



2012 Minerals Yearbook

NITROGEN

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The world production table was prepared by Glenn J. Wallace, international data coordinator.

In 2012, U.S. ammonia production contained 8.73 million metric tons (Mt) of nitrogen, about a 7% decrease from production in 2011, and apparent consumption decreased by about 7% from that in 2011. According to the U.S. Census Bureau, exports of ammonia increased by 19% from those in 2011, and imports decreased by about 8% from those of 2011 (tables 8, 9). Most of the imports in 2012 were from Canada, Russia, Trinidad and Tobago, and Ukraine. About 87% of the domestically produced ammonia consumed in the United States was used in fertilizer applications. Global ammonia production in 2012, which was estimated to contain 136 Mt of nitrogen, was 2% higher than that in 2011. China, India, Russia, and the United States were the leading producers, together accounting for about 56% of the total. In the United States, the increased supply of shale gas has lowered prices for domestic natural gas, which has resulted in significant interest in new nitrogen capacity to replace higher cost imports.

Nitrogen is an essential element of life and a part of all plant and animal proteins. Some crop plants, such as alfalfa, soybeans, garden peas, and peanuts, can convert atmospheric nitrogen into a usable form in a process called fixation. Most nitrogen available for crop production, however, comes from decomposing animal and plant waste or from commercially produced fertilizers.

All commercial fertilizers contain their nitrogen in the ammonium and (or) nitrate form or in a form that is quickly converted to these forms once the fertilizer is applied to the soil. Commercial production of anhydrous ammonia is based on reacting nitrogen with hydrogen under high temperatures and pressures. The source of nitrogen is air, which is almost 80% nitrogen. Hydrogen is derived from a variety of raw materials, including water, and crude oil, coal, or natural gas hydrocarbons. Other nitrogen fertilizers are produced from ammonia feedstocks through a variety of chemical processes.

Legislation and Government Programs

The 2008 Farm Bill expired at the end of September 2012, and Congress passed a 1-year extension of the Farm Bill in January 2013. The Farm Bill is a comprehensive bill that addresses agriculture, conservation, and food policy in the United States (Thiesse, 2013). Changes to the Farm Bill could have affected the planting season, which in turn could have affected the purchase of fertilizers.

In November 2012, the U.S. Environmental Protection Agency (EPA) approved Florida's State numeric nutrient criteria for streams, lakes, springs, and south Florida estuaries and coastal waters as established by the Florida Department of Environmental Protection (FDEP). FDEP's criteria establish specific limits on the amount of nitrogen and phosphorus allowed in Florida's waterways. The agreement between FDEP and EPA would allow FDEP to move forward with rulemaking

and legislation in 2013 to finish setting specific nutrient criteria for Florida's waterways (Green Markets, 2012d).

In June 2012, the U.S. Department of Commerce initiated an expedited second sunset review and determined that revoking the existing antidumping duty order on solid agricultural grade ammonium nitrate from Ukraine would lead to continuation or recurrence of dumping and material injury to an industry in the United States. The results indicated that the existing antidumping duty orders should remain in place. The products covered by the order were solid, fertilizer grade ammonium nitrate products, whether prilled, granular or in other solid form, with or without additives or coating, and with bulk density equal to or greater than 849 kilograms per cubic meter (53 pounds per cubic foot) (U.S. International Trade Administration, 2012).

Production

Industry statistics for anhydrous ammonia and derivative products, including the third and fourth quarters of 2011 and all of 2012, were developed by the The Fertilizer Institute and adjusted by the U.S. Geological Survey. A summary of the production of principal inorganic fertilizers through the second quarter of 2011 was reported in the U.S. Census Bureau's series MQ325B. In 2012, production of anhydrous ammonia (82.2% nitrogen) decreased by about 7% to 8.73 Mt of contained nitrogen compared with 9.35 Mt in 2011 (table 1). Of the total produced, 87% was used as a fertilizer and 13% was used in other chemical and industrial sectors (table 2).

The United States was a leading producer and consumer of elemental and fixed types of nitrogen. In declining order, urea, ammonium nitrate, ammonium phosphates [diammonium phosphate (DAP) and monoammonium phosphate (MAP)], nitric acid, and ammonium sulfate were the major downstream products derived from domestic and imported ammonia in the United States. Their combined estimated production was 8.58 Mt of contained nitrogen, with urea and ammonium nitrate each accounting for 28%, ammonium phosphates 19%, nitric acid 17%, and ammonium sulfate 8% of the total production (table 3).

Ammonia producers in the United States operated at about 80% of design capacity in 2012; this percentage included capacities at plants that operated during any part of the year and did not include plants that were idle for all of 2012. More than 57% of the U.S. ammonia production capacity was concentrated in Louisiana (30%), Oklahoma (21%), and Texas (6%), where there are large reserves of feedstock natural gas. CF Industries Holdings, Inc., Koch Nitrogen Co., LLC, PCS Nitrogen, Inc., and Agrium Inc., in descending order, accounted for 75% of total U.S. ammonia production capacity (table 4).

In February, Rentech Nitrogen Partners LP secured a \$100 million loan to finance expansion of ammonia production and storage at the East Dubuque, IL, plant. The project would

increase ammonia production capacity by 23% or about 65,000 metric tons per year (t/yr), bringing the total ammonia production at the plant to about 336,000 t/yr. Ammonia storage capacity would increase to 18,000 t/yr. The ammonia expansion project was expected to be completed by yearend 2013 (Green Markets, 2012c).

In November, Iowa Fertilizer Co. (a wholly owned subsidiary of Orascom Construction Industries) began constructing its new greenfield nitrogen fertilizer production plant in Wever, IA. This would be the first large gas-based fertilizer plant built in the United States in 25 years and was projected to cost \$1.4 billion. The plant was expected to produce between 1.5 and 2.0 million metric tons per year (Mt/yr) of ammonia, urea, urea ammonium nitrate (UAN) and was expected to be completed by midyear 2015 (Fertilizer Week, 2012b; Orascom Construction Industries, 2012).

CF Industries announced that it would construct new ammonia and urea/UAN production units at its complex in Donaldsonville, LA, and new ammonia and urea units at its complex in Port Neal, IA. In total, the plants would add 1.9 Mt/yr of ammonia capacity, 2.5 Mt/yr of urea capacity, and 1.6 Mt/yr of UAN capacity. These projects were expected to be completed by 2016 at a cost of \$3.8 billion (CF Industries Holdings, Inc., 2012).

Environment

Hypoxia, or oxygen depletion, is caused by excess nutrients in the water coming from many sources including fertilizers, soil erosion, sewage discharge, and deposition of atmospheric nitrogen. Therefore, hypoxia has become a controversial environmental concern for the fertilizer industry and an issue that spawned significant research efforts to determine its cause. Hypoxia occurs where water near the bottom of an affected area of a large body of water, such as the Gulf of Mexico, contains less than 2 parts per million of dissolved oxygen. Hypoxia can cause stress or death in bottom-dwelling organisms that cannot move out of the hypoxic or “dead” zone.

Dead zones in coastal oceans have been reported in more than 400 ecosystems, affecting a total area of more than 245,000 square kilometers (km) worldwide. The number of dead zones has approximately doubled each decade since the 1960s. More recently, dead zones have developed in continental seas, such as the Baltic Sea, the Black Sea, the East China Sea, the Gulf of Mexico, and the Kattegat (Diaz and Rosenberg, 2008).

On July 6, 2012, the Resources and Ecosystems Sustainability, Tourist Opportunities and Revived Economies of the Gulf Coast States Act (RESTORE Act) was signed into law by the President of the United States. The law creates an essential framework for managing and financing the Gulf Coast’s recovery and established a trust account that was to receive 80% of the Clean Water Act penalties from the Deepwater Horizon oil spill. This executive order terminated the Gulf Coast Ecosystem Restoration Task Force, a joint state federal council, established in 2010 by Executive Order 13554 to address the persistent and significant damage in the Gulf Coast region of the United States as a result of the Deepwater Horizon oil spill.

Under the RESTORE Act, a Gulf Restoration Council was established and charged with developing a comprehensive plan

for ecosystem restoration in the Gulf Coast. In addition, the Gulf Restoration Council was tasked with identifying projects and programs aimed at restoring and protecting the natural resources and ecosystems of the Gulf Coast region, which was to be funded from a portion of the trust account established from the Deepwater Horizon oil spill (White House, The, Office of the Press Secretary, 2012). The RESTORE Act not only addresses the effects from the Deepwater Horizon oil spill but also addresses other water quality issues affecting the Gulf Coast, such as excess nutrients, hypoxia, altered sediment resources, pathogens, and mercury (Gulf Coast Ecosystem Restoration Council, 2013).

Consumption

In 2012, U.S. apparent consumption of ammonia was 13.9 Mt of contained nitrogen, about 7% lower than that in 2011. Apparent consumption is calculated as production plus imports minus exports, adjusted to reflect any changes in stocks. Consumption of nitrogen fertilizers in the United States for the 2012 crop year (ending June 30, 2012) is listed in table 5. Consumption of fertilizers was reported to be 12.3 Mt of contained nitrogen, which was an increase of about 6% compared with that of 2011. Anhydrous ammonia and nitrogen solutions, mostly UAN solutions containing 29.8% to 29.9% nitrogen, were the principal nitrogen fertilizer products, each representing about 28% of fertilizer consumption. Urea (45.9% nitrogen) constituted 21% of the nitrogen fertilizer consumption during the 2012 crop year. Ammonium nitrate (33.9% nitrogen) and ammonium sulfate each constituted 2% of 2012 nitrogen fertilizer consumption. The remaining 19% consisted of multiple-nutrient (various combinations of nitrogen, phosphate, and potassium) and other nitrogen fertilizers. The leading nitrogen-consuming States in the 2012 crop year in descending order were Iowa, Illinois, Nebraska, Kansas, and Minnesota, accounting for about 40% of total fertilizer consumption.

Transportation

Ammonia was transported by refrigerated barge, rail car, pipeline, and tank truck. Three companies served 11 States with 5,090 km of pipelines and 4,800 km of river barge transport; rail and truck were used primarily for interstate or local delivery.

NuStar Energy L.P. continued to operate the Gulf Central ammonia pipeline. The 3,200-km ammonia pipeline originated in the Louisiana Delta, where it had access to three marine terminals and three anhydrous ammonia plants on the Mississippi River. The capacity of this pipeline was about 2 Mt/yr of ammonia, with a storage capacity of more than 1 Mt. In 2012, about 1.4 Mt of ammonia was shipped through the Gulf Central ammonia pipeline (NuStar Energy L.P., 2013, p. 13).

Magellan Midstream Partners, L.P. owned a common carrier ammonia pipeline system. The 1,750-km pipeline system, which transported and distributed ammonia from production facilities in Oklahoma and Texas to various distribution plants in the Midwest, had a delivery capacity of about 820,000 t/yr. In 2012, 700,000 t of ammonia was shipped through Magellan’s pipeline compared with 660,000 t in 2011 (Magellan Midstream Partners, L.P., 2013, p. 40). Tampa Pipeline Corp. operated the

135-km Tampa Bay pipeline system, which moved ammonium phosphate and nitrogen compounds for fertilizer producers in Hillsborough and Polk Counties, FL.

Prices and Stocks

Midyear and yearend prices for nitrogen materials are listed in table 7. According to Green Markets, the average Gulf Coast ammonia price began 2012 at \$612 per short ton (\$675 per metric ton), and in mid-October reached the high for the year of \$685 per short ton (\$755 per metric ton), where it remained until yearend, a 12% increase in price from the average high for 2011.

The average granular urea price fluctuated throughout 2012, beginning the year at \$373 per short ton (\$411 per metric ton). The average price reached a high of \$728 per short ton (\$802 per metric ton) at the end of April. At yearend, the average urea price was \$402 per short ton (\$443 per metric ton).

The average ammonium nitrate price, which began 2012 at \$395 per short ton (\$435 per metric ton), fluctuated through most of the year. The average price rose to \$485 per short ton (\$535 per metric ton) by early May and then declined to \$398 per short ton (\$439 per metric ton) by yearend.

Typically, ammonium sulfate prices do not follow the same trend as other nitrogen products, which correlate to natural gas prices, mainly because a substantial portion of the material is produced as a byproduct of caprolactam production. Caprolactam, an organic compound, is the precursor to Nylon 6, a widely used synthetic polymer. The average price of ammonium sulfate began 2012 at about \$370 per short ton (\$408 per metric ton) and fluctuated, reaching a high of \$435 per short ton (\$480 per metric ton) at end of April. By yearend, the price averaged \$400 per short ton (\$441 per metric ton).

In 2012, the annual average price paid index for all types of fertilizers increased by about 14% from the 2011 index (U.S. Department of Agriculture, Economic Research Service, 2013a). Fertilizer prices increased as a result of the decrease in available supply and not as a result of increased demand for fertilizers.

Stocks of ammonia at yearend 2012 were estimated to be 180,000 metric tons (t), slightly higher than comparable stocks at yearend 2011 (table 6).

Foreign Trade

Ammonia exports increased by 19% compared with those in 2011 (table 8). Canada was the leading destination for U.S. exports of ammonia accounting for 79% of the total.

Ammonia imports decreased by 8% compared with those in 2011 and dwarfed the quantity of exports. The average value of ammonia imports increased to about \$600 per metric ton from \$560 per metric ton in 2011 (table 9). Trinidad and Tobago (60%) continued to be the leading import source. Canada (18%), Russia (9%), and Ukraine (5%) were the remaining significant import sources.

Tables 10 and 11 list trade data for other nitrogen materials and include information on principal destination or source countries. Exports of DAP and MAP decreased in 2012, while ammonium nitrate, ammonium sulfate, and urea increased.

Imports of nitrogen materials in 2012 increased compared with those in 2011 for about one-half of the nitrogen compounds. The exceptions were ammonium sulfate, DAP, MAP, nitrogen solutions, and potassium nitrate-sodium nitrate mixtures.

World Review

Anhydrous ammonia and other nitrogen materials were produced in more than 60 countries. Global ammonia production in 2012, estimated to be 136 Mt, was a 2% increase compared with that of 2011 (table 12). China, with 33% of total production, was the leading world producer of ammonia. Asia contributed 50% of total world ammonia production, and the Commonwealth of Independent States (CIS), Estonia, and Lithuania produced 13% of the global total. North America produced 10% of the total; Middle East, 9%; Western Europe, 8%; Central America and South America, 4%; and Africa, Eastern Europe, and Oceania contributed the remaining 6%.

In 2012, world ammonia exports, estimated to be 15.5 Mt of contained nitrogen, increased by 3% compared with those in 2011. Canada, Indonesia, Russia, Saudi Arabia, Trinidad and Tobago, and Ukraine accounted for about two-thirds of world exports. North America (primarily the United States) imported about one-third of global ammonia trade, followed by Asia and Western Europe (International Fertilizer Industry Association, 2013).

Bangladesh.—China Chengda Engineering Co. awarded a contract to Stamicarbon B.V. for the supply of high-pressure proprietary urea synthesis and granulation equipment for the Shahjalal Fertilizer Project. This contract followed the license and process design package agreement signed at the beginning of the year for urea synthesis and a granulation unit, each with a capacity of 1,760 metric tons per day (t/d). The plant was expected to begin operations in 2015 (Nitrogen + Syngas, 2012a).

Bolivia.—Bolivia's national oil company, Yacimientos Petroliferos Fiscales Bolivianos (YPFB), awarded Toyo Engineering Corp. the urea synthesis and granulation technologies supply contract and Samsung Engineering Co. Ltd. the engineering, procurement, and construction contract for the ammonia and urea project to be located in Carrasco. The plant was expected to produce 2,100 t/d of urea using natural gas as a feedstock and was scheduled to be operational by 2015 (Nitrogen + Syngas, 2012b).

Canada.—Yara International ASA announced it would expand the Belle Plaine facility in Saskatchewan. The expansion would increase urea capacity by approximately 1.3 Mt/yr. The project was expected to begin in early 2014 and to be completed by 2016 (Nitrogen + Syngas, 2012d).

Indian Farmers Fertiliser Cooperative (IFFCO) and agriculture food cooperative La Coop Fédérée signed an agreement to invest \$1.2 billion in the construction of a nitrogen fertilizer plant in Becancour, Quebec. The plant was expected to produce 1.25 Mt/yr of urea using natural gas as the feedstock. Construction of the plant was expected to begin in 2014 and to be completed by 2017 (Nitrogen + Syngas, 2012c).

The Government of Canada added 41 unique substances including ammonium nitrate fertilizer to its Environmental Emergency Regulations. The regulations require that facilities

that handle these 41 listed substances at or above regulated quantities develop environmental emergency (E2) plans, if they are not already in place. E2 regulations require that individuals and industrial facilities using and storing regulated hazardous substances listed in the regulations have plans for and can manage the consequences of unintended release of the substance into the environment. For ammonium nitrate, the E2 regulation set the regulation limit at 20 t, but the new rule includes an exemption for bagged ammonium nitrate sold in its usual 20-kilogram (44 pound) container (Green Markets, 2012a).

China.—Inner Mongolia Erdos Chemical Industry Group Co., Ltd. contracted with Stamicarbon for a new urea plant to be built in Qi Pan Jing, Ordos City, Inner Mongolia. The 2,860 t/d plant was planned to start up in 2014 (Nitrogen + Syngas, 2013a).

China XLX Fertiliser Ltd. planned to construct a new coal-based complex in Manas county in Xinjiang Uyghur Autonomous Region to expand its production of urea and compound fertilizer and to begin melamine production. The complex would produce about 450,000 t/yr of urea, most of which was to be used in the production of 100,000 t/yr of melamine. The project would be carried out in stages and was expected to be completed by yearend 2016 at a cost of about \$424 million (Nitrogen + Syngas, 2012e).

In December, the Chinese Government released its 2013 export tariff rates for many products, including urea. The rate for urea was lowered from 110% to 75% during the high seasons, which are from January through June and November through December. The rate of 7% in the low season was reduced to 2%. In addition to the reduced tariff rates, the base price on which the progressive taxation would be assessed was increased by about 8% (Fertilizer Week, 2012a).

Ethiopia.—Metal and Engineering Corp. signed an agreement with the Privatisation and Public Enterprises Agency of Ethiopia to build a fertilizer complex in the country within the next 3 years. The \$3.1 billion project would include five coal-fired ammonia-urea trains, each with a capacity of 300,000 t/yr of urea, three 250,000-t/yr DAP plants, and a 1.1-Mt/yr phosphate plant (Nitrogen + Syngas, 2012f).

Iraq.—Mitsui, Toyo Engineering Corp. and Unico International Corp. were conducting a feasibility study for a 2,000- to 3,000-t/d ammonia/urea plant to be built at Basra. The government-owned Japan International Cooperation Agency would provide \$1.95 million for the feasibility study. The development would be a joint venture with an Iraqi state-run fertilizer company, with project completion slated for 2018 (Nitrogen + Syngas, 2012g).

Malaysia.—Petronas Chemical Group broke ground on the \$1.5 billion Sabah Ammonia Urea (SAMUR) project in Siptang. The plant would have the capacity to produce 2,100 t/d of ammonia and 3,850 t/d of urea. When complete, the new facility would almost double Petronas Chemical's urea production capacity to 2.7 Mt/yr, making it the second ranked producer of urea in Southeast Asia. The plant was expected to be completed by 2015 with the output aimed primarily (95%) at the export market (Nitrogen + Syngas, 2012h).

The Republic of Korea's Huchems Fine Chemical Corp. signed a memorandum of understanding with the government of Sarawak State in Malaysia to construct a nitrogen complex.

The complex would consist of a 600,000-t/yr ammonia plant, a 400,000-t/yr nitric acid plant, and 200,000-t/yr ammonium nitrate plant next to the Bintulu port on the Malaysian part of the island of Borneo. The complex was expected to be completed by late 2015 or early 2016 at an estimated cost of \$740 million (Nitrogen + Syngas, 2013b).

Nigeria.—Notore Chemical Industries Ltd. signed a joint-venture agreement with Mitsubishi Corp. to develop an integrated 1,700-t/d ammonia, 3,000-t/d urea, and 1,500-t/d petrochemical plant at its existing facility at Onne, Rivers State. The plant was expected to be operational by 2016 (Green Markets, 2012b).

Indorama Eleme Fertilizer & Chemicals Ltd. contracted with KBR, Inc. to provide ammonia technology for its planned grassroots 2,300-t/d ammonia plant in Port Harcourt, Rivers State. No timetable for completion of the plant was announced (KBR, Inc., 2012).

Dangote Group awarded front-end engineering and design contracts for twin 2,200-t/d ammonia and 3,850-t/d urea plants at Algenbode in Edo State to Saipem S.p.A. Construction was expected to begin in January 2013 and to be completed by late 2015 or early 2016 at an estimated cost of \$1.9 billion (Nitrogen + Syngas, 2013c).

Trinidad and Tobago.—The government-owned National Gas Co. Ltd. and Methanol Holdings Trinidad Ltd. (MHTL) signed a 20-year natural gas supply agreement that would provide 100 million standard cubic feet per day (MMcfd) of natural gas to MHTL's proposed \$2 billion ammonia-urea-melamine complex. Construction was expected to begin in 2013, but no timetable for completion of the complex was announced (Oil & Gas Journal, 2012).

Outlook

Large corn plantings increase the demand for nitrogen fertilizers. According to the U.S. Department of Agriculture (USDA), U.S. corn growers intended to plant 39 million hectares (Mha) of corn for all purposes in the 2013 crop year, a slight increase from that in 2012 and an increase of 6% from that in 2011 (U.S. Department of Agriculture, National Agricultural Statistics Service, 2013a, p. 1). If this takes place, 2013 will represent the largest planted corn acreage in the United States since 1936 when an estimated 41 Mha were planted, and it would mark the fifth consecutive year that planted corn acreage increased in the United States. Corn acreage utilization was projected to increase in many States because of expectations of higher selling prices and better net returns from corn compared to other field crops. The 2013 growing season did not get off to a good start as a result of the cold and wet weather in early spring in much of the major corn-producing regions; however, conditions improved in May, allowing U.S. growers to continue planting (U.S. Department of Agriculture, National Agricultural Statistics Service, 2013b). For 2013, the production forecast remained high for corn yields.

According to long-term projections from the USDA, plantings for the eight major field crops (barley, corn, oats, rice, sorghum, soybeans, upland cotton, and wheat) in the United States were expected to decrease slightly in the next few years, but during the remainder of the projection period (2012–22), plantings

would remain near 98 Mha, down from about 104 Mha in 2012. Corn, soybeans, and wheat were expected to account for about 89% of acreage utilization for the eight major field crops during this 10-year period, and the amount of acreage planted in corn was expected to remain high. Soybean planting likely would rise during the projection period as growth in domestic and foreign demand keeps prices high, which could result in higher profits for producers. Wheat plantings probably would decline as a result of weak demand.

Continued high levels of domestic corn-based ethanol production and gains in exports were projected to keep demand for corn high. Most U.S. ethanol production used corn as a feedstock, with about 35% of total corn use expected to go to ethanol production through 2022. Smaller gains for corn-based ethanol were projected during the 10-year period than those of recent years (U.S. Department of Agriculture, Economic Research Service, 2013b, p. 56–89).

In 2012, as a result of strong gains in domestic shale gas production, natural gas prices decreased by 31% to the lowest annual average price since 1999. Natural gas prices in the United States have typically been higher than those in the rest of the world, and lower natural gas prices made U.S. ammonia production more competitive with offshore imports. Depending on its price, natural gas can account for approximately 70% to 85% of the U.S. cash cost of producing ammonia. Favorable natural gas prices continued to provide North American producers with a delivered-cost advantage to domestic markets over most offshore suppliers, prompting the announcement of several regional expansions and potential greenfield nitrogen projects. The Middle East, North Africa, and Russia have large supplies of lower cost natural gas, which gave them a cost advantage in producing and exporting ammonia. Western Europe, Ukraine, and China have experienced rising natural gas prices, so producers in these regions were higher cost suppliers and played an important role in setting prices in the global marketplace (Potash Corp. of Saskatchewan Inc., 2013, p. 71). The U.S. Department of Energy projected that the Henry Hub natural gas spot price in the United States would average \$3.69 million British thermal units (Btu) in 2013, a \$0.94 increase from the 2012 average, and \$3.78 per million Btu in 2014 (U.S. Energy Information Administration, 2013, p. 1).

The future of U.S. ammonia production depends on the variability in natural gas prices. The United States is the world's leading importer of ammonia and the second ranked consumer. U.S. firms have favored constructing new plants in Trinidad and Tobago where natural gas prices were lower and the distance to the United States was shorter compared with other offshore exporters. However, recent low prices for natural gas in the United States have prompted some companies to upgrade or make plans to upgrade existing U.S. plants, while other companies are considering the possibility of constructing new nitrogen projects in North America.

References Cited

- CF Industries Holdings, Inc., 2012, CF Industries announces capacity expansions: CF Industries Holdings, Inc. news release, November 1. (Accessed January 29, 2014, at <http://phx.corporate-ir.net/phoenix.zhtml?c=190537&p=irol-newsArticle&ID=1753230&highlight=>)
- Diaz, R.J., and Rosenberg, Rutger, 2008, Spreading dead zones and consequences for marine ecosystems: *Science*, v. 321, no. 5891, February 15, p. 926–929.
- Fertilizer Week, 2012a, Chinese customs release 2013 export regime: Fertilizer Week, December 17, p. 1. (Accessed February 4, 2014, via <http://fw.crugroup.com/fertilizer/dashboards/urea/daily-market-updates/>.)
- Fertilizer Week, 2012b, OCI/Iowa Fertilizer Co. breaks ground in Iowa: Fertilizer Week, November 20, p. 1.
- Green Markets, 2012a, Canada adds more regulation of ammonium nitrate: Green Markets, v. 36, no. 1, January 2, p. 12.
- Green Markets, 2012b, Mitsubishi partners in Nigerian urea plant: Green Markets, v. 36, no. 18, April 30, p. 12.
- Green Markets, 2012c, Rentech looks at increased urea capacity; ammonia projects on track: Green Markets, v. 36, no. 21, May 21, p. 13–14.
- Green Markets, 2012d, TFI praises EPA for Florida water ruling: Green Markets, v. 36, no. 51, December 17, p. 14–15.
- Gulf Coast Ecosystem Restoration Council, 2013, Draft initial comprehensive plan—Restoring the Gulf Coast's ecosystem and economy: Gulf Coast Ecosystem Restoration Council, May, 20 p. (Accessed April 28, 2014, via <http://www.restorethegulf.gov/>.)
- International Fertilizer Industry Association, 2013, Statistics: Paris, France, International Fertilizer Industry Association. (Accessed December 12, 2013, via <http://www.ifa.org>.)
- KBR, Inc., 2012, KBR awarded ammonia technology license agreement by Indorama Eleme Fertilizer & Chemicals Limited: KBR, Inc. news release, December 13, p. 1.
- Magellan Midstream Partners L.P., 2013, Form 10-K—2012: U.S. Securities and Exchange Commission, 125 p.
- Nitrogen + Syngas, 2012a, Bangladesh—Stamincarbone to supply high pressure equipment for Shahjalal: Nitrogen + Syngas, no. 320, November–December, p. 13.
- Nitrogen + Syngas, 2012b, Bolivia—Toyo to license new urea plant: Nitrogen + Syngas, no. 320, November–December, p. 13.
- Nitrogen + Syngas, 2012c, Canada—Indian partner signs memorandum of understanding of new urea plant: Nitrogen + Syngas, no. 320, November–December, p. 11.
- Nitrogen + Syngas, 2012d, Canada—Yara to double capacity at Belle Plaine: Nitrogen + Syngas, no. 318, July–August, p. 10.
- Nitrogen + Syngas, 2012e, China—China XLX continues to expand urea and compound fertilizer production: Nitrogen + Syngas, no. 314, July–August, p. 11.
- Nitrogen + Syngas, 2012f, Ethiopia—Ethiopia to build urea capacity?: Nitrogen + Syngas, no. 318, July–August, p. 13.
- Nitrogen + Syngas, 2012g, Iraq—Feasibility study on new urea plant: Nitrogen + Syngas, no. 316, March–April, p. 12.
- Nitrogen + Syngas, 2012h, Malaysia—Ground broken at new Sabah urea complex: Nitrogen + Syngas, no. 316, March–April, p. 12, 14.
- Nitrogen + Syngas, 2013a, China—Stamincarbone to build urea plant: Nitrogen + Syngas, no. 321, January–February, p. 9.
- Nitrogen + Syngas, 2013b, Malaysia—Ammonium nitrate complex for Bintulu: Nitrogen + Syngas, no. 321, January–February, p. 11.
- Nitrogen + Syngas, 2013c, Nigeria—Contracts awarded for Nigerian urea complexes: Nitrogen + Syngas, no. 321, January–February, p. 10.
- NuStar Energy L.P., 2013, Form 10-K—2012: U.S. Securities and Exchange Commission, 167 p. (Accessed December 9, 2013, at <http://nustarenergy.com/en-us/Investors/Pages/SECFilings.aspx>.)
- Oil & Gas Journal, 2012, Trinidad and Tobago's NGC signs gas supply deal: Oil & Gas Journal news, July 9, p. 1. (Accessed February 6, 2014, at <http://www.ogj.com/articles/2012/07/trinidad-and-tobagos-ngc-signs-gas-supply-deal.html>.)
- Orascom Construction Industries, 2012, OCI Fertilizer Group selects Iowa for its new US\$ 1.4 billion Greenfield nitrogen fertilizer plant in the United States: Cairo, Egypt, Orascom Construction Industries press release, September 5, p. 1. (Accessed February 10, 2014, at <http://www.orascomci.com/index.php?id=latestnewsreleases&show=archive&year=2012>.)
- Potash Corp. of Saskatchewan Inc., 2013, Solutions for a growing world—2012 annual integrated report: Saskatoon, Saskatchewan, Canada, Potash Corp. of Saskatchewan Inc., 160 p.
- Thiesse, Kent, 2013, Congress extends current Farm Bill into 2013: Farm & Ranch Guide, January 11. (Accessed February 12, 2014, at http://www.farmandranchguide.com/news/regional/congress-extends-current-farm-bill-into/article_da45da64-5c1a-11e2-ac54-001a4bcf887a.html?print=true&cid=print.)

- U.S. Department of Agriculture, Economic Research Service, 2013a, Farm sector income & finances—2013 farm sector income forecast: U.S. Department of Agriculture, November 26. (Accessed December 12, 2013, via <http://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances.aspx>.)
- U.S. Department of Agriculture, Economic Research Service, 2013b, USDA agricultural projections to 2022: U.S. Department of Agriculture, February, 99 p.
- U.S. Department of Agriculture, National Agricultural Statistics Service, 2013a, Prospective plantings: U.S. Department of Agriculture, March 28, 35 p. (Accessed December 13, 2013, at http://usda01.library.cornell.edu/usda/current/ProsPlan/ProsPlan-03-28-2013_revision.pdf.)
- U.S. Department of Agriculture, National Agricultural Statistics Service, 2013b, U.S. corn acreage up for fifth straight year: U.S. Department of Agriculture, National Agricultural Statistics Service news release, June 28, 1 p. (Accessed December 13, 2013, at http://www.nass.usda.gov/Newsroom/2013/06_28_2013.asp.)
- U.S. Energy Information Administration, 2013, Short-term energy outlook: U.S. Department of Energy, December, 47 p. (Accessed December 13, 2013, at http://www.eia.gov/forecasts/steo/pdf/steo_full.pdf.)
- U.S. International Trade Administration, 2012, Solid agricultural grade ammonium nitrate from Ukraine—Final results of the expedited second sunset review of the antidumping duty order: Federal Register, v. 77, no. 188, September 27, p. 59377.
- White House, The, Office of the Press Secretary, 2012, Executive Order—Gulf Coast ecosystem restoration: The White House, Office of the Press Secretary press release, September 10. (Accessed February 6, 2014, at <http://www.whitehouse.gov/the-press-office/2012/09/10/executive-order-gulf-coast-ecosystem-restoration>.)
- Mineral Commodity Profiles—Nitrogen. Open-File Report 2004–1290, 2004.
- Nitrogen. Ch. in Mineral Commodity Summaries, annual.
- Nitrogen in the Mississippi Basin—Estimating Sources and Predicting Flux to the Gulf of Mexico. Fact Sheet 135–00, 2000.
- Nonpoint and Point Sources of Nitrogen in Major Watersheds of the United States. Water-Resources Investigations Report 94–4001, 1994.
- Nutrients in the Nation’s Waters—Too Much of a Good Thing?. Circular 1136, 1996.
- Nutrients in the Nation’s Streams and Groundwater, 1992–2004. Circular 1350, 2010.

Other

- Amber Waves. U.S. Department of Agriculture, monthly.
- Fertilizer Institute, The.
- Fertilizer Week. CRU International Ltd., weekly.
- Green Markets. Kennedy Information, LLC, weekly.
- International Fertilizer Development Center.
- International Fertilizer Industry Association.
- Nitrogen + Syngas. BCInsight Ltd., bimonthly.

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

- Evaporites and Brines. Ch. in United States Mineral Resources, Professional Paper 820, 1973.
- Fertilizers—Sustaining Global Food Supplies. Fact Sheet 155–99, 1999.
- Historical Statistics for Mineral and Material Commodities in the United States, Data Series 140.

TABLE 1
SALIENT AMMONIA STATISTICS^{1,2}

(Thousand metric tons of contained nitrogen unless otherwise specified)

	2008	2009	2010	2011	2012
United States:					
Production	7,870	7,700	8,290	9,350 ³	8,730 ^{3,4}
Exports	192	16	36 ^r	26	31
Imports for consumption	6,020	4,530	5,540	5,600	5,170
Consumption, apparent ⁵	13,500	12,300	13,800	14,900	13,900 ^p
Stocks, December 31, producers	302	167	165	178 ^c	180 ^c
Average annual price, free on board gulf coast ⁶ dollars per short ton	590	251	396	531	579
Net import reliance as a percentage of apparent consumption ⁷	42	38	40	37	37 ^p
Natural gas price, wellhead, average price ⁸ dollars per thousand cubic feet	7.97	3.67	4.48	3.95	2.66
World:					
Production	123,000 ^r	121,000	127,000 ^r	133,000 ^r	136,000
Trade ⁹	15,500	14,400	16,000	16,600	15,400

^eEstimated. ^pPreliminary. ^rRevised.

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

²Synthetic anhydrous ammonia, excluding coke oven byproduct; data are for calendar year and are from the U.S. Census Bureau unless otherwise noted.

³Source: U.S. Census Bureau and The Fertilizer Institute; data adjusted by the U.S. Geological Survey.

⁴Source: The Fertilizer Institute; data adjusted by the U.S. Geological Survey.

⁵Calculated from production plus imports minus exports and industry stock changes.

⁶Source: Green Markets.

⁷Defined as imports minus exports; adjusted for industry stock changes.

⁸Source: Monthly Energy Review, U.S. Department of Energy.

⁹Source: International Fertilizer Industry Association Statistics, World Anhydrous Ammonia Trade.

TABLE 2
ANHYDROUS AMMONIA SUPPLY AND DEMAND IN THE UNITED STATES¹

(Thousand metric tons of contained nitrogen)

	2010	2011	2012 ^p
Production:			
Fertilizer:			
January–June	3,550	4,090	3,860
July–December	3,580	4,080	3,740
Total	7,130	8,170	7,600
Nonfertilizer:			
January–June	577	590	568 ^e
July–December	585	590	567 ^e
Total	1,160	1,180	1,140 ^e
Grand total	8,290	9,350²	8,730³
Exports:			
January–June	28	13	19
July–December	7	13	12
Total	35	26	31
Imports for consumption:			
January–June	2,630	2,880	2,580
July–December	2,910	2,720	2,590
Total	5,540	5,600	5,170
Stocks, end of period:			
January–June	149	170	170 ^e
July–December	165	178 ^e	180 ^e
Apparent consumption:⁴			
January–June	6,750	7,550	7,170
July–December	7,050	7,360	6,710
Total	13,800	14,900	13,900

^eEstimated. ^pPreliminary.

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

²Source: U.S. Census Bureau and The Fertilizer Institute; data adjusted by the U.S. Geological Survey.

³Source: The Fertilizer Institute; data adjusted by the U.S. Geological Survey.

⁴Calculated from production plus imports minus exports and industry stock changes.

Source: U.S. Census Bureau.

TABLE 3
MAJOR DOWNSTREAM NITROGEN COMPOUNDS PRODUCED IN THE UNITED STATES^{1,2}

(Thousand metric tons)

	2011						2012 ^p					
	January–June		July–December		Total		January–June		July–December		Total	
	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content
Urea	2,840 ^e	1,300	2,590 ^e	1,190	5,430 ^e	2,490	2,730 ^e	1,250	2,490 ^e	1,150	5,220 ^e	2,400
Ammonium nitrate	3,490	1,180	3,450 ^e	1,170	6,930 ^e	2,350	3,560 ^e	1,210	3,520 ^e	1,190	7,080 ^e	2,400
Ammonium phosphates ³	5,770	893	5,940	895	11,700	1,790	5,220	786	5,470	823	10,700	1,610
Nitric acid	3,520	774	3,480 ^e	766	7,000 ^e	1,540	3,410 ^e	751	3,380 ^e	743	6,790 ^e	1,490
Ammonium sulfate ⁴	1,300	276	1,480	313	2,780	589	1,650	350	1,550	329	3,200	679

^eEstimated. ^pPreliminary.

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

²Ranked in relative order of importance by nitrogen content.

³Diammonium phosphate and monoammonium phosphate.

⁴Excludes coke plant ammonium sulfate.

Source: U.S. Census Bureau, Current Industrial Reports MQ325B, and The Fertilizer Institute; data adjusted by the U.S. Geological Survey.

TABLE 4
DOMESTIC PRODUCERS OF ANHYDROUS AMMONIA IN 2012¹

(Thousand metric tons per year of ammonia)

Company	Location	Capacity ²
Agrium Inc.	Borger, TX	490
Do.	Kennewick, WA ³	180
CF Industries Holdings, Inc.	Donaldsonville, LA	2,490
Do.	Port Neal, IA	336
Do.	Verdigris, OK	953
Do.	Woodward, OK	399
Do.	Yazoo City, MS	454
Coffeyville Resources Nitrogen Fertilizers, LLC	Coffeyville, KS	375
Dakota Gasification Co.	Beulah, ND	363
Dyno Nobel Inc.	Cheyenne, WY	174
Do.	St. Helens, OR	101
Green Valley Chemical Corp.	Creston, IA	32
Honeywell International Inc.	Hopewell, VA	530
Koch Nitrogen Co., LLC	Beatrice, NE	265
Do.	Dodge City, KS	280
Do.	Enid, OK	930
Do.	Fort Dodge, IA	350
LSB Industries, Inc.	Cherokee, AL	159
Do.	Pryor, OK	210
Mosaic Co., The	Faustina (Donaldsonville), LA	508
OCI North America	Beaumont, TX	231
PCS Nitrogen, Inc.	Augusta, GA	644
Do.	Geismar, LA ³	483
Do.	Lima, OH	535
Rentech Energy Midwest Corp.	East Dubuque, IL	278
Total		11,800

Do. Ditto.

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

²Engineering design capacity adjusted for 340 days per year of effective production capability.

³Idle.

TABLE 5
U.S. NITROGEN FERTILIZER CONSUMPTION, BY PRODUCT TYPE^{1,2}

(Thousand metric tons of nitrogen)

Fertilizer material ³	2011 ^r	2012
Single-nutrient:		
Anhydrous ammonia	3,160	3,470
Nitrogen solutions ⁴	3,100	3,390
Urea	2,530	2,620
Ammonium nitrate	230	262
Ammonium sulfate	284	289
Aqua ammonia	31	37
Other ⁵	438	393
Total	9,780	10,500
Multiple-nutrient ⁶	1,860	1,830
Grand total	11,600	12,300

^rRevised.

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

²Fertilizer years ending June 30.

³Ranked in relative order of importance by product type.

⁴Principally urea-ammonium nitrate solutions, 29.9% nitrogen.

⁵Includes other single-nutrient nitrogen materials, all natural organics, and statistical discrepancies.

⁶Various combinations of nitrogen (N), phosphate (P), and potassium (K): N-P-K, N-P, and N-K.

Source: Slater, J.V. and Kirby, B.J., 2014, Commercial Fertilizers 2012: Columbia, MO, Association of American Plant Food Control Officials Inc. Fertilizer/Ag Lime Control Service, University of Missouri, 42 p.

TABLE 6
U.S. PRODUCER STOCKS OF FIXED NITROGEN
COMPOUNDS AT END OF PERIOD

(Thousand metric tons of contained nitrogen)

Material ¹	2011	2012
Ammonia:		
January–June	170	170 ^e
July–December	178 ^e	180 ^e
Nitrogen solutions:²		
January–June	121	NA
July–December	NA	NA
Urea:		
January–June	NA	NA
July–December	NA	NA
Ammonium phosphates:³		
January–June	NA ⁴	NA
July–December	NA	NA
Ammonium nitrate:		
January–June	22	NA
July–December	NA	NA
Ammonium sulfate:		
January–June	38	NA
July–December	NA	NA
Yearend total ⁵	NA	NA

^eEstimated. NA Not available.

¹Ranked in relative order of importance.

²Urea-ammonium nitrate and ammoniacal solutions.

³Diammonium and monoammonium phosphates.

⁴Diammonium phosphates data withheld.

⁵Calendar year ending December 31.

Source: U.S. Census Bureau, Current Industrial Reports
MQ325B.

TABLE 7
PRICE QUOTATIONS FOR MAJOR NITROGEN COMPOUNDS AT END OF PERIOD

(Dollars per short ton)

Compound	2011		2012	
	June	December	June	December
Ammonium nitrate, free on board (f.o.b.) Corn Belt ¹	385–400 ^r	395–400	480	395–400
Ammonium sulfate, f.o.b. Corn Belt ¹	360–380	365–375	375–425	380–420
Anhydrous ammonia:				
F.o.b. Corn Belt ¹	635–680 ^r	670–710	625–730	760–820
F.o.b. Gulf Coast ²	550 ^r	612	655	685
Diammonium phosphate, f.o.b. central Florida	565–570 ^r	540–575	490–500	490–520
Urea:				
F.o.b. Corn Belt, ¹ prilled and granular	505–520 ^r	410–450	450–550	440–480
F.o.b. Gulf Coast, granular ²	490–495 ^r	360–375	418–506	393–410

^rRevised.

¹Illinois, Indiana, Iowa, Missouri, Nebraska, and Ohio.

²Barge, New Orleans, LA.

Source: Green Markets.

TABLE 8
U.S. EXPORTS OF ANHYDROUS AMMONIA, BY COUNTRY¹

(Thousand metric tons of ammonia and thousand dollars)

Country	2011		2012	
	Gross weight	Value ²	Gross weight	Value ²
Belgium	1	185	(3)	161
Canada	21	12,000	30	18,000
Israel	(3)	201	1	517
Korea	4	1,080	2	1,790
Singapore	(3)	128	1	214
Taiwan	1	323	(3)	36
Other	5	1,450	5	959
Total	32	15,300	38	21,700

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

²Cost, insurance, and freight value.

³Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9
U.S. IMPORTS OF ANHYDROUS AMMONIA, BY COUNTRY¹

(Thousand metric tons of ammonia and thousand dollars)

Country	2011		2012	
	Gross weight	Value ²	Gross weight	Value ²
Canada	1,160	687,000	1,130	768,000
Egypt	162	86,400	49	21,500
Estonia	109	62,900	--	--
Russia	546	312,000	538	341,000
Saudi Arabia	57	40,800	117	48,600
Trinidad and Tobago	3,770	2,030,000	3,770	2,150,000
Ukraine	588	342,000	303	204,000
Venezuela	234	131,000	206	126,000
Other	180	104,000	183	125,000
Total	6,810	3,790,000	6,300	3,780,000

-- Zero.

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

²Cost, insurance, and freight value.

Source: U.S. Census Bureau.

TABLE 10
U.S. EXPORTS OF MAJOR NITROGEN COMPOUNDS¹

(Thousand metric tons)

Compound	2011		2012		Principal destinations in 2012
	Gross weight	Nitrogen content	Gross weight	Nitrogen content	
Ammonium nitrate ²	315	107	335	114	Canada, 76%; Mexico, 23%.
Ammonium sulfate ²	1,050	222	1,300	275	Brazil, 35%; Mexico, 15%; Peru, 14%; Canada, 9%.
Anhydrous ammonia	32	26	38	31	Canada, 81%; Republic of Korea, 6%.
Diammonium phosphate	3,940	708	3,630	653	India, 29%; Brazil, 14%; Mexico, 11%.
Monoammonium phosphate	2,710	298	2,410	265	Canada, 34%; Brazil, 25%; Australia, 14%; Argentina, 10%.
Urea	207	95	336	154	Canada, 90%; Mexico, 8%.
Total	8,250	1,460	8,040	1,490	

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

²Includes industrial chemical products.

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS OF MAJOR NITROGEN COMPOUNDS¹

(Thousand metric tons and thousand dollars)

Compound	2011			2012			Principal sources in 2012
	Gross weight	Nitrogen content	Value ²	Gross weight	Nitrogen content	Value ²	
Ammonium nitrate ³	634	215	180,000	851	288	267,000	Canada, 40%; Georgia, 30%; Netherlands, 19%.
Ammonium nitrate and limestone mixtures	74	20	22,900	81	22	23,600	Netherlands, 34%; Lithuania, 23%; Croatia, 14%.
Ammonium sulfate ³	300	64	68,200	249	53	74,900	Canada, 90%.
Anhydrous ammonia ⁴	6,810	5,600	3,790,000	6,300	5,170	3,780,000	Trinidad and Tobago, 60%; Canada, 18%.
Calcium nitrate	34	6	6,160	39	7	7,040	Norway, 91%.
Diammonium phosphate	260	47	155,000	92	17	52,500	Russia, 51%; Morocco, 29%.
Monoammonium phosphate	598	66	377,000	477	52	277,000	Morocco, 36%; Russia, 35%; Canada, 16%; Mexico, 10%.
Nitrogen solutions	3,500	1,050	1,130,000	3,010	900	990,000	Trinidad and Tobago, 26%; Russia, 23%; Canada, 12%; Lithuania, 12%; Romania, 9%.
Potassium nitrate	115	16	77,400	159	22	123,000	Chile, 90%.
Potassium nitrate and sodium nitrate mixtures	2	(5)	998	1	(5)	295	Chile, 69%; Canada, 30%.
Sodium nitrate	92	15	29,800	152	25	73,700	Chile, 82%; Germany, 14%.
Urea	5,860	2,690	2,690,000	6,910	3,170	3,370,000	Canada, 21%; Oman, 15%.
Total	18,300	9,780	8,530,000	18,300	9,730	9,040,000	

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

²Cost, insurance, and freight value.

³Includes industrial chemical products.

⁴Includes industrial ammonia.

⁵Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 12
AMMONIA: ESTIMATED WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons, contained nitrogen)

Country ³	2008	2009	2010	2011	2012
Afghanistan	18 ⁴	22 ⁴	27 ⁴	28	30
Algeria	500	500 ^r	600	593 ^{r,4}	713 ⁴
Australia	-- ^r	-- ^r	-- ^r	-- ^r	--
Austria	400	370	400	400	400
Bahrain	393 ^{r,4}	390 ^{r,4}	357 ^{r,4}	380 ^{r,4}	341
Bangladesh ⁵	1,300	1,300	1,300	1,300	1,300
Belarus	743 ^{r,4}	829 ^{r,4}	836 ^{r,4}	804 ^{r,4}	815 ⁴
Belgium	830 ^r	830 ^r	830 ^r	830 ^r	830
Brazil	NA ^r	NA ^r	NA ^r	NA ^r	NA
Bulgaria	350	320	320	320	320
Burma	30	30	30	30	30
Canada ⁴	3,920	3,611	3,620	3,946	3,942 ^p
China ⁴	41,140	42,290	40,870	43,250 ^r	45,520
Croatia	300 ^r	300 ^r	358 ^{r,4}	367 ^{r,4}	350
Cuba ⁴	42	27	36 ^r	45 ^r	59
Czech Republic	175 ^{r,4}	173 ^{r,4}	160 ^{r,4}	189 ^{r,4}	200
Denmark	-- ^r	-- ^r	-- ^r	-- ^r	--
Egypt	2,500 ^r	1,790 ^r	3,000	3,500 ^r	2,950
Estonia	79 ^{r,4}	50 ^{r,4}	50 ^r	-- ^r	--
Finland	74 ^{r,4}	68 ^{r,4}	78 ^{r,4}	72 ^{r,4}	72
France	800	2,970 ^{r,4}	3,517 ^{r,4}	3,500 ^r	2,644 ⁴
Georgia	150	150	150	145 ^r	150
Germany ⁴	2,819	2,363	2,677	2,821 ^r	2,823
Greece	130	130 ^r	130 ^r	130 ^r	130
Hungary	300	300	300	300	300
India ⁶	11,100	11,200	11,500	11,800	12,000
Indonesia	4,500	4,600	4,800	5,000	5,100
Iran	2,000	2,000	2,500	2,500	2,500
Iraq	10	30	126 ⁴	143 ^{r,4}	143
Italy	460	460	460	460	2,365 ⁴
Japan ⁴	1,244	1,021	1,178	1,211 ^r	1,055
Korea, North	100	100	100	100	100
Kuwait	490 ^r	470	380 ^r	520 ^r	470
Libya ⁴	417	530	580 ^r	71 ^r	79
Lithuania ⁴	759 ^r	472 ^r	434 ^r	870 ^r	918
Malaysia	NA ^r	NA ^r	NA ^r	NA ^r	NA
Mexico ⁴	737 ^r	861 ^r	824 ^r	766 ^r	880
Netherlands	NA ^r	NA ^r	NA ^r	NA ^r	NA
New Zealand	125	125	120 ^r	120 ^r	120
Norway	350 ⁴	300 ^{r,4}	300 ^{r,4}	300 ^r	300
Oman	1,000	1,000	1,700 ^{r,4}	1,700	1,700
Pakistan	2,300	2,350	2,400	2,450	2,500
Peru	-- ^r	-- ^r	-- ^r	-- ^r	--
Poland	2,000 ^r	1,600 ^r	1,700	1,900 ^r	2,100
Portugal	244	244	244	244	244
Qatar ⁴	1,812 ^r	1,828 ^r	1,883 ^r	1,919 ^r	2,665
Romania	1,300	40 ^r	80 ^r	160 ^r	115
Russia	10,425 ⁴	10,441 ⁴	10,400	10,400 ^r	10,300
Saudi Arabia	2,500 ^r	2,400 ^r	2,500 ^r	2,800 ^r	3,700
Serbia	47	53	84	132 ^r	130
Slovakia	260	260	493 ^r	487 ^{r,4}	486 ⁴
South Africa	510 ^r	510 ^r	470 ^r	470 ^r	470
Spain	-- ^r	-- ^r	-- ^r	-- ^r	--
Switzerland	30 ^r	30 ^r	30 ^r	30	30
Syria	165 ^{r,4}	180 ^{r,4}	169 ^{r,4}	85 ^{r,4}	50

See footnotes at end of table.

TABLE 12—Continued
AMMONIA: ESTIMATED WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons, contained nitrogen)

Country ³	2008	2009	2010	2011	2012
Taiwan	-- ^r	-- ^r	-- ^r	-- ^r	--
Tajikistan ⁴	23 ^r	-- ^r	-- ^r	-- ^r	--
Trinidad and Tobago ⁴	5,100 ^r	4,946	5,553	5,444 ^r	4,466
Turkey	50	100	200 ^r	200 ^r	280
Turkmenistan	270	270	270	270	280
Ukraine	4,000	2,500	3,400	4,300	4,160
United Arab Emirates ⁴	380	380	392	386 ^r	330
United Kingdom	1,100	1,100	1,100	1,100	1,100
United States ^{4,7}	7,870	7,700	8,290	9,350	8,730 ^p
Uzbekistan	1,000	1,000	1,344 ^{r,4}	1,294 ^{r,4}	1,300
Venezuela	1,160	1,160	1,160	1,200 ^r	1,200
Vietnam	NA ^r	NA ^r	NA ^r	NA ^r	NA
Zimbabwe	20	14	29	26 ^r	25
Total	123,000 ^r	121,000 ^r	127,000 ^r	133,000 ^r	136,000

^pPreliminary. ^rRevised. NA Not available. -- Zero.

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

²Includes data available through June 24, 2014.

³In addition to the countries listed, Argentina, Brazil, Malaysia, Netherlands, and Vietnam produced ammonia, but available information is inadequate to make reliable estimates of output levels.

⁴Reported figure.

⁵May include nitrogen content of urea.

⁶Data are for years beginning April 1 of that stated.

⁷Synthetic anhydrous ammonia; excludes coke oven byproduct ammonia.