



2011 Minerals Yearbook

GYPSUM

GYPSUM

By Robert D. Crangle, Jr.

Domestic survey data and tables were prepared by Shonta E. Osborne, statistical assistant, and the world production table was prepared by Glenn J. Wallace, international data coordinator.

In 2011, the United States ranked fifth worldwide in the production of crude gypsum, with 8.48 million metric tons (Mt) of production and a reported value of \$70.5 million. China was the world's leading producer and consumer of gypsum, with estimated production of 48 Mt of crude gypsum. As a result of the slow recovery in the U.S. economy, especially in the residential construction sector, 2011 crude production tonnage decreased by approximately 4% from that of 2010. Prices, however, rebounded from 2010, and accounted for an increase in value of 16% in 2011 (table 1). Calcined gypsum production decreased by 6% to 11.9 Mt in 2011 compared with 12.6 Mt produced in 2010.

The sale of synthetic gypsum increased by 10% to 11.8 Mt in 2011 from 10.7 Mt in 2010. Many coal-burning powerplants in the United States are required by the U.S. Environmental Protection Agency to install sulfur dioxide scrubbing systems (U.S. Environmental Protection Agency, 2012). Because many of these systems produce byproduct gypsum, this has created a significant source of gypsum, at a lower price than the cost of its mined counterpart, which has led to the construction of wallboard production facilities adjacent to many coal-fired powerplants.

Production

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 2011, the USGS annual survey canvassed 112 gypsum production operations that accounted for all 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.

The United States was the fifth leading producer of gypsum in 2011, accounting for 6% of global output (table 8). During 2011, crude gypsum in the United States was mined by 40 companies at 46 mines in 16 States (table 2). The leading crude gypsum-producing States were, in descending order, Oklahoma, Texas, California, Iowa, and Arkansas, which together accounted for 60% 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 eight mines, Georgia Pacific LLC (GP) with seven mines, National Gypsum Co. (NGC) with six mines, CertainTeed Corp. with six mines, American Gypsum with three mines, Temple Inland Inc. (TI) with two mines, and PABCO Gypsum with one

mine. In 2011, these seven companies produced 58% of the total U.S. crude gypsum.

In 2011, domestic output of calcined gypsum decreased by 6% to 11.9 Mt valued at more than \$340 million (table 1); 10.0 Mt of calcined gypsum was used in the production of plasters and prefabricated products (table 3).

In addition to mined gypsum production, synthetic gypsum was generated as a byproduct of various industrial processes. The primary source of synthetic gypsum was flue gas desulfurization (FGD) from coal-fired electric powerplants. Smaller quantities of synthetic gypsum were derived as byproducts of chemical processes, such as acid neutralization, 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.

Sixteen synthetic gypsum producers sold 11.8 Mt of synthetic gypsum from their FGD systems during 2011, with an estimated value of \$17.7 million. Of the total synthetic gypsum sold and used, 60% was used for wallboard production, 10% was used in cement and concrete manufacture, 9% for mining applications, 5% for agricultural, and the remaining 18% for a variety of other applications. Approximately 47% of synthetic gypsum produced in 2011 was neither sold, nor used, and in most cases was landfilled (American Coal Ash Association, 2012).

For 2011, gypsum-derived products, including agricultural products, cement, plasters, and wallboard totaled 11.4 Mt with a value of \$1.54 billion. This represented a production increase of 3% from the 11.1 Mt produced in 2010, although a 3% decrease in value from \$1.59 billion (table 3).

During 2011, eight companies manufactured gypsum wallboard products at 62 plants in the United States. Wallboard product shipments were approximately 17.2 million square feet (1.6 million square meters), a slight increase compared with those of 2010 (table 4).

The wallboard industry expanded rapidly between 2003 and 2006. American Gypsum, CertainTeed, 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 that began in 2007 and continued through 2010 resulted in flat and declining sales for most gypsum producers, and led to layoffs and the idling of wallboard production plants (Crangle, 2011). In 2011, however, new-home starts, an indicator of gypsum consumption used in residential construction, increased by 4% from 2010 (U.S. Census Bureau, 2012a).

Consumption

In 2011, U.S. apparent domestic gypsum consumption was more than 23.3 Mt, an increase of 4% compared with that of 2010. Domestic sources (mined crude plus an estimated 11.8 Mt of synthetic gypsum produced) met approximately 86% of domestic consumption requirements; imports, totaling 3.33 Mt, satisfied the remaining need. In 2011, approximately 50% of the gypsum consumed in the United States came from synthetic sources, slightly more compared with that in 2010. An industry-wide shift toward the use of synthetic gypsum continued in 2011. 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. However, should the increased production and consumption of domestic shale-gas continue, this could lead to a corresponding decrease in coal consumption, and with it, a decrease in the production of synthetic gypsum. Shale gas production in 2010 (the most recent data available) was 5.34 billion cubic feet (BCF), which was 72% more than that of 2009, and more than triple that in 2007 (U.S. Energy Information Administration, 2012).

Gypsum output is categorized as either calcined or uncalcined (table 3). 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 less than 1% of consumption.

In 2011, more than 99% of calcined gypsum was used in the production of prefabricated products, most of which consisted of wallboard (table 3). Half-inch wallboard accounted for 33% of total calcined gypsum consumption. Type X gypsum board, so named because of extra fire retardation qualities, consumed 35% of calcined gypsum. Other regular gypsum board, from ¼- to 1-inch thick, consumed 2% 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, West South Central, East North Central, Pacific, and Middle Atlantic (in decreasing order) were the leading sales areas for gypsum wallboard products.

As a result of improved economic conditions and a corresponding increase in demand from the construction industry for concrete, uncalcined gypsum consumption in the United States increased by 8% in 2011 to 1.39 Mt. About 951,000 t, or 69%, of the uncalcined gypsum consumed in the United States was for Portland cement production (table 3). 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 434,000 metric tons (t), was used for agricultural purposes. Agricultural use of gypsum increased by 15% from that of 2010. 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 quantities of high-purity gypsum also are 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 may be recycled. The gypsum core and paper covering are separated, then the gypsum is reinjected with new material into the manufacturing stream.

Several million tons of gypsum waste are 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. On December 14, 2010, the Massachusetts Department of Environmental Protection banned the disposal of clean wallboard from State waste disposal facilities (Massachusetts Department of Environmental Protection, 2010). 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.

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 2011, the average values (free on board, mine or plant) reported by U.S. producers were \$8.31 per metric ton for crude gypsum and \$28.66 per ton for calcined gypsum (table 1). The average value for plaster reported by domestic producers during the year was \$356 per ton (table 3). The average value of uncalcined gypsum used primarily for agricultural purposes was approximately \$59.15 per ton, and that used in cement production was about \$16.78 per ton (table 3).

During 2011, prices for gypsum wallboard decreased by 6% and total wallboard production increased slightly (table 4). This was likely a result of the wallboard industry adjusting to market conditions following several years of declining production. The combined average price of ½-inch wallboard for 20 major U.S. metropolitan cities in 2011 was \$246 per 100 square meters (\$229 per 1,000 square feet). From January 2011 to January 2012, prices for ½-inch regular wallboard decreased slightly (Engineering News-Record, 2011; 2012).

Average ½-inch wallboard prices during 2011 were lowest in St. Louis, MO, (\$108 per 100 square meters or \$100 per 1,000 square feet), followed by Detroit, MI, (\$113 per 100 square meters or \$105 per 1,000 square feet), and Cleveland, OH, (\$129 per 100 square meters or \$120 per 1,000 square feet). The highest average wallboard prices in 2011 were in Boston, MA,

(\$394 per 100 square meters or \$366 per 1,000 square feet), followed by Philadelphia, PA, (\$293 per 100 square meters or \$272 per 1,000 square feet) and Seattle, WA, (\$292 per 100 square meters or \$271 per 1,000 square feet) (Engineering News-Record, 2011).

Foreign Trade

In 2010, the United States led the world in international trade in gypsum and gypsum products (tables 5, 6). The United States imported crude gypsum from 13 countries and exported gypsum and gypsum products to 66 countries and territories, although only a small quantity of crude gypsum and other gypsum products were exported by the United States in 2011, most of which went to Canada.

Imports of crude gypsum in 2011 were unchanged from those of 2010 and accounted for 14% of apparent consumption. Much of this import reliance 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 81% of imported gypsum, while imports from Spain supplied most of the remainder. The majority of imports from Canada went to east coast plants, while Mexican sources chiefly served the west coast. Most 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.

Wallboard exports increased by nearly 14% in 2011, totaling about 833,000 t valued at \$149 million. Approximately 95% of board exports went to Canada. Wallboard imports decreased by 4% in 2011, totaling 235,000 t valued at \$30.8 million.

World Industry Structure

Global crude gypsum production in 2011 was estimated to be 148 Mt, a slight increase compared with that of 2010, when production totaled 147 Mt (table 1). In 2011, 87 countries produced gypsum, 10 of which accounted for 75% of the total world production (table 7). Much of the synthetic production, however, was likely disposed of rather than used. China was the leading producer of crude gypsum in 2011 with an estimated 48 Mt, followed by Iran with 13 Mt, Spain with 12 Mt, Thailand with 9.9 Mt, the United States with 8.5 Mt, Japan with 5.6 Mt, and Italy with 4.1 Mt.

North American production accounted for 10% 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 mineral commodity mined 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 proximate to wallboard markets in the United States.

Estimated world production capacity for gypsum wallboard in 2010 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.—Boral Ltd., Australia's leading building and construction materials producer, agreed to acquire Lafarge's 50% interest in the Lafarge Boral Gypsum Asian venture for an estimated \$550 million; the company is the leading supplier of wallboard in Asia, which operated production facilities in eight countries while providing exports to an additional 30 countries (Boral Ltd., 2012, p. 18).

Europe.—Lafarge Group (France) initiated steps to sell most of its gypsum operations in an attempt to focus its organizational efforts toward aggregates, cement, and concrete operations (Lafarge Group, 2012, p. 3). In 2011, Saint-Gobain employed approximately 12,000 employees at 75 gypsum quarries and 130 gypsum-product facilities worldwide in 2011, (Saint-Gobain, 2012, p. 19). The privately owned and operated Knauf Group (Germany) operated 40 wallboard and 110 plaster and building materials plants in 49 countries (Global Gypsum Magazine, 2010a).

Canada.—Canadian production of crude gypsum totaled 2.56 Mt, a 6% decline from the 2.72 Mt produced in 2010. About 1.47 Mt, or 58% of Canadian production, was exported to the United States. Cabot Gypsum Company, a subsidiary of Cabot Corp., based in Point Tupper, Nova Scotia, in 2011, purchased and reopened a bankrupted Federal Gypsum Company wallboard production facility, the only wallboard plant located in Nova Scotia (Cape Breton Post, 2011).

China.—In 2011, Beijing New Building Materials (BNBM), the largest gypsum-board producer in Asia, operated 21 wallboard plants in China with an estimated annual production of 1.2 billion square meters. Wallboard has become the standard building material for nonload bearing walls and ceilings in China, with an estimated 80% of all domestically consumed board used in commercial construction and the remaining

consumption for residential purposes (Global Gypsum Magazine, 2011). Given the low level of use in residential consumption, the potential for substantial growth in wallboard consumption exists in China. Given the expansion in China's economy and its respective construction and infrastructure demands and assuming its domestic real estate market, which has exhibited signs of economic unsustainability, does not decline, China will likely continue to be the world's leading gypsum producer for the foreseeable future (Rapoza, 2013).

The issue of corrosive imported wallboard from China into the United States continued to be problematic. The U.S. Consumer Product Safety Commission received approximately 4,000 reports of possible corrosive wallboard from residents in 43 States, the District of Columbia, American Samoa, and Puerto Rico (U.S. Consumer Product Safety Commission, 2013). Sulfide gases emitted from the problematic drywall were suspected of damaging copper wiring and plumbing, while also raising human health concerns (Global Gypsum Magazine, 2010b). Following several years of complaints regarding corrosive wallboard imported from China, a pending class-action settlement between approximately 10,000 affected homeowners, most of whom reside in Gulf Coast and southern U.S. States, and Chinese wallboard manufacturer, Knauf Plasterboard Tianjin, was pending at yearend in U.S. Federal court.

Iran.—Although its crude gypsum reserves are substantial, the available Iranian crude production data predate the global recession, as well as several years of international sanctions that intensified in 2006. These conditions degraded Iran's economy and were accompanied by a rise in unemployment and inflation, which may have led to a decline in residential and commercial construction and a corresponding decrease in gypsum consumption (Fassihi, 2010). Furthermore, since 2009, most Iranian banks have been prohibited from extending loan assistance toward the purchase of property, crude oil output production has decreased to its lowest level in nearly 25 years, and overall trade has been severely restricted, all of which likely further hampered residential construction, and with it, gypsum production (Guillaume and Sensenbrenner, 2011, p. 5; Wurtz, 2012). Consequently, the available gypsum production data for Iran may not be accurate.

Japan.—Yoshino Gypsum Co. Ltd., which opened Japan's first plasterboard factory in 1921, owned 16 wallboard plants throughout Japan in 2011 with a combined wallboard production of 350 million square meters per year, which accounted for about 80% of Japan's total wallboard production (Global Gypsum Magazine, 2012).

Mexico.—In 2011, gypsum production in Mexico was 3.84 Mt, an 8% increase from that of 2010. About 1.23 Mt, or 32% of Mexico's 2011 crude gypsum production, was exported to the United States. In 2011, USG Mexico, S.A. de C.V., the largest manufacturer of wallboard in Mexico with three wallboard manufacturing facilities, employed more than 680 people and reported net sales of \$154.1 million (USG Corp., 2012).

Outlook

Although residential housing prices decreased nationwide in 2011 by approximately 4% from those seen in 2010, inventory

decreased by a greater amount; in some previously distressed markets, inventory of existing homes decreased by up to 50% for the same period (Brennan, 2012; S&P Indices, 2012). The combination of lower prices and decreased inventory may be interpreted as an overall strengthening of the domestic real estate marketplace, a primary driver of gypsum consumption. Likewise, U.S. demand for gypsum products was expected to increase during the next 2 to 3 years as housing starts are projected to rise (Irwin, 2011). 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. Since 1959, the average number of annual housing starts, including multidwelling units, is 1.5 million per year (Zibel and Bater, 2011). Annual housing starts averaged about 1.8 million during the 5 years preceding the recessionary years, which began in 2007. Housing starts of 2010 and 2011 were 587,000 and 609,000, respectively (U.S. Census Bureau, 2012a). Neither the high nor the low rates were sustainable. As the surplus of residential real estate dwellings constructed before 2009 is drawn down, the Nation's annual population growth of more than 3,000,000 new persons, alone, may necessitate an increase in residential construction within the near future (Irwin, 2011; Zibel and Bater, 2011; U.S. Census Bureau, 2012b).

The future of FGD gypsum, following more than 20 years of large annual growth rates, may begin to slow as significant supplies of comparatively less expensive and cleaner burning natural gas competes with coal in the generation of electrical power. The changeover of crude to synthetic gypsum 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 reach an economic equilibrium point. In the long term, as disposal areas fill and the opening of new disposal sites becomes increasingly difficult, and should shale-gas supplies continue to offer an economically attractive alternative to coal, power companies may consider converting electrical generation plants to operate on natural gas. The growth of synthetic gypsum production from FGD, following years of large annual increases, may begin to stabilize. The retrofitting of coal-fired electric powerplants with desulfurization systems, which has been accomplished for many plants, coupled with the availability of less expensive natural gas for electrical generation, could lead to a stabilization of FGD production.

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. Older and less efficient crude gypsum-fed plants may find it increasingly difficult to compete, but could see a revival with regard to the possibility of lesser amounts of consumed FGD. In response to increased public awareness, the gypsum industry may boost the recycling of scrap gypsum in its raw materials streams. The industry may also increase the use of labels, such as the Scientific Certification System Green Cross,

which certify 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 in 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. Should the economic conditions in the United States more favorably affect the U.S. housing sector, and in turn the U.S. consumption for gypsum, the growth in Canadian gypsum production should likewise increase. 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, 2012, 2011 coal combustion product (CCP) production & use survey report: Farmington Hills, MI, American Coal Ash Association, October, 1 p. (Accessed March 20, 2013, at <http://www.acaa-usa.org/associations/8003/files/Final2011CCPSurvey.pdf>.)
- Boral Ltd., 2012, Boral Ltd. annual review 2011: Sydney, New South Wales, Australia, Boral Ltd., 144 p. (Accessed April 4, 2013, at http://www.boral.com.au/Images/common/pdfs/annual-reports/2011_annual_report.pdf.)
- Brennan, Morgan, 2012, The housing market's latest problem—Lack of inventory: Forbes, June 28. (Accessed March 21, 2013, at <http://www.forbes.com/sites/morganbrennan/2012/06/28/the-housing-markets-latest-problem-lack-of-inventory/>.)
- Cape Breton Post, 2011, Company reopens gypsum wallboard plant: Cape Breton [Nova Scotia, Canada] Post, October 9. (Accessed April 3, 2013, at http://www.capebretonpost.com/?controllerName=search&siteId=32&searchQueryString=cabot+gypsum&search_submit=&clearFacets=1.)
- Compania Minera Caopas, S.A. de C.V., 2010, Company profile: Saltillo, Mexico, Compania Minera Caopas, S.A. de C.V. (Accessed January 25, 2012, 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 January 25, 2012, 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, 2011, Construction economics: Engineering News-Record, v. 266, no. 3, January 24, p. 33–34.
- Engineering News-Record, 2012, Construction economics: Engineering News-Record, v. 268, no. 2, January 23, p. 61–62.
- Fassihi, Farnaz, 2010, Iran's economy feels sting of sanctions: The Wall Street Journal, October 12. (Accessed April 4, 2013, at <http://online.wsj.com/article/SB10001424052748703735804575535920875779114.html>.)
- Global Gypsum Magazine, 2010a, Corporate focus: Global Gypsum Magazine, September/October, p. 14.
- Global Gypsum Magazine, 2010b, Corporation focus—China National Building Material Group Corporation: Global Gypsum Magazine, September/October, p. 28.
- Global Gypsum Magazine, 2011, The status and development trends of the wallboard industry in China: Global Gypsum Magazine, March 3. (Accessed April 4, 2013, at <http://www.globalgypsum.com/magazine/articles/322-the-status-and-development-trends-of-the-wallboard-industry-in-china>.)
- Global Gypsum Magazine, 2012, Yoshino Gypsum: Global Gypsum Magazine, March, p. 16.
- Guillaume, Dominique, and Sensenbrenner, Gabriel, 2011, Islamic Republic of Iran—Selected issues paper: Washington, DC, International Monetary Fund, July 6, 27 p. (Accessed February 2, 2012, at <http://www.imf.org/external/pubs/ft/scr/2011/cr11242.pdf>.)
- Irwin, Neil, 2011, Is housing bouncing back?: The Washington Post, December 20. (Accessed January 5, 2012, at http://www.washingtonpost.com/business/economy/is-housing-bouncing-back/2011/12/20/gIQAwpyYY7O_story.html.)
- Lafarge Group, 2012, Annual report 2011: Paris, France, Lafarge Group, March 22, 272 p. (Accessed April 4, 2013, at http://www.lafarge.com/04102012-press_publication-2011_annual_report-uk.pdf.)
- Massachusetts Department of Environmental Protection, 2010, Waste disposal ban regulation: Boston, Massachusetts, Massachusetts Department of Environmental Protection, December 14. (Accessed November 16, 2011, at <http://www.mass.gov/dep/recycle/laws/bansreg.htm>.)
- Rapoza, Kenneth, 2013, China housing bubble up, up and away: Forbes, March 18. (Accessed March 21, 2013, at <http://www.forbes.com/sites/kenrapoza/2013/03/18/china-housing-bubble-up-and-away/>.)
- Roskill Information Services Ltd., 2009, Gypsum and anhydrite—Global industry markets and outlook (10th ed.): London, United Kingdom, Roskill Information Services Ltd., 367 p.
- S&P Indices, 2012, All three home price composites end 2011 at new lows according to the S&P/Case-Shiller home price indices: S&P Indices press release, February 28, 5 p. (Accessed March 21, 2013, at http://www.spindices.com/documents/index-announcements/CSHomePrice_Release_022862.pdf.)
- Saint-Gobain Group, 2012, Annual report 2011: Paris, France, Saint-Gobain Group, March 29, 208 p. (Accessed April 4, 2013, at <http://www.saint-gobain.com/files/Saint-Gobain-annual-report-2011.pdf>.)
- USG Corp., 2012, USG Mexico S.A. de C.V.: USG Corp corporate fact sheet, 1 p. (Accessed April 3, 2013, at http://www.usg.com/documents/company/Corporate_Fact_Sheet_USG_Mexico.pdf.)
- U.S. Census Bureau, 2012a, New privately owned housing units started: U.S. Census Bureau. (Accessed March 20, 2013, at <http://www.census.gov/construction/nrc/pdf/startsan.pdf>.)
- U.S. Census Bureau, 2012b, U.S. population projections: U.S. Census Bureau. (Accessed April 5, 2013, at <http://www.census.gov/population/projections/data/national/2012/summarytables.html>.)
- U.S. Consumer Product Safety Commission, 2013, Drywall information center: U.S. Consumer Product Safety Commission. (Accessed April 5, 2013, at <http://www.cpsc.gov/info/drywall/index.html>.)
- U.S. Energy Information Administration, 2012, Shale gas production: U.S. Energy Administration, August 2. (Accessed March 20, 2013, at http://www.eia.gov/dnav/ng/ng_prod_shalegas_s1_a.htm.)
- U.S. Environmental Protection Agency, 2012, Basic information, clear skies: U.S. Environmental Protection Agency, January 14. (Accessed April 5, 2013, at <http://www.epa.gov/air/clearskies/basic.html>.)
- Wurtz, Walter, 2012, Conditions in Iran are becoming increasingly desperate: Business Insider, October 14. (Accessed March 21, 2013, at <http://www.businessinsider.com/iran-conditions-becoming-increasingly-desperate-2012-10>.)
- Zibel, Alan, and Bater, Jeff, 2011, Multifamily construction drives housing starts jump: The Wall Street Journal, December 20. (Accessed January 5, 2012, at <http://online.wsj.com/article/SB10001424052970204791104577110204041040514.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 Deposits of the United States, Bulletin 697, 1920.
- Gypsum. Mineral Industry Surveys, monthly.
- Historical Statistics for Mineral and Material Commodities in the United States, Data Series 140.

Other

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

TABLE 1
SALIENT GYPSUM STATISTICS¹

(Thousand metric tons and thousand dollars)

	2007	2008	2009	2010	2011
United States:					
Crude:					
Production:					
Quantity	15,700	12,300	10,100 ^r	8,800 ^r	8,480
Value	95,000	91,200	74,700 ^r	60,800 ^r	70,500
Imports for consumption	9,390	7,330	4,220	3,330	3,330
Synthetic gypsum sales ²	8,370	9,660	8,120	10,700	11,800
Calcined:					
Production:					
Quantity	21,700	17,900	13,400	12,600 ^r	11,900
Value	768,000	674,000	471,000 ^r	373,000 ^r	340,000
Products sold, value	3,610,000	2,500,000	1,480,000 ^r	1,530,000 ^r	1,470,000
Exports, value	43,600	47,400	37,800	42,200	48,200
Imports for consumption, value	6,700	7,240	6,800	7,180	7,780
World, production	167,000	157,000 ^r	148,000 ^r	147,000	148,000 ^c

^cEstimated. ^rRevised.

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

²Source: American Coal Ash Association.

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

State	2010			2011		
	Active mines	Quantity ^r (thousand metric tons)	Value ^r (thousands)	Active mines	Quantity (thousand metric tons)	Value (thousands)
Arizona, Colorado, New Mexico	7 ^r	892	\$6,260	7	W	\$6,680
Nevada and Utah	6 ^r	1,300	8,920	7	854	7,170
Arkansas and Louisiana	2 ^r	W	W	2	W	W
California	5 ^r	873	6,020	5	992	12,000
Iowa and Indiana	8 ^r	1,700	11,700	7	1,340	10,300
Michigan	3	302	2,080	3	345	2,670
South Dakota and Wyoming	2 ^r	W	W	2	W	W
Kansas, Oklahoma, Texas	12	2,970	20,500	13	3,250	24,800
Total	45 ^r	8,800	60,800	46	8,480	70,500

^rRevised. W Withheld to avoid disclosing company proprietary data; included in "Total."

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

TABLE 3
 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	2010		2011	
	Quantity	Value	Quantity	Value
Uncalcined:				
Portland cement	901	15,900 ^r	951	16,000
Agriculture and miscellaneous ²	377 ^r	18,600 ^r	434	25,700
Total	1,280	34,500 ^r	1,390	41,600
Calcined:				
Plasters	80	27,300	75	26,700
Prefabricated products ³	9,730 ^r	1,530,000 ^r	9,910	1,470,000
Total	9,810 ^r	1,560,000 ^r	9,980	1,500,000
Grand total	11,100 ^r	1,590,000 ^r	11,400	1,540,000

^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 4
 PREFABRICATED GYPSUM PRODUCTS SOLD OR USED IN THE UNITED STATES¹

Product	2010			2011		
	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	W	W	W	W	W	W
¹ / ₂ -inch	--	--	--	--	--	--
Other	--	--	--	--	--	--
Total	W	W	W	W	W	W
Veneer base	203,000	147 ^r	\$19,500 ^r	199,000	144	\$23,900
Sheathing	327,000	238	42,400 ^r	389,000	283	46,700
Regular gypsumboard:						
³ / ₈ -inch	459,000 ^r	146 ^r	25,700 ^r	389,000	123	20,400
¹ / ₂ -inch	8,890,000 ^r	4,030 ^r	604,000 ^r	8,620,000	3,910	647,000
⁵ / ₈ -inch	-- ^r	-- ^r	-- ^r	59,900	35	5,840
1-inch	49,500 ^r	45 ^r	7,230 ^r	44,200	40	6,620
Other ³	177,000 ^r	80 ^r	18,500 ^r	177,000	80	18,600
Total	9,570,000	4,300 ^r	656,000 ^r	9,290,000	4,190	698,000
Type X gypsumboard	5,560,000	4,040 ^r	605,000 ^r	5,770,000	4,190	462,000
Predecorated wallboard	60,200	44	18,800	58,000	42	15,100
⁵ / ₁₆ -inch mobile home board	104,000	61 ^r	13,500 ^r	92,100	54	12,000
Water- and moisture-resistant board	1,140,000	827 ^r	165,000 ^r	1,270,000	919	202,000
Other	100,000 ^r	73 ^r	10,100 ^r	118,000	86	12,000
Grand total	17,100,000 ^r	9,730 ^r	1,530,000 ^r	17,200,000	9,910	1,470,000

^rRevised. W Withheld to avoid disclosing company proprietary data. -- 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 5
IMPORTS FOR CONSUMPTION OF CRUDE GYPSUM, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2010		2011	
	Quantity	Value	Quantity	Value
Canada ²	1,980	26,000	1,470	19,800
Mexico	1,140	11,800	1,230	11,900
South Africa	8	951	--	--
Spain	198	2,940	628	11,900
Other	(3)	170	2	416
Total	3,330	41,800	3,330	44,000

-- Zero.

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

²Includes anhydrite.

³Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 6
U.S. GYPSUM AND GYPSUM PRODUCTS FOREIGN TRADE¹

(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:								
2010	360	19,300	190	42,200	729	129,000	66,200	257,000
2011	316	20,000	307	48,200	833	149,000	68,600	286,000
Imports for consumption:								
2010	3,330	41,800	15	7,180	244	32,400	29,600	111,000
2011	3,330	44,000	14	7,780	235	30,800	34,700	117,000

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 7
GYPSUM: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2007	2008	2009	2010	2011 ^e
Afghanistan ^c	35 ^r	49 ^r	46 ^r	63 ^r	62
Algeria	1,198	1,672	1,757 ^r	1,610 ^r	1,650
Argentina	1,227	1,257	1,300	1,347 ^r	1,340
Armenia	55	46	40 ^r	45 ^c	47
Australia	3,896	3,734 ^r	3,430 ^r	3,500 ^c	3,500
Austria, gypsum and anhydrate	1,064	1,087	911	872 ^r	900
Azerbaijan	22	38	46	48	50
Bhutan	189	248	300 ^r	344 ^r	350
Bolivia	4	4	2	1	1
Bosnia and Herzegovina	154	150	74	65 ^r	66
Brazil ³	1,923 ^r	2,239	2,348	2,350 ^c	2,750
Bulgaria ^{e,3}	234 ⁴	210	128 ^{r,4}	130 ^r	130
Burma	75	82	98	81	82
Canada ³	7,562	5,740	3,540	2,717	2,555 ^{p,4}
Chile	773	774	724	758 ^r	918 ⁴
China ^c	48,000	46,000	45,000	47,000	48,000
Colombia	200	200	190 ^c	200 ^c	200
Croatia	335	330	234	240 ^c	240
Cuba ^c	(5)	(5)	(5)	(5)	(5)
Cyprus ^c	250	250	250	250	250
Czech Republic	66	35 ^c	13	5 ^c	11
Dominican Republic	146	185	175	175 ^c	175
Ecuador	-- ^r	-- ^r	-- ^r	-- ^r	--
Egypt ³	178 ^r	456 ^r	735 ^r	840 ^r	840
El Salvador ^c	6	6	6	6	NA
Eritrea ^c	1	1	1	1	1
Ethiopia ^{e,3,6}	30 ⁴	33 ⁴	36 ^r	36 ^r	36
France ^{e,3}	4,800	2,339 ⁴	2,300	2,300	2,300
Germany, marketable ³	1,898	2,112	1,898	1,822	2,021 ⁴
Greece ^{e,3}	500	500	500	500	500
Guatemala	495	127	19	59 ^r	50
Honduras ^c	6	6	6	6	6
Hungary ^{e,3}	26	26	24	20 ^r	20
India ^c	2,500	2,550	2,600	2,650	2,700
Indonesia ^c	6	6	8 ^{r,4}	7 ^r	8
Iran ^{e,7}	12,000	11,251 ^{r,4}	13,000	13,000	13,000
Ireland ^c	450	450	450	450	450
Israel	83	10	9	100 ^r	100
Italy ^c	5,459 ⁴	4,139 ⁴	4,130	4,130	4,130
Jamaica ^c	228 ⁴	238 ⁴	230	230	230
Japan ^c	5,850 ⁴	5,800	5,750	5,700	5,600
Jordan	288	232 ^r	304 ^r	292 ^r	300
Kenya ³	5 ^r	5 ^r	5 ^r	6 ^r	6
Laos ^c	775	775	775	775	775
Latvia ^c	230	230	230	230	230
Lebanon ^c	80	85	100	105	100
Libya ^c	240	250	250	250	100
Luxembourg ^{e,3}	(5)	(5)	(5)	(5)	(5)
Macedonia	256	242	155	143 ^r	163 ⁴
Mauritania	49	44	37	71 ^r	75
Mexico ³	6,080 ^c	5,135	5,757	3,560	3,838 ⁴
Moldova	312	701	164	300 ^r	320
Mongolia ^c	NA	NA	NA	NA	NA
Morocco ^c	600	600	600	600	600
Nicaragua ^{e,3}	40	40	40	40	40
Niger ^c	5 ⁴	9 ⁴	9	9	9
Nigeria ^c	579	300	300	350	350

See footnotes at end of table.

TABLE 7—Continued
 GYPSUM: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2007	2008	2009	2010	2011 ^e
Oman	183	349	254	395	400
Pakistan	703	730 ^r	827 ^r	800 ^r	810
Paraguay ^e	5	5	5	5	5
Peru	335	335 ^c	355	335	335
Poland ³	1,492	1,481	1,277 ^r	1,300 ^c	1,300
Portugal ^{e,3}	400	300	300	300	300
Romania ^e	707 ⁴	885 ⁴	800	600	600
Russia ^e	3,000	3,600	2,900 ⁴	2,900	3,000
Saudi Arabia ^e	2,100	2,300	2,000 ^r	2,100	2,100
Serbia ^e	45	45	45	45	45
Slovakia ³	151	152	131	135	130
South Africa	627	571	598 ^r	513 ^r	500
Spain ³	15,000 ^r	15,000 ^r	11,500	11,500	11,500
Sudan ³	8	13	30	31 ^r	32 ⁴
Switzerland ^c	250	250	250	25	250
Syria	448	573	403	450	400
Tajikistan ^e	9	9	26 ⁴	15 ⁴	20
Tanzania ³	53	56	8	19 ^r	19
Thailand	8,643	8,500 ^c	8,679 ^r	9,985 ^r	9,900
Tunisia ^e	157	177	360	360	300
Turkey ^e	3,241 ⁴	3,000	3,100	3,200	3,200
Turkmenistan ^e	100	100	100	100	100
Uganda ^c	(5)	(5)	(5)	(5)	(5)
Ukraine	742	1,158	711	679 ^r	670
United Arab Emirates ^e	150	200	200	150	100
United Kingdom ^{e,3}	1,700	1,700	1,700	1,700	1,700
United States ⁵	15,700	12,300	10,100 ^r	8,800 ^r	8,480 ⁴
Uruguay ^e	5	5	5	5	5
Venezuela	7	7	7	7	7
Yemen ^e	45 ⁴	50	50	65	50
Total	167,000	157,000 ^r	148,000 ^r	147,000	148,000

^eEstimated. ^pPreliminary. ^rRevised. NA Not available. -- 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 June 25, 2012.

³Includes anhydrite.

⁴Reported figure.

⁵Less than ½ unit.

⁶Excludes byproduct gypsum.

⁷Data are for years beginning March 21 of that stated.