

NITROGEN (FIXED)—AMMONIA

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

Domestic Production and Use: Ammonia was produced by 13 companies at 29 plants in 15 States in the United States during 2015; 2 additional plants were idle for the entire year. About 60% 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 2015, U.S. producers operated at about 80% 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 plastics, synthetic fibers and resins, explosives, and numerous other chemical compounds.

Salient Statistics—United States: ¹	2011	2012	2013	2014	2015^e
Production	² 9,350	³ 8,730	³ 9,170	³ 9,330	9,400
Imports for consumption	5,600	5,170	4,960	4,150	4,530
Exports	26	31	196	111	640
Consumption, apparent	14,900	13,900	13,900	13,300	13,300
Stocks, producer, yearend	178	180	⁴ 240	280	300
Price, dollars per short ton, average, f.o.b. Gulf Coast ⁴	531	579	541	530	470
Employment, plant, number ^e	1,050	1,100	1,200	1,200	1,200
Net import reliance ⁵ as a percentage of apparent consumption	37	37	34	30	29

Recycling: None.

Import Sources (2011–14): Trinidad and Tobago, 59%; Canada, 18%; Russia, 7%; Ukraine, 6%; and other, 10%.

Tariff: Item	Number	Normal Trade Relations 12–31–15
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 \$2.30 and \$3.30 per million British thermal units for most of the year, with an average of about \$2.80 per million British thermal units. Natural gas prices in 2015 were relatively stable; slightly higher prices were a result of increased demand for natural gas owing to unseasonably cold and high temperatures and associated increased demand for power generation. The weekly average Gulf Coast ammonia price was \$565 per short ton at the beginning of 2015 and decreased to \$345 per short ton in October. The average ammonia price for 2015 was estimated to be about \$470 per short ton. The U.S. Department of Energy, Energy Information Administration, projected that Henry Hub natural gas spot prices would average \$3.05 per million British thermal units in 2016.

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 5.0 million tons per year of production capacity will be added in the United States. The additional capacity will reduce but likely not eliminate ammonia imports.

Global ammonia capacity is expected to increase by 15% during the next 4 years. Capacity additions are expected in Africa, Asia, Eastern Europe, and Latin America. The largest growth is expected in China and Russia.

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Large corn plantings increase the demand for nitrogen fertilizers. According to the U.S. Department of Agriculture, U.S. corn growers planted 36 million hectares of corn in the 2015 crop year (July 1, 2014, through June 30, 2015), which is 2% less than the area planted in 2014. Corn acreage decreased in most of the Corn Belt States in the 2015 crop year because of anticipated lower net returns from corn compared to other commodities. Overall corn acreage in the United States was expected to increase owing to continued U.S. ethanol production and U.S. corn exports in response to a strong global demand for feed grains.

Nitrogen fertilizers continue to be an environmental concern. Overfertilization and the subsequent runoff of excess fertilizer may contribute to nitrogen accumulation in watersheds. Nitrogen in excess fertilizer runoff was suspected to be a cause of the hypoxic zone that arises in the Gulf of Mexico during the summer. A hypoxic zone happens where water near the bottom of a large body of water, such as the Gulf of Mexico, contains less than 2 parts per million of dissolved oxygen. This may cause stress or death in bottom-dwelling organisms that cannot move out of the hypoxic zone. Scientists continued to study the effects of fertilization on the Nation's environmental health.

World Ammonia Production and Reserves:

	Plant production		Reserves ⁶
	2014	2015 ^e	
United States	9,330	9,400	Available atmospheric nitrogen and sources of natural gas for production of ammonia are considered adequate for all listed countries.
Australia	1,250	1,300	
Belarus	1,060	1,100	
Canada	3,940	3,900	
China	47,300	48,000	
Egypt	2,660	2,600	
Estonia	3,000	3,000	
France	2,600	2,600	
Germany	2,800	2,800	
India	11,000	11,000	
Indonesia	5,000	5,000	
Iran	2,500	2,500	
Malaysia	1,000	1,000	
Netherlands	1,800	1,800	
Oman	1,100	1,100	
Pakistan	2,700	2,700	
Poland	2,100	2,100	
Qatar	2,990	3,000	
Russia	11,800	12,000	
Saudi Arabia	3,200	3,200	
Trinidad and Tobago	4,730	4,700	
Ukraine	4,240	4,200	
United Kingdom	1,100	1,100	
Uzbekistan	1,350	1,300	
Venezuela	1,200	1,200	
Other countries	13,300	13,000	
World total (rounded)	145,000	146,000	

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 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.

^eEstimated.

¹U.S. Department of Commerce data unless otherwise noted.

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.

⁴Source: Green Markets.

⁵Defined as imports – exports + adjustments for industry stock changes.

⁶See [Appendix C](#) for resource/reserve definitions and information concerning data sources.