



2006 Minerals Yearbook

GYPSUM

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Production of crude gypsum in the United States was 21.1 million metric tons (Mt), about the same as in 2005; however, its value increased by 21% to \$192 million in 2006 compared with \$158 million in 2005 (table 1). The United States remained the world's leading producer and consumer of gypsum. Calcined gypsum production increased by 24% to 26.1 Mt in 2006 compared with 21.0 Mt produced in 2005. Preliminary figures indicated that the use of synthetic gypsum increased by 7% to 9.29 Mt in 2006 from 8.69 Mt in 2005. The use of synthetic gypsum from flue gas desulfurization (FGD) is expected to continue to increase as more coal-fired electric powerplants convert their desulfurization processes to produce marketable gypsum and as more wallboard plants are constructed near these powerplants. Most coal-burning powerplants in the United States are required by the U.S. Environmental Protection Agency mandates to install sulfur dioxide removal systems within the next few years, and this has created a significant potential source of gypsum.

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 statistics provided by the Gypsum Association in Washington, DC. In 2006, the USGS annual survey canvassed 144 gypsum production operations that accounted for all known domestic output of crude, calcined, and byproduct gypsum. Of the nonrespondents, five were found to be nonoperational in 2006. Data were available for 138 of the operations through the survey, the Gypsum Association, or other Federal and State agencies, representing 96% of known production. The output of the producers who did not respond to the survey was determined from public company reports or was estimated from prior year survey responses. The nonrespondents were mostly small producers that account for less than 4% of total gypsum production and their production was estimated from previous years production records and knowledge of industry trends.

Production

The United States continued to lead the world in gypsum production in 2006, accounting for about 16.8% of reported global output (table 8). During 2006, domestic output of crude gypsum remained constant with about 21.1 Mt produced in both 2005 and 2006 (table 1). Crude gypsum was mined by 25 companies in the United States at 59 mines in 17 States. About 87% of the crude gypsum produced was mined by 9 companies at 38 facilities in 16 States. The top gypsum producing States in 2006 were, in descending order of tonnage, Oklahoma, Iowa,

Arkansas, Nevada, California, Texas, Indiana, and Michigan. These 8 States had 40 mines that produced more than 1 Mt each and together accounted for 16.2 Mt or 77% of the total domestic output of gypsum.

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 U.S. Gypsum Corporation (USG) with nine mines; Georgia-Pacific Corporation (GPC) and National Gypsum Company (NGC) each with six mines; Harrison Gypsum Company with five mines; BPB America Inc. (BPB) with four mines; Temple Inland Forest Products Corporation (TI) with 3 mines; and American Gypsum Company (AGC, a subsidiary of the Eagle Materials Corporation) and Pacific Coast Building Products Inc. (PABCO) each with two mines. These eight companies produced 85% of the total U.S. crude gypsum. The 10 leading gypsum mines in the United States accounted for 45% of domestic output in 2006. These 10 mines were owned by 6 companies, and their average output was about 948,000 metric tons per year (t/yr).

During 2006, gypsum was calcined (partially dehydrated by heating) at 66 plants operated by 9 companies in 28 States, principally to produce feedstock for wallboard and plaster manufacturing plants. The leading gypsum calcining States in 2006 were, in descending order, California, Nevada, Iowa, Texas, Arkansas, Florida, Oklahoma, Ohio, and New York (table 3). These 9 States had 36 plants that produced more than 1 Mt of calcined gypsum each and together accounted for about 62% of national output. In 2006, domestic output of calcined gypsum increased by 24% to 26.1 Mt valued at more than \$460 million (table 1).

Companies with the most calcining plants were USG with 21 plants; NGC, 18 plants; GPC, 9 plants; BPB, 7 plants; and AGC and Lafarge North America (a subsidiary of Lafarge S.A.) each with 3 plants. These six companies produced almost 90% of the national calcined gypsum output. The 10 leading calcining plants in the United States accounted for more than 35% of production in 2006. These 10 plants were owned by six companies, and the average output of the plants was 922,000 t/yr.

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. There were 20 domestic coal-fired powerplants that sold synthetic gypsum to the wallboard industry in 2006. 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.

In response to USGS surveys, seven companies that were not electric powerplants reported that they produced synthetic gypsum. These seven companies had seven operations in five States and reported that 365,000 metric tons (t) of synthetic gypsum valued at \$3.28 million was produced as a byproduct of processes at their mines and plants and was sold in 2006. Domestic coal-fired electric powerplants generated more than 11.5 Mt of synthetic gypsum from their FGD systems during 2006. Of the synthetic gypsum generated by domestic coal-fired electric utility FGD systems, 9.3 Mt or 81% was used in 2006 compared with 77% in 2005. Of the total 9.3 Mt of synthetic gypsum consumed during the year, about 90% was used for wallboard production, 8% was used in cement and concrete manufacture, and 2% was used in agricultural applications.

Phosphogypsum, another industrial byproduct, is produced in the manufacturing of fertilizers. At present, phosphogypsum is not used in wallboard manufacturing because of the presence of radionuclides, which produce radioactive radon gas as they decay.

The United States gypsum industry achieved its highest rate of annual shipments ever in calendar year 2006 when U.S. manufacturers shipped a total of 41.5 billion metric tons (Gt) of products. This volume represents a 29% increase in shipments compared with the same 12-month period of 2005 when 32.1 Gt of products were shipped.

During 2006, eight companies manufactured gypsum wallboard products at 77 plants in the United States. In 2006, wallboard product shipments were approximately 3.25 billion square meters (35.0 billion square feet), an increase of about 22% compared with those of 2005 (table 5). This represented about 95% of the total domestic wallboard products production capacity available in 2006. No new wallboard plants were completed in 2006. However, new plant construction and plant expansions were in progress during the year.

American Gypsum broke ground in 2006 for its new wallboard plant in South Carolina. This plant is expected to be completed in 2007 and will have 69.7 million square meters per year (750 million square feet per year) of wallboard. Most of the gypsum used at this plant will be FGD gypsum from the nearby Santee Cooper cooperative power generating station (Eagle Materials Inc., 2006). BPB was constructing wallboard plants in West Virginia and North Carolina. These plants are scheduled to come online in 2007 and 2008, respectively, and each will have the capacity to produce about 65 million square meters per year (700 million square feet per year) of gypsum wallboard (Sharpe, 2007). Lafarge North America Inc. (LaFarge NA) completed upgrading its wallboard plant in Westchester County, NY, and continued work on expanding its plant in Savannah, GA, and Silver Grove, KY. All of these plants will have the capacity to produce 60 million square meters per year (650 million square feet per year) of wallboard (Lafarge Group, 2006). In March 2006, National Gypsum began construction of its new wallboard plant near Charlotte, NC, capable of producing 70 million square meters per year (750 million square feet per year), that will use FGD gypsum generated by Duke Power (National Gypsum Company, 2006a). Also, in March, National

Gypsum announced plans to build a wallboard plant near Phoenix, AZ. The new plant will be capable of producing 92.8 million square meters per year (1 billion square feet per year) of wallboard (National Gypsum Company, 2006b). After 4.5 years, USG finally emerged from Chapter 11 in mid-2006 (USG Corporation, 2006). USG began construction of a new wallboard plant in Pennsylvania in 2006. This plant will have a capacity to produce 180 million square meters per year (1.94 billion square feet per year) of wallboard and will use FGD gypsum from PPL Corporation's Montour Station coal-fired electric powerplant (Sharpe, 2007).

Expansion and modernization continued at USG's wallboard plant in Norfolk, VA. Construction was expected to be completed in 2007 and this plant's wallboard manufacturing capacity will have probably increased to about 69.7 million square meters per year (750 million square feet per year).

The combined production of these new wallboard plants and expansions is expected to increase U.S. wallboard production capacity by almost 0.53 billion square meters per year (5.7 billion square feet per year) by 2009, resulting in a 15% increase and raising total wallboard production capacity to about 4.1 billion square meters per year (44.1 billion square feet per year). A few additional plants are being planned or contemplated.

Consumption

In 2006, U.S. apparent domestic gypsum consumption was more than 41.6 Mt, a 2% increase compared with that of 2005. Domestic sources (mined crude plus an estimated 9.3 Mt of synthetic gypsum produced) met more than 73% of domestic consumption requirements; imports satisfied the remaining needs. In 2006, slightly more than 22% of the gypsum consumed in the United States came from synthetic sources, slightly less than in 2005.

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 2006, about 48% of the calcined gypsum used to manufacture wallboard was consumed in the production of regular ½-inch gypsum board (table 5). Type-X gypsum board, so named because of extra fire retardation qualities, consumed 30% of calcined gypsum. Other regular gypsum board, from ¼- to 1-inch thick, consumed 13%. 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, Pacific, and West South Central regions (in decreasing order) were the leading sales areas for gypsum wallboard products.

Uncalcined gypsum consumed in the United States was up 36% during 2006 to 5.31 Mt. About 3.46 Mt, or 65%, of the uncalcined gypsum consumed in the United States was for portland cement production (table 4). This was an increase of about 26% from that of 2005. Gypsum is added to cement

to retard its setting time and makes up about 2% to 6% by weight of cement output (Roskill Information Services Ltd., 2004, p. 294). Most of the remainder of the uncalcined gypsum consumed, about 1.85 Mt, was used primarily in agriculture. Agricultural use of gypsum was up almost 60% from that of 2005. 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

Several million tons of gypsum waste is generated every year by building demolition, wallboard installation, and wallboard manufacturing. Only a small portion of this waste has been recycled in the past, but in 2006, two wallboard manufacturers in the United States began to use recycled material to supplement natural gypsum at plants in New England. Initially this was not expected to significantly affect gypsum supplies much, but as more and more waste is generated and room in landfills runs out, recycling could increase.

Gypsum waste generated by the wallboard manufacturing process can be recycled easily. The gypsum core and paper covering are disaggregated and fed back into the raw material stream along with new material. Between 10% and 12% of the wallboard used in new construction and renovation winds up as wallboard scrap. The costs of disposal of this wallboard scrap in solid waste landfills are increasing. In addition to recycling scrap in wallboard plants, wallboard scrap may also be ground and used as a soil conditioner. Wallboard manufacturers and the construction industry have been exploring ways to return this scrap and waste to a plant for recycling. Other potential markets for recycled gypsum waste are in cement production, as a stucco additive, in sludge drying, in water treatment, in grease absorption, and for marking athletic fields.

Prices

In 2006, the average values (free on board, mine or plant) reported by U.S. producers were \$9.08 per metric ton for crude gypsum and \$17.63 per ton for calcined gypsum (table 1). The average value for plaster reported by domestic producers during the year was \$18.39 per 100 kilograms (\$8.36 per 100 pounds). The average value of uncalcined gypsum used in agriculture was about \$24.40 per ton and that used in cement production was about \$15.23 per ton (table 4).

During 2006, prices for gypsum wallboard generally increased in response to increased demand. The average wallboard price for 2006 in 19 major U.S. metropolitan areas across the country was \$306.01 per 100 square meters (\$283.87 per 1,000 square feet). Prices for regular ½-inch wallboard rose in 16 of the 19 cities that were sampled. Wallboard prices decreased slightly in one city in Ohio and remained constant in two cities in Michigan and Ohio. The changes in prices for each metropolitan area ranged from a decrease of \$43.60 per

100 square meters (\$47.00 per 1,000 square feet) in Cincinnati, OH, to an increase of \$92.88 per 100 square meters (\$100.13 per 1,000 square feet) in St. Louis, MO. At the beginning of the year, prices in these 19 cities ranged from \$208 per 100 square meters in Dallas, TX, to \$342 per 100 square meters in Boston, MA (\$224 to \$369 per 1,000 square feet). At yearend 2006, wallboard prices ranged from \$221 per 100 square meters in Chicago, IL, to \$393 per 100 square meters in Minneapolis, MN (\$238 to \$423 per 1,000 square feet).

The average prices from these 19 cities combined was \$253 per 100 square meters (\$273 per 1,000 square feet) in January and \$273 per 100 square meters (\$294 per 1,000 square feet) at yearend. This represented an overall average increase in price of \$19.71 per 100 square meters (\$21.25 per 1,000 square feet), or 8%, from the beginning of 2006 to yearend 2006 (Engineering News-Record, 2006, 2007).

The combined average price throughout 2006 across the United States was \$263 per 100 square meters (\$284 per 1,000 square feet), a rise of 7% from the overall average of \$237 per 100 square meters (\$255 per 1,000 square feet) in 2005. The average wallboard prices over all of 2006 were lowest in Dallas, TX (\$215 per 100 square meters or \$232 per 1,000 square feet) followed closely by New Orleans, LA (\$230 per 100 square meters or \$246 per 1,000 square feet). The highest average wallboard prices throughout 2006 were in New England (\$308 per 100 square meters or \$19.71 per 1,000 square feet).

Foreign Trade

In 2006, the United States was the world leader in international trade of gypsum and gypsum products (tables 6, 7). The United States imported crude gypsum from 17 countries and exported gypsum and gypsum products to 69 countries and territories in 2006. Only a small amount of crude gypsum and other gypsum products were exported by the United States in 2006, most of which went to Canada.

Net imports of crude gypsum in 2006 increased by 2% from those of 2005 and accounted for 27% of apparent consumption. Much of this import dependence can be attributed to the lack of adequate domestic gypsum resources near large east and west coast wallboard markets. Canada and Mexico accounted for 91% of imported gypsum, while Spain, the Dominican Republic, China, Brazil, and Germany (in descending order) supplied most of the remainder (table 6). Most imports from Canada went to east coast plants, and Mexican sources chiefly served the west coast. Foreign subsidiaries of U.S. gypsum companies produced much of the gypsum that was imported for the wallboard plants. Most of the crude gypsum imported by the United States from Mexico was produced by Compania Minera Caopas de C.V. and Compania Occidental Mexicana S.A. de C.V. (COMSA) in Baja California Sur and by USG Mexico in Colina (Sharpe, 2007). Almost all gypsum imported from Canada came from Nova Scotia. Smaller amounts of imported gypsum were used in portland cement production. The completion of large wallboard manufacturing plants near powerplants along the east coast may affect gypsum imports in the future.

Wallboard exports rose by 14% in 2006, totaling about 10.9 million square meters (118 million square feet) valued at \$70

million; they went primarily to countries in Asia, Europe, and Latin America. Wallboard imports increased by 36% in 2006 and totaled 11.1 million square meters (120 million square feet) valued at \$206 million.

World Industry

Global natural gypsum production in 2006 was estimated to be 125 Mt representing an increase of 2% compared with that of 2005, when production totaled 122 Mt (table 1). This represented the third year in a row that worldwide gypsum production increased to record breaking levels. In 2006, 84 countries produced gypsum, 10 of which accounted for 75% of the total world production (table 8). More than 200 million metric tons per year of synthetic gypsum (mostly phosphogypsum) is generated worldwide (Roskill Information Services Ltd., 2004, p. 20). However, only a small portion of that gypsum is consumed. The United States remained the largest producer of crude gypsum in 2006 with 21.1 Mt, followed by Spain with 13.2 Mt. Spain, where it is estimated that gypsum deposits underlay 12% of the surface area, is the largest European producer of crude gypsum. Iran was third in gypsum production with 13.0 Mt, followed by Canada with 9.5 Mt, Thailand with 8.4 Mt, and Mexico with 7.0 Mt. North American production accounted for almost 32% of total crude gypsum production. Although the use of gypsum wallboard increased worldwide, only industrialized nations, such as the United States, used gypsum primarily for wallboard products. In developing countries, especially in the Middle East and Asia, most gypsum was used in the production of cement or as a plaster product. World production is probably underestimated because output that is used by gypsum producers in some countries to make other products onsite is not 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 2003 (the last year worldwide consumption use was available), cement manufacture accounted for about 51% of worldwide gypsum consumption, while plaster products, including wallboard, accounted for 39% of all consumption (Roskill Information Services Ltd., 2004, p. 283).

As a low-value, high-bulk commodity drawn from deposits widely distributed throughout the world, gypsum tended to be consumed within the many countries that produce it. 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 are significant gypsum exporters because of their large deposits in proximity to large wallboard markets in the United States. Little crude gypsum was exported from the United States.

Estimated world production capacity for gypsum wallboard in 2006 exceeded 8.0 billion square meters per year (about 86 billion square feet per year) at more than 250 plants worldwide. Almost one-half of this capacity was in the United States; Asia and Western Europe each accounted for about one-fifth of capacity. Construction or expansion of dozens of wallboard plants was underway during the year in many countries as

European and Asian markets increased the use of wallboard in their building styles. As in the United States, the use of synthetic gypsum from FGD sources increased in other industrialized nations, particularly in Europe.

Globally, 2006 was a year marked by the construction of new gypsum facilities and wallboard plants as well as the expansion and modernization of existing facilities. More and more construction companies worldwide have recognized the economy and convenience of using gypsum board products.

World Review

Africa and the Middle East.—BPB continued with plans for the construction of new plants in Egypt, South Africa, and Turkey (Harder, 2006; Sharpe, 2007). Lafarge also announced plans for wallboard plants in South Africa and Turkey, as well as plaster plants in Algeria and Saudi Arabia (Sharpe, 2007).

Asia.—In 2006, construction growth in Asia showed a marked slowdown after several years of rapid growth. This downturn affected the consumption of most building materials, including gypsum. However, production of gypsum and wallboard did rise in China, Japan, and Southeast Asia. Lafarge expanded gypsum and wallboard operations in Thailand and Vietnam in 2006 (Global Gypsum Magazine, 2006e, h). BPB Malaysia Gypsum Sdn Bhd opened a wallboard plant in Malaysia. This plant has the capacity of producing 16 million square meters (172.4 million square feet), and is supplied by importing gypsum from BPB's mine in Thailand (Global Gypsum Magazine, 2006d). BPB also announced plans for two new plants in India, a new plant in China, and the expansion of two plants in Thailand (Sharpe, 2007). Lafarge Boral Gypsum in Asia (LBGA) built two plants in China and announced that it will build another plant in China and a plant in India. LBGA also expanded gypsum and wallboard operations in the Republic of Korea, Thailand, and Vietnam in 2006 (Global Gypsum Magazine, 2006e, h; Sharpe, 2007).

Australia.—Boral Australian Gypsum reported the expansion of its wallboard plant in Brisbane, Queensland, to 40 million square meters (431 million square feet) (Sharpe, 2007).

Europe.—In 2006, BPB completed and commenced operation at a new wallboard plant near Madrid, Spain, and plans to construct another. In the United Kingdom (UK), BPB expanded or commenced expansion of plants in Sherburn, England, and Kingscourt, Ireland. In France, BPB began upgrading the Vaujours plant (Sharpe, 2007). The Sherburn plant in the UK was to use FGD gypsum from an electric powerplant as well as natural gypsum as raw materials. BPB also announced plans for a new plant in Romania. KnaufGips KG (Knauf) was also constructing a wallboard plant in the United Kingdom. Yesos Millan S.L. announced it planned to build a new plaster plant in Spain with the capacity of producing 70,000 t/yr of a wide range of plasters (Global Gypsum Magazine, 2006c). In Eastern Europe, Knauf completed a new wallboard plant in St. Petersburg, Russia, and announced plans for new wallboard plants in Irkutsk, Russia, and began excavating a mine in the Arkhangelsk region (Global Gypsum Magazine, 2006f). Lafarge announced plans for a wallboard plant in Ukraine (Global Gypsum Magazine, 2006b).

Canada.—In 2006, Canadian production of crude gypsum totaled 9.5 Mt, slightly more than that of 2005. About 7.4 Mt or 78% of Canadian production was exported to the United States. Canada continued as the second ranked North American producer of gypsum. In 2006, Federal Gypsum opened a plant in Nova Scotia to produce wallboard for the northeastern U.S. market. This plant has the capacity to produce 25.5 million square meters per year of wallboard (215.3 million square feet per year). Atlantic Wallboard LP (AWL) (a subsidiary of J.D. Irving, Limited) began construction of a new wallboard plant in New Brunswick. The plant was to use FGD gypsum from NB Power Coleson Cove Corporation's generating station. CGC Inc. (a subsidiary of USG Corporation) entered into a product purchase agreement with AWL and was to purchase all the output from this plant (J.D. Irving, Limited, 2007).

Mexico.—Gypsum production in Mexico continued to grow in 2006 owing to increased wallboard consumption. There are three operating wallboard plants in Mexico and three gypsum mines. BPB was constructing a fourth wallboard plant in Mexico. Lafarge was to team up with Consorcio Comex S.A. de C.V. (Comex) to build a new gypsum production plant in Querearo State. USG Mexico also announced plans to construct another plant there, bringing the total to five operating wallboard plants in Mexico (Sharpe, 2007).

South America.—The use of plasterboard and gypsum ceiling tile spurred in private housing and commercial construction in several South American countries. The Etex Group of Belgium (Etex) and Lafarge announced plans for a gypsum plasterboard plant in northern Colombia that was to be the largest wallboard plant in terms of production capacity in the Andean region (Global Gypsum Magazine, 2006a). In Chile, Sociedad Industrial Romeral S.A. and Compania Industrial El Volcan S.A. built a new gypsum board plant near Santiago.

Outlook

Demand for gypsum products was expected to decrease slightly for the next 2 years as housing starts continued to drop (National Association of Home Builders, 2007). Unit value was expected to increase by about 4% per year through 2010. Demand for wallboard was expected to increase again after 2008 finally reaching levels greater than 4 billion square meters (43 billion square feet) by 2010 (Bruce, 2006).

One of the key economic indicators used by the wallboard and gypsum industry is the number of new housing starts. The residential market is responsible for about 60% of consumption of gypsum products. Housing starts in North America were expected to drop slightly in 2007 and to continue to decrease slightly into 2007 if interest rates rise as expected (National Association of Home Builders, 2007). Preliminary gypsum production and consumption data for the first part of 2007 suggested that use levels would continue to drop through yearend and into 2008. Other supply and demand indicators, such as construction rates for new office and commercial buildings and the continuing trend to construct larger homes with more rooms, also suggested that the gypsum industry would produce slightly less than in 2006.

The availability of more FGD gypsum was expected to continue to increase as more scrubbers come online at more coal-fired electric powerplants (U.S. Environmental Protection Agency, 2003). During the next several years, the use of mined gypsum may decline in the United States as greater quantities of synthetic gypsum are used in wallboard manufacturing. Some actual and planned gypsum mine closings already have been attributed to substitution by synthetic gypsum. This rate of substitution could accelerate additional mine closings during the rest of this decade. However, only those FGD plants that are near enough to wallboard plants to have a transportation advantage will be able to have their gypsum output used in the near future. The percentage of synthetic gypsum use may eventually reach an economic equilibrium point. In the long term, as disposal areas fill and opening new disposal sites becomes more difficult, power companies may have to calcine and clean the gypsum waste slurry that they produce and may even have to subsidize transportation costs to get rid of excess gypsum waste. This may increase the economic viability of using FGD gypsum from powerplants that may have been considered too far from wallboard plants in the past.

Research by academic, governmental, and private entities continued in 2006 to promote the development of agricultural uses for gypsum (Industrial Minerals, 2006). More and more soil and environmental uses of gypsum are being researched and developed, and the agricultural use of gypsum may increase and even significantly influence future markets.

Expansion of synthetic gypsum resources will continue in Europe and the rest of North America, but it would be limited by the diminishing number of coal-fired electric powerplants without FGD systems. Most domestic powerplants built in recent years have been natural-gas fired. The trend towards using FGD gypsum as a raw material at the expense of natural gypsum is expected to continue as air pollution regulations spread across the globe to include developing nations. In Europe, 16 Mt of FGD gypsum was produced in 2006, and there were 74 gypsum factories using FGD gypsum as a raw material (Slatten, 2006).

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 located 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 will close. As a response to increased public awareness, the gypsum industry probably will increase its recycling of scrap materials into raw materials streams. There also will be an increase in the use of ecolabels, such as the Scientific Certification System Green Cross, which certifies there is recycled and recovered content in each product. Implementation of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, Public Law 109-59 (SAFETEA-LU), which was passed by Congress and signed by the President in August 2006, will continue funding for the building and repair of the Nation's highway system through 2009 (U.S. Department of Transportation, Federal Highway Administration, 2006). This will be an important

stimulus for the domestic cement industry and, thus, will increase the demand for gypsum as an integral component of cement.

Industry trends also indicated significant developments abroad in the coming decade. For example, the pace and magnitude of wallboard plant construction in Asia, particularly China, India, and Thailand, indicated that this continent, with billions of potential consumers, could become one of the world's leading gypsum wallboard markets. The gypsum market in Japan will probably also grow at increasing rates. Future demand in emerging Asian markets is likely to be an important factor in gypsum sector growth (Global Gypsum Magazine, 2006i).

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 suggests that wallboard manufacturing will require increased production of gypsum in the future.

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TABLE 1
SALIENT GYPSUM STATISTICS¹

(Thousand metric tons and thousand dollars)

	2002	2003	2004	2005	2006
United States:					
Crude:					
Production:					
Quantity	15,700	16,700	17,200	21,100	21,100
Value	108,000	114,000	124,000	158,000	192,000
Imports for consumption	7,970	8,300	10,100	11,200	11,400
Synthetic gypsum sales	9,900	8,300	8,400	8,690	9,290
Calcined:					
Production:					
Quantity	18,600	20,400	23,200	21,000	26,100
Value	372,000	400,000	489,000	426,000	460,000
Products sold, value	2,480,000 ^r	2,640,000 ^r	2,940,000 ^r	3,260,000 ^r	5,680,000
Exports, value	104,000 ^r	113,000 ^r	129,000 ^r	144,000 ^r	163,000
Imports for consumption, value	196,000	184,000	231,000	288,000	401,000
World, production	111,000 ^r	114,000 ^r	120,000 ^r	122,000 ^r	125,000 ^c

^cEstimated. ^rRevised.

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

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

State	2005			2006		
	Active mines	Quantity (thousand metric tons)	Value (thousands)	Active mines	Quantity (thousand metric tons)	Value (thousands)
Arizona and New Mexico	4 ^r	701	\$5,300	7	1,780	\$16,200
Arkansas, Kansas, Louisiana	6	3,400	34,200	6	3,610	39,500
California, Nevada, Utah	11	4,690	29,900	11	4,200	42,600
Colorado, South Dakota, Wyoming	4	1,080	7,750	6	1,120	11,000
Indiana, New York, Ohio, Virginia	3	3,430	19,800	3	1,520	9,360
Iowa	5	2,610	20,100	7	2,550	23,900
Michigan	3	1,050	10,700	3	1,050	9,980
Oklahoma	4	2,620	18,400	12	3,860	27,400
Texas	4	1,540	11,800	4	1,430	11,800
Total	44 ^r	21,100	158,000	59	21,100	192,000

^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	2005			2006		
	Active plants	Quantity		Active plants	Quantity	
		(thousand metric tons)	Value (thousands)		(thousand metric tons)	Value (thousands)
Alabama, Florida, Georgia	5 ^r	1,850 ^r	\$45,800 ^r	7	2,880	\$68,400
Arizona, Colorado, New Mexico, Utah	3	831	9,860	4	2,300	15,300
Arkansas, Louisiana, Oklahoma, Texas	10 ^r	3,600 ^r	64,700 ^r	10	5,090	71,200
California, Nevada, Oregon, Washington	11 ^r	4,400 ^r	68,300 ^r	14	6,950	117,000
Illinois, Indiana, Michigan, Ohio	9 ^r	2,300 ^r	67,600 ^r	11	2,730	58,300
Iowa and Kansas	7 ^r	3,190 ^r	49,100 ^r	7	2,340	36,200
Maryland, North Carolina, Virginia	3	1,010	31,400	4	897	32,200
Massachusetts, New Hampshire	3 ^r	1,380 ^r	16,800 ^r	3	717	12,700
New Jersey, New York, Pennsylvania	4 ^r	752	21,700	6	2,190	49,400
Total	55 ^r	19,300 ^r	375,000 ^r	66	26,100	461,000

^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	2005		2006	
	Quantity	Value	Quantity	Value
Uncalcined:				
Portland cement	2,750	39,500	3,460	52,800
Agriculture and miscellaneous ²	1,160	30,500	1,850	45,100
Total	3,920	70,000	5,310	97,900
Calcined:				
Plasters	892	149,000	853	157,000
Prefabricated products ³	27,300	3,260,000	35,300	5,430,000
Total calcined	28,200	3,410,000	36,100	5,590,000
Grand total	32,100	3,480,000	41,500	5,680,000

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	2005			2006		
	Quantity (thousand square feet)	Quantity ² (thousand metric tons)	Value (thousands)	Quantity (thousand square feet)	Quantity ² (thousand metric tons)	Value (thousands)
Lath:						
³ / ₈ -inch	767	487	\$229	509	323	\$222
¹ / ₂ -inch	1,420	1	331	1,120	928	321
Other	12,300	9	1,420	9,130	7	1,060
Total	14,500	11	1,980	10,800	1,260	1,600
Veneer base	429,000	442	52,600	490,000	461	96,700
Sheathing	186,000	182	25,000	758,000	713	70,100
Regular gypsumboard:						
³ / ₈ -inch	687,000	636	104,000	348,000	365	97,000
¹ / ₂ -inch	13,300,000	11,500	1,520,000	16,700,000	17,600	3,100,000
⁵ / ₈ -inch	2,110,000	2,260	135,000	151,000	158	19,900
1-inch	211,000	228	54,200	88,400	93	32,100
Other ³	1,150,000	1,210	121,000	3,920,000	4,110	116,000
Total	17,500,000	15,800	1,940,000	21,200,000	22,300	3,370,000
Type X gypsumboard	7,830,000	8,130	908,000	10,600,000	11,200	1,730,000
Predecorated wallboard	80,200	81	12,400	74,100	78	24,500
⁵ / ₁₆ -inch mobile home board	462,000	427	50,800	335,000	351	73,700
Water- and moisture-resistant board	1,740,000	1,760	186,000	1,350,000	1,570	204,000
Other	448,000	467	89,600	150,000	156	29,900
Grand total	28,700,000	27,300	3,260,000	35,000,000	35,500	5,430,000

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	2005		2006	
	Quantity	Value	Quantity	Value
Austria	--	--	(2)	12
Bahrain	(2)	11	--	--
Brazil	17	155	14	2,740
Canada ³	7,650	79,800	7,380	80,700
China	(2)	2	39	6,140
Denmark	(2)	24	--	--
Dominica	(2)	13	--	--
Dominican Republic	166	1,290	93	1,120
France	(2)	20	1	52
Germany	(2)	50	14	1,990
Greece	--	--	(2)	3
India	--	--	(2)	15
Italy	(2)	3	--	--
Jamaica	64	434	4	30
Jordan	(2)	2	(2)	30
Korea, Republic of	--	--	(2)	3
Mexico	2,500	21,500	2,930	26,300
Morocco	(2)	2	(2)	4
Peru	(2)	8	--	--
Spain	782	10,600	899	10,300
Sweden	(2)	42	(2)	8
United Kingdom	(2)	9	(2)	33
Total	11,200	114,000	11,400	130,000

-- 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:								
2005	148	16,400	174	33,700	86	58,900	33,000	142,000
2006	143	18,300	209	36,700	98	69,900	37,400	162,000
Imports for consumption:								
2005	11,200	114,000	7 [†]	4,350	739	129,000	41,100	288,000
2006	11,400	130,000	12	5,010	994	206,000	60,400	401,000

[†]Revised.

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	2002	2003	2004	2005	2006 ^c
Afghanistan ^c	3	3	3	2	2
Algeria	322	350	1,058	1,460	1,500
Argentina	366	490	675 ^r	1,050 ^r	1,000
Australia	4,268 ^r	4,066 ^r	4,325 ^r	3,857 ^r	4,000
Austria ^{c,3}	1,000	1,000	1,000	1,000	1,000
Azerbaijan ^c	1	4 ⁴	4	5	5
Bhutan	106 ^r	123 ^r	131 ^r	151 ^r	160
Bosnia and Herzegovina ^c	100 ^r	140 ^r	143 ^r	157 ^r	160
Brazil ³	1,633	1,529	1,472	1,582 ^r	1,600 ^p
Bulgaria ³	156	168	176 ^r	188 ^r	185
Burma	90	66	71	68 ^r	67
Canada ³	8,809	8,378 ^r	9,339	9,400	9,500 ^p
Chile	610	662	630	661 ^r	660
China ^c	6,850	6,850	7,000	7,300	7,500
Colombia ^c	560	560	560	700	750
Croatia	145	166	150	150 ^e	150
Cuba ^c	130	130	130	130	--
Cyprus	295	300	255	260 ^e	250
Czech Republic	108 ^r	104	71 ^r	25 ^r	300
Dominican Republic	163	250 ^r	459	370 ^r	370
Ecuador	5	(5) ^e	(5) ^r	(5) ^r	(5)
Egypt ^{c,3}	2,000	2,000	2,000	2,000	2,000
El Salvador ^c	6	6	6	6	6
Eritrea	1	1	1	1 ^c	1
Ethiopia ³	23	48	51	35 ^r	35
France ^{c,3}	4,900 ^r	5,600 ^r	5,700 ^r	4,902 ^{r,4}	4,800
Germany, marketable ³	1,761	1,748	1,579	1,644 ^r	1,650
Greece ^{c,3}	500	500	500	500	500
Guatemala	81	67	106	350 ^r	350
Honduras	60	60	60 ^e	60 ^e	60
Hungary ^{c,3}	72	62 ^r	62 ^r	55 ^r	60
India ^c	2,300	2,300	2,350	2,400	2,450
Indonesia	6	6	6	6	6
Iran ⁶	13,535	13,828	12,594	13,000	13,000
Iraq ⁷	-- ^r	-- ^r	-- ^r	-- ^r	--
Ireland ^c	450	450	450	450	450
Israel	14	65	125 ^r	107 ^r	110
Italy ^c	1,300	1,200	1,200	1,210	1,200
Jamaica	165	249	283	302 ^r	300
Japan	5,645	5,764	5,865	5,913 ^r	5,950
Jordan	11	64	57 ^r	46 ^r	46
Kenya ³	8	9	9	9	9
Laos	110	102	201 ^r	132 ^r	150
Latvia	217	159	226	220 ^e	230
Lebanon ^c	2	2	2	2	2
Libya ^c	150	150	175	175	175
Luxembourg ^{c,3}	(5)	(5)	(5)	(5)	(5)
Macedonia ^c	20	20	20	20	20
Mali ^c	1	1	1	-- ^r	--
Mauritania	100 ^e	34	39	39 ^e	39
Mexico ³	6,740	6,986	9,221 ^r	6,252 ^r	7,000
Moldova ^c	32 ⁴	32	32	32	32
Mongolia ^c	25	25	25	25	26

See footnotes at end of table.

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

(Thousand metric tons)

Country	2002	2003	2004	2005	2006 ^c
Morocco ^c	600	600	600	600	600
Nicaragua ³	28	31	30 ^c	30 ^c	30
Niger	18	18	18 ^c	18 ^c	18
Nigeria ^c	300	100	100	100	150
Oman ^c	56 ⁴	50	60	60	60
Pakistan	402 ^r	424 ^r	467 ^r	552 ^r	590
Paraguay ^c	4	5	5	5	5
Peru	75	71	150	150	150 ^p
Poland ³	1,147	1,328	1,272	1,243 ^r	1,250
Portugal ³	579 ^r	420 ^r	461 ^r	500 ^c	500
Romania	421	394	490 ^r	502 ^r	500
Russia ^c	1,600	1,800	2,077 ⁴	2,200	2,200
Saudi Arabia ^c	450	450	641 ^{r,4}	713 ^{r,4}	750
Serbia and Montenegro ⁸	55	55	55 ^c	50 ^e	50
Sierra Leone ^c	4	4	-- ^r	-- ^r	--
Slovakia ³	122	94 ^r	127 ^r	125 ^e	120
Slovenia ^c	10	10	-- ^r	-- ^r	--
Somalia	-- ^r	-- ^r	-- ^r	-- ^r	--
South Africa	422	394	452	548	554 ⁴
Spain ³	11,218	11,500 ^e	12,534 ^r	13,000 ^{r,c}	13,200
Sudan ^{e,3}	5	13 ⁴	14	14	14
Switzerland ^c	250	250	250	250	250
Syria	350 ^r	377 ^r	432 ^r	467 ^r	470
Tajikistan ^c	153 ^r	22 ^r	45 ^r	35 ^e	35
Tanzania	73	33	59 ^r	23	33 ^p
Thailand	6,326	7,291	7,169	6,920	8,355 ⁴
Tunisia ^c	125	110	108 ^r	113 ^r	115
Turkey	264	197	250	250 ^c	250
Turkmenistan ^c	100	100	100	100	100
Uganda	5	(5)	(5)	(5)	(5)
United Arab Emirates ^c	90	100	110 ^r	120 ^r	130
United Kingdom ³	2,543 ^r	2,783 ^r	2,914 ^r	2,900 ^{r,c}	2,900
United States ⁹	15,700	16,700	17,200	21,100	21,100 ⁴
Uruguay ^c	1,130	1,130	1,130	1,130	1,130 ^p
Venezuela	--	5 ^r	4 ^r	6 ^r	7
Yemen	41	42	37 ^r	38 ^{r,c}	40
Total	111,000 ^r	114,000 ^r	120,000 ^r	122,000 ^r	125,000

^cEstimated. ^pPreliminary. ^rRevised. -- Zero.

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 15, 2007.

³Includes anhydrite.

⁴Reported figure.

⁵Less than ½ unit.

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

⁷Iraq may also produce gypsum, but definitive information on output levels, if any, is not available.

⁸In June 2006, Montenegro and Serbia formally declared independence from each other and dissolved their union. Mineral production data for 2006, however, still reflect the unified country.

⁹Excludes byproducts gypsum.