or plant) reported by U.S. producers were \$7.44 per metric ton for crude gypsum and \$35.28 per ton for calcined gypsum (table 1). The average value for plaster reported by domestic producers during the year was \$148 per ton (table 4). The average value of uncalcined gypsum used in agriculture (not including miscellaneous uses) was about \$25.95 per ton and that used in cement production was about \$15.52 per ton (table 4).

During 2009, prices for gypsum wallboard generally decreased in response to a corresponding decrease in demand. The decline was related to the continuing decline in the housing construction sector, on which the gypsum industry is heavily dependent. The combined average price of ½-inch wallboard for 20 major U.S. metropolitan cities in 2009 was \$260.96 per 100 square meters (\$242.44 per 1,000 square feet). From January 2009 to January 2010, prices for ½-inch wallboard and Type X wallboard decreased by 10% and 8%, respectively, in 20 major

U.S. metropolitan cities (Engineering News-Record, 2009, 2010).

Average ½-inch wallboard prices during 2009 were lowest in St. Louis, MO, (\$185 per 100 square meters or \$172 per 1,000 square feet), followed by Detroit, MI, (\$187 per 100 square meters or \$174 per 1,000 square feet), and Cleveland, OH, (\$194 per 100 square meters or \$180 per 1,000 square feet). The highest average wallboard prices in 2009 were in Boston, MA, (\$405 per 100 square meters or \$377 per 1,000 square feet), followed by Philadelphia, PA, (\$311 per 100 square meters or \$289 per 1,000 square feet) and San Francisco, CA, (\$309 per 100 square meters or \$287 per 1,000 square feet).

Foreign Trade

In 2009, the United States led the world in international trade in gypsum and gypsum products (tables 6, 7). The United States imported crude gypsum from 11 countries and exported gypsum and gypsum products to 97 countries and territories, although only a small quantity of crude gypsum and other gypsum products were exported by the United States in 2009, most of which went to Canada.

Imports of crude gypsum in 2009 decreased by 42% from those of 2008 and accounted for 19% of apparent consumption. Much of this import dependence can be attributed to the lack of adequate domestic gypsum resources near large east coast and west coast wallboard markets. Canada and Mexico accounted for 96% of imported gypsum, while imports from Spain supplied most of the remainder. Imports from Brazil, China, France, Germany, South Korea, Singapore, Sweden, and the United Kingdom were negligible (table 6). The majority of imports from Canada went to east coast plants, while Mexican sources chiefly served the west coast. Foreign subsidiaries of U.S. gypsum companies produced much of the gypsum that was imported for their respective U.S.-based wallboard plants. The majority of the crude gypsum imported by the United States from Mexico was produced by Compania Minera Caopas, S.A. de C.V. and Compania Occidental Mexicana S.A. de C.V. in Baja California Sur, both of which operate mines on the Baja California Peninsula (Compania Occidental Mexicana S.A. de C.V., 2005; Compania Minera Caopas, S.A. de C.V., 2010). Almost all gypsum imported from Canada came from Nova Scotia. The completion of large wallboard manufacturing plants near powerplants along the east coast may reduce gypsum imports in the future.

Although wallboard exports appeared to increase by nearly 579% in 2009, totaling about 73.9 million square meters (796 million square feet) valued at \$120 million, an adjustment by the U.S. Census Bureau in the method for calculation of 2009 wallboard exports to Canada resulted in the large year-over-year increase. Consequently, this increase should not be interpreted as an actual rise in exports. The majority of board exports went to Canada in 2009, which accounted for 93%, followed by 63 other countries, each of which accounted for a negligible amount. Reflecting a significant decrease in demand owing to the decline in the U.S. housing sector, wallboard imports decreased by 42% in 2009, totaled 50 million square meters (535 million square feet), and were valued at \$30.3 million.

World Industry Structure

Global crude gypsum production in 2009 was estimated to be 149 Mt, representing a decrease of 5% compared with that of 2008, when production totaled 157 Mt (table 1). In 2009, 87 countries produced gypsum, 10 of which accounted for 74% of the total world production (table 8). An estimated 250 million metric tons per year of synthetic gypsum (mostly phosphogypsum) was generated worldwide (Roskill Information Services Ltd., 2009, p. 22). Much of the synthetic production, however, was disposed of rather than used. China was the leading producer of crude gypsum in 2009 with an estimated 45 Mt, followed by Iran with 13.0 Mt, Spain with 11.5 Mt, the United States with 10.4 Mt, Thailand with 8.5 Mt, Mexico and Japan with 5.8 Mt each, and Italy with 4.1 Mt. Given the expansion in China's economy and its respective construction and infrastructure demands, China will likely continue to be the world's leading gypsum producer for the near future. North American production accounted for more than 13% of total crude gypsum production. Although the use of gypsum wallboard increased worldwide, only industrialized nations used gypsum primarily for wallboard products. In developing countries, especially in Asia and the Middle East, most gypsum was used in the production of cement or plaster products. World production may have been underestimated, because output by some foreign gypsum producers was used to manufacture products onsite, which may not have been reported. Additionally, production from small deposits in developing nations was intermittent and in many cases unreported.

Worldwide, the leading use of gypsum is in the manufacture of cement and concrete. In 2008 (the last year worldwide end use was available), cement manufacture accounted for up to 60% of worldwide gypsum consumption, while plaster products, including wallboard, accounted for approximately 30% of all consumption (Roskill Information Services Ltd., 2009, p. 320, 330).

As a low-value, high-bulk commodity drawn from deposits widely distributed throughout the world, gypsum tended to be consumed within the many countries where it was produced. Less than 20% of the world's crude gypsum production was estimated to enter international trade. Only a few countries, such as Canada, Mexico, Spain, and Thailand, were major crude gypsum exporters; of these, Canada and Mexico were significant exporters because of their large deposits in proximity to wallboard markets in the United States. Compared to imports, little crude gypsum was exported from the United States (tables 1, 7).

Estimated world production capacity for gypsum wallboard in 2009 exceeded 17 billion square meters per year (about 183 billion square feet per year) at more than 250 plants worldwide. Approximately 20% of this capacity was in the United States; Asia and Western Europe each accounted for about 20% of capacity.

World Review

Asia.—A significant increase in commercial and residential construction and infrastructure additions and improvements, coupled with a cultural shift toward the use of

more gypsum-based products, resulted in increased gypsum consumption. Since 2002, the production of crude gypsum in Asia has increased 2% faster than the rate of economic growth, as the acceptance and use of wallboard and plaster products has increased faster than the region's Gross Domestic Product (GDP) (Roskill Information Services Ltd., 2009, p. 18). In a continuing trend throughout the region, India opened a new load-bearing phosphogypsum panel plant. Panels from this plant were purported to be substitutes for brick and concrete (Global Gypsum Magazine, 2009b).

Europe.—Lafarge Group, a French company, indicated that effects from the global economic downturn led to continued corporate losses in 2009 (Global Gypsum Magazine, 2010a). Lafarge Group operated 76 wallboard plants (33 in Europe) in 29 countries with 8,132 employees and total sales of \$2.12 billion (Lafarge Group, 2009, p. 5).

Middle East.—Most countries in the Middle East consume all domestically produced gypsum, with the exception of Iran, which annually exports more than 1 Mt (Roskill Information Services Ltd., 2009, p. 17).

South America.—In 2009, Lafarge operated wallboard plants in Argentina, Brazil, Chile, and Colombia as well as plaster plants in Brazil and Chile (Lafarge, 2009, p. 36–37). Brazilian Gypsum produced approximately 2 Mt of gypsum in 2008, representing 95% of total Brazilian production, with mineral reserves estimated to be 1,200 Mt (Brazilian Gypsum, 2010).

Australia.—Australian housing construction activity decreased by 7% in 2009 to 139,000 new-home starts, a 40-year low, reflecting the global recession that slowed both residential and commercial building activities (Housing Industry Association of Australia, 2011). In response to the economic decline, Boral Ltd., Australia's largest building and construction materials supplier, reported an earnings decrease of 42% (Boral Ltd., 2009, p. 4, 24).

Canada.—In 2009, Canadian production of crude gypsum totaled 3.54 Mt, a 38% decline from that of 2008. About 2.72 Mt, or 77% of Canadian production, was exported to the United States. The sluggish U.S. residential and commercial construction sectors were likely to continue to have a negative impact on the Canadian gypsum industry.

China.—Despite the continued slow global economy, China expected continued growth in wallboard and plaster production in 2010 of 8% to 10% (Roskill Information Services Ltd., 2009, p. 18). The issue of corrosive imported wallboard from China into the United States continued to be a problem. The U.S. Consumer Product Safety Commission received more than 3,000 reports of possible corrosive wallboard from residents in 42 States, the District of Columbia, American Samoa, and Puerto Rico (U.S. Consumer Product Safety Commission, 2009). Only one Chinese wallboard manufacturer, Knauf Plasterboard Tianjin, responded to U.S. litigation regarding complaints of Chinese-manufactured wallboard, acknowledging that some wallboard may emit sulfide gasses. These gasses were suspected to damage copper wiring and plumbing, while also raising human-health concerns (Global Gypsum Magazine, 2010b).

Mexico.—In 2009, gypsum production in Mexico was 5.76 Mt, a 12% increase from that of 2008, the only North American

gypsum producer to show an increase. About 1.34 Mt, or 23% of Mexico's 2009 crude gypsum production, was exported to the United States. In 2009, USG Mexico S.A. de C.V., the largest manufacturer of wallboard in Mexico, operated four gypsum quarries and three wallboard manufacturing facilities, which accounted for more than 50% of the country's total market share (USG Corp., 2010, p. 14).

Nigeria.—Changes in Nigerian import regulations allowed the country's cement manufacturer to annually import the estimated 500,000 t of gypsum needed to meet the country's cement demand. Prior to the regulation change, large quantities of imported gypsum were prohibited from being imported, which required the importation of much more expensive bagged cement (Global Gypsum Magazine, 2009a).

Outlook

U.S. demand for gypsum products was expected to stabilize during the next 2 to 3 years as housing starts are expected to remain constant (U.S. Census Bureau, 2010). Because the residential housing market is responsible for approximately 60% of the consumption of gypsum products, a key economic indicator used by the gypsum and wallboard industries is the number of new housing starts, as measured by the issuance of new building permits. Preliminary gypsum production and consumption data for the beginning of 2010 indicated that the amount of gypsum used was likely to remain level.

The availability of FGD gypsum was expected to continue to increase as new scrubbers come online at more coal-fired electric powerplants (U.S. Environmental Protection Agency, 2010). During the next several years, the use of mined gypsum may continue to decline in the United States as greater quantities of synthetic gypsum are used in wallboard manufacturing. Some actual and planned gypsum mine closings have already been attributed to the increased availability of synthetic gypsum. This increased use of synthetic gypsum could accelerate additional mine closings through 2020. This changeover, however, will likely be limited to FGD plants with close proximities to wallboard production facilities, or where new wallboard plants will be constructed adjacent to existing FGD plants. The percentage of synthetic gypsum use may eventually reach an economic equilibrium point. In the long term, as disposal areas fill and the opening of new disposal sites becomes increasingly difficult, power companies may have to calcine, clean, or subsidize the transportation costs associated with synthetic gypsum in order to dispose of excess waste. This may increase the economic viability of using FGD gypsum from powerplants that are presently considered too far from wallboard plants.

Expansion of synthetic gypsum resources will continue in the United States. Forecasts indicate that demand of high calcium limestone, the primary component required to transform sulfur dioxide to synthetic gypsum, in many FGD processes, could increase by about 70% during the next 10 years as existing and new coal-fired powerplants are fitted with FGD scrubbing systems to meet Clean Air Act regulatory requirements (Industrial Minerals, 2008). Approximately 85% of FGD systems are wet scrubbers that use a limestone slurry to capture sulfur dioxide emissions (Industrial Minerals, 2009). The trend toward FGD gypsum as a raw material, at the expense of crude

gypsum, is expected to continue as air pollution regulations become more stringent within the United States and throughout the industrialized world.

The U.S. gypsum industry has been moving toward the use of large-capacity wallboard plants supplied from multiple sources, including synthetic gypsum from coal-fired powerplants. These larger wallboard plants have been built in regions of high population and growth, which are the areas of highest consumption. The older, less efficient, and smaller natural (mined) gypsum-fed plants will find it increasingly difficult to compete, and some likely will close. As a response to increased public awareness, the gypsum industry may boost the recycling of scrap gypsum into its raw materials streams. The industry may also increase the use of ecolabels, such as the Scientific Certification System Green Cross, which certifies the presence of recycled and recovered content in each product.

Industry trends indicate significant developments abroad in the coming decade. The pace and magnitude of wallboard plant construction in Asia, particularly China, India, and Thailand, suggest that the continent, with billions of potential consumers, will probably become one of the world's leading gypsum wallboard markets. Elsewhere, wallboard production capacity growth and the recognition of the convenience and economy of wallboard as a building material in Central America, Europe, India, and South America means that wallboard manufacturing may require increased gypsum production in future years. A decline in national and global economic conditions may, however, hamper such growth.

References Cited

- American Coal Ash Association, 2011, 2009 coal combustion product (CCP) production & use survey report: Aurora, CO, American Coal Ash Association, February 8, 1 p. (Accessed May 11, 2011, at http://acaa.affiniscap.com/associations/8003/files/2009_CCP_Production_Use_Survey_Corrected_020811.pdf.)
- Boral Ltd., 2009, Boral Ltd. annual review 2009: Sydney, New South Wales, Australia, Boral Ltd., October 28, 84 p. (Accessed May 11, 2011, at http://www.boral.com.au/Images/common/pdfs/Reports_2009/Annual_Report_2009.pdf.)
- Brazilian Gypsum, 2010, Brazilian gypsum description: Araripe, Brazil, Brazilian Gypsum. (Accessed May 12, 2011, at http://www.braziliangypsum.com/home_ingles.htm.)
- Compania Minera Caopas, S.A. de C.V., 2010, Company profile: Saltillo, Mexico, Compania Minera Caopas, S.A. de C.V. (Accessed May 12, 2011, at <http://www.caopas.net/Profile.aspx>.)
- Compania Occidental Mexicana S.A. de C.V., 2005, Compania Occidental S.A. de C.V.: Isla San Marcos, Mexico, Compania Occidental Mexicana S.A. de C.V. (Accessed May 12, 2011, at <http://www.comsamexico.com.mx/EnglishPage/geographicallocation.htm>.)
- Crangle, R.D., Jr., 2011, Trends in U.S. gypsum consumption: Global Gypsum Magazine, January, p. 28.
- Engineering News-Record, 2009, Construction economics: Engineering News-Record, v. 262, no. 3, January 19, p. 26–27.
- Engineering News-Record, 2010, Construction economics: Engineering News-Record, v. 264, no. 2, January 18, p. 20–21.
- Global Gypsum Magazine, 2009a, Bagged cement ban benefits gypsum imports to Nigerian industry: Global Gypsum Magazine, November/December, p. 14.
- Global Gypsum Magazine, 2009b, RCF uses rapidwall technology for new building panel plant project: Global Gypsum Magazine, August, p. 12.
- Global Gypsum Magazine, 2009c, Triumvirate set to launch phospho-gypsum in India: Global Gypsum Magazine, March, p. 10.
- Global Gypsum Magazine, 2010a, Lafarge announces Q1 2010 results: Global Gypsum Magazine, March/April 2010, p. 11.
- Global Gypsum Magazine, 2010b, Latest development in the Chinese wallboard saga: Global Gypsum Magazine, March/April 2010, p. 4.
- Housing Industry Association of Australia, 2011, Dwelling starts—By state and territory: March, p. 1. (Accessed May 11, 2011 at <http://economics.hia.com.au/media/April 2011\Forecasts.pdf>.)
- Industrial Minerals, 2008, FGD drives US high-Ca limestone demand: Industrial Minerals, no. 486, March, p. 28.
- Industrial Minerals, 2009, FGD—Capturing mineral opportunities: Industrial minerals, no 505, October, p. 66.
- Lafarge Group, 2009, Annual report: Paris, France, Lafarge Group, March 16, 268 p. (Accessed February 19, 2010, at http://www.lafarge.com/03162009-publications_finance-annual_report_2008-uk.pdf.)
- Roskill Information Services Ltd., 2009, Gypsum and anhydrite—Global industry markets and outlook (10th ed.): London, United Kingdom, Roskill Information Services Ltd., 367 p.
- USG Corp., 2010, Letter to shareholders: Chicago, IL, USG Corp., February 12, 2010, 112 p. (Accessed May 11, 2011, via <http://www.usg.com>.)
- U.S. Census Bureau, 2010, New privately owned housing units started: U.S. Census Bureau. (Accessed May 12, 2011, at <http://www.census.gov/const/startsna.pdf>.)
- U.S. Consumer Product Safety Commission, 2009, Drywall information center: U.S. Consumer Product Safety Commission. (Accessed May 11, 2011, at <http://www.cpsc.gov/info/drywall/index.html>.)
- U.S. Environmental Protection Agency, 2010, Basic information, clear skies: U.S. Environmental Protection Agency, January 14. (Accessed May 12, 2011, at <http://www.epa.gov/air/clearskies/basic.html>.)

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

- Coal Combustion Products. Ch. in Minerals Yearbook, annual (1994–2000).
- Gypsum. Ch. in Mineral Commodity Summaries, annual.
- Gypsum. Ch. in United States Mineral Resources, Professional Paper 820, 1973.
- Gypsum. Mineral Industry Surveys, monthly.
- Gypsum Deposits of the United States, Bulletin 697, 1920.

Other

- Gypsum. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.
- Gypsum Association.

TABLE 1
SALIENT GYPSUM STATISTICS¹

(Thousand metric tons and thousand dollars)

	2005	2006	2007	2008	2009
United States:					
Crude:					
Production:					
Quantity	18,700 ^r	18,600 ^r	15,700 ^r	12,300 ^r	10,400
Value	98,000 ^r	107,000 ^r	95,000 ^r	91,200 ^r	77,400
Imports for consumption	11,200	11,400	9,390	7,330	4,220
Synthetic gypsum sales	8,410	8,670	8,370	9,660	8,120
Calcined:					
Production:					
Quantity	24,300 ^r	21,600 ^r	21,700 ^r	17,900 ^r	13,800
Value	756,000 ^r	716,000 ^r	768,000 ^r	674,000 ^r	486,000
Products sold, value	4,750,000 ^r	4,260,000 ^r	3,610,000 ^r	2,500,000 ^r	1,850,000
Exports, value	33,700	36,700	43,600	47,400	37,800
Imports for consumption, value	4,350	5,010	6,700	7,240	6,800
World, production	147,000 ^r	160,000 ^r	166,000 ^r	155,000 ^r	149,000 ^e

^eEstimated. ^rRevised.

¹Data are rounded to no more than three significant digits.

TABLE 2
CRUDE GYPSUM MINED IN THE UNITED STATES, BY STATE¹

State	2008			2009		
	Active mines	Quantity	Value (thousands)	Active mines	Quantity	Value (thousands)
		(thousand metric tons)			(thousand metric tons)	
Arizona, New Mexico	6 ^r	738 ^r	\$5,500 ^r	6	530	\$4,100
Arkansas, Indiana, Kansas, Louisiana	6	3,040	22,600	6	1,840	13,200
California, Nevada, Utah	10 ^r	1,880 ^r	14,000 ^r	11	1,850	13,200
Colorado, South Dakota, Wyoming	4	713	5,300	4	535	3,830
Iowa	6 ^r	1,250 ^r	9,230 ^r	7	1,780	14,800
Michigan	3	603 ^r	4,490 ^r	3	372	3,110
Oklahoma	4 ^r	2,180 ^r	16,200 ^r	5	2,180	15,900
Texas	6 ^r	1,870 ^r	13,900 ^r	6	1,310	9,330
Total	45 ^r	12,300 ^r	91,200 ^r	48	10,400	77,400

^rRevised.

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

TABLE 3
CALCINED GYPSUM PRODUCED IN THE UNITED STATES, BY STATE¹

State	2008			2009		
	Active plants	Quantity	Value (thousands)	Active plants	Quantity	Value (thousands)
		(thousand metric tons)			(thousand metric tons)	
Arizona, Colorado, Utah, Wyoming	4	850	\$31,900	4	655	\$23,100
Arkansas, Florida, Texas	8	6,030	226,000	7	3,930	139,000
California, Nevada, Washington	5	1,830	68,700	5	1,220	43,100
Indiana, Michigan, New Hampshire, New Jersey, New York, Pennsylvania	9	6,910	259,000	9	5,430	191,000
Iowa and Kansas	5	2,340	87,800	6	2,540	89,500
Total	31 ^r	17,900 ^r	674,000 ^r	31	13,800	486,000

^rRevised.

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

TABLE 4
 GYPSUM PRODUCTS (MADE FROM DOMESTIC, IMPORTED, AND
 SYNTHETIC GYPSUM) SOLD OR USED IN THE UNITED STATES, BY USE¹

(Thousand metric tons and thousand dollars)

Use	2008 ^r		2009	
	Quantity	Value	Quantity	Value
Uncalcined:				
Portland cement	1,500	24,200	992	15,400
Agriculture and miscellaneous ²	614	30,500	352	19,500
Total	2,110	54,800	1,340	34,900
Calcined:				
Plasters	102	32,400	83	27,700
Prefabricated products ³	17,300	2,500,000	12,600	1,850,000
Total	17,400	2,530,000	12,700	1,880,000
Grand total	19,600	2,590,000	14,000	1,920,000

^rRevised.

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

²Includes synthetic gypsum.

³Includes weight of paper, metal, or other materials and some synthetic gypsum.

TABLE 5
 PREFABRICATED GYPSUM PRODUCTS SOLD OR USED IN THE UNITED STATES¹

Product	2008			2009		
	Quantity (thousand square feet)	Quantity ² (thousand metric tons)	Value ^r (thousands)	Quantity (thousand square feet)	Quantity ² (thousand metric tons)	Value (thousands)
Lath:						
³ / ₈ -inch	-- ^r	-- ^r	--	--	--	--
¹ / ₂ -inch	-- ^r	-- ^r	--	--	--	--
Other	21,600	18	\$2,720	29,900	27	\$4,020
Total	21,600 ^r	18 ^r	2,720	29,900	27	4,020
Veneer base	288,000 ^r	214 ^r	28,500	202,000	147	21,100
Sheathing	596,000 ^r	433 ^r	71,700	390,000	283	48,400
Regular gypsumboard:						
³ / ₈ -inch	564,000 ^r	316 ^r	58,400	467,000	270	46,100
¹ / ₂ -inch	11,300,000 ^r	7,370 ^r	1,060,000	8,360,000	5,360	817,000
⁵ / ₈ -inch	507,000 ^r	432 ^r	95,200	329,000	267	58,800
1-inch	88,500 ^r	71 ^r	10,600	58,600	51	7,940
Other ³	484,000 ^r	270 ^r	83,100	260,000	170	46,800
Total	13,000,000 ^r	8,460 ^r	1,310,000	9,470,000	6,120	977,000
Type X gypsumboard	9,210,000 ^r	6,780 ^r	793,000	6,550,000	4,860	561,000
Predecorated wallboard	128,000 ^r	103 ^r	50,000	58,700	43	18,800
⁵ / ₁₆ -inch mobile home board	311,000 ^r	185 ^r	32,500	202,000	119	23,700
Water- and moisture-resistant board	1,350,000 ^r	993 ^r	198,000	1,140,000	835	174,000
Other	149,000 ^r	156 ^r	19,000	213,000	187	26,900
Grand total	25,000,000 ^r	17,300 ^r	2,500,000	18,300,000	12,600	1,850,000

^rRevised. -- Zero.

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

²Includes weight of paper, metal, or other materials.

³Includes ¹/₄-, ⁷/₁₆-, and ³/₄-inch gypsumboard.

TABLE 6
IMPORTS FOR CONSUMPTION OF CRUDE GYPSUM, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2008		2009	
	Quantity	Value	Quantity	Value
Brazil	--	--	(2)	2
Canada ³	4,740	62,900	2,720	38,500
China	42	307	(2)	17
Dominican Republic	66	2,070	--	--
France	--	--	(2)	8
Germany	--	--	(2)	10
India	(2)	2	--	--
Italy	(2)	27	--	--
Jamaica	19	742	--	--
Japan	(2)	2	--	--
Korea, Republic of	(2)	20	(2)	15
Mexico	1,930	19,500	1,340	12,700
Netherlands	(2)	3	--	--
Singapore	--	--	(2)	2
Spain	524	7,720	164	1,640
Sweden	--	--	(2)	3
United Kingdom	(2)	20	(2)	8
Total	7,330	93,400	4,220	52,900

-- Zero.

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

²Less than ½ unit.

³Includes anhydrite.

Source: U.S. Census Bureau.

TABLE 7
U.S. GYPSUM AND GYPSUM PRODUCTS TRADE FOREIGN¹

(Thousand metric tons and thousand dollars)

Year	Crude ²		Plasters ³		Boards ⁴		Other, value ⁵	Total, value
	Quantity	Value	Quantity	Value	Quantity	Value		
Exports:								
2008	149	20,500	135	47,400	98	133,000	55,400	257,000
2009	156	16,000	155	37,800	665	120,000	50,200	224,000
Imports for consumption:								
2008	7,330	93,400	13	7,240	306	50,600	43,400	195,000
2009	4,220	52,900	15	6,800	236	38,500	30,300	128,000

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

²Data are for "Gypsum, anhydrite," Harmonized Tariff Schedule of the United States (HTS) code 2520.10.0000.

³Data are for "Plasters," HTS code 2520.20.0000.

⁴Data are for "Boards, sheets, panels, tiles, and similar articles, not ornamented—Faced or reinforced with paper or paperboard only," HTS code 6809.11.0000.

⁵Data are for "Boards, sheets, panels, tiles, and similar articles, not ornamented: Other," HTS code 6809.19.0000, and "Other articles," HTS code 6809.90.0000.

Source: U.S. Census Bureau.

TABLE 8
GYPSUM: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2005	2006	2007	2008	2009 ^e
Afghanistan ^c	2	2	2	2	2
Algeria	1,460	1,033	1,198	1,672	1,700 ³
Argentina	1,073	1,203	1,227	1,257 ^r	1,300
Armenia	44	44	55	46 ^r	45 ³
Australia	3,857	4,265	3,896	3,500 ^e	3,500
Austria:					
Gypsum	911	936	1,006	1,023	900
Anhydrite	106	135	57	64	50
Total	1,017	1,071	1,064	1,087 ^r	950
Azerbaijan	28	35	22	23 ^e	22
Bhutan	151	160	165 ^r	160 ^e	160
Bolivia	(5)	1	4	4 ^e	1
Bosnia and Herzegovina	153	132	154	150 ^r	150
Brazil ⁴	1,582	1,712 ^r	1,923 ^r	1,923 ^r	1,923 ^{p,3}
Bulgaria ⁴	188	216	234	230 ^{r,e}	230
Burma	68	69	75 ^r	82 ^r	98 ³
Canada ⁴	9,400	9,036	7,562	5,740	3,540
Chile	661	845	773	774	724 ³
China ^c	32,000	42,000	48,000	46,000	45,000
Colombia	173	186	200	200 ^e	190
Croatia	196	170	335 ^r	335 ^{r,e}	335
Cuba ^e	(5)	(5)	(5)	(5)	(5)
Cyprus ^e	260	250 ³	250	250	250
Czech Republic	25	16	66	35 ^e	13
Dominican Republic	181 ^r	161 ^r	146 ^r	185 ^r	175
Ecuador ^c	1 ³	1 ³	2	1	1
Egypt ^{e,4}	2,000	2,000	3,007 ^{r,3}	2,381 ^{r,3}	2,500
El Salvador ^c	6	6	6	6	6
Eritrea ^e	1	1 ³	1	1	1
Ethiopia ⁴	35	39	30 ^r	33 ^r	33
France ^{e,4}	4,902 ³	4,800	4,800	2,339 ^{r,3}	2,300
Germany, marketable ⁴	1,644	1,771	1,898	2,112 ^r	1,898 ³
Greece ^{e,4}	500	500	500	500	500
Guatemala	350	227	495	127 ^r	19 ³
Honduras ^c	6	6	6	6	6
Hungary ^{e,4}	55	30 ³	26	26	26
India ^e	2,400	2,450	2,500	2,550	2,600
Indonesia ^c	6	6	6	6	6
Iran ^{e,6}	11,196 ³	12,000	12,000	12,000	13,000
Ireland ^c	450	450	450	450	450
Israel	107	111	83	10 ^r	10
Italy	2,905	2,860	5,459	4,139 ^r	4,130
Jamaica	302	364	228	238 ^r	230
Japan	5,913	5,796	5,850	5,800 ^e	5,750
Jordan	345	334	288	300 ^e	300
Kenya ⁴	9	9	10	10	10
Laos ^c	774	775 ³	775	775	775

See footnotes at end of table.

TABLE 8—Continued
GYPSUM: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2005	2006	2007	2008	2009 ^c
Latvia ^e	220	230 ³	230	230	230
Lebanon ^c	30	30	30	30	30
Libya ^e	175	200	240	250	250
Luxembourg ^{e,4}	(5)	(5)	(5)	(5)	(5)
Macedonia	190	268	256	242 ^r	155
Mauritania	43	45	49	44	45
Mexico ⁴	6,252	6,076	6,080 ^e	5,135	5,757 ³
Moldova	131	186	312	300 ^e	250
Mongolia ^c	25	26	NA ^r	NA ^r	NA
Morocco ^c	600	600	600	600	600
Nicaragua ^{e,4}	36 ³	42 ³	40	40	40
Niger	17	13	5	9 ^{r,e}	9
Nigeria ^c	150	169	579	300 ^r	300
Oman ^c	60	60	60	60	80
Pakistan	552	650	620	640 ^e	650
Paraguay ^c	5	5	5	5	5
Peru	150	151	335 ^r	335 ^{r,e}	355
Poland ⁴	1,243	1,353	1,492 ^r	1,500 ^{r,e}	1,500
Portugal ⁴	389	400	400 ^e	300 ^e	300
Romania	502	615	707	800 ^{r,e}	800
Russia ^c	2,200	2,600 ^r	3,000 ^r	3,600 ^r	2,900 ³
Saudi Arabia	713	2,101	2,100 ^e	2,300 ^e	2,100
Serbia ^e	45 ⁷	45	45	45	45
Slovakia ⁴	107	126 ^r	151 ^r	152 ^r	150
South Africa	548	554	627	571	598 ³
Spain ^{e,4}	13,000 ^e	11,500	11,500 ^e	11,500	11,500
Sudan ^{e,4}	9	7 ³	8 ³	8	8
Switzerland ^c	250	250	250	250	250
Syria	467	444	448	573	403 ³
Tajikistan	9	9	9 ^e	9 ^e	9
Tanzania ⁴	23 ^r	33	53 ^r	53 ^r	53
Thailand	7,113	8,355	8,569	8,500 ^{r,e}	8,500
Tunisia ^c	113	151	157	165	170
Turkey	3,501	4,370	3,241	3,000 ^e	3,100
Turkmenistan ^c	100	100	100	100	100
Uganda	(5)	(5)	(5) ^e	(5) ^e	(5)
Ukraine	381	376	742	1,158 ^r	1,000 ^e
United Arab Emirates ^c	120	130	150	200	200
United Kingdom ⁴	2,000	1,700	1,700 ^e	1,700 ^e	1,700
United States ⁸	18,700 ^r	18,600 ^r	15,700 ^r	12,300 ^r	10,400 ³
Uruguay ^c	5 ^r	5 ^r	5 ^r	5 ^r	5
Venezuela	6	7	7 ^e	7 ^e	7
Yemen	38	44	45	50 ^e	50
Total	147,000 ^r	160,000 ^r	166,000 ^r	155,000 ^r	149,000

^eEstimated. ^pPreliminary. ^rRevised. NA Not available.

¹World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through July 8, 2010.

³Reported figure.

⁴Includes anhydrite.

TABLE 8—Continued
GYPSUM: WORLD PRODUCTION, BY COUNTRY^{1,2}

⁵Less than ½ unit.

⁶Data are for years beginning March 21 of that stated.

⁷Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.

⁸Excludes byproduct gypsum.