

NITROGEN (FIXED)—AMMONIA

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

Domestic Production and Use: Ammonia was produced by 16 companies at 35 plants in 16 States in the United States during 2019; 2 additional plants were idle for the entire year. About 60% of total U.S. ammonia production capacity was in Louisiana, Oklahoma, and Texas because of their large reserves of natural gas, the dominant domestic feedstock for ammonia. In 2019, U.S. producers operated at about 90% of rated capacity. The United States was one of the world's leading producers and consumers of ammonia. Urea, ammonium nitrate, nitric acid, ammonium phosphates, 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.

Salient Statistics—United States:	2015	2016	2017	2018	2019^e
Production	19,590	110,200	111,600	113,100	14,000
Imports for consumption	4,320	3,840	3,090	2,530	2,000
Exports	93	183	612	281	240
Consumption, apparent ²	13,700	13,800	14,100	15,200	16,000
Stocks, producer, yearend	420	400	320	490	400
Price, dollars per short ton, average, f.o.b. Gulf Coast ³	481	267	247	281	230
Employment, plant, number ^e	1,200	1,300	1,500	1,600	1,600
Net import reliance ⁴ as a percentage of apparent consumption	30	26	18	14	12

Recycling: None.

Import Sources (2015–18): Trinidad and Tobago, 65%; Canada, 26%; Russia, 3%; Venezuela, 3%; and other, 3%.

Tariff: Item	Number	Normal Trade Relations 12–31–19
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 \$2.03 and \$4.12 per million British thermal units for most of the year, with an average of about \$2.60 per million British thermal units. Natural gas prices in 2019 were lower than those in 2018; a result of strong supply growth and warmer winter weather compared with that in 2018. The U.S. Department of Energy, Energy Information Administration, projected that Henry Hub natural gas spot prices would average \$2.52 per million British thermal units in 2020.

The weekly average Gulf Coast ammonia price was \$259 per short ton at the beginning of 2019, decreased to \$200 per short ton in mid-April, and then increased to \$235 per short ton in mid-August. The average ammonia price for 2019 was estimated to be \$230 per short ton. In 2019, low natural gas prices resulted in lower ammonia prices.

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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 construct new nitrogen facilities. The additional capacity has reduced ammonia imports. Expansion in the ammonia industry took place throughout the past 5 years; however, no additional ammonia plants are expected to be commissioned before 2022. The newest U.S. ammonia plant located in Freeport, TX, became operational in 2018.

Global ammonia capacity is expected to increase by a total of 4% during the next 4 years. Capacity additions are expected in Africa, Eastern Europe, and south Asia; however, ongoing plant closures will decrease capacity in east Asia. Demand for ammonia is expected to increase in all regions with the largest increases expected in Africa and Eastern Europe.

Large corn plantings maintain the continued demand for nitrogen fertilizers. According to the U.S. Department of Agriculture, U.S. corn growers planted 37.1 million hectares of corn in the 2019 crop-year (July 1, 2018, through June 30, 2019), which was 3% greater than the area planted in 2018. Corn acreage in the 2020 crop-year is expected to increase because of anticipated higher returns for corn compared with those of other crops.

World Ammonia Production and Reserves:

	Plant production		Reserves ⁵
	2018	2019 ^e	
United States	13,100	14,000	Available atmospheric nitrogen and sources of natural gas for production of ammonia are considered adequate for all listed countries.
Algeria	1,600	2,300	
Australia	1,300	1,300	
Belarus	1,050	1,100	
Brazil	1,000	1,000	
Canada	3,830	3,800	
China	41,000	40,000	
Egypt	3,700	4,100	
Germany	2,600	2,600	
India	11,400	12,000	
Indonesia	5,000	5,000	
Iran	3,400	3,400	
Netherlands	2,400	2,400	
Oman	1,700	1,700	
Pakistan	3,100	3,100	
Poland	2,170	2,200	
Qatar	3,100	3,100	
Russia	14,900	15,000	
Saudi Arabia	4,000	4,300	
Trinidad and Tobago	4,000	4,000	
Ukraine	1,620	1,600	
Uzbekistan	1,200	1,200	
Vietnam	1,100	1,100	
Other countries	15,800	15,000	
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, such as those 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.

^eEstimated.

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

²Defined as production + imports – exports + adjustments for industry stock changes.

³Source: Green Markets.

⁴Defined as imports – exports + adjustments for industry stock changes.

⁵See Appendix C for resource and reserve definitions and information concerning data sources.