

HELIUM

(Data in million cubic meters of contained helium gas¹ unless otherwise noted)

Domestic Production and Use: The estimated value of Grade-A helium (99.997% or greater) extracted during 2017 by private industry was about \$660 million. Fourteen plants (one in Arizona, two in Colorado, five in Kansas, one in Oklahoma, four in Texas, and one in Utah) extracted helium from natural gas and produced crude helium that ranged from 50% to 99% helium. One plant in Colorado and another in Wyoming extracted helium from natural gas and produced Grade-A helium. Three plants in Kansas and one in Oklahoma accepted crude helium from other producers and the Bureau of Land Management (BLM) pipeline and purified it to Grade-A helium. In 2017, estimated domestic consumption of Grade-A helium was 43 million cubic meters (1.5 billion cubic feet), and it was used for magnetic resonance imaging, 30%; lifting gas, 17%; analytical and laboratory applications, 14%; welding, 9%; engineering and scientific applications, 6%; leak detection and semiconductor manufacturing, 5% each; and various other minor applications, 14%.

| Salient Statistics—United States: | 2013 | 2014 | 2015 | 2016 | 2017^e |
|--|-------------|-------------|-------------|-------------|-------------------------|
| Helium extracted from natural gas ² | 69 | 75 | 71 | 66 | 63 |
| Withdrawn from storage ³ | 49 | 27 | 20 | 23 | 28 |
| Grade-A helium sales | 118 | 102 | 91 | 89 | 91 |
| Imports for consumption | 2 | 7 | 16 | 24 | 21 |
| Exports ⁴ | 81 | 67 | 65 | 61 | 69 |
| Consumption, apparent ⁴ | 39 | 42 | 42 | 52 | 43 |
| Net import reliance ⁵ as a percentage of apparent consumption | E | E | E | E | E |

In fiscal year (FY) 2017, the price for crude helium to Government users was \$2.99 per cubic meter (\$83.00 per thousand cubic feet) and to nongovernment users was \$3.86 per cubic meter (\$107.00 per thousand cubic feet). The price for the Government-owned helium is mandated by the Helium Stewardship Act of 2013 (Public Law 113–40) and determined through public auctions and industry surveys. The estimated price for private industry's Grade-A helium was about \$7.21 per cubic meter (\$200 per thousand cubic feet), with some producers posting surcharges to this price.

Recycling: In the United States, helium used in large-volume applications is seldom recycled. Some low-volume or liquid boil-off recovery systems are used. In the rest of the world, helium recycling is practiced more often.

Import Sources (2013–16): Qatar, 95%; and other, 5%.

| Tariff: Item | Number | Normal Trade Relations |
|---------------------|---------------|---------------------------------|
| Helium | 2804.29.0010 | <u>12–31–17</u> 3.7% ad val. |

Depletion Allowance: Allowances are applicable to natural gas from which helium is extracted, but no allowance is granted directly to helium.

Government Stockpile: Under the Helium Stewardship Act of 2013, the BLM manages the Federal Helium Program, which includes all operations of the Cliffside Field helium storage reservoir, in Potter County, TX, and the Government's crude helium pipeline system. Private firms that sell Grade-A helium to Federal agencies are required to purchase a like amount of (in-kind) crude helium from the BLM. The law mandated that the BLM annually sell at auction Federal Conservation helium stored in Bush Dome at the Cliffside Field. The amounts sold are approximately equal to the amount that the Federal helium system can produce each year. The BLM will dispose of all helium-related assets when the remaining conservation helium falls below 83.2 million cubic meters or no later than 2021. In FY 2017, privately owned companies purchased about 3.9 million cubic meters (142 million cubic feet) of in-kind crude helium. Privately owned companies also purchased 47.8 million cubic meters (1.725 billion cubic feet) of open market sales helium. During FY 2017, the BLM's Amarillo Field Office, Helium Operations, accepted about 6.1 million cubic meters (220 million cubic feet) of private helium for storage and redelivered nearly 33.4 million cubic meters (1.2 billion cubic feet). As of September 30, 2017, about 102.6 million cubic meters (3.7 billion cubic feet) of privately owned helium remained in storage at Cliffside Field.

Stockpile Status—9–30–17⁶

| Material | Inventory | Authorized for disposal | Disposal plan FY 2017 | Disposals FY 2017 |
|-----------------|------------------|--------------------------------|------------------------------|--------------------------|
| Helium | 181.1 | 181.1 | 28.4 | 29.1 |

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Events, Trends, and Issues: In 2017, the BLM continued implementation of the Helium Stewardship Act of 2013 by conducting its fourth auction of helium from Federal helium storage at the Cliffside Field near Amarillo. By the end of the decade, international helium extraction facilities are likely to become the main source of supply for world helium users. Seven international helium plants are in operation and more are planned during the next 3 to 5 years. Expansions to facilities have been completed in Algeria and Qatar. In 2017, domestic consumption of helium decreased while worldwide consumption remained unchanged; however, an embargo of products from Qatar, beginning about July 2017, caused a temporary shortage. As a result, production of helium from the Federal Helium Reserve increased along with exports.

World Production and Reserves:⁸

| | Production | | Reserves ⁹ |
|--|------------|-------------------|-----------------------|
| | 2016 | 2017 ^e | |
| United States (extracted from natural gas) | 66 | 63 | 3,900 |
| United States (from Cliffside Field) | 23 | 28 | (¹⁰) |
| Algeria | 10 | 14 | 1,800 |
| Australia | 4 | 4 | NA |
| Canada | <1 | <1 | NA |
| China | NA | NA | NA |
| Poland | 2 | 2 | 25 |
| Qatar | 50 | 45 | NA |
| Russia | 3 | 3 | 1,700 |
| World total (rounded) | 160 | 160 | NA |

World Resources: Section 16 of Public Law 113-40 requires the U.S. Geological Survey (USGS) to complete a national helium gas assessment along with a global helium gas assessment. The USGS and the BLM have been coordinating efforts to complete this assessment. However, it may be several years before a project of this magnitude will be completed. The BLM plans to update the report of Helium Resources of the United States by yearend 2018. Until then, the following estimates are still the best available.

As of December 31, 2006, the total helium reserves and resources of the United States were estimated to be 20.6 billion cubic meters (744 billion cubic feet). This includes 4.25 billion cubic meters (153 billion cubic feet) of measured reserves, 5.33 billion cubic meters (192 billion cubic feet) of probable resources, 5.93 billion cubic meters (214 billion cubic feet) of possible resources, and 5.11 billion cubic meters (184 billion cubic feet) of speculative resources. Included in the measured reserves are 670 million cubic meters (24.2 billion cubic feet) of helium stored in the Cliffside Field Government Reserve, and 65 million cubic meters (2.3 billion cubic feet) of helium contained in Cliffside Field native gas. The Hugoton (Kansas, Oklahoma, and Texas), Panhandle West, Panoma, Riley Ridge in Wyoming, and Cliffside Fields are the depleting fields from which most U.S.-produced helium is extracted. These fields contained an estimated 3.9 billion cubic meters (140 billion cubic feet) of helium.

Helium resources of the world, exclusive of the United States, were estimated to be about 31.3 billion cubic meters (1.13 trillion cubic feet). The locations and volumes of the major deposits, in billion cubic meters, are Qatar, 10.1; Algeria, 8.2; Russia, 6.8; Canada, 2.0; and China, 1.1. As of December 31, 2017, the BLM had analyzed about 22,100 gas samples from 26 countries and the United States, in a program to identify world helium resources.

Substitutes: There is no substitute for helium in cryogenic applications if temperatures below -429 °F are required. Argon can be substituted for helium in welding, and hydrogen can be substituted for helium in some lighter-than-air applications in which the flammable nature of hydrogen is not objectionable. Hydrogen is also being investigated as a substitute for helium in deep-sea diving applications below 1,000 feet.

^eEstimated. E Net exporter. NA Not available.

¹Measured at 101.325 kilopascals absolute (14.696 psia) and 15 °C; 27.737 cubic meters of helium = 1,000 cubic feet of helium at 70 °F and 14.7 psia.

²Both Grade-A and crude helium.

³Extracted from natural gas in prior years.

⁴Grade-A helium. Defined as Grade-A helium sales + imports – exports.

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

⁶See [Appendix B](#) for definitions.

⁷Team Leader, Resources and Evaluation Group, Bureau of Land Management, Amarillo Field Office, Helium Operations, Amarillo, TX.

⁸Production and reserves outside of the United States are estimated.

⁹See [Appendix C](#) for resource and reserve definitions and information concerning data sources.

¹⁰Included in United States (extracted from natural gas) reserves.