

## NITROGEN (FIXED)—AMMONIA

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

**Domestic Production and Use:** Ammonia was produced by 16 companies at 32 plants in 19 States in the United States during 2004. Fifty-four percent of total U.S. ammonia production capacity was centered in Louisiana, Oklahoma, and Texas because of their large reserves of natural gas, the dominant domestic feedstock. In 2004, U.S. producers operated at about 72% of their rated capacity. The United States remained the world's second largest ammonia producer and consumer following China. Urea, ammonium nitrate, ammonium phosphates, nitric acid, and ammonium sulfate were the major derivatives of ammonia in the United States, in descending order of importance.

Approximately 90% 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.

<b>Salient Statistics—United States:</b> <sup>1</sup>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004<sup>e</sup></b>
Production <sup>2</sup>	11,800	9,120	10,100	8,770	8,900
Imports for consumption	3,880	4,550	4,670	5,720	5,800
Exports	662	647	437	400	430
Consumption, apparent	14,900	13,200	14,500	14,200	14,200
Stocks, producer, yearend <sup>3</sup>	1,120	916	771	167	197
Price, dollars per ton, average, f.o.b. Gulf Coast <sup>3</sup>	169	183	137	245	275
Employment, plant, number <sup>e</sup>	2,000	1,800	1,700	1,550	1,300
Net import reliance <sup>4</sup> as a percentage of apparent consumption	21	31	30	42	38

**Recycling:** None.

**Import Sources (2000-03):** Trinidad and Tobago, 54%; Canada, 18%; Russia, 15%; and other, 13%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations</b>
Ammonia, anhydrous	2814.10.0000	<u>12-31-04</u> 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:** In August, the second largest U.S. ammonia producer agreed to acquire the assets of the sixth largest ammonia producer, who had filed for bankruptcy in 2003. The acquisition, which was expected to be completed by the first quarter of 2005, includes ammonia production facilities in Donaldsonville, LA, and Yazoo City, MS, with a total capacity of 1.5 million tons per year, and one-half ownership of a plant in Trinidad and Tobago with a total capacity of 648,000 tons per year. This acquisition will make the second largest ammonia producer the largest in the United States, with 24% of total U.S. production capacity.

Also in August, a synthesis gas conversion company, based in Denver, CO, entered into an agreement to purchase the East Dubuque, IL, nitrogen-fertilizer complex, which includes a 278,000-ton-per-year ammonia plant, for \$63 million. The company intended to continue to operate the plant as a natural-gas-fed nitrogen plant while converting it to a coal-fed gasification process using Illinois coal as the feedstock. The conversion time was estimated to be about 3 years.

Researchers at Iowa State University, in conjunction with one of the U.S. ammonia producers, developed an ammonia additive to help stop the theft of anhydrous ammonia for methamphetamine production, which has become an increasingly frequent event. The product will stain anyone who comes in contact with the treated product a fluorescent pink, and the stain can be detected by ultraviolet light for up to 72 hours. Marketing of the new product, which was estimated to add \$9 per ton to the price of ammonia, began in September. Researchers at Iowa State also have identified an additive that makes anhydrous ammonia ineffective for methamphetamine production, although it is not yet in commercial production.

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Three new ammonia plants were opened in 2004—a 697,000-ton-per-year plant in Iran, a 680,000-ton-per-year plant in Qatar, and a 204,000-ton-per-year plant in Turkmenistan. In addition, several companies announced capacity increases in Bolivia, Brazil, China, Egypt, Lithuania, Russia, and Trinidad and Tobago that would add about 2.7 million tons of ammonia production capacity.

According to long-term projections by the U.S. Department of Agriculture (USDA), projected plantings for eight major field crops in the United States were expected to remain relatively stable at about 101 million hectares through the 2004-13 forecast period. Corn, soybeans, and wheat account for about 86% of this acreage. The USDA expected that corn acreage would rise gradually as increasing domestic and export demands lead to rising prices. Feed and residual use of corn is initially unchanged with fewer cattle on feed and lower pork production offsetting increases in poultry output. Feed use then rises as meat production increases. Significant growth in corn production is expected for ethanol use during the next several years as many States ban methyl tertiary butyl ether as a fuel oxygenate. U.S. corn exports are expected to rise faster than global trade, with the United States increasing its market share of exports. Because corn is the most intensive nitrogen-fertilizer-demand crop, increasing corn acreage is expected to lead to increasing nitrogen use in the United States.

According to the U.S. Department of Energy, Energy Information Administration, average natural gas spot prices were not expected to be significantly higher in 2005 than in 2004. Henry Hub prices averaged \$5.80 per million cubic feet in 2003 and were expected to average \$5.96 in 2004 and \$6.16 in 2005.

Nitrogen compounds also are an environmental concern. Overfertilization and the subsequent runoff of excess fertilizer may contribute to nitrogen accumulation in watersheds. Nitrogen in excess fertilizer runoff is suspected to be a cause of the hypoxic zone that takes place in the Gulf of Mexico during the summer. Scientists continue to study the effects of fertilization on the Nation's environmental health.

### **World Ammonia Production, Reserves, and Reserve Base:**

	Plant production		Reserves and reserve base <sup>5</sup>
	2003	2004 <sup>e</sup>	
United States	8,770	8,900	Available atmospheric nitrogen and sources of natural gas for production of ammonia are considered adequate for all listed countries.
Canada	3,650	3,800	
China	30,200	31,000	
Egypt	1,790	1,600	
Germany	2,800	2,700	
India	9,710	9,400	
Indonesia	4,250	3,900	
Netherlands	1,750	1,900	
Pakistan	2,360	2,400	
Poland	1,910	1,900	
Russia	9,100	9,100	
Saudi Arabia	1,740	1,750	
Trinidad and Tobago	3,570	3,800	
Ukraine	3,900	4,000	
Other countries	<u>23,400</u>	<u>23,000</u>	
World total (rounded)	109,000	109,000	

**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. Also, there are no known practical substitutes for nitrogen explosives and blasting agents.

<sup>e</sup>Estimated.

<sup>1</sup>U.S. Department of Commerce (DOC) data unless otherwise noted.

<sup>2</sup>Annual and preliminary data as reported in Current Industrial Reports MA325B and MQ325B (DOC).

<sup>3</sup>For 2000-03, source: Green Markets.

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

<sup>5</sup>See [Appendix C](#) for definitions.