

NATURAL GAS USE IN **VIRGINIA**

ENHANCING THE QUALITY OF LIFE FOR VIRGINIANS



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ENHANCING THE QUALITY OF LIFE FOR VIRGINIANS



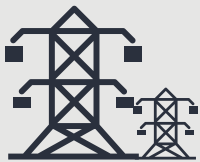


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SUMMARY

From heating schools and hospitals, to producing the fertilizer that grows the crops, to generating the electricity that runs our computers, natural gas touches every aspect of life in Virginia. And the role that natural gas plays in our lives is growing. Natural gas use in Virginia has **increased over 50 percent** between 2004 and 2014 and this increased use of natural gas is generating significant economic benefits for Virginia, including lower costs for consumers and manufacturers:



POWER GENERATION

POWER GENERATION: Virginia has become increasingly reliant on natural gas for power generation. Between 2003 and 2013, natural gas consumption to generate power increased almost fourfold. Increasing natural gas use has greatly benefitted the environment, helping Virginia cut **CO₂ emission from electricity generation by 25 percent during that time frame.**



RESIDENTIAL

RESIDENTIAL: Natural gas prices have fallen significantly over the past decade, ranging from 24 percent for residential consumers to 63 percent for power generators. If residential and commercial consumers had made their 2015 purchases using 2010 prices, they would have spent an **extra \$193.4 million.**



INDUSTRY

INDUSTRY: The use of natural gas in Virginia has **risen 42 percent** over the past five years. Increased use of natural gas is helping Virginian companies cut costs, lower prices and create good-paying jobs.



COMMERCIAL

COMMERCIAL USERS: Commercial consumption of natural gas has risen 6.6 percent in part due to an approximately 3.3 percent increase in both the number of consumers and quantity consumed by each facility. As natural gas prices fall, more facilities will be looking to convert to natural gas.



SCHOOLS

SCHOOLS: Nearly three quarters of U.S. schools use natural gas as their fuel for building and water heating and cooking. In Virginia, colleges and universities are increasingly turning to natural gas for power generation as well.

The right infrastructure approach, including expanded pipeline capacity, can help Virginia achieve important economic and environmental goals.

INTRODUCTION

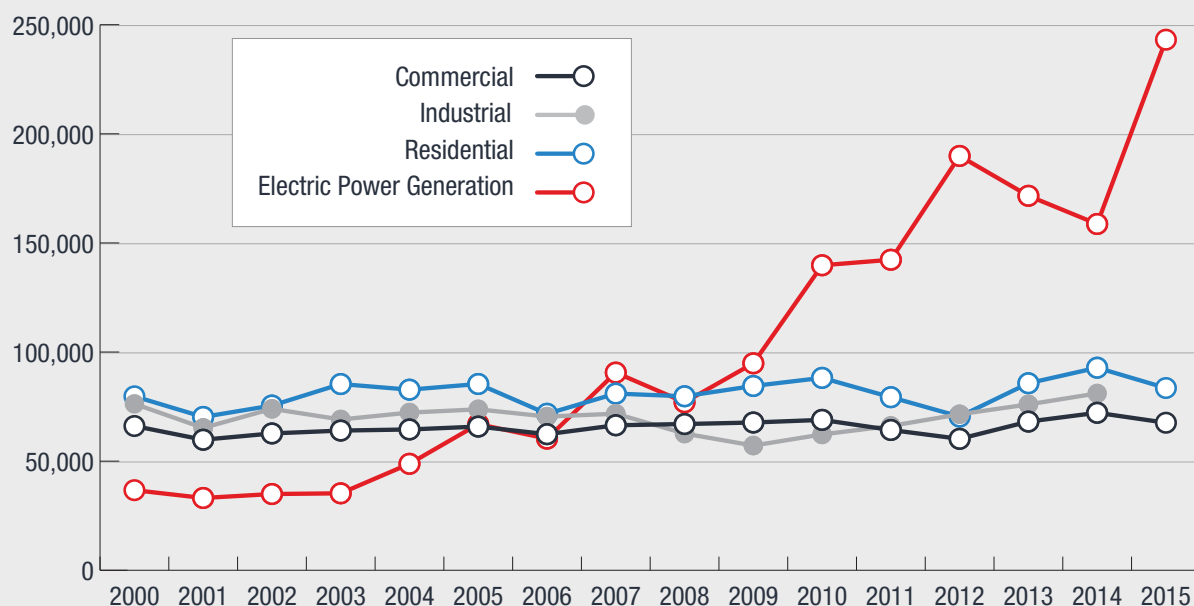
NATURAL GAS CONSUMPTION IN VIRGINIA

Natural gas plays a vital role in enhancing the quality of life Virginians enjoy. Over the last decade, Virginians' use of natural gas has increased dramatically. This growth is primarily attributable to a tripling of the natural gas used for low-emissions electricity generation. In 2014, the electric power sector accounted for more than two-fifths of the total amount of natural gas consumed in the state.

Beyond electricity, the number of residential natural gas users has increased by five percent, or approximately 60,000 customers, over the past five years, and each household's use of natural gas has increased four percent over the same time period. The residential sector, where one in three households uses natural gas for home heating, is the second-largest natural gas consuming sector in Virginia. Commercial use has similarly increased over the past five years. Industrial use of natural gas, which includes agriculture, is up over 40 percent, and natural gas use for transportation is up over 75 percent.

FIGURE 1: NATURAL GAS CONSUMPTION IN VIRGINIA

Million Cubic Feet (MMcf)



Source: EIA.



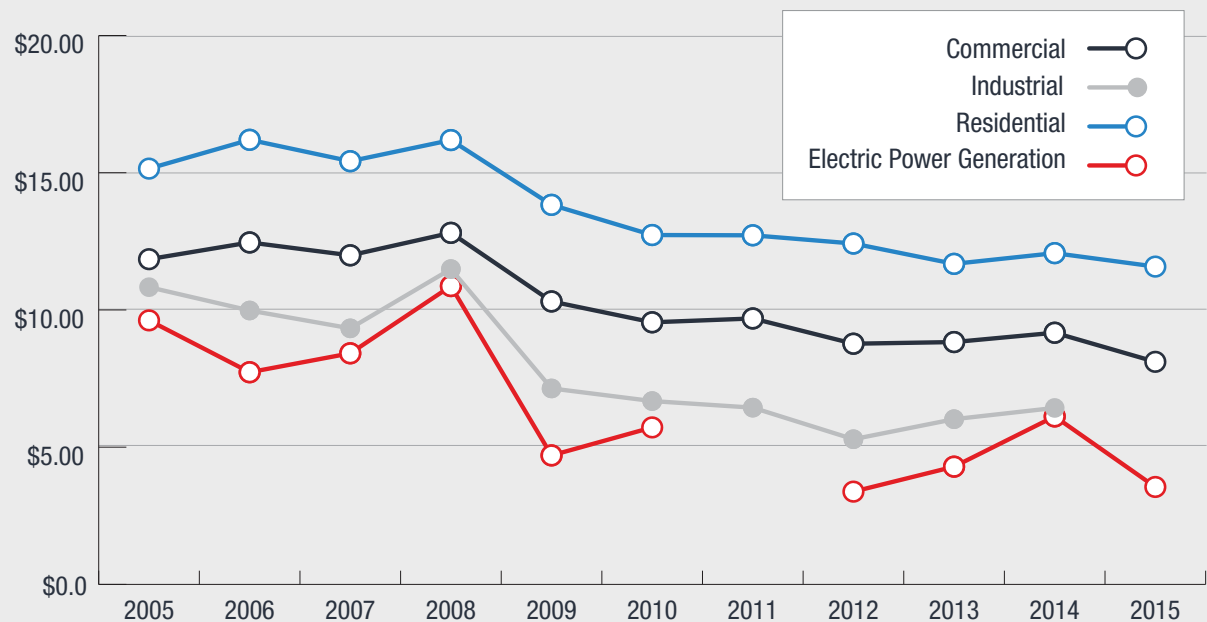
Despite the increase in demand, natural gas prices have not risen for Virginians. On the contrary, natural gas prices have fallen significantly over the past decade, ranging from 24 percent for residential consumers to 63 percent for power generators.¹ This has meant large savings in energy expenditures. For example, if residential and commercial consumers had made their 2015 purchases using 2010 prices, they would have spent an extra \$193.4 million.²

Looking forward, natural gas consumption in Virginia is likely to grow over the next ten years. Virginia's 2014 Energy Plan³ identified the following drivers for demand growth:

- ▶ Utility and non-utility construction of new natural gas-fired generation plants.
- ▶ Additional retail consumer demand associated with population growth.
- ▶ Transportation use of natural gas, particularly if the number of refueling facilities is expanded.

FIGURE 2: VIRGINIA NATURAL GAS PRICES

Per Thousand Cubic Feet



Source: EIA.

NATURAL GAS TRANSPORTATION & STORAGE

THERE ARE APPROXIMATELY 2,950 MILES OF NATURAL GAS TRANSMISSION PIPELINES IN VIRGINIA.

Increased natural gas production in Pennsylvania has led to proposals to reverse flow on existing interstate pipelines and to construct new pipelines, allowing natural gas supplies to flow from Pennsylvania into Virginia. In 2012, natural gas movements into Virginia from the south began to decline, and more natural gas entered the state from the north.

According to EIA, Virginia transports about 60 percent of the natural gas received on to other states. Almost half the natural gas that enters Virginia moves to Maryland and then to other markets in the Northeast. Some of the natural gas leaving Virginia is distributed to Washington, DC, and the surrounding Maryland suburbs by a local natural gas utility.

Virginia's natural gas production, primarily located in the southwestern corner of the state, has increased significantly in the past three decades, however it only equals about one-third of the state's demand. Most of Virginia's natural gas supply comes primarily from the Gulf Coast and Appalachian regions and is delivered via several major interstate natural gas pipelines.

Virginia is the natural gas crossroads of the East Coast. There are approximately 2,950 miles of natural gas transmission pipelines in Virginia which typically move natural gas from the Gulf region along the Atlantic seaboard to the Northeast. In fact, Virginia sends about three-fifths of the natural gas it receives to other states, with more than half going to Maryland, D.C. and other northern states. However, increased production in neighboring states, West Virginia and Pennsylvania, has led to an increase in the amount of gas coming from the West and North, reversing in part the historic pattern of natural gas flows. This in turn has led to the development of new projects that would increase natural gas access in Virginia from the Marcellus region.

NATURAL GAS CONSUMED IN VIRGINIA IS TRANSPORTED BY FOUR PRIMARY INTERSTATE PIPELINES:⁴

- ▶ Transcontinental pipeline provides access to supply sources from Texas, the Gulf of Mexico, and other southern locations.
- ▶ East Tennessee Gas pipeline provides access to supply sources from Virginia and other Appalachian natural gas production areas, from Texas and other southern locations via the Tennessee Gas Pipeline system.
- ▶ Columbia Gas Transmission pipeline provides access to supply sources from Appalachian Marcellus and Utica Shale, and Texas, the Gulf of Mexico, and other southern locations via the Columbia Gulf Transmission system.
- ▶ Dominion Transmission pipeline provides access to supply sources from Appalachian Marcellus and Utica Shale production, and connects to the Cove Point liquefied natural gas (LNG) facility in Maryland.
- ▶ There are two proposed interstate pipelines that would also bring natural gas to Virginia. The 600-mile, 1.5 million dekatherm, Atlantic Coast Pipeline would extend from West Virginia through Virginia into North Carolina and would include a 70 mile spur extending to Eastern Virginia for distribution to customers of Virginia Natural Gas.⁵ The 303-mile Mountain Valley Pipeline would transport natural gas produced in northwestern West Virginia to southern Virginia. Mountain Valley Pipeline would provide Mid-Atlantic markets with up to two million dekatherms of transmission capacity.⁶

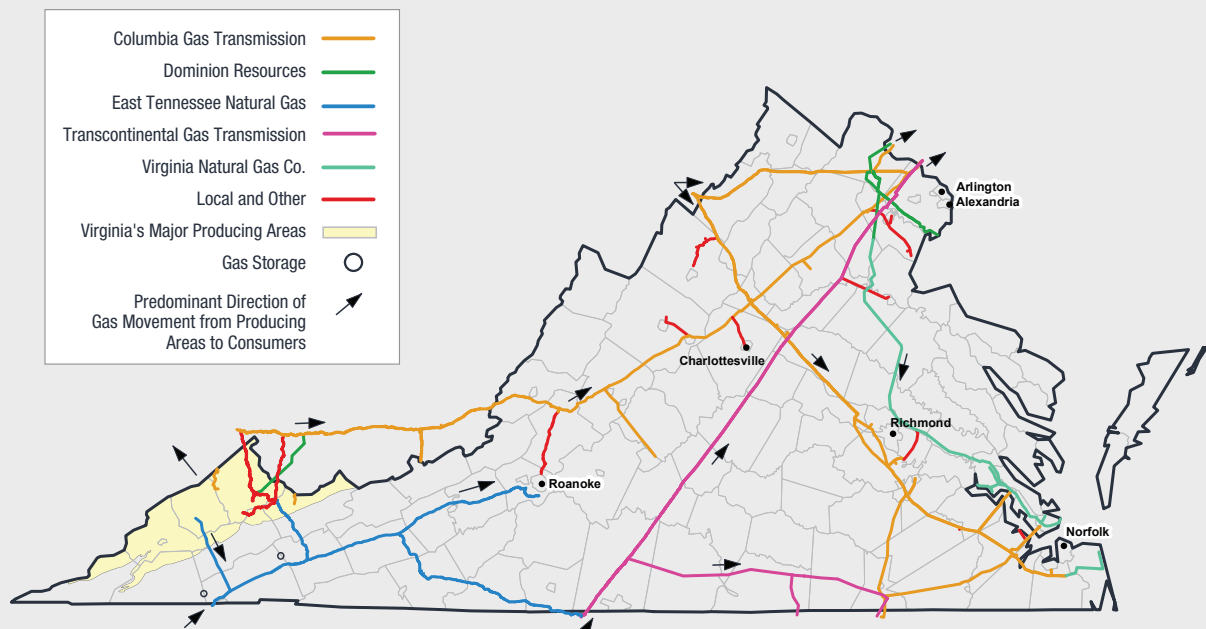


UNDERGROUND STORAGE

Natural gas is also injected into Virginia's two natural gas storage fields that have a combined capacity of 9.5 billion cubic feet. To ensure adequate supplies during the winter, natural gas is transported during the summer by pipeline to Saltville and Early Grove, where it is stored in salt beds and depleted reservoirs, respectively. The Saltville storage caverns were excavated decades ago when salt brine was pumped to the surface for a

chlorine and caustic soda business. The caverns sat idle for two decades until they were revitalized and expanded for storage. In the years following, the expansion annually generated an estimated \$135,000 in property taxes, \$125,000 in storage compensation fees and \$110,000 in royalties. This additional revenue enabled the Saltville Town Council to hold down tax rates in a town of largely elderly and low- and moderate-income families.⁷

FIGURE 3: MAJOR NATURAL GAS TRANSMISSION PIPELINES IN VIRGINIA 2016



Source: EIA; ESRI. This map includes information copyrighted by PennWell Corporation, 800-823-6277. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

USE OF NATURAL GAS IN VIRGINIA

The remainder of this report examines the five major users of natural gas in Virginia: power generation, industrial, residential, commercial, and transportation.



**1. POWER
GENERATION**



2. INDUSTRIAL



3. RESIDENTIAL



4. COMMERCIAL



**5.
TRANSPORTATION**

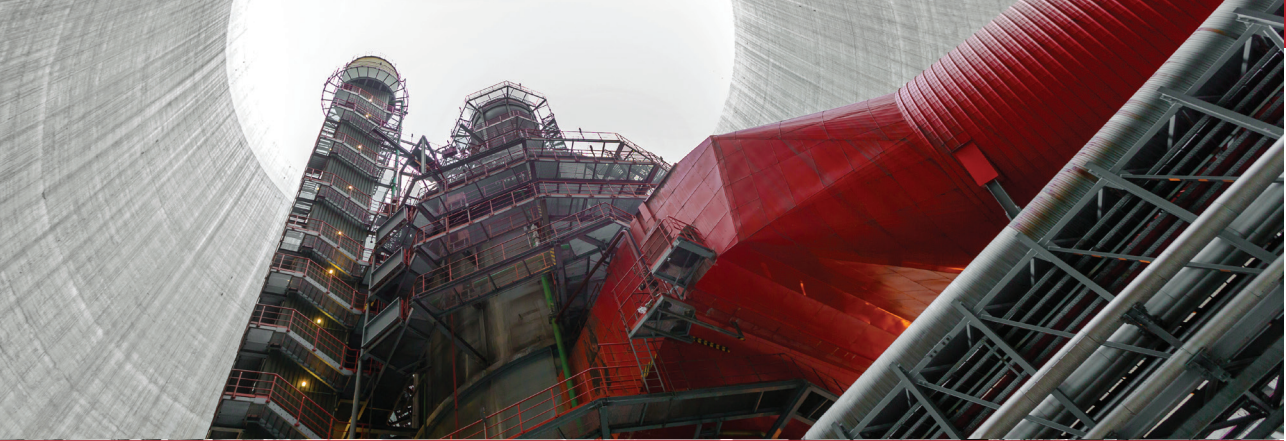
1. POWER GENERATION



Virginia has become increasingly reliant for natural gas in the power generation sector. Between 2003 and 2013, natural gas use in power generation increased almost fourfold. Increased consumption of natural gas to generate electricity has greatly benefited the environment, cutting CO₂ emissions by 25 percent during that time frame.⁸

Expanding the use of natural gas for power generation has also allowed power plants to lessen their emissions of other pollutants. Dominion converted Units 3 & 4 at the Possum Point power plant in Prince William County from coal to natural gas, and added a 550 megawatt combined cycle Unit 6 that can burn either natural gas or #2 fuel oil. The conversion helped meet air pollution mandates required to settle a lawsuit between EPA and Dominion.⁹

The expansion of natural gas pipelines in Virginia has allowed Virginian power generators to expand their use of natural gas. For example, the completion in 2015 of the Virginia Southside extended service 100 miles eastward from the compressor station known as Transco Station 165 in Pittsylvania County, allowing Dominion Power to use the gas to fuel a new 1,358 megawatt electricity generating plant in Brunswick County and a 1,580 megawatt plant in Greenville county. These additions allowed Dominion to shut down two older coal-fired power plants.¹⁰



Thanks to affordable and reliable supply, new power plants, including the Greenville County Power Station, expected to be complete in 2018, are using more and more natural gas. The plant will generate 1,588 megawatts, providing sufficient electricity to power 400,000 Virginia homes at peak demand. The plant will also generate immense benefits for Virginia. In first year of the Greenville plants operation, it is expected to provide up to \$8 million in property taxes for Greenville County. Post-construction

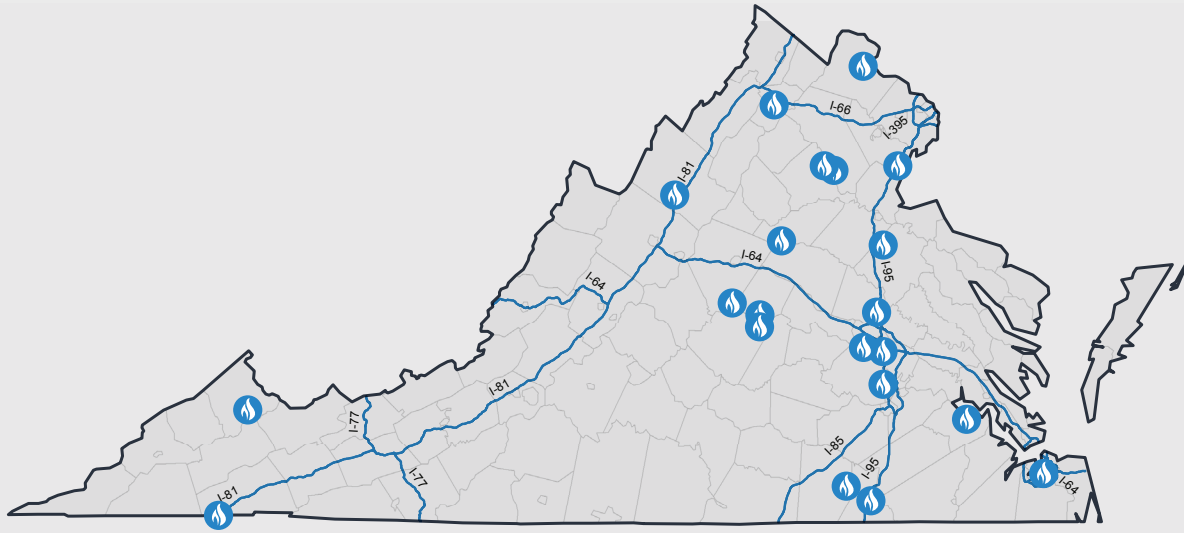
economic benefits are projected to amount to about \$36 million annually, and about 166 jobs will be supported, with roughly half of these in Greenville County.¹¹ Over its expected 36-year life, the station will save customers about \$2 billion as a result of the company not having to purchase power from market sources. Greenville, expected to be one of the largest power plants in the nation, will also be one of the most stringent in reducing CO₂ emissions.¹²

VIRGINIA POWER PLANTS USING NATURAL GAS.

PLANT NAME	CITY	NATURAL GAS PIPELINE NAME
Bear Garden	New Canton	Transco
Bellmeade Power Station	Richmond	TCO
Bremo Bluff	Bremo Bluff	Transco
Brunswick County Power Station	Freeman	Transco
Buchanan Generation LLC	Keen Mountain	Columbia Gas Transmission
Chesterfield	Chester	TCO and DTI
Darbytown	Richmond	DTI
Doswell Energy Center	Ashland	Virginia Natural Gas Co
Elizabeth River Power Station	Chesapeake	TCO
Gordonsville Energy LP	Gordonsville	TCO
Gravel Neck	Surry	TCO
Greenville County Power Station	Emporia	Transco Virginia Southside Expansion Pipeline
Harrisonburg Power Plant	Harrisonburg	N/A
Ladysmith	Woodford	DTI
Louisa Generation Facility	Gordonsville	Transco wholly owned by Williams Partners L.P.
Marsh Run Generation Facility	Remington	Transco wholly owned by Williams Partners L.P.
Possum Point	Dumfries	Dominion Cove Point
Remington	Remington	Transco
Stonewall	Leesburg	Dominion Transmission Inc.: PL-1 Columbia: VC
Tenaska Virginia Generating Station	Scottsville	Williams/Transco
Warren County	Front Royal	TCO
Wolf Hills Energy	Bristol	East Tennessee Natural Gas

SOURCE: EIA

FIGURE 4: NATURAL GAS POWER PLANTS



SOURCE: EIA; ESRI

2. INDUSTRIAL USERS

MANUFACTURING

The industrial sector uses natural gas as fuel for industrial processes (which could include generating heat and/or electricity) and/or feedstock for products. The EIA's Manufacturing Energy Consumption Survey in 2010 (MECS 2010) provides a detailed breakdown. Large industrial consumers of natural gas include manufacturers of chemicals, primary metals, paper, and food and beverage.¹³

A number of industrial facilities in Virginia rely on natural gas for their operations. EIA data indicates that while the number of industrial natural gas users in Virginia has been constant, averaging 1,113, their use of natural gas has risen by 42 percent

over the past 5 years. Because of falling natural gas prices, industrial consumers spent \$57.5 million less in 2014 than if prices had remained where they were in 2009.¹⁴ Industrial facilities can use natural gas in several ways. It can be used to generate heat for industrial processes, to generate electricity for industrial processes, and it can be used to do the latter two together (referred to as co-generation, or cogen, or as combined heat and power, or CHP). The table below lists facilities that have been identified as being CHP facilities using pipeline gas (as opposed to landfill). Some of these facilities, such as chemical manufacturers, also use natural gas as a feedstock.

INDUSTRIAL		2009	2010	2011	2012	2013	2014
	Number of Consumers	1,126	1,059	1,103	1,132	1,132	1,123
	Consumption (MMcf)	57,144	62,243	66,147	71,486	75,998	81,040
	Average Consumption Per Consumer (Thousand Cubic Ft.)	50,750	58,775	59,970	63,150	67,136	72,164

SOURCE: EIA.

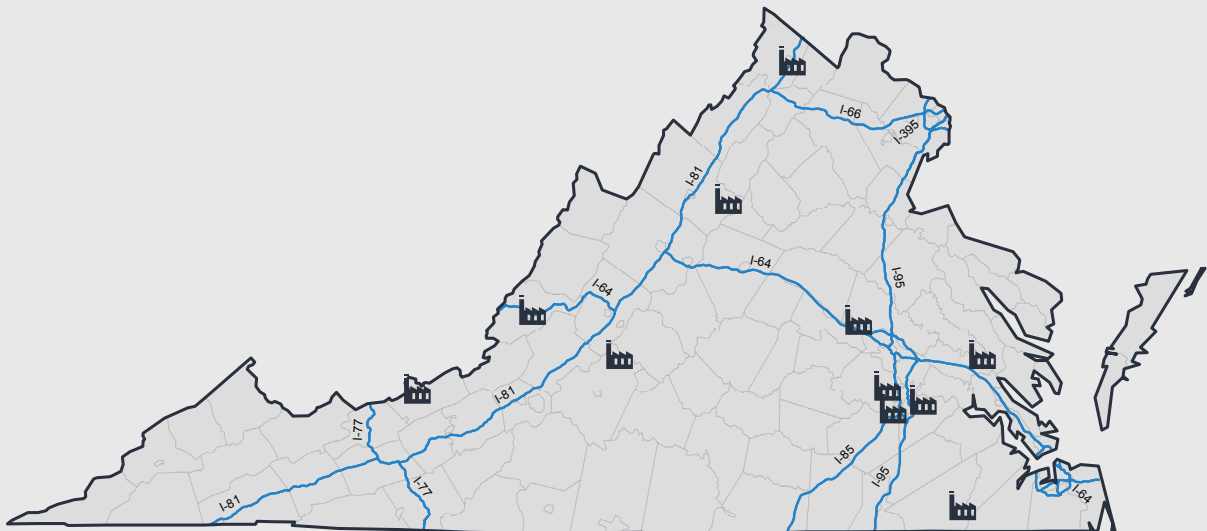


COGEN FACILITIES USING PIPELINE NATURAL GAS

PLANT NAME	UTILITY NAME	INDUSTRY
Elkton/Stonewall Plant	Merck & Co Inc	Chemicals
Celco Plant	Celanese Acetate LLC	Chemicals
Hopewell Cogeneration/Aqualon Co.	GDF Suez NA - Hopewell	Chemicals
HP Hood CT	HP Hood LLC	Food Processing
Park 500 Philip Morris USA	Park 500 Philip Morris USA	Misc. Manufacturing
Lanier Road Facility	Industrial Power Generating Corp	Misc. Manufacturing
Gerdau Ameristeel	Industrial Power Generating Corp	Primary Metals
Georgia-Pacific Big Island	GP Big Island LLC	Pulp/Paper Mill
Covington Facility	MeadWestvaco Corp	Pulp/Paper Mill
Hopewell Mill	MeadWestvaco Corp	Pulp/Paper Mill
WestRock-West Point Mill	MeadWestvaco Corp	Pulp/Paper Mill
Franklin Mill	International Paper	Pulp/Paper Mill

SOURCE: EIA, DOE.

FIGURE 5: INDUSTRIAL FACILITIES

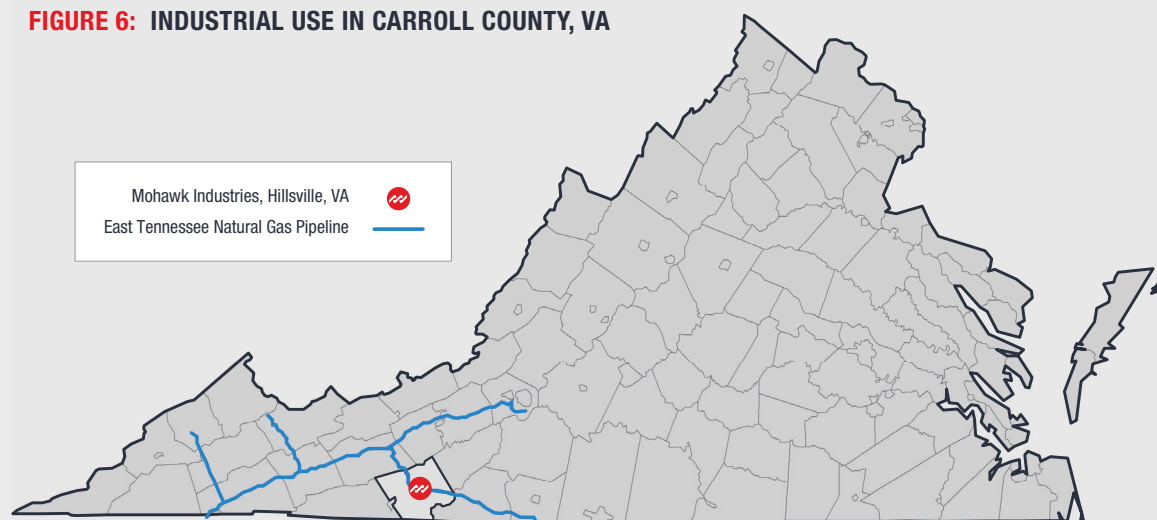


SOURCE: EIA; ESRI; DOE; ICF.

The low cost of natural gas compared with other fuels, partly due to the new shale supplies, has prompted more industrial users to convert their operations to natural gas. Natural gas is critical to ensuring these businesses can cut energy costs while still providing good-paying jobs and generating taxes for local communities. For example, MeadWestvaco's WestPoint facility has more than 500 employees and is one of the largest employers in the Middle Peninsula region. MeadWestvaco is the largest source of tax revenue for West Point. It is estimated that it accounts for 40-50 percent of the town's local tax base.¹⁵

Natural gas can also be used as a feedstock (input) for manufacturing products. For example, ammonia, produced from natural gas, is important in fertilizer and pulp and paper industries.¹⁶ Hopewell, Virginia has a high concentration of Virginia's chemical/fertilizer plants (e.g. [Ashland Plant](#), [Honeywell](#),¹⁷ GDF Suez, Evonik, Schenker, Airgas) and pulp and paper plants (e.g. MeadWestvaco). Other companies use natural gas for just heat (as opposed to heat and power). For example, the MillerCoors' Shenandoah Brewery uses natural gas to fire five boilers at their facility.¹⁸

FIGURE 6: INDUSTRIAL USE IN CARROLL COUNTY, VA



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Whatever the use, access to natural gas is very important to companies. In 2009 in Carroll County, Virginia, Mohawk Industries alerted county officials that it needed to reduce its operating costs to stay in Carroll County; otherwise, it would need to relocate to Alabama.

In 2013, Mohawk opened a distribution line from a nearby natural gas pipeline to its facility.¹⁹

The county administrator for Carroll County said access to a natural gas transmission pipeline helped the county retain a key employer with 154 employees and has also helped attracted two other companies with a total of 255 employees.

Additionally, other industries already in the county have accessed the pipeline, and other companies from outside the county are requesting information due to the access to natural gas.²⁰

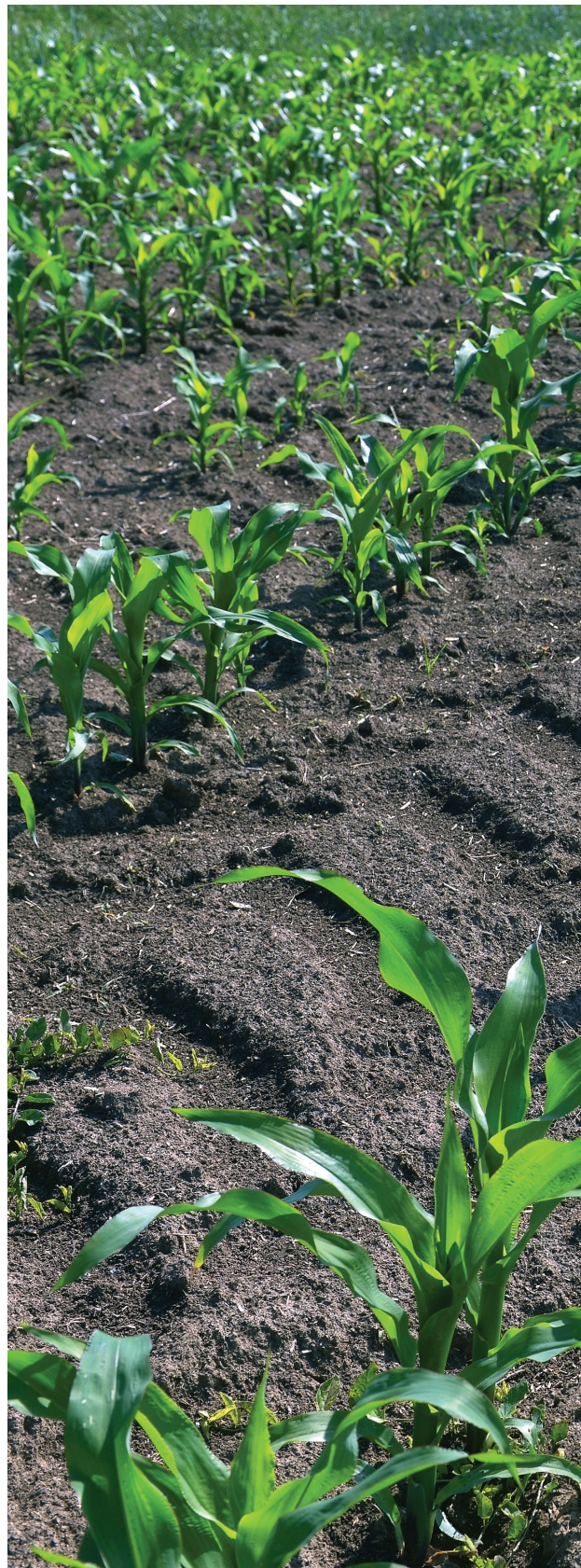
AGRICULTURE

Agriculture is one of Virginia's largest private industries and one of Virginia's largest natural gas consumers.²¹ Production agriculture employs nearly 55,000 farmers and workers in Virginia and generates approximately \$3.3 billion in total output.²² In addition, value-added industries that depend on farm commodities employ more than 67,000 workers. When the employment and value-added impact of agriculture and forestry are considered together, they make up 8.1 percent of the Commonwealth's total gross domestic product.

Access to energy and energy costs are particularly important to Virginia's agricultural industry as energy accounts for over 30 percent of farm production expenditures.²³ Natural gas helps provide electricity for buildings and fuel for farm vehicles, equipment,²⁴ and grain drying. However, indirect uses of energy represent a larger share of farm expenses than direct uses,²⁵ and natural gas is key component in two major indirect uses: fertilizer and pesticides.

Fertilizer accounted for over half of all indirect energy consumption on U.S. farms in 2011,²⁶ and natural gas represents approximately 70 percent of the cost in manufacturing fertilizer.²⁷ Fertilizer intensive crops including grain, corn, and soybeans account for \$478 million in Virginia farm cash receipts.²⁸ Not surprisingly, Virginia's farms use a considerable amount of fertilizer. EPA estimates Virginian farmers purchased 85,962 metric tons of nitrogen-based fertilizer in 2011.²⁹ Because fertilizer is bulky to transport, several companies manufacture fertilizer near farming areas. In Virginia, there are at least four manufacturers in (including the Honeywell facility) providing fertilizer for the state's farms.³⁰

Pesticides, which use natural gas as a feedstock,³¹ accounted for slightly less than 50 percent of indirect energy use on U.S. farms in 2010, and slightly less than 15 percent of total energy use.³² Use of herbicides has increased over time as the share of corn, soybean, and cotton acreage planted with herbicide-tolerant (HT) seed has increased dramatically. For corn, use of HT varieties increased from 11 percent of planted acres in 2002 to 70 percent in 2010.³³

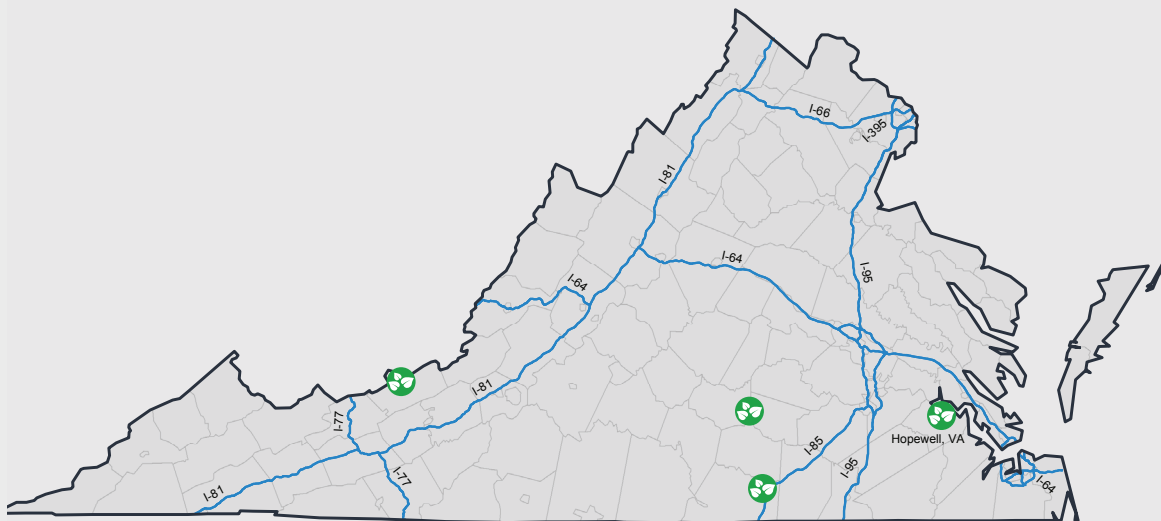


FERTILIZER MANUFACTURERS

PLANT NAME	CITY
Giles Farm Bureau Fertilizer Plant	Pearisburg
Royster-Clark CO-OP	South Hill
Southern States CO-OP	Burkeville
Honeywell	Hopewell

Source: Manta.com; Honeywell.

FIGURE 7: FERTILIZER PLANTS



Source: ESRI; Manta.com based on NAICS codes 32531102, Nitrogenous Fertilizer Manufacturing.

3. RESIDENTIAL USERS

The residential sector is the second-largest natural gas consuming sector in Virginia where one in three state households rely on natural gas to provide hot water, heat homes and cook dinner.³⁴ Consumption has risen 9.9 percent since 2009 due to increases in both the number of consumers and consumption per household.

Virginia households receive their natural gas from Local Distribution Companies (LDCs), which serve as the primary distribution method for almost all residential and small business consumers.

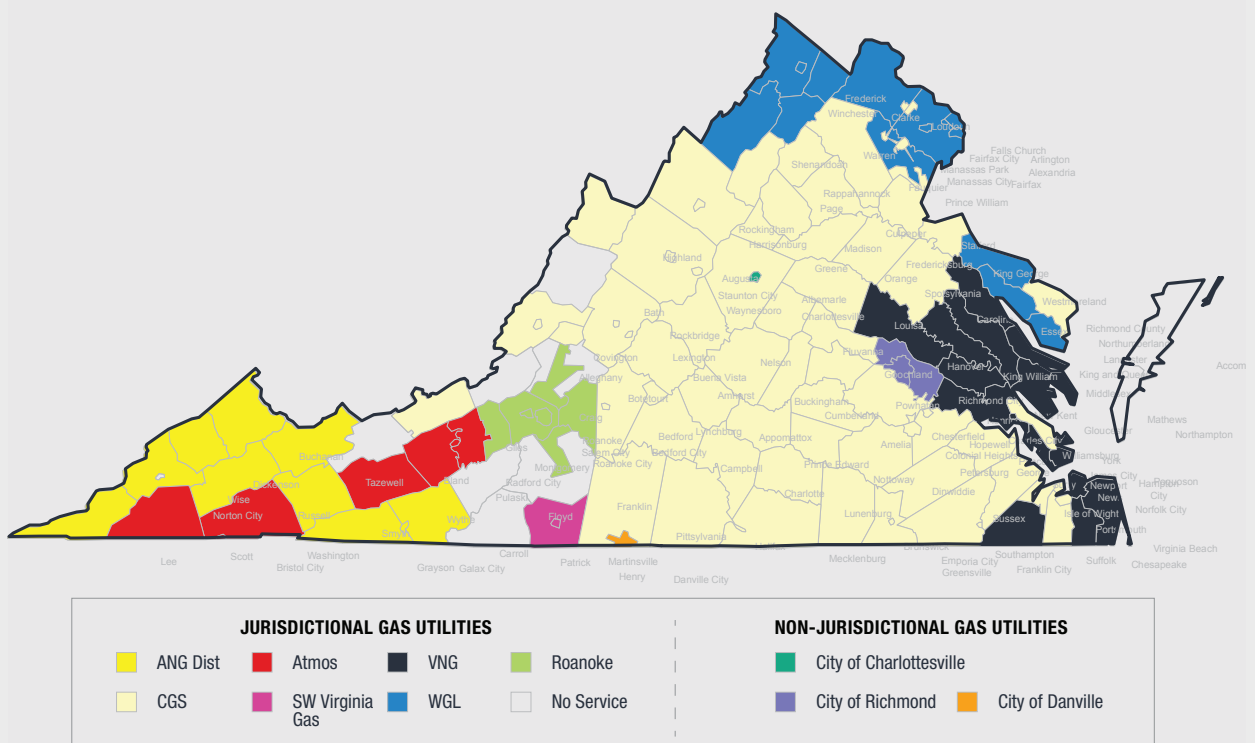
A total of ten natural gas LDCs serve Virginia customers in assigned territories, but some counties in Virginia, primarily on the eastern shore and along the western border, do not have the option of using pipelined natural gas as no LDC services the county.³⁵



RESIDENTIAL		2009	2010	2011	2012	2013	2014
	Number of Consumers	1,124,717	1,133,103	1,145,049	1,155,636	1,170,161	1,183,894
	Consumption (MMcf)	84,445	88,157	79,301	70,438	85,702	92,817
	Average Consumption Per Consumer (Thousand Cubic Ft.)	75	78	69	61	73	78

Source: EIA.

FIGURE 8: SERVICE AREAS OF VIRGINIA NATURAL GAS DISTRIBUTION COMPANIES 2016



Source: ESRI; VA State Corporation Commission. This is an approximation, please contact the Division of Energy Regulation for an official natural gas territory map.

4. COMMERCIAL USERS

LDCs and some interstate pipelines provide natural gas to commercial facilities such as retail business, hospitals, and schools. Reliable supply of natural gas is helping Virginia's small businesses, schools and hospitals cut every cost and expand services for state residents.

Commercial consumption of natural gas has risen 6.6 percent in part due to an approximately 3.3 percent increase in both the number of consumers and quantity consumed by each facility. As prices fall, more facilities will be looking to

convert to natural gas to achieve the valuable economic and environmental benefits. In Carroll County, the administration building switched from fuel oil to natural gas and saves more than \$40,000 a year.³⁶

Like industrial facilities, some commercial facilities, including military installations, have saved on energy costs by taking steam generated for producing electricity and using it for heating as well (or vice versa).

COMMERCIAL		2009	2010	2011	2012	2013	2014
	Number of Consumers	95,704	95,401	96,086	96,503	97,499	98,741
	Consumption (MMcf)	67,709	68,911	64,282	60,217	68,126	72,164
	Average Consumption Per Consumer (Thousand Cubic Ft.)	707	722	669	624	699	731

Source: EIA



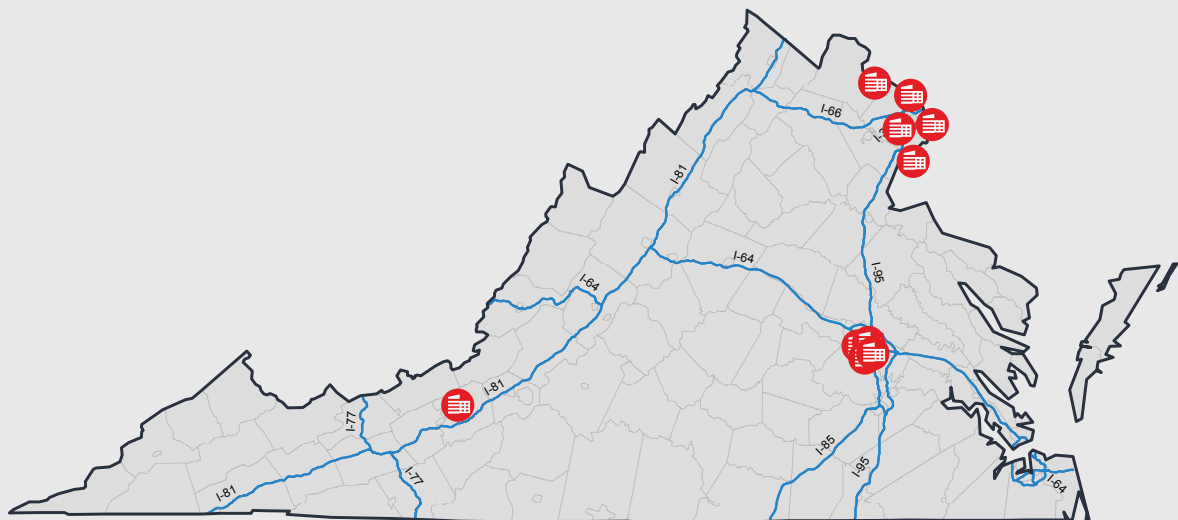


COMMERCIAL COGEN FACILITIES USING NATURAL GAS³⁷

PLANT NAME	UTILITY NAME	CITY	SECTOR
Handcraft Facility	Virginia Cogen II Inc	Richmond	Amusement/Recreation
Data Center	National Rural Utilities Cooperative Finance Corporation (NRUCFC)	Sterling	Business Services
University Of Richmond	University Of Richmond	Richmond	Colleges/Univ.
Virginia Tech Power Plant	Virginia Polytechnic Inst and State Univ	Blacksburg	Colleges/Univ.
Johnston-Willis Hospital Facility	Virginia Cogen IV, Inc	Richmond	Hospitals/Healthcare
Fort Belvoir Fire Station	Fort Belvoir Fire Station	Alexandria	Military/National Security
Military Site	Military Site	Fort Belvoir	Military/National Security
Langley AFB	U.S. Air Force	Langley	Military/National Security
Baker Facility	Virginia Cogen, Inc.	Richmond	Misc. Manufacturing
William Bird Press Facility	Virginia Cogen III, Inc.	Richmond	Printing/Publishing
Washington Gas Co.	Washington Gas Co.	Springfield	Utilities

Source: DOE.

FIGURE 9: VIRGINIA INFRASTRUCTURE: COMMERCIAL FACILITIES



Source: EIA; ESRI; DOE; ICF.

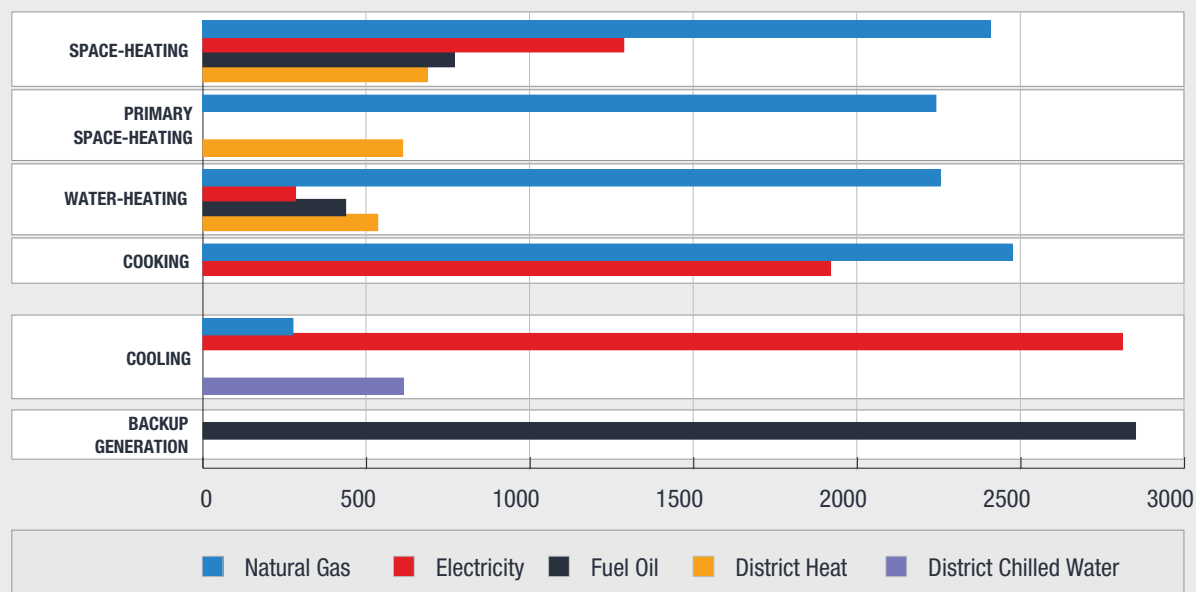
HOSPITALS

Hospitals rely heavily on natural gas to provide consistent, comfortable temperatures and improved air quality when heating, and to create a medically safe environment for all occupants. According to EIA's 2007 Commercial Buildings Energy Consumption Survey (CBECS), natural gas represented 45 percent of all energy consumed at large hospitals, more than any other fuel.³⁸ Natural gas was the most common main space heating fuel, used by 74 percent of the buildings. Similarly, natural gas was the most common water heating fuel, used also by 74 percent of the buildings. Natural gas is not only used by healthcare providers to heat water for showers and baths but also for dishwashing, washing hands and scrubbing in for surgery.

There are about 107 hospitals in Virginia.³⁹ The affordable and reliable supply of natural gas may incentivize more hospitals to convert their energy source and save money.

Cooking was reported in 95 percent of the buildings, with natural gas and electricity the most common cooking fuels. Natural gas is an efficient energy source for commercial refrigerators, freezers, ovens, stoves, and more. Some hospitals, such as Johnston-Willis Hospital in Richmond, rely on natural gas to provide steam for heating and electricity.

FIGURE 10: FUELS AND ENERGY END USES IN LARGE HOSPITAL BUILDINGS, 2007



Source: EIA.

Note: Except for Primary Space-Heating, more than one fuel may apply.



SCHOOLS

Schools are another type of commercial facility that relies on the dependability of natural gas. Data from EIA's 2012 Commercial Buildings Energy Consumption Survey (CBECS) indicates that 72 percent of schools in the survey use natural gas. The majority of schools in the survey use natural gas as the main fuel for heating while a similar percentage use it for water heating. Over a third of schools use natural gas for cooking.⁴⁰

The flexibility of natural gas is also increasing use in schools, colleges and universities. For example, the University of Richmond already has a small natural gas cogeneration facility.⁴¹ It has a central steam plant consisting of four boilers to create steam for heating and electricity for running some of the larger chillers on campus. Two of the boilers are tri-fuel and capable of running on coal, oil, or natural gas.⁴² Similarly, Carroll County High School is switching from coal to natural gas to meet their energy needs.⁴³ Nationally, coal consumption by U.S. educational institutions has declined by 64 percent between 2008 and 2015, in part due to increased use of natural gas. Virginia's use of coal in its educational institutions has declined by approximately 50 percent between 2008 and 2015.⁴⁴

To reduce its carbon emissions by 50 percent by 2020, Virginia Tech will decrease its use of coal in generating power.⁴⁵ The university tapped into a nearby natural gas pipeline and installed a four-mile long, eight-inch in diameter pipeline across campus to meet its energy demands in 2015. In 2016, Virginia Tech finished the upgrades and improvements to begin delivering natural gas to two of its steam boilers. The university is in the process of switching the three coal-fired plants that are the core of the steam plant's production to natural gas.⁴⁶ When fully implemented, the changeover is expected to cut about \$1 million per year from the university's fuel budget of between \$6 and \$7 million. In addition, the university's new demand for natural gas increased the pipeline's capacity to reliably serve customers in the area, now reliably providing home heating and warm water even in cold winter months.⁴⁷

5. TRANSPORTATION



Virginia's Department of Mines, Minerals, and Energy believes that transportation uses may increase demand for natural gas going forward, especially if the number of refueling facilities is expanded.⁴⁸ Virginia fleets already have nearly 1,000 compressed natural gas (CNG) vehicles on the road, mainly located in the Hampton Roads, Richmond, and Northern Virginia areas. Virginia's largest CNG fleets are operated by the U.S. Navy, Virginia Department of General Services, and the Washington Metro Area Transit Authority.

Examples of the spread of natural gas vehicles include a project by Virginia Clean Cities that replaced Chesapeake and Richmond city haulers ahead of schedule with natural gas models, and replaced four Spotsylvania Public Schools buses ahead of schedule with propane models.⁴⁹



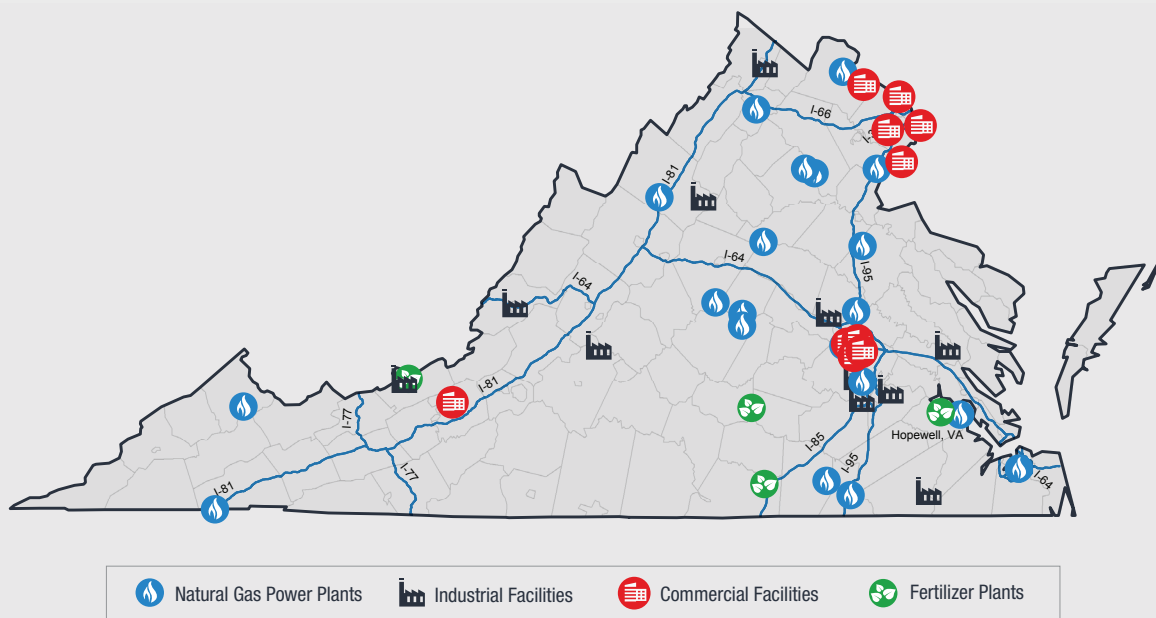


6. CONCLUSION

Natural gas touches nearly every aspect of life in Virginia. From generating electricity, lowering energy costs and creating jobs for small businesses to expanding services for Virginia's educational institutions, natural gas is fueling every part of modern life.

Expanding energy infrastructure including natural gas pipelines will benefit the environment and lower prices for Virginians by providing clean, affordable and reliable natural gas supply for years to come.

FIGURE 11: VIRGINIA INFRASTRUCTURE



Source: EIA; ESRI; DOE; ICF

RESOURCES

1. https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_sva_a.htm
2. Ibid; The savings are split almost evenly between the two sectors at \$96 million for residential consumers and \$97 million for commercial consumers
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This image shows a full page of handwriting practice paper. It features multiple sets of horizontal dashed lines spaced evenly down the page, providing a guide for letter height and placement. The background is white, and the lines are a light gray color. There is no text or other markings on the page.

NOTES

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