

## NITROGEN (FIXED)—AMMONIA

(Data in thousand metric tons of contained nitrogen unless otherwise noted)

**Domestic Production and Use:** Ammonia was produced by 15 companies at 32 plants in 16 States in the United States during 2017; 2 additional plants were idle for the entire year. About 50% of total U.S. ammonia production capacity was located in Louisiana, Oklahoma, and Texas because of their large reserves of natural gas, the dominant domestic feedstock for ammonia. In 2017, U.S. producers operated at about 75% of rated capacity. The United States was one of the world's leading producers and consumers of ammonia. Urea, ammonium nitrate, ammonium phosphates, nitric acid, and ammonium sulfate were, in descending order of importance, the major derivatives of ammonia produced in the United States.

Approximately 88% of apparent domestic ammonia consumption was for fertilizer use, including anhydrous ammonia for direct application, urea, ammonium nitrates, ammonium phosphates, and other nitrogen compounds. Ammonia also was used to produce explosives, plastics, synthetic fibers and resins, and numerous other chemical compounds.

<b>Salient Statistics—United States:</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017<sup>e</sup></b>
Production	19,170	19,330	19,590	110,200	10,500
Imports for consumption	4,960	4,150	4,320	3,840	3,300
Exports	196	111	93	182	530
Consumption, apparent <sup>2</sup>	13,900	13,300	13,700	13,900	13,300
Stocks, producer, yearend	240	280	420	400	410
Price, dollars per short ton, average, f.o.b. Gulf Coast <sup>3</sup>	541	531	481	267	240
Employment, plant, number <sup>e</sup>	1,200	1,200	1,200	1,300	1,500
Net import reliance <sup>4</sup> as a percentage of apparent consumption	34	30	30	26	21

**Recycling:** None.

**Import Sources (2013–16):** Trinidad and Tobago, 63%; Canada, 21%; Russia, 5%; Ukraine, 4%; and other, 7%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12–31–17</b>
Ammonia, anhydrous	2814.10.0000	Free.
Urea	3102.10.0000	Free.
Ammonium sulfate	3102.21.0000	Free.
Ammonium nitrate	3102.30.0000	Free.

**Depletion Allowance:** Not applicable.

**Government Stockpile:** None.

**Events, Trends, and Issues:** The Henry Hub spot natural gas price ranged between about \$2.44 and \$3.42 per million British thermal units for most of the year, with an average of about \$3.00 per million British thermal units. Natural gas prices in 2017 were relatively stable; slightly higher prices were a result of increased demand for natural gas owing to cold temperatures and associated increased demand for power generation. The U.S. Department of Energy, Energy Information Administration, projected that Henry Hub natural gas spot prices would average \$3.10 per million British thermal units in 2018.

The weekly average Gulf Coast ammonia price was \$257 per short ton at the beginning of 2017 and decreased to \$235 per short ton in October. The average ammonia price for 2017 was estimated to be about \$240 per short ton. Decreased demand for ammonia globally has resulted in the lower fertilizer prices in 2017.

A long period of stable and low natural gas prices in the United States has made it economical for companies to upgrade existing ammonia plants and plan for the construction of new nitrogen projects. During the next 4 years, it is expected that about 2.5 million tons of annual production capacity will be added in the United States. The additional capacity will reduce, but likely not eliminate, ammonia imports. In 2016, upgrades to increase ammonia capacity came on line as well as one new ammonia plant in Arkansas. In 2017, two new ammonia facilities in Iowa and Louisiana became operational.

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Global ammonia capacity is expected to increase by 8% during the next 4 years. In addition to North America, capacity additions are expected in Africa, Central Asia, and Eastern Europe. Increased demand for ammonia is expected in Latin America and South Asia as a result of regional nitrogen deficits.

Large corn plantings increase the demand for nitrogen fertilizers. According to the U.S. Department of Agriculture, U.S. corn growers planted 36.4 million hectares of corn in the 2017 crop year (July 1, 2016, through June 30, 2017), which was 4% less than the area planted in 2016. Corn acreage in the 2018 crop year is expected to remain about the same in most States because of anticipated higher returns for corn compared with other crops.

### World Ammonia Production and Reserves:

	Plant production		Reserves <sup>5</sup>
	<u>2016</u>	<u>2017<sup>e</sup></u>	
United States	10,200	10,500	Available atmospheric nitrogen and sources of natural gas for production of ammonia are considered adequate for all listed countries.
Algeria	1,130	1,200	
Australia	1,300	1,300	
Belarus	1,060	1,100	
Brazil	1,000	1,000	
Canada	4,140	4,100	
China	46,000	46,000	
Egypt	1,800	2,000	
France	2,600	2,600	
Germany	2,500	2,500	
India	10,800	11,000	
Indonesia	5,000	5,000	
Iran	2,640	2,700	
Malaysia	1,460	1,500	
Mexico	1,100	1,100	
Netherlands	2,300	2,300	
Oman	1,700	1,700	
Pakistan	2,600	2,600	
Poland	2,200	2,200	
Qatar	3,050	3,000	
Russia	12,500	13,000	
Saudi Arabia	4,100	4,100	
Trinidad and Tobago	4,910	4,900	
Ukraine	1,800	1,800	
Uzbekistan	1,200	1,200	
Venezuela	1,000	1,000	
Vietnam	1,100	1,100	
Other countries	<u>13,100</u>	<u>13,100</u>	
World total (rounded)	144,000	150,000	

**World Resources:** The availability of nitrogen from the atmosphere for fixed nitrogen production is unlimited. Mineralized occurrences of sodium and potassium nitrates, found in the Atacama Desert of Chile, contribute minimally to the global nitrogen supply.

**Substitutes:** Nitrogen is an essential plant nutrient that has no substitute. No practical substitutes for nitrogen explosives and blasting agents are known.

<sup>e</sup>Estimated.

<sup>1</sup>Source: The Fertilizer Institute; data adjusted by the U.S. Geological Survey.

<sup>2</sup>Defined as production + imports – exports + adjustments for industry stock changes.

<sup>3</sup>Source: Green Markets.

<sup>4</sup>Defined as imports – exports + adjustments for industry stock changes.

<sup>5</sup>See [Appendix C](#) for resource and reserve definitions and information concerning data sources.