



2020

# STATISTICAL GUIDE

 **Northeast**  
GAS ASSOCIATION

## NORTHEAST NATURAL GAS MARKET AT-A-GLANCE

	<b>NEW ENGLAND</b>	<b>NEW JERSEY</b>	<b>NEW YORK</b>	<b>PENNSYLVANIA</b>
<i>Gas Customers</i>	<b>2.8 million</b>	<b>3 million</b>	<b>5 million</b>	<b>3 million</b>
<i>Annual Consumption (2019)</i>	<b>908 Bcf</b>	<b>759 Bcf</b>	<b>1,287 Bcf</b>	<b>1,324 Bcf</b>
<i>Interstate Pipelines</i>	<b>5</b>	<b>5</b>	<b>11</b>	<b>7</b>
<i>Miles of transmission pipeline</i>	<b>2,698</b>	<b>1,570</b>	<b>4,592</b>	<b>10,345</b>
<i>Underground Storage</i>	-	-	<b>246 Bcf</b>	<b>763 Bcf</b>
<i>LNG operating import facilities</i>	<b>2</b>	-	-	-
<i>Gas production in-state, annual (2019)</i>	-	-	<b>11 Bcf</b>	<b>6,821 Bcf</b>
<i>Gas Efficiency Program Budgets (2018)</i>	<b>\$331.7 million</b>	<b>\$90.1 million</b>	<b>\$141.7 million</b>	<b>\$8.8 million</b>
<i>Primary energy consumption, leading fuels, % (2018)</i>	<b>Natural Gas, 29%</b> Oil, 42% Nuclear, 10% Coal, <1% Renewables, 13%	<b>Natural Gas, 36%</b> Oil, 42% Nuclear, 15% Coal, <1% Renewables, 4%	<b>Natural Gas, 36%</b> Oil, 34% Nuclear, 12% Coal, <1% Renewables, 13%	<b>Natural Gas, 34%</b> Oil, 27% Nuclear, 19% Coal, 14% Renewables, 6%
<i>Gas as a share of residential home heating fuels (2019)</i>	<b>40%</b>	<b>75%</b>	<b>61%</b>	<b>51%</b>
<i>Total population</i>	<b>14.8 million</b>	<b>8.8 million</b>	<b>19.4 million</b>	<b>12.8 million</b>
<i>Gross state domestic product (GDP, 2020, 1<sup>st</sup> qtr; % of U.S)</i>	<b>\$1,144 billion</b> <b>5.3%</b>	<b>\$647 billion</b> <b>3.0%</b>	<b>\$1,729 billion</b> <b>8.0%</b>	<b>\$815 billion</b> <b>3.8%</b>

Sources: NGA, American Council for an Energy Efficient Economy, U.S. EIA, PHMSA, U.S. Census Bureau, U.S. BEA. Updated by NGA, October 2020

# **STATISTICAL GUIDE TO THE NORTHEAST U.S. NATURAL GAS INDUSTRY *2020***

*An annual review of statistics and trends  
relating to the region's natural gas industry*



***November 2020***



The NGA *Statistical Guide* is intended as an introduction to the natural gas market in the Northeast U.S. region of New England, New Jersey, New York and Pennsylvania. Included are basic statistics on end-use markets, infrastructure, and natural gas issues and trends - from technology applications to environmental topics.

Regional information is updated through calendar year 2019, where available. As much as possible the most recent data from other sources are presented.

NGA is grateful to its member companies for their cooperation and support in providing data and information for presentation in a regional tabulation.

Other particularly helpful sources of information are the U.S. Department of Energy/Energy Information Administration, the Federal Energy Regulatory Commission, and Canada's Energy Regulator.

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# *The Year in Review*

## *2020*

*The Northeast Gas Association (NGA) is pleased to present this annual overview of market characteristics and recent developments in the Northeast region of the United States. This paper summarizes key features of the natural gas system in New England, New Jersey, New York, and Pennsylvania, and then reviews several current market issues.*

*This paper has been prepared in November 2020 in the midst of the Coronavirus pandemic impacting the United States and the global community. This paper then, to a great extent, represents a snapshot in time. How and when will the economy and markets fully recover, and how changed might energy markets be in the end? We will see. Meanwhile, we extend our sincere hopes for good health and safety to all.*

### **MARKET BACKGROUND**

#### **Population and Economy**

The Northeast region consists of the nine states of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. The composite population is 56.1 million (17% of the U.S.). Total state domestic product for the region is \$4.3 trillion (20% of the U.S. total).

#### **Regional Natural Gas Market**

The nine-state region has 13.8 million natural gas customers (18% of the U.S. total of 76 million). Total annual gas sendout on the regional gas system is 4.2 trillion cubic feet (Tcf), or 15% of U.S. total consumption (measured in volumes delivered to consumers).

#### ***Primary Energy Consumption***

Natural gas represents 29% of the primary energy consumption of the six New England states, 36% of New Jersey, 36% of New York, and 34% of Pennsylvania, compared to the national average of 31% (based on 2018 U.S. EIA data).

#### ***Gas Customers***

New England has 2.8 million natural gas customers. Residential customers total 2.5 million; commercial and industrial customers number over 280,000.



## ***“NGA Year in Review 2020”***

New Jersey has 3 million natural gas customers. Residential customers total 2.8 million; commercial and industrial customers number about 250,000.

New York has 5 million natural gas customers. Residential customers total 4.5 million; commercial and industrial customers number about 420,000.

Pennsylvania has 3 million natural gas customers. Residential customers number 2.8 million; commercial and industrial customers number 250,000.

Natural gas remains the leading home heating fuel: in New England it is 40%, followed by fuel oil (34%); in New Jersey, 75%, followed by electricity (14%); in New York, 61%, followed by fuel oil (19%); and in Pennsylvania, 51%, followed by electricity (24%), and fuel oil (15%).

### ***Consumption/Sendout by Sector***

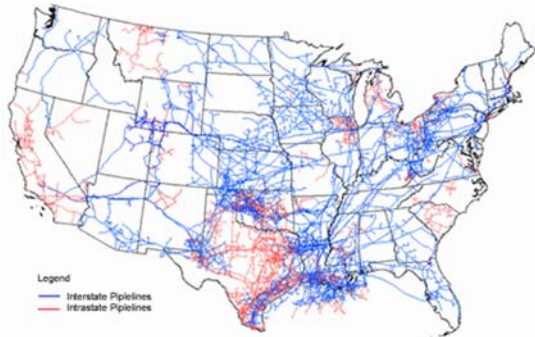
Total annual sendout in New England is about 910 billion cubic feet (Bcf), in New Jersey about 760 Bcf, in New York about 1,290 Bcf, and in Pennsylvania about 1,300 Bcf (2019 EIA annual data).

In New England, gas consumption by end-use sector is 24% residential, 24% commercial, 13% industrial, and 39% power generation. In New Jersey, it is 31% residential, 21% commercial, 9% industrial, and 39% power generation. In New York, it is 37% residential, 25% commercial, 7% industrial, and 31% power generation. In Pennsylvania, it is 18% residential, 12% commercial, 19% industrial, and 51% power generation.

In New England, the local gas distribution company, or LDC, design day demand is 4.8 Bcf per day, in New Jersey over 4 Bcf/d, and in Pennsylvania 5.4 Bcf/d. In New York, gas system peak demand is 7.8 Bcf/d. While winter is still the peak season for demand, the increasing use of gas for power generation has led to higher demand in summer months.

### ***Electric Generation Sector***

Based on annual fuel mix and generator applications in the queues at ISO-NE, NYISO, and PJM, natural gas is the leading current fuel source for electricity generation, and it remains in the mix for proposed plants as well. In New England, natural gas represents 49% of current regional electric capacity, in New Jersey, 67% (in-state generation), in New York, over 50%, and in Pennsylvania, 42%.

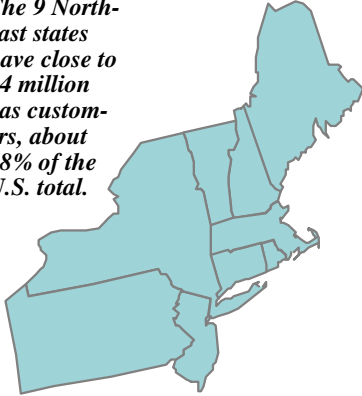


***The U.S. interstate natural gas pipeline system includes 300,000 miles of transmission pipeline, according to the U.S. PHMSA. The EIA map on the left illustrates the extensive system.***



## *“NGA Year in Review 2020”*

*The 9 Northeast states have close to 14 million gas customers, about 18% of the U.S. total.*



### **Regional Market: Gas Supply Sources**

Domestic resources account for 90% of the natural gas consumed in the U.S. The balance is imported from Canada, and a small share is imported in the form of liquefied natural gas (LNG).

Net imports as a percentage of total natural gas consumption in the U.S. totaled 8% in 2011, but dropped to about 2.5% in 2016. “The U.S. became a net natural gas exporter on an annual basis in 2017 for the first time in almost 60 years,” according to the EIA.

Historically, the Northeast relied on three supply areas: Gulf Coast U.S., Canada, and imported LNG. Throughout the last two decades, supply areas expanded to include Rockies/Midcontinent gas and eastern Canada. For the Northeast, the most significant supply change has been the relatively recent development of the Marcellus and Utica Shale gas basins in Appalachia and Ohio. Marcellus/Utica production is resulting in new delivery points and new pipeline infrastructure. Appalachian production reached 32 Bcf/d in early 2020.

Exports from Canada to the Eastern U.S. have fallen from 2.8 Bcf/d in 2007 to 0.8 Bcf/d in 2019, in light of Marcellus and Utica shale gas availability.

LNG imports into the U.S. were 53 Bcf in 2019, substantially lower than the high point of 771 Bcf a decade earlier. The Everett LNG facility outside Boston imported 35 Bcf in 2019, which represented about 67% of total U.S. imports.

LNG imports play a critical role in helping gas utilities in the Northeast region meet winter peak day requirements; LNG provides about 27% of New England utilities’ peak day requirements. Canaport in New Brunswick, Canada delivered 18 Bcf to the regional market in 2019. The offshore Northeast Gateway terminal imported about 5 Bcf in early 2019.

### **Pipeline and LNG Deliverability**

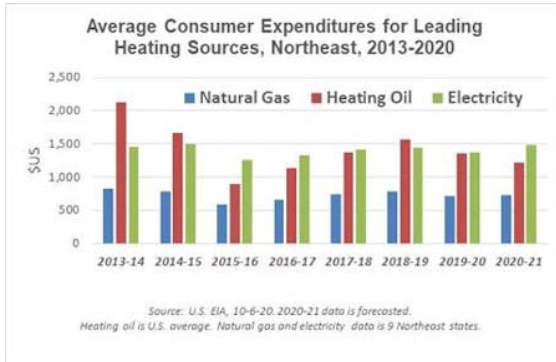
#### ***New England***

New England has 2,698 miles of gas transmission pipeline, according to the U.S. Department of Transportation / Pipeline and Hazardous Materials Safety Administration (PHMSA).

The pipeline companies serving New England, interstate and intrastate, are: Algonquin Gas Transmission, Granite State Gas Transmission, Iroquois Gas Transmission System, Maritimes & Northeast Pipeline, Portland Natural Gas Transmission System, and Tennessee Gas Pipeline Co.

New England is the site of three import terminals for LNG, two of which are operational. The onshore terminal in Everett, outside of Boston, is owned by Ex-

**“NGA Year in Review 2020”**



*As illustrated in the chart, natural gas in the Northeast (shown in blue) maintains a price advantage over heating oil and electricity for heating fuel costs. Natural gas remains the heating fuel of choice: over 90% of new single-family homes built in the Northeast in 2019 with furnaces ran on natural gas, according to the U.S. Census.*

*Chart source: U.S. Energy Information Administration, Oct. 2020*

elon (Constellation). LNG is delivered by tanker to the terminal which has storage capacity of 3.4 Bcf. The terminal has pipeline interconnections as well as connections with a major gas utility and a major power plant. LNG is also transported to multiple LDCs’ satellite storage tanks from trucks that fuel at the Everett facility. The terminal’s vaporization capability is 715 MMcf/d; it also has daily sendout by truck of another 100 MMcf/d.

The offshore Northeast Gateway facility (near Cape Ann, MA) is owned by Excelerate Energy. It can receive LNG cargoes and inject the revaporized gas into Enbridge’s HubLine pipeline system. After several years of inactivity it brought in 2.6 Bcf in 2015 and 2.3 Bcf in 2016, none in 2017 or 2018, and about 5 Bcf to meet cold weather demand in early 2019.

The offshore Neptune LNG facility owned by ENGIE (also near Cape Ann, MA) was completed in 2010. It has been inactive since its start-up, and is presently offline.

Canaport LNG (located across the Maine border in Saint John, New Brunswick) is owned and operated by Repsol and Irving Oil. It can deliver up to 1 Bcf/d into the Brunswick Pipeline, which connects with the Maritimes & Northeast Pipeline, that transports the volumes into New England. Since its inception, it has delivered over 430 Bcf into the regional market. Canada’s National Energy Board noted in March 2017 that “Canaport is a peak demand serving facility with deliveries increasing during the winter months in response to cold temperatures.”

***New Jersey***

New Jersey has 1,570 miles of gas transmission pipeline.

The interstate pipeline companies serving New Jersey are: Algonquin Gas Transmission, Columbia Gas Transmission, Tennessee Gas Pipeline Co., Texas Eastern Pipeline Co., and Transcontinental Gas Pipe Line Corp.

The LDCs utilize local LNG storage for peak day support.

***New York***

New York has 4,592 miles of gas transmission pipeline. The pipeline compa-

## ***“NGA Year in Review 2020”***



nies serving New York State are: Algonquin Gas Transmission, Columbia Gas Transmission, Eastern Gas Transmission & Storage (formerly Dominion), Empire State Pipeline Co., Iroquois Gas Transmission System, Millennium Pipeline Company, National Fuel Gas Supply Co., North Country Pipeline, Stagecoach Gas Services, Tennessee Gas Pipeline Co., Texas Eastern Pipeline Co., and Transcontinental Gas Pipe Line Corp. New York also has gathering systems such as Laser Pipeline.

LNG is utilized by two local utilities in the New York City and Long Island areas. The LNG is received from the pipeline in vapor form and then liquefied. New York has no LNG import facility.

### ***Pennsylvania***

Pennsylvania has 10,345 miles of gas transmission pipeline. The pipeline companies serving Pennsylvania are: Columbia Gas Transmission, Eastern Gas Transmission & Storage, National Fuel Gas Supply Co., Tennessee Gas Pipeline Co., Texas Eastern Pipeline Co., and Transcontinental Gas Pipe Line Corp. LNG is utilized by two LDCs and produced by the affiliate of another utility for sale into the regional energy market.

### **Regional Production**

The Northeast region, a major consumer of natural gas and a high-priced energy market, is a center of U.S. natural gas production.

For years the region had only limited natural gas production in New York and Pennsylvania. (There is no gas resource production base in New Jersey or New England.) With the advancement of hydraulic fracturing and the development of the Marcellus resource base, the Northeast is now a significant production region.

Appalachian production, centered in Pennsylvania, Ohio, and West Virginia, reached close to 33 Bcf/d in early 2020. Pennsylvania’s annual production grew to 6.8 Tcf in 2019 (compared to 0.6 Tcf in 2010); it is the second-largest state producer of natural gas in the U.S.

Interstate pipeline companies serving the Appalachian region continue to work to add interconnects from area producers. Several projects have been completed, others are in development, while still others face siting challenges, an issue discussed below.

There is a shale gas resource in New York but use of the hydraulic fracturing process is prohibited per state regulation announced in late 2014. New York does allow conventional drilling production. Total annual state output was 11 Bcf in 2019. The state’s conventional production has steadily declined since 2007, when annual production totaled 55 Bcf.

## ***“NGA Year in Review 2020”***

There is some limited conventional production in eastern Canada.

Gas from offshore Nova Scotia was produced for two decades from the Sable Offshore Energy Project, but its production ceased at the end of 2018. In February 2019, Canada’s NEB noted: “The Maritimes will transform from being an exporter of natural gas to being an importer of natural gas from the U.S.”

In New Brunswick, the McCully field of Corridor Resources, which began production in 2007, provides small amounts of gas for delivery into the Maritimes & Northeast Pipeline.



### **Regional Storage**

Storage is a crucial part of the natural gas supply and delivery chain. The Northeast region has considerable underground storage, notably in Pennsylvania (8.2% of the U.S. total). Underground storage in New York is about 2.6% of the U.S. total. The geology of New Jersey and New England is not suitable for underground gas storage.

LNG is an important part of the storage portfolio. Total LNG storage capacity in New York is 3.2 Bcf, in New Jersey about 4 Bcf, in Pennsylvania 6.7 Bcf, and in New England 16 Bcf on the LDC system and another 3.4 Bcf at the Everett import terminal. The Canaport LNG facility has 9.9 Bcf of storage. LNG is also produced and supplied by companies in Québec and Pennsylvania.

### **Recent System Upgrades... and Setbacks**

Looking back, 2020 seems most notable for infrastructure projects that did *not* advance – but nonetheless, some infrastructure additions did occur over the last year, including:

- Empire: “Empire North Expansion”
- Enbridge: “Atlantic Bridge” [construction completed, awaiting final permitting]
- PNGTS: “Portland XPress” [phase 3]
- Tennessee Gas: “Station 261” [phase 1]

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*Another key supply point for the region is liquefied natural gas (LNG). The region has three operating import facilities, two in MA and one in New Brunswick, Canada. LNG remains especially important to the Northeast region for winter peak days. This photo is of an LNG storage tank in Boston owned by National Grid.*



*Photo: National Grid*

- Transco: “Gateway Expansion Project.”

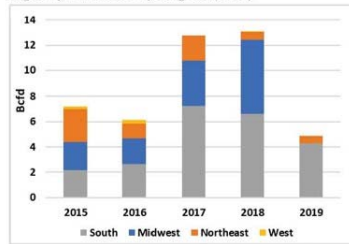
Several other projects however experienced permitting delays, and some others were withdrawn in the first half of 2020. The Constitution Pipeline, in development for eight years, was withdrawn in the spring, as was the proposed “Northeast Supply Enhancement Project (NESE).” In its press statement on NESE, Williams/Transco said that “the decision to pause this important infrastructure project is unfortunate for the region” but that it could not proceed without the

required state environmental permits from New York and New Jersey. The Atlantic Coast Pipeline, while not in this region, was also withdrawn in the summer, reflecting the difficulty of adding new large-scale projects in the midst of state permitting delays and opposition.

This chart from the FERC displays pipeline capacity additions by year for the period of 2015-19. The Northeast, shown in orange, did add fairly substantial increments in 2015-17, but the last few years indicate a slowing of new capacity additions. Some of this reflects the natural cycle of project development and individual project timing, but it also re-

reflects perhaps that the region has entered a new era of extremely difficult siting for natural gas... and likely for other energy sources as well.

*Fig. 7 U.S. Natural Gas Pipeline In-Service Capacity Additions by Region (Bcf/d)*



*Source: Office of Energy Projects*

*Chart: FERC, March 2020*

### Planned Infrastructure Enhancements

The Northeast region’s natural gas industry plans several infrastructure projects in the near-term to meet market demand. Its natural gas system remains constrained at several points, especially into New England and southern New York/Long Island. Citing supply and delivery limitations, several gas utilities in the region have implemented moratoria on new customer connections.

NGA posts updates on proposed expansion projects at:

[http://www.northeastgas.org/pipeline\\_expansion.php](http://www.northeastgas.org/pipeline_expansion.php)

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As mentioned, challenges faced by new projects include siting, environmental concerns, and securing market position. Contract commitments in New England remain a vexing market issue, as the largest consuming sector, power generation, is constrained by the complex economic structure of its wholesale electricity market. Local natural gas utilities have tried to invest in incremental pipeline projects to meet system expansion and reliability needs, but this too has proven to be challenging.

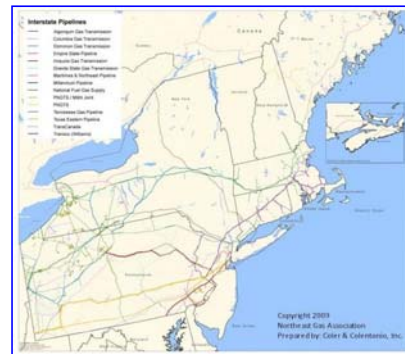
LNG is another supply option for the market in general and for gas LDCs. UGI Corp. in Pennsylvania, through its subsidiary, UGI LNG, has LNG storage, associated peak shaving services, and an LNG tanker truck-loading terminal. En-ergir (Gaz Métro LNG) in Québec increased its liquefaction capability in 2016. National Grid received federal regulatory approval to add liquefaction at its Providence, RI facility, which is expected to be completed in 2021. Philadelphia Gas Works (PGW) received city approval in 2019 to advance its proposed LNG project with Passyunk Energy Center, LLC (PEC) to facilitate the marketing and sale of LNG to regional customers.

Portable or mobile compressed natural gas (CNG), another supply/delivery option, is designed to bring natural gas to communities and businesses that are not located near a pipeline or distribution system. Some large commercial and industrial facilities, such as medical centers and colleges, have opted for “portable” or “mobile” natural gas delivered by truck. In this approach, large tube trailers are filled at large compression facilities and the CNG is delivered to the customer’s facility, where it is de-pressurized, off-loaded, and flowed into the customer’s gas (or dual-fuel) equipment. CNG is also being looked at by several gas utilities as another supply input into the distribution network at particularly constrained points, such as the greater New York City area.

## Industry Realignments & Mergers

Some industry realignments of note occurred over the past year. Perhaps the most significant was the decision by Dominion to sell its natural gas transmission and storage assets to Berkshire Hathaway. As of November 1, 2020, Berkshire

*The interstate pipeline system in the Northeast accesses supplies from multiple sources. The pipelines also can access storage at different points along their systems, including local storage in Pennsylvania and New York. With prolific production underway in Appalachia, these pipeline operators have been undertaking projects to add facilities to bring these new supplies to local markets in the Northeast and elsewhere, changing traditional flow patterns.*



## ***“NGA Year in Review 2020”***

Hathaway Energy completed its acquisition of the Dominion Energy's Gas Transmission and Storage business in the eastern region. The new company, BHE GT&S, is now a standalone subsidiary of Berkshire Hathaway Energy's Pipeline Group. Dominion Transmission is known as Eastern Gas Transmission and Storage. Berkshire also now has partial ownership of Dominion's prior shares in Iroquois Gas Transmission and Millennium Pipeline, among other entities.

Eversource completed its acquisition of Columbia Gas of Massachusetts in October 2020, accruing over 300,000 natural gas customers. By the end of 2020, Blackstone Gas Company, a small utility in MA, is expected to become part of Liberty Utilities.

Also this year National Fuel Gas Company acquired Shell's upstream and midstream gathering assets in Pennsylvania.

### **MARKET ISSUES**

#### **Supply Outlook**

U.S. production reached new heights in 2019, a 10% increase over 2018 levels. 2020 was on track to set another record... until the coronavirus outbreak. As of March, EIA was forecasting that U.S. dry natural gas production would set another annual record in 2020. By April it had readjusted the annual outlook in light of COVID-19. EIA as of November is now forecasting that dry natural gas production will average 91 Bcf/d for 2020, lower than the 2019 average. In July, EIA observed that “The April 2020 decline in natural gas production was the largest monthly decrease since Hurricane Isaac-related shut-ins in August 2012... The declining market led oil and natural gas operators to shut-in wells and limit the number of wells brought online, lowering the output for the major oil- and natural gas-producing regions.”

U.S. consumption also set a new record in 2019, but it too is on track to fall below last year's levels – down by about 2% overall.

While production has been cut back in the near-term, the U.S. resource base for natural gas nevertheless remains extensive.

In September 2019, the Potential Gas Committee (PGC) at the Colorado School of Mines released its 2018 biennial report, *Potential Supply of Natural Gas in the United States*. The report stated that the U.S. possesses a technically recoverable natural gas resource potential of 3,374 Tcf, which is the highest resource evaluation in the PGC's 54-year history. The future supply of domestic natural gas continues to increase due to the emergence and advancement of key technologies that unlock gas production from reservoirs such as the nation's shale formations.



*Photo: PA DEP*

## “NGA Year in Review 2020”

Canada, which has considerable natural gas reserves, remains an important energy partner, although its share of the U.S. natural gas market is expected to decline. In its December 2019 report, *Canada’s Energy Future 2019*, the Canada Energy Regulator (CER) projected that natural gas production will increase over the next decades, driven by the power generation market and LNG exports.

The higher U.S. domestic production in the U.S. also affects LNG imports. LNG imports into the U.S. are substantially lower than a decade ago, and the focus for the U.S. gas market has shifted from imports to exports. In 2019, the U.S. *exported* far more LNG (1.8 Tcf) than it *imported* (53 Bcf), a trend that will continue. Even so, the global LNG industry faces its own challenges in light of low global energy prices and a recent concern expressed by some in Europe about sourcing LNG from U.S. shale fields.

With the Northeast delivery system remaining constrained at certain points, regionally based LNG facilities will continue to help ease bottlenecks and increase supply and delivery options.

### Efficiency Initiatives

The Northeast region is a recognized national leader in per capita energy efficiency. A 2019 report by the American Council for an Energy Efficient Economy (ACEEE) noted that \$1.4 billion was invested in natural gas efficiency programs nationwide in 2018 (latest data). Over 40% (\$572 million) of the national total was invested in the nine Northeast states alone.

ACEEE notes that efficiency opportunities exist in multiple sectors: “While the roots of natural gas efficiency programs lie within residential markets, there are now programs serving multiple types of natural gas customers – from homeowners to large industries....Programs may target specific technologies that use natural gas, such as furnaces, water heaters, boilers, and cooking equipment, or they may target the systems and facilities that are served by natural gas technologies. Improving the thermal envelope of buildings is one example of programs that address whole buildings.”

In an October 2020 paper, ACEEE noted that “low natural gas market prices over the last few years have made it more difficult for some utility programs to demonstrate cost effectiveness using traditional tests.” It concludes though that “natural gas efficiency programs are sustainable and worth pursuing for both economic and environmental reasons.”

Efficiency is seen as a core part of utilities’ decarbonization efforts.

**The Northeast states continue to be leaders in per capita energy efficiency.**



## ***“NGA Year in Review 2020”***

### **Price Trends**

The key variables in natural gas price formation are: demand growth, the state of the national economy, production levels, storage levels, weather, and alternative fuel prices.

The natural gas price trend in this new era of domestic production continues to be positive for both consumers and the entire U.S. economy. In July 2008 natural gas commodity prices reached \$13.50/MMBtu (and oil hovered close to \$150 a barrel), whereas in 2019 the average natural gas commodity price was around \$2.50/MMBtu.

In the first half of 2020, natural gas prices at the U.S. Henry Hub benchmark reached record lows, according to EIA, which noted in July: “Monthly prices reached a low of \$1.63/MMBtu in June, the lowest monthly inflation-adjusted (real) price since at least 1989. Prices started the year low because of mild winter weather, which resulted in less natural gas demand for space heating. Beginning in March, spring weather and the economic slowdown induced by mitigation efforts for the coronavirus disease 2019 (COVID-19) contributed to lower demand, further lowering prices.”

Given the size of the domestic supply resource base, it is projected that the natural gas price bandwidth will remain relatively stable and moderate. However, short-term volatility reflecting delivery constraints and weather will continue to affect regional markets.

EIA has projected an average commodity spot price of around \$2.14 per MMBtu in 2020, but that the average price will rise to over \$3/MMBtu in 2021 in the wake of lowered production trends.

### **Winter Challenges & Market Constraints**

In its outlook for the winter of 2020/21, the FERC observed that “Electric and natural gas markets are expected to be constrained in the Northeast.” It’s a long-standing regional market characteristic: a high demand region with infrastructure constraints in particular market areas such as New York City/Long Island and



*Air emissions from power generation in the region have declined substantially in the past decades thanks in great part to the use of cleaner-burning fuels such as natural gas.*

*Photo: Joseph Murphy*

## *“NGA Year in Review 2020”*

New England. It is evidenced in the winter months when the demand is highest and system capacity at peak.

The combination of high demand, record cold and system constraints has resulted in considerable short-term price volatility in recent years regionally. In January 2018, spot prices hit extremely high levels, including a record on the Transco system in New York. While the Midwest price rose as high as \$6.50/MMBtu on January 5, 2018, the spot price on that same date was \$83 in Boston and \$140 in



the New York City area, a sharp illustration of regional price disparities.

Natural gas winter futures prices for the 2021/21 winter are once again expected to be at their highest in the Northeast region, where Transco Zone 6 and Algonquin continue to exceed the national benchmark at Henry Hub and other regional hubs. Natural gas utility customers in the region are largely shielded from spot market price volatility thanks to gas utilities' firm contract arrangements for pipeline capacity and storage arrangements. Market participants such as some power generators which rely on non-firm capacity however are subject to spot market prices and interruptions in capacity delivery according to their contract terms.

EIA noted in 2017 that “both the Boston and New York natural gas markets have experienced winter price spikes because of pipeline constraints during periods of peak demand. Natural gas pipeline expansion projects that were completed in recent years may have reduced, but did not eliminate, sharp price increases with anticipated cold weather.”

The situation in the summer months is far less challenging, although pipeline maintenance work can affect the regional market.

### **Gas and Electric Power Generation**

The regional power generation fleet, highly reliant on natural gas, is positioned to remain so for several more years, even as the regional power grids transition to an increasingly clean energy profile. Combined-cycle technology (CCT) made the natural gas power plant the energy system of choice for the last two decades. CCT's advantages over other conventional fuel types include higher efficiency, lower heat rates, shorter construction lead times, and reduced air emissions.

Natural gas power plants have continued to be added in the region in recent years, as retirements of oil, coal and some nuclear plants have continued.

In 2018, new gas combined-cycle plants opened in Connecticut (805 MW, CPV Towantic plant), Massachusetts (674 MW, Salem Harbor unit), and New York (680 MW, CPV Valley Energy Center). In 2019, a combined cycle plant

**“NGA Year in Review 2020”**

*A natural gas power plant in Dover, NY that went into operation in spring 2020; 1,100 MWs.*

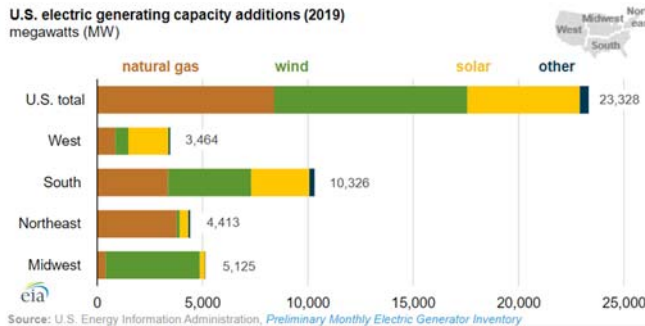


*Photo: Cricket Valley Energy Center*

opened in Bridgeport, CT (485 MW), and two gas peakers totaling just over 500 MW opened in MA. In April 2020 a major gas unit, Cricket Valley Energy Center (1,100 MW), became operational in New York. It entered service in the same timeframe that one of the last units of Indian Point nuclear plant closed; Indian Point’s last nuclear unit will close in spring 2021.

Natural gas units continue to provide important baseload and fast-start capability, and remain pivotal to grid reliability. PJM’s “2019 Regional Transmission Expansion Plan,” released in February 2020,

noted that “Both natural gas and solar fuels comprise 43 percent of the generation in PJM’s interconnection queue...Favorable fuel economics have emerged with the development of the Marcellus and Utica shale formations natural gas reserves, lo-



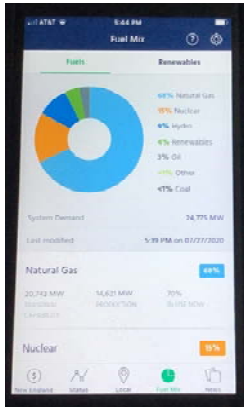
*This chart from the U.S. EIA shows new power generation capacity by fuel type added in 2019. The top line shows new capacity in the U.S. as a whole, a fairly equal split among natural gas (brown), wind (green) and solar (yellow). The Northeast regional line shows that virtually all of the new capacity added in 2019 was natural gas. Chart: U.S. EIA, April 2020*

cated in the middle of PJM’s footprint.”

The New York Independent System Operator (NYISO) noted in its June 2020 report “Power Trends 2020” that the portion of New York’s installed capacity from natural gas and dual-fuel facilities grew from 47% in 2000 to 62% in 2020. As the ISO noted its 2019 report: “Reflecting economic and public policy investment signals, recent generation additions have primarily been natural gas-fueled in downstate New York and wind-powered in upstate.”

Public policy and legislative initiatives in the region are increasingly prioritizing non-fossil fuel units for new generation and encouraging electric utilities to contract for substantial amounts of offshore wind and imports of Canadian hydro. (The Northeast states alone are looking to add over 23 GW of offshore wind capacity in the next decade-and-a-half.) Solar continues to make inroads behind-the-meter as its technology costs decline.

## “NGA Year in Review 2020”



*The highest power demand in the summer of 2020 on the ISO-NE system occurred on July 27. As seen in the snapshot here, natural gas at the peak hour represented close to 70% of generation.*

The continued value of natural gas to the region nevertheless was underscored in the biennial “Regional System Plan” from ISO-NE, released in October 2019: “Natural-gas-fired generation’s proportion of the system capacity mix is expected to grow from 49.5% in 2019 to approximately 54.4% by 2023 but decrease to 48.6% by 2028. Further retirements of coal and oil generators are expected over the next 10 years due to generally low natural gas prices, renewable energy additions, and pending environmental regulations. The Pilgrim nuclear plant in Massachusetts retired in 2019. Although renewable resources are anticipated to grow over the long term, the ISO expects natural gas resources to continue to set the marginal price for wholesale electricity in most hours over the planning horizon.”

Fuel choices and power system reliability remain highly topical at national and regional/state energy forums. Fuel security and grid resilience remain key topics for the RTOs. At the same time, some state government leaders are expressing concern that the power markets are not facilitating the clean energy transition on a fast-enough timetable. In October 2020, for example, five of the six New England governors called for a “modernized grid.”

The issues are complex: the future of nuclear, the uncertainty over increasing pipeline infrastructure in areas like the Northeast, the balancing of intermittent renewable resources on the system, the valuing of capacity in power markets, addressing emissions through carbon pricing or a cap-and-trade framework, onshore connectivity, solar acreage, and affordability, among others. Debate will continue into 2021 and beyond as the Northeast region’s power markets evolve to reflect the changing policy and regulatory environment.

## Utility System Expansions, Limitations and Reassessments



## *“NGA Year in Review 2020”*

Natural gas demand has been rising due to its advantageous price, reliability, and efficiency. Since 2012, the number of homes heating with natural gas in the Northeast region has increased by over one million, to over twelve million heating customers. U.S. Census data for 2019 indicated that the natural gas furnace remains the predominant heating choice for new home construction in the Northeast. It now heats 55% of the homes in the region.

However, rising demand and new customer additions are beginning to run up against system delivery constraints in some areas.

Five utilities in Massachusetts have put moratoria in place on new customer connections because of supply and delivery constraints. In 2019, Con Edison and National Grid announced moratoria on new customer connections in the New York City area because of system constraints. Both are working to implement a broad portfolio of supply and demand management options, from greater efficiency, to incorporating

CNG, LNG and renewable natural gas, to incentives for customers who upgrade their heating equipment or install heat pumps to reduce natural gas usage. They also are looking to possible compression expansions by two pipelines to increase natural gas supply in the next two or three years, if possible.



Even as natural gas remains the most popular heating fuel, there are efforts now to try to reverse or slow its growth.

In 2019 a few communities in California and Massachusetts proposed local building ordinances to prohibit gas (and other fossil fuel) connections for new customers, citing environmental concerns and the desire for an all-electric system. (In November 2020, the San Francisco Board of Supervisors did vote to ban natural gas in new construction, effective in June 2021.) A community in the Boston area, Brookline, voted in late 2019 to ban oil and natural gas connections in new buildings, and other communities such as Cambridge, MA announced they were also exploring that option. In July 2020, the Attorney General of MA ruled that the Brookline ban was not legal – it was a violation of state law and was preempted by the state building code.

**The Northeast states have added over 1 million new natural gas customers since 2012.**

Nevertheless, the “gas ban” efforts reflects a challenge to the growth trends of natural gas. In comments provided to the Cambridge, MA City Council public hearing in December 2019 as it discussed a proposed restriction on natural gas in new buildings, NGA noted that such an action would directly impact consumer choice and energy affordability for city residents and businesses. “The industry shares the City’s goal of reducing carbon emissions,” said

NGA, but the pathway needs to be carefully considered for its impacts, feasibility

## ***“NGA Year in Review 2020”***

and timing.

Two state initiatives are now addressing the role of natural gas in the midst of this changing environment. The New York State Public Service Commission in March 2020 initiated a proceeding to consider issues related to the planning procedures used by New York’s natural gas local distribution companies (LDCs). The proceeding, said the Commission, “responds to recent actions by certain LDCs to invoke moratoria on new service connections based on their assessment that supply constraints would prevent them from maintaining reliable service to all customers during every hour of the year in parts of their service territories. The Gas Planning Proceeding will address four interrelated issues: (1) the identification of “vulnerable locations” where there is an expected/forecasted future imbalance in the supply of and demand for natural gas; (2) reliance on peaking services to meet demand; (3) management of moratoria conditions when such events are contemplated; and (4) the design of a “modernized” gas system planning process.” In October 2020, the MA Department of Public Utilities (DPU) announced its own investigation into the future role of natural gas. The DPU “will assess the role of gas companies in ensuring a low-carbon future and explore strategies that enable the Commonwealth to achieve net zero greenhouse gas emissions while safeguarding ratepayer interests and securing safe, reliable, and affordable natural gas service.”

### **Assessing the Future Role of Natural Gas As Interest in Decarbonization and Electrification Grows**

The benefits of natural gas – lower price, lower emissions, domestic supply – contribute to continued levels of customer conversions and new customer development.

The natural gas industry recognizes the interest of policymakers, regulators, customers, and the public in decarbonizing the energy system as much and as swiftly as possible. Natural gas utilities have proposed various pathways to decarbonization, including greater efficiency, incorporation of renewable natural gas, and the accelerated replacement of older, more “leak-prone” system components.

Concurrently, several national and regional advocacy groups and consultants are promoting “strategic electrification” or “beneficial electrification” as the new overarching energy system paradigm, under

*A natural gas combined cycle plant, with oil backup, in MA that went online in 2019. Photo: Exelon Generation*

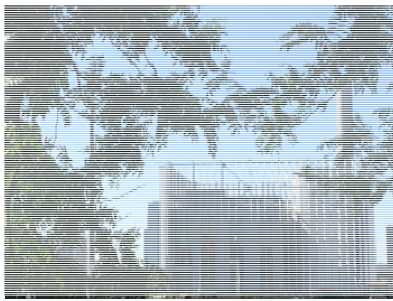


## “NGA Year in Review 2020”

which all systems – heating, power generation, and transportation – would operate via electricity, and that fossil fuels would be substantially reduced and eventually eliminated.

The costs and practicality of electrification are a concern. The approach to the energy future needs to be thoughtful and mindful always of such critical criteria as energy affordability and system reliability.

Several studies released by ACEEE identify value in converting homes heated with heating oil and propane to electricity, but find less benefit in converting natural gas homes, especially in colder climates. In a September 2018 blog post,



*In 2020, Harvard’s new central energy facility in Allston, MA became fully operational. It runs primarily on natural gas.*

ACEEE observed: “For the residential sector, recent ACEEE research has found that some applications (oil- and propane-heated homes and homes in the South) can meet the criteria for beneficial electrification discussed above. For these applications it can make sense to electrify the next time a heating or cooling system or water heater needs to be replaced. But for many homes, electrification may not currently make sense and as a result, natural gas use will likely continue for decades, particularly in the North.”

In a June 2020 report on electrification efforts at the state level, ACEEE observed again: “In areas with high use of delivered fuels (fuel oil or propane), many programs target customers using these fuels because the economics of electrification in these situations are often better than when displacing natural gas.”

In January 2019, NYSERDA published “New Efficiency: New York—Analysis of Residential Heat Pump Potential and Economics.” It noted that “generally, installations replacing natural gas have negative IRRs [internal rates of return].”

The importance of natural gas as a reliable balancing fuel for intermittent renewables (until such time as battery storage becomes fully feasible) remains generally acknowledged. In its April 2018 “National Electrification Assessment,” the Electric Power Research Institute (EPRI) noted the central role for gas in power generation over the next several decades. “Natural gas use continues to grow in all four EPRI scenarios based on its operational flexibility and an assumed cost of around \$4/MMBtu...Direct gas use in industry and gas-fired electric generation grows while gas use in building heat remains relatively flat over time.”

The growing interest in electrification and a relative ambivalence about the future role of natural gas in some policy circles was addressed in a May 2017 paper from the Natural Regulatory Research Institute (NRRI), “Questioning the Future of Natural Gas”: “A reasonable argument is that U.S. and state energy policy should encourage the use of natural gas for different uses rather than its suppres-

## “NGA Year in Review 2020”

sion. A proper balancing of economic and environmental considerations would likely reach that conclusion. Those who advocate less natural-gas usage generally skew their finding by giving little if any weight to the economic effects....Climate change concerns should certainly be a factor in developing energy policy, but not the sole or even overriding factor.”

Ken Costello, the author of the NRRI report, is now an independent consultant, and is still articulating well the comparative benefits of natural gas at this time of growing policy interest in electrification. In November 2020 he wrote an op-ed in the *San Francisco Chronicle* after that city’s Board voted to ban natural gas in new buildings. It’s worth quoting at some length: “A ban represents a command-and-control policy at its worst. It is a highly blunt instrument, draconian and highly costly relative to other alternatives to mitigate greenhouse gas emissions. The good that comes to energy consumers and society from natural gas far exceeds the bad. What natural gas has going for it is plenty: (1) abundant domestic availability, (2) low price for the foreseeable future, (3) relative cleanliness when compared with other fossil fuels, (4) promising technological prospects for a more benign environmental footprint in the future, (5) flexibility in electric power production, one use being a backup to renewable energy. It seems absurd to ban or even restrict a product that has done, and is expected in the future to do, so much good for both energy consumers and the economy.”

### Infrastructure Siting Challenges and Regulatory Delays

Energy infrastructure has always encountered siting issues. Examples include siting wind turbines on mountain ridges or offshore, nuclear power, and electric and gas transmission.

Siting challenges for fossil fuel projects appear to have reached a new level in the U.S. and Canada in a time of growing awareness of climate change. Today’s increasing “dependence” on natural gas is viewed by some as an obstacle to the deployment of “clean energy.”



In the U.S., delays at the state level, particularly regarding the issuance of state water quality certificates, add to project costs and prolong uncertainty. To secure federal approval, natural gas pipeline projects must demonstrate market need and financial viability, and their routes must comply with environ-



## “NGA Year in Review 2020”

mental requirements. Contract commitments by proposed customers or shippers are essential to the process.

In 2020, the siting trends continued, as several pipeline proposals were withdrawn after multiple years of navigating the permitting process, including the Constitution Pipeline, the NESE Project, and the Atlantic Coast Pipeline. The developers noted the costs of delay and the uncertainty of the regulatory process.

The Northeast region, as a highly congested area, poses challenges for any energy development. Public policy requires all sides to weigh the costs and benefits and seek balanced and reasonable solutions.

### Environmental Considerations

Environmental issues are central to debates about energy system usage and infrastructure expansion. The natural gas industry can contribute by noting past progress and offering future solutions.

#### *Reductions in air emissions from power generation*

Natural gas compares favorably to other fossil fuels regarding air emissions, and it remains a favored fuel for power generation. MIT’s June 2011 study on gas concluded that using very efficient natural gas-powered plants to replace coal-fired plants was “the most cost-effective way of reducing CO<sub>2</sub> emissions in the power sector” in the coming years. Natural gas will also play “a central role in integrating more intermittent renewable sources – wind and solar – into the electric system because they can easily be brought in and out of service as needed.”

The rise in natural gas use in power generation is leading to lower air emissions, from sulfur dioxide to carbon dioxide. In November 2020, U.S. EIA noted: “U.S. electric power sector emissions have fallen 33% from their peak in 2007 because less electricity has been generated from coal and more electricity has been generated from natural gas (which emits less CO<sub>2</sub> when combusted) and non-carbon sources.”

At the regional level, air emission trends remain favorable. NY ISO reported in 2020 that emissions rates from its power sector dropped by 55% for CO<sub>2</sub>, 92% for NO<sub>x</sub>, and 99% for SO<sub>2</sub> over the last two decades. ISO-NE reported that from 2001 to 2018, total emissions from power plants in New England declined by 98% for SO<sub>2</sub>, 74% for NO<sub>x</sub>, and 36% for CO<sub>2</sub>. The ISO noted: “Several factors have played a role in the overall reduction of generator air emissions... The biggest contributor has been the region’s shift to lower-

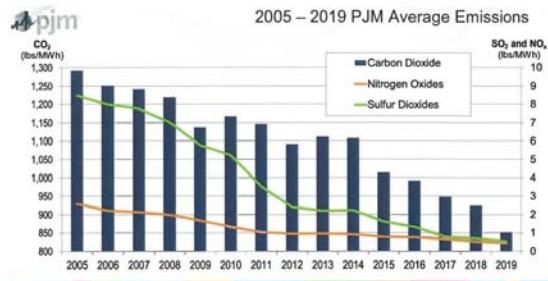


Chart: PJM, 2020

## ***“NGA Year in Review 2020”***

emitting, highly efficient natural-gas-fired generation. Natural gas-fired resources account for the vast majority of new generators built in New England since 1997, and they typically outcompete oil- and coal-fired generators in the marketplace to serve the region’s electricity needs.”

PJM reported substantial declines in NO<sub>x</sub>, SO<sub>2</sub>, and CO<sub>2</sub> from 2005 to 2018 (see chart).

### ***Reductions of methane emissions in natural gas system operations***

The natural gas industry is cognizant of its responsibility to reduce emissions throughout its system operations. Many of NGA’s distribution and transmission company members participate in the EPA’s Natural Gas STAR Program and progress continues on this front. In 2018, Natural Gas STAR partners reported methane emissions reduction of 130.6 Bcf in the U.S., which provided “cross-cutting benefits” according to EPA. Reducing pipeline leaks is of paramount interest (see section on infrastructure replacement below).

Natural gas systems in total account for about a quarter of all U.S. methane emissions, or nearly 3% of all U.S. greenhouse gas (GHG) emissions. Since 1990, methane emissions related to the U.S. natural gas system have declined by 23.7%, according to the EPA’s April 2020 national GHG inventory report. The report, reflecting 2018 data, noted: “The decrease in transmission and storage emissions is largely due to reduced compressor station emissions (including emissions from compressor and equipment leaks)....Distribution system emissions, which account for 8 percent of CH<sub>4</sub> emissions from natural gas systems and less than 1 percent of non-combustion CO<sub>2</sub> emissions, result [sic] mainly from leak emissions from pipelines and stations. An increased use of plastic piping, which has lower emissions than other pipe materials, has reduced both CH<sub>4</sub> and CO<sub>2</sub> emissions from this stage, as have station upgrades at metering and regulating (M&R) stations. Distribution system CH<sub>4</sub> emissions in 2018 were 73 percent lower than 1990 levels.”



In the distribution sector, the main emphasis is on accelerating the replacement of older, potentially more “leak-prone” pipe.

The latest GHG data from New York indicated that methane emissions related to “natural gas leakage” have declined by 20% in the last dozen years; in Massachusetts, methane emissions from natural gas systems have declined by 67% since 1990.

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### ***Shale gas development***

Development of shale gas in the U.S. continues to merit analysis and technological improvements. MIT’s June 2011 study on natural gas noted that “the environmental impacts of shale development are challenging but manageable.” An October 2011 paper by the National Regulatory Research Institute (NRRI) noted that “Based on more than one million wells drilled with fracking, however, there is little evidence that fracking directly causes groundwater contamination....[R]eports show that these incidents resulted from surface spills, poor cementing jobs in wellbores, and other operational failures.”

Proper procedures and oversight are necessary at all stages of the process.

The Pennsylvania Governor’s Marcellus Shale Advisory Commission reported that “The primary concerns regarding hydraulic fracturing relate to surface spills of fluids, well control and lost containment of production and flowback water on the surface.”

The Pennsylvania DEP’s “2017 Oil and Gas Annual Report” released in August 2018 noted: “Although there is no evidence that hydraulic fracturing has resulted in a direct impact to a water supply in Pennsylvania, there are cases where related oil and gas activities have adversely affected private water supplies. DEP investigates all stray gas-related complaints and if it is determined that a water supply is adversely affected by oil and gas activities, DEP works with the responsible operator to ensure the water supply is restored or replaced.”



*Photo: PA PUC*

Reducing the use of diesel fuel in the production process, enhancing “green completion” in the entire production cycle to reduce emissions, and mitigating community impacts, continue to receive industry attention in Pennsylvania and elsewhere.

### **Accelerated Pipeline Replacement**

Related to safe operations and environmental performance is the accelerated replacement and repair of older pipeline system components (pipes constructed of bare steel or cast-iron) that are considered more “leak-prone.” The U.S. Department of Energy observed in January 2017: “Safety remains the primary policy driver for LDC pipeline and infrastructure repair programs. However, the significance of methane emissions is becoming more recognized and companies, regulators, and other stakeholders are seeking ways to incorporate emission reductions into utility programs while limiting the cost to consumers.”

PHMSA continues to urge action on repairing older, potentially more leak-prone systems. In general, due to its older systems, the Northeast states have higher levels of such distribution pipe components than the national average, but those

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percentages are declining as system replacement continues.

In February 2020, the National Association of Regulatory Utility Commissioners (NARUC) published an informational handbook summarizing natural gas distribution infrastructure replacement programs in 41 states and the District of Columbia. The handbook cites substantial progress in replacing aging bare steel and cast iron main miles and service counts across the U.S. in recent years, but notes as well: “However, bare steel and cast iron still account for 5.1 percent of main miles and 2.7 percent of service lines, demonstrating the need for continued action on infrastructure replacement.”

### **Pipeline Safety Management and Public Awareness**

Pipeline safety is always a priority for the industry. Federal and state regulatory requirements are extensive, and recent regulations have been announced to enhance operational safety, from transmission and distribution integrity management to control room operations.



Both industry and government regulators prioritize worker and contractor training, including addressing the prevalence of “third party damage” (the leading cause of incidents); the importance of “call before you dig” programs; increasing public awareness of natural gas; encouraging individuals to call utility or emergency personnel if they smell gas in the home or street; and maintaining and enhancing the physical components of the delivery system by implementing methods like “accelerated infrastructure replacement.”

NGA and its members continue to work on important initiatives in the areas of public awareness and new technologies. NGA introduced in recent years a “First Responder utility online safety training program” based on an award-winning program developed by National Grid.

After the 2018 Merrimack Valley incident north of Boston which had widespread impact in three communities, Massachusetts Governor Charlie Baker led the state’s gas utilities to undertake implementation of a pipeline safety management system (PSMS). The purpose of a Safety Management System is to help pipeline operators create a framework for developing a comprehensive, process-oriented approach to safety, emphasizing continual assessment and improvement.

NGA is presently conducting an initiative of Massachusetts and other utilities in the region to implement PSMS. The NGA membership collaborative approach is viewed as one of the largest coordinated PSMS implementation programs underway in the U.S.



## *“NGA Year in Review 2020”*

### **Renewable Natural Gas**

Renewable Natural Gas (RNG), also known as bio-methane or biogas, is pipeline quality gas derived from biomass that is fully interchangeable with natural gas. The future natural gas network will include renewable gas from dairy farms, wastewater treatment plants, landfills, wood waste, and food waste plants.

In the Northeast there is growing interest and action in implementing RNG, from Vermont and Maine to New York City and beyond.

In 2019, NGA and GTI released the “Interconnect Guide for Renewable Natural Gas in New York State.” The report was sponsored by and developed in coordination with several New York natural gas utilities. The report provides a guideline for RNG pipeline interconnections that is applicable and of value throughout the U.S. and Canada. It provides a framework and technical guidance by which project developers and the local gas utility can use common core principles and a rigorous technical framework to facilitate maximizing the acceptance and introduction of RNG into the natural gas pipeline network.



RNG is also seen as a potential source for natural gas in the transportation sector. The U.S. Department of Energy notes that “like conventional natural gas, RNG can be used as a transportation fuel in the form of compressed natural gas (CNG) or liquefied natural gas (LNG). RNG qualifies as an advanced biofuel under the Renewable Fuel Standard.”

RNG is a cornerstone of utilities’ efforts to decarbonize their supply sources.

### **Hydrogen’s Potential**

Among the energy sources seen as potentially significant for establishing a low-carbon energy future is hydrogen.

For natural gas systems, hydrogen has the potential to reduce carbon intensity through blending into existing gas pipeline systems.

The Canada Energy Regulator notes there are three methods to produce hydrogen:

**“Grey hydrogen** uses an industrial process called ‘steam methane reforming’, which uses high temperature steam to separate hydrogen from methane—the main component of natural gas.

**Blue hydrogen** uses the same method as grey hydrogen, except it captures and stores the carbon dioxide (CO<sub>2</sub>) emissions resulting from the process.

**Green hydrogen** utilizes renewable electricity and a process called electrolysis (passing an electric current through water) to separate and extract hydrogen molecules from water.”

## ***“NGA Year in Review 2020”***

Hydrogen is currently used in the transportation sector as a vehicle fuel as well, notably in California, but on a very limited basis. There are a few hydrogen fueling stations in the region through such firms as Air Liquide, and there is consideration of establishing a “Northeast hydrogen roadmap.”

There are challenges of cost and scale. In November 2020, the U.S. Department of Energy (DOE) released its "Hydrogen Program Plan." DOE noted: “The key technical challenges for hydrogen and related technologies are cost, durability, reliability, and performance, as well as the lack of hydrogen infrastructure. To achieve widespread commercialization, hydrogen utilization technologies must enter larger markets and be able to compete with incumbent technologies in terms of life-cycle cost, performance, durability, and environmental impact. Non-technical barriers also need to be addressed, such as developing and harmonizing codes and standards, fostering best practices for safety, and developing a robust supply chain and workforce.”

It is a challenge, but there remains great expectations as well that the technology can contribute successfully to a low-carbon future.

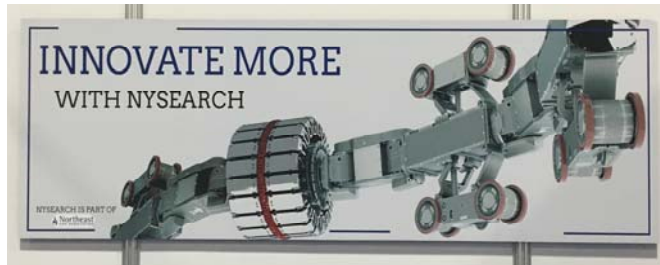
### **New Technology R&D**

NGA has a significant R&D program operated by NYSEARCH.

NYSEARCH has been involved with innovative projects such as pipeline sensing and guided wave technology, and continues to utilize its own testbed facility (Johnson City, NY) for advanced demonstrations. Recent success stories include the development, testing and commercialization of the Remote Methane Leak Detector (RMLD), the EXPLORER II robotics program, and tests of drones for gas company facility inspection flights. NYSEARCH is also conducting an evaluation and test program for methane emissions technology, and evaluating residential methane detector technology.

NGA has collaborated with the Gas Technology Institute (GTI) to help facilitate knowledge transfers regarding new technologies that can enhance operations, safety, efficiency, and analysis.

NGA and its members continue to support innovative advances in natural gas technology.



***“NGA Year in Review 2020”***

**The Year Ahead**

NGA will continue to post updates throughout the year at:

[www.northeastgas.org](http://www.northeastgas.org)

We wish everyone good health and safety this year and beyond.



## **II.**

# **REGIONAL ENERGY OVERVIEW**

*This section provides an introduction to the energy scene in the Northeast region.*

*Among the areas addressed are:*

- *economic profile*
- *primary energy mix*
- *electric generation mix*
- *state energy consumption.*



## NORTHEAST ECONOMIC PROFILE

STATE	POPULATION (2019)	HOUSE- HOLDS (2019)	LABOR FORCE (Aug. 2020) [thousands]	GDP (2020, 1 <sup>st</sup> qtr) [\$ billions]	GDP as % OF U.S. TOTAL (2019)	PER CAPITA PERSONAL INCOME (2019)
<b>Connecticut</b>	3,565,287	1,377,166	1,867	288	1.3	<b>\$79,087</b>
<b>Maine</b>	1,344,212	573,618	678	68	0.3	<b>\$50,950</b>
<b>Massachusetts</b>	6,892,503	2,650,680	3,546	604	2.8	<b>\$74,967</b>
<b>New Hampshire</b>	1,359,711	541,396	737	90	0.4	<b>\$63,880</b>
<b>New Jersey</b>	8,882,190	3,286,264	4,568	647	3.0	<b>\$70,979</b>
<b>New York</b>	19,453,561	7,446,812	9,497	1,729	8.0	<b>\$71,440</b>
<b>Pennsylvania</b>	12,801,989	5,119,249	6,302	815	3.8	<b>\$58,775</b>
<b>Rhode Island</b>	1,059,361	407,174	541	64	0.3	<b>\$56,542</b>
<b>Vermont</b>	623,989	262,767	324	35	0.2	<b>\$56,691</b>
<b>U.S.</b>	<b>330,337,749</b>	<b>122,802,852</b>	<b>160,838</b>	<b>21,539</b>	<b>100</b>	<b>\$56,663</b>

*Sources: U.S. Bureau of the Census, U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics. GDP = current dollar.*

## TOTAL PRIMARY ENERGY CONSUMPTION

*A comparison of primary energy consumption in the Northeast states indicates a strong role for petroleum, reflecting the inclusion of the transportation sector; a minimal role for coal compared to the national average, a varying role for nuclear, a growing share for renewables, and a solid and growing share for natural gas.*

### *Percentage by State per Fuel Type*

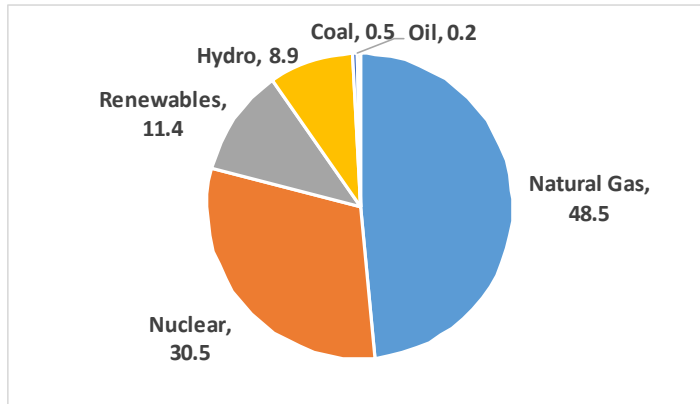
	Natural Gas	Oil	Nuclear	Renewables	Coal	Electric Flows
<b>CT</b>	<b>38</b>	<b>41</b>	<b>23</b>	<b>7</b>	<b>&lt;1</b>	<b>- 10</b>
<b>ME</b>	<b>12</b>	<b>44</b>	<b>-</b>	<b>41</b>	<b>-</b>	<b>- 1</b>
<b>MA</b>	<b>31</b>	<b>38</b>	<b>3</b>	<b>7</b>	<b>&lt;1</b>	<b>20</b>
<b>NH</b>	<b>16</b>	<b>48</b>	<b>32</b>	<b>19</b>	<b>2</b>	<b>- 18</b>
<b>NJ</b>	<b>36</b>	<b>42</b>	<b>15</b>	<b>4</b>	<b>&lt;1</b>	<b>2</b>
<b>NY</b>	<b>36</b>	<b>34</b>	<b>12</b>	<b>13</b>	<b>&lt;1</b>	<b>3</b>
<b>PA</b>	<b>34</b>	<b>27</b>	<b>19</b>	<b>6</b>	<b>14</b>	
<b>RI</b>	<b>53</b>	<b>43</b>	<b>-</b>	<b>5</b>	<b>-</b>	<b>- 1</b>
<b>VT</b>	<b>10</b>	<b>55</b>	<b>0</b>	<b>32</b>	<b>-</b>	<b>- 21</b>
<b>US</b>	<b>31</b>	<b>36</b>	<b>8</b>	<b>11</b>	<b>13</b>	

*Sources: U.S. Energy Information Administration (EIA), "State Energy Data Report 2018," released 2020. Electric flows shown for states where numbers make material difference. \* Vermont imports substantial amount as well.*

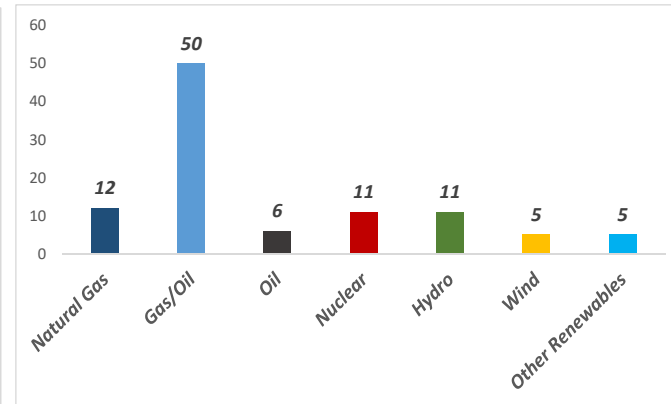
# ELECTRIC GENERATION FUEL SOURCE

(% of total)

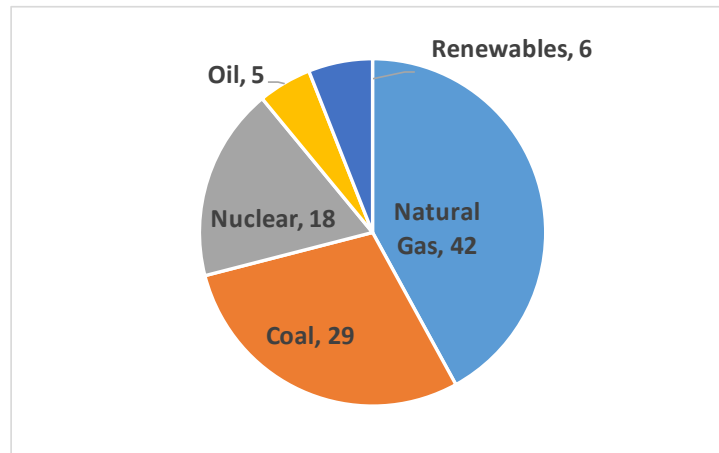
**NEW ENGLAND**



**NEW YORK**



**PJM**



Sources:  
 ISO New England,  
 2019 sources of total  
 electric energy produc-  
 tion;  
 NY ISO, 2020 "Power  
 Trends";  
 PJM, "2019 Regional  
 Transmission Expans-  
 ion Plan, State Re-  
 ports," released 2020.

## ENERGY CONSUMPTION BY MAJOR SOURCE

*The Northeast states consume less energy per capita than the U.S. on average. Source: U.S. Energy Information Administration, "State Energy Data Report 2018," released 2020. Sum of fuel totals is not equal to total consumption due to other energy components not shown. Rank signifies level of state consumption compared to 50 U.S. states and District of Columbia. The data for fuels in TBtu is EIA's estimates for the year 2018.*

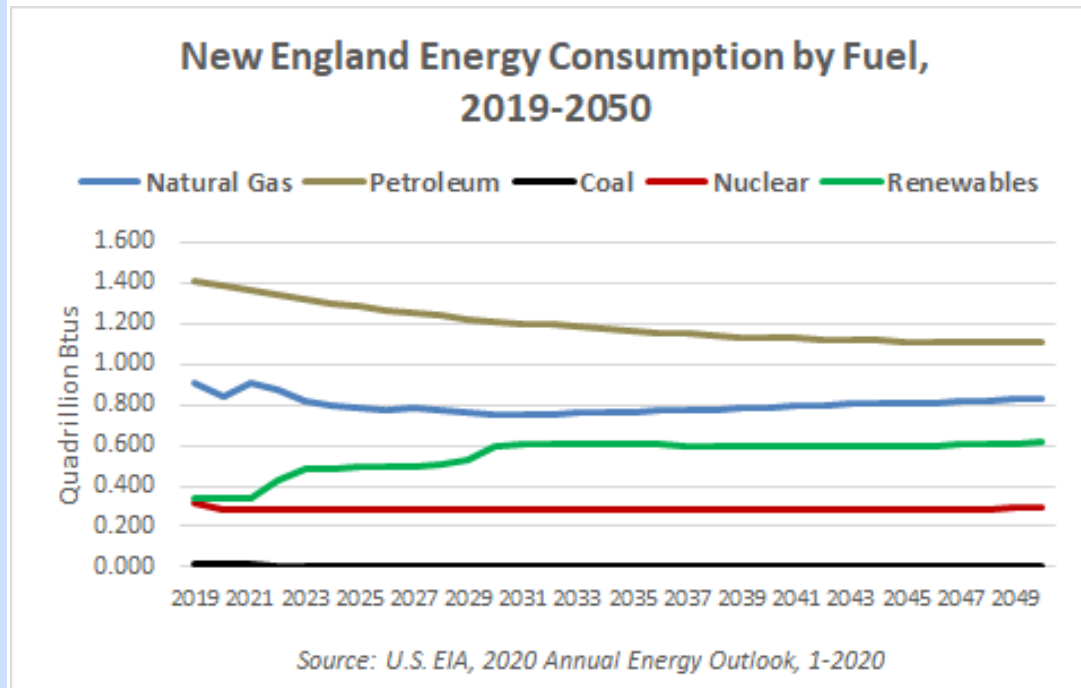
	Per Capita, 2018, Consumption		Natural Gas		Petroleum		Coal		Renewable Energy	
	MMBtu	Rank	TBtu	Rank	TBtu	Rank	TBtu	Rank	TBtu	Rank
<b>CT</b>	210.8	45	286.0	34	312.7	33	4.0	45	50.4	45
<b>ME</b>	295.2	29	48.4	48	173.6	43	2.1	47	160.4	27
<b>MA</b>	211.9	44	452.6	21	561.5	20	0.1	48	105.2	35
<b>NH</b>	239.9	41	51.5	47	155.2	46	7.8	43	62.1	41
<b>NJ</b>	252.2	36	799.6	12	935.1	9	16.7	40	86.9	39
<b>NY</b>	197.3	50	1,393.7	6	1,328.9	5	16.7	41	490.3	5
<b>PA</b>	309.5	26	1,513.2	4	1,203.2	7	644.1	8	251.2	14
<b>RI</b>	186.5	51	104.7	43	84.4	49	-	50	10.0	49
<b>VT</b>	222.9	43	14.2	50	76.3	50	-	51	44.2	46
<b>Northeast</b>			<b>4,663.9</b>		<b>4,830.9</b>		<b>691.5</b>		<b>1,260.7</b>	
<b>U.S.</b>	309.4		<b>31,086.4</b>		<b>36,901.6</b>		<b>13,250.0</b>		<b>11,281.6</b>	

## PROJECTED ENERGY CONSUMPTION GROWTH, NEW ENGLAND

U.S. EIA projects natural gas to grow at an annual rate of -0.3% in New England through 2050. Gas is projected to have growth in the residential/commercial/industrial sectors, but to decline in the power sector in the longer-term, according to EIA.

EIA projects growth trends for other leading energy sources as follows:

- Renewables, 1.9%
- Coal, -12%
- Nuclear, -0.3%
- Oil, -0.8%.



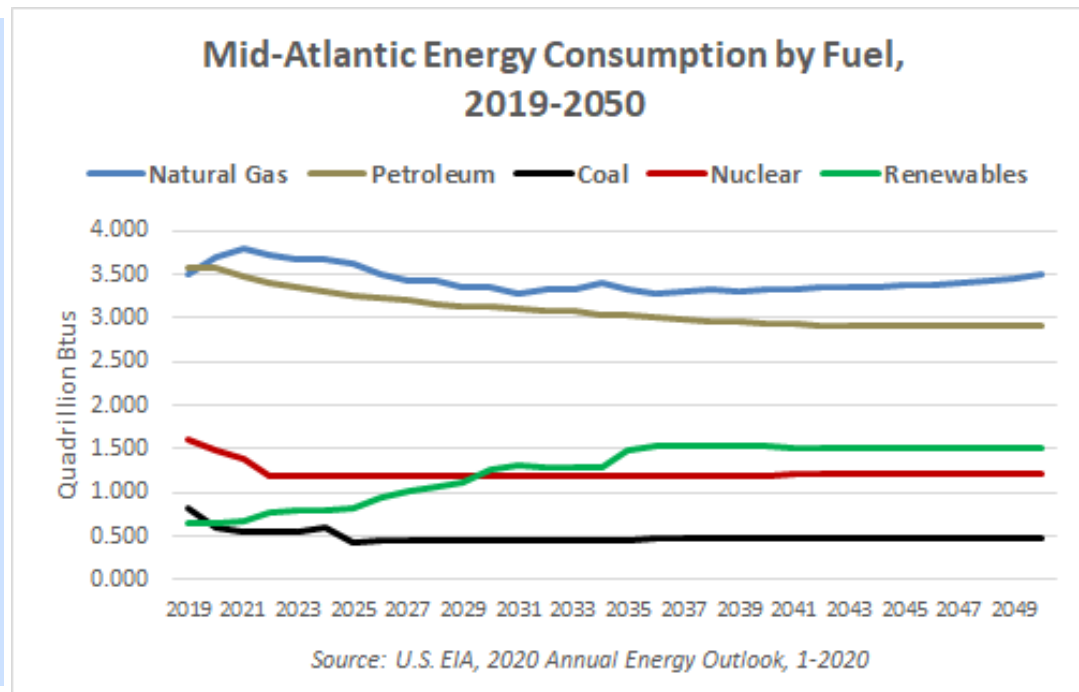
Source: U.S. Energy Information Administration, "2020 Annual Energy Outlook"

## PROJECTED ENERGY CONSUMPTION GROWTH, MID-ATLANTIC

U.S. EIA projects natural gas to grow at an annual rate of 0.4% in the Mid-Atlantic region through 2050.

EIA projects growth trends for other leading energy sources as follows:

Renewables, 2.8%  
Coal, -1.8%  
Nuclear, -0.9%  
Oil, -0.6%.



*Source: U.S. Energy Information Administration, "2020 Annual Energy Outlook"*

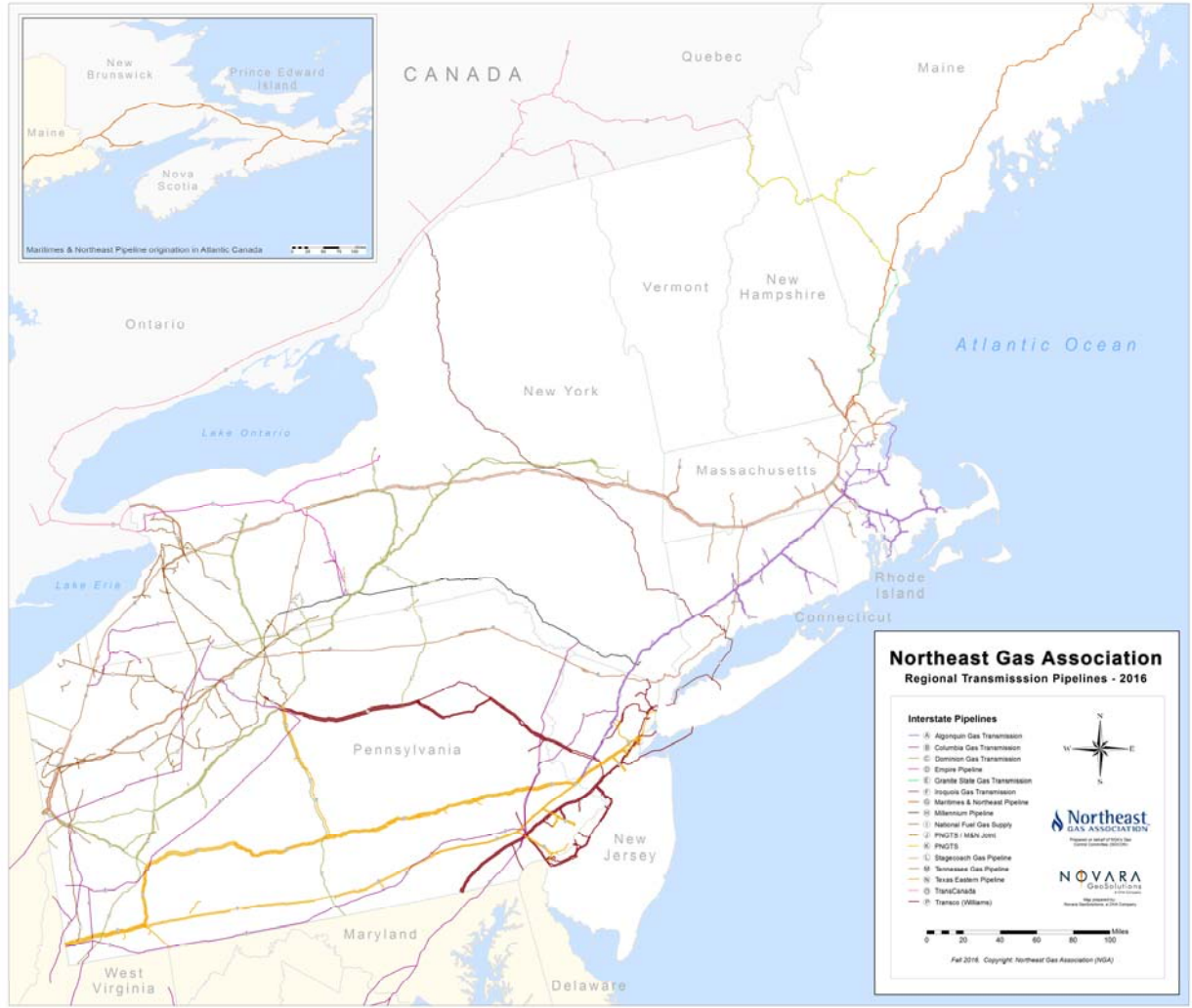
# **III.**

## **SUPPLIES & INFRASTRUCTURE**

*This section provides an introduction to the natural gas delivery network in the Northeast.*

*Among the areas addressed are:*

- *Description of pipeline systems*
- *Liquefied natural gas (LNG)*
- *Sources of regional gas supply*
- *Proposed infrastructure enhancements.*





## Description of Pipelines/LNG Import Facilities Serving the Northeast Market

**Algonquin Gas Transmission Company** is a business unit of Enbridge. Its system incorporates approximately 1,129 miles of pipe. Its system commences in NJ, connecting with Texas Eastern, and extends through NY, CT, northern RI, and eastern and southeastern MA. Its capacity is 3.12 Bcf/d.

**Columbia Gas Transmission, Inc.** is a subsidiary of TC Energy and is headquartered in Houston, TX. The company serves customers along its 12,000-mile pipeline system in 10 Northeastern, Midwestern, and Mid-Atlantic states. It transports an average of 3 Bcf/day. It enters New York State through Pennsylvania and runs along the southern counties of New York bordering Pennsylvania; it also serves New Jersey. It has storage of more than 650 Bcf.

**Con Ed Transmission (CET)** was established in January 2016; it invests in electric and gas transmission projects. On the natural gas side, CET operates Con Edison Gas Pipeline and Storage, LLC, which invests in gas pipeline and storage businesses. CET holds a minority interest in the Mountain Valley Pipeline (MVP). CET owns Stagecoach Gas Services (SGS), a 50/50 joint venture with Crestwood Equity Partners, formed in June 2016. SGS operates approximately 185 miles of pipeline and 41 billion cubic feet of gas storage capacity across four storage fields in Pennsylvania and New York's Southern Tier. SGS operates as a FERC-regulated entity and provides market storage and transportation to customers including producers, utilities, marketers, and power generators. CET is the majority owner and operator of Honeoye Storage Corporation (HSC), which is a 6.7 billion cubic foot natural gas storage field located in Ontario County, NY.

**Eastern Gas Transmission and Storage, Inc.**, headquartered in Richmond, VA, is a subsidiary of Berkshire Hathaway Energy's Pipeline Group. It was acquired by Berkshire Hathaway in 2020 from Dominion. It operates one of the largest underground natural gas storage systems in the U.S., with links to other major pipelines and to markets in the Midwest, Mid-Atlantic and Northeast regions. It maintains 3,900 miles of pipeline in six states, and stores and transports large quantities of natural gas for customers, including major utilities and power plants. The system enters New York State through Pennsylvania, and continues to points in western, central, and eastern New York, extending to the Albany area.

**Empire Pipeline** is a subsidiary of National Fuel Gas Company. Empire is a 24-inch diameter natural gas transmission pipeline that originates at the U.S./Canada border at Niagara, and extends easterly 249 miles from Buffalo, NY to near Syracuse and then south to Corning. Empire has been in service since 1993.

**Everett LNG**, a subsidiary of Exelon Generation (Constellation), operates an LNG import terminal in Everett, MA. It interconnects with both the Tennessee and Algonquin systems. It began operation in 1971. Its vaporization sendout is approx. 715 MMcf/d, with another 100 MMcf/d by truck. Its storage is 3.4 Bcf. The facility, formerly known as Distrigas, has received over 1,200 cargoes, and served more than 350,000 truck loads.

**Excelerate Energy** operates the Northeast Gateway Deepwater LNG Port facility located approx. 13 miles offshore near Cape Ann, MA. The facility received its first shipment in May 2008. The physical infrastructure consists of a dual subsea buoy system and an approx. 16 mile long pipeline connecting into the HubLine pipeline operated by Algonquin Gas Transmission. The Northeast Gateway infrastructure is designed to accommodate gas deliveries up to 800 million cubic feet per day.

**Granite State Gas Transmission, Inc.** is a unit of Unitil. Granite State operates 86-miles of underground interstate pipeline extending from the MA-NH border through the New Hampshire coastal area to Portland, Maine, transporting gas from other pipeline companies. The NH portion began operation in 1956; in 1966 the line was extended to Maine.

**Iroquois Gas Transmission System** is a 416-mile interstate pipeline owned by a partnership of U.S. and Canadian energy companies (TC Energy and Berkshire Hathaway). It began operation in 1991. It transports natural gas from TC Energy at the Ontario/NY border as well as Marcellus receipts, and travels through NY and CT to Long Island and into the New York City area. It has a physical receipt capability of 1.7 Bcf/d. It interconnects with TC Energy, Dominion, Tennessee and Algonquin.

**Maritimes & Northeast Pipeline (M&NE)** is a partnership of Enbridge, Emera and ExxonMobil. It transports gas between New England and the Canadian Maritimes. The total pipeline is 888 miles. U.S. capacity is 833 MMcf/d; its capacity in Canada is 555 MMcf/d. It interconnects with the PNGTS system in Westbrook, ME.

**Millennium Pipeline** traverses New York's lower Hudson Valley and Southern Tier. It is comprised of 220 miles of 30 inch diameter steel pipeline and is capable of transporting up to 850,000 dekatherms per day of natural gas. It is owned by subsidiaries of TC Energy/Columbia Pipeline Group, National Grid and BHE GT&S. It began commercial operations in December 2008. It interconnects with eight systems. Its winter peak day is about 1.7 Bcf/d.

**National Fuel Gas Supply Corporation** provides interstate natural gas transmission and storage for affiliated and nonaffiliated companies through an integrated gas pipeline system of 2,500 miles that extends from southwestern Pennsylvania to the New York-Canadian border at the Niagara River. It also owns and operates 31 underground natural gas storage areas.

**Neptune LNG** is an LNG facility located approximately ten miles off the coast of Gloucester, MA. It is owned by ENGIE. It was completed in 2010. It connects with Enbridge's underwater HubLine system via a 13 mile-interconnect. It was designed to deliver from 400 to 750 million cubic feet per day. It has been inactive since its start-up. It requested a multi-year suspension of its operating license in 2013 from the U.S. Maritime Administration (MARAD) which was granted. In December 2017, Neptune requested an extension of the license suspension from MARAD. The suspension was extended by MARAD in 2018 for another four years, or until 2022.

**North Country Pipeline** is an intrastate pipeline of approximately 22 miles that runs from the Canadian border in northeastern New York near Champlain to the Plattsburgh area, with natural gas imported from the TC Energy system. It has a capacity of about 100 Dth/day.

**Portland Natural Gas Transmission (PNGTS)** is jointly owned by TC Energy Corp. and Energir. It transports western Canadian gas and Marcellus gas to New England markets at Dra-

cut, MA and to Maine/Atlantic Canada markets at Westbrook, ME. On the U.S. side, it involves approximately 300 miles of pipeline including 50 miles of variously sized laterals, extending through northern NH to southern Maine and interconnecting with Maritimes & Northeast through the Joint Facilities. Its current capacity is 318 Dth/d. It interconnects with the Maritimes & Northeast Pipeline at Westbrook, ME; from there, the Joint Facilities line extends to Dracut, MA.

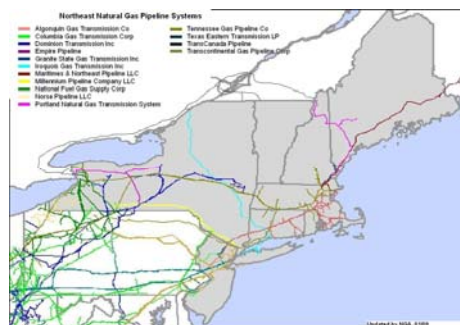
**Repsol** operates the Canaport LNG facility located in Saint John, New Brunswick, Canada; its project partner is Irving Oil. The facility received its first shipment in June 2009. The physical infrastructure consists of three storage tanks with total capacity of 9.9 Bcf. The terminal has a maximum sendout capacity of 1.2 Bcf/day. Regasified LNG from the terminal flows through the Brunswick Pipeline, a 90 mile pipeline connecting the terminal to the Maritimes & Northeast Pipeline at the Maine border. Since its start-up, it has delivered about 430 Bcf to the market.

**Tennessee Gas Pipeline Company** is a business unit of Kinder Morgan. The Tennessee Gas Pipeline has 11,750 miles of pipeline. Tennessee’s system enters New England at two points: western Mass. near West Pittsfield and southern Connecticut near Greenwich. It enters New York at several points – from southwestern Pennsylvania, central Pennsylvania, an interconnect at Niagara, and through New Jersey into the New York City area and on to Connecticut. It has 152 Bcf of storage. It recorded a systemwide peak day of 11.7 Bcf/d in January 2019.

**Texas Eastern Transmission Company** is a business unit of Enbridge. Its system incorporates approximately 9,000 miles of pipe, from the U.S. Gulf Coast to New Jersey. Its peak capacity is 11.69 Bcf/d, with storage of 74 Bcf.

**TC Energy** (formerly known as TransCanada Pipeline) has a network of approximately 57,000 miles of pipeline which tap into virtually all major gas supply basins in North America. It interconnects with several systems serving the Northeast. It has more than 650 Bcf of working gas storage capacity.

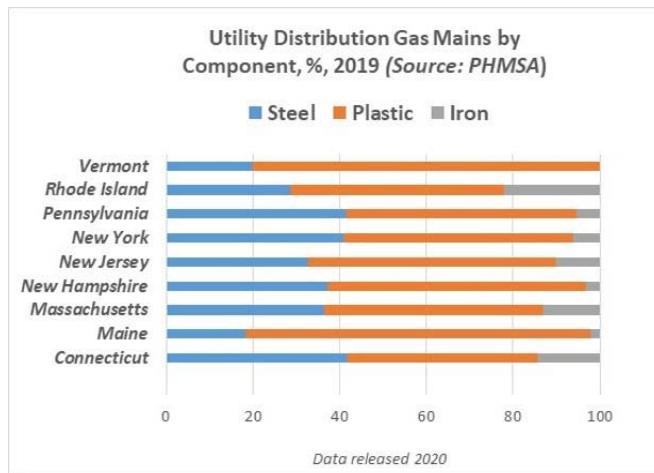
**Transcontinental (Transco)** is a subsidiary of Williams Company. The Transco pipeline comprises a 10,000-mile pipeline system, extending from South Texas to New York City. The system design capacity is 17.3 billion cubic feet per day. In the Northeast, it provides gas service to New York City, New Jersey and the Mid-Atlantic region. It has 200 Bcf of seasonal storage.



# UTILITY MILES OF PIPELINE AND MAIN, NORTHEAST

*The miles of pipeline and distribution mains form a basic indicator of access to the gas market. The Northeast has continued to increase both its transmission and distribution systems.*

The chart below shows percentage of pipeline mains by material by state as of 2019. Plastic pipe is in the 40-50 percentile range for most states in the region, but is the dominant method for new distribution pipe, and now represents 58% of all U.S. miles of main and 74% of services.



STATE / U.S.	DISTRIBUTION MAIN MILES	TRANSMISSION MILES
<b>Connecticut</b>	8,286	598
<b>Maine</b>	1,347	507
<b>Massachusetts</b>	21,755	1,128
<b>New Hampshire</b>	2,020	251
<b>New Jersey</b>	35,265	1,570
<b>New York</b>	49,456	4,592
<b>Pennsylvania</b>	48,578	10,385
<b>Rhode Island</b>	3,195	95
<b>Vermont</b>	873	119
<b>U.S. total</b>	1,318,510	302,252

*Source: PHMSA, U.S. Department of Transportation, 2019 data. Numbers rounded off.*

## NORTHEAST PIPELINE PROJECTS IN PROCESS

*Some infrastructure projects were placed into service in the region in 2020, even as some others were delayed or withdrawn that year due to state permitting issues. Several other projects are in the regulatory and development process for the period 2021-2023 and are summarized below. This list changes with market conditions—please visit NGA’s web site during the year for updated listings.*

<b>PROJECT</b>	<b>COMPANY</b>	<b>DESCRIPTION</b>	<b>EST. IN-SERVICE</b>	<b>STATUS</b>
<b>Westbrook XPress</b>	PNGTS	Phase I increased the certificated capacity on the northern portion of its system from Pittsburg, New Hampshire, to Westbrook, Maine, by 42.46Dth/d, effective November 2019. Phase II would add 63 Dth/d in 2021; Phase III would add 18 Dth/d by 2022.	Phase I, 2019; Phase II, 2021; Phase III, 2022	Filed with FERC, 12-18. Phase I completed, 2019.
<b>Station 261</b>	Tennessee Gas Pipeline / Kinder Morgan	The 261 Upgrade Projects will create 96,400 dekatherms per day (Dth/d) of additional transportation capacity of natural gas on the existing Tennessee Gas Pipeline system. Projects are located in Agawam, MA and include the Looping Project and the Horsepower (HP) Replacement Project. The Looping Project involves the installation of 2.1 miles of a 12-inch diameter pipeline loop that will run parallel and adjacent to an existing TGP pipeline. The HP Replacement Project involves the replacement of two existing turbine compressor units with one new, cleaner-burning turbine compressor unit, as well as the installation of auxiliary facilities at TGP’s existing Compressor Station 261. Customer is Eversource Gas of MA.	Nov. 2020 (partial) / Nov. 2021	Announced late 2017. Filed with FERC, 12-19. Approved by FERC, 12-19. Looping segment completed in Nov. 2020. HP replacement to be completed by Nov. 2021.
<b>FM100 Project</b>	National Fuel Gas Supply	Approximately 30 miles of new pipelines, 2 new compressor stations. NFG Supply lease to Transco of new capacity of 330,000 Dth/day.	Late 2021	Filed with FERC, 7-19. FERC approves project, July 2020.

*This table is based on publicly-available information as of Nov. 2020; project details may change.*

## NORTHEAST PIPELINE PROJECTS IN PROCESS (cont'd)

PROJECT	COMPANY	DESCRIPTION	EST. IN-SERVICE	STATUS
<b>Leidy South Project</b>	Transco/Williams	The Leidy South project will expand Transco's firm transportation capacity by 582,400 dekatherms per day from the Leidy Hub and Zick interconnect to points downstream in Transco's Zone 5 and Zone 6 market areas. Seneca Resources Company, LLC, Cabot Oil & Gas Corporation and UGI Utilities have executed binding, 15-year commitments for 100 percent of such capacity. It includes 6.3 miles of existing pipe replacement, 5.9 miles of new pipeline loop segments along the existing corridor, and horsepower additions at two existing compressor facilities. The project also includes 2 new greenfield compressor facilities in PA.	Late 2021	Filed with FERC, 7-19. FERC approves project, July 2020.
<b>Adelphia Gateway Project</b>	New Jersey Resources	The Adelphia Gateway project will convert the remaining 50 miles of an existing 84-mile pipeline in southeastern Pennsylvania from oil to natural gas. When commissioned, Adelphia Gateway will serve customers in the greater Philadelphia area with a new source of natural gas. The 18-inch pipeline covers portions of Delaware, Chester, Bucks, Montgomery and Northampton counties. Upon completion of the conversion and enhancements, the newly repurposed southern portion of the pipeline will be able to transport 250,000 dekatherms (Dth) per day.	2021	Filed with FERC, 1-18. Approved by FERC, 12-19. Construction begins, Oct. 2020.
<b>East 300 Upgrade</b>	Tennessee Gas Pipeline / Kinder Morgan	Capacity of 115,000 Dth/day. Compression only in NJ and PA. Designed to meet residential and commercial customer growth on Con Edison's system.	Nov. 2022	Binding open season held in May 2019. Filed with FERC, June 2020.

*This table is based on publicly-available information as of Nov. 2020; project details may change.*

## NORTHEAST PIPELINE PROJECTS IN PROCESS (cont'd)

PROJECT	COMPANY	DESCRIPTION	EST. IN-SERVICE	STATUS
<b>PennEast Project</b>	AGL Resources, NJR Pipeline Company, South Jersey Industries, UGI Energy Services, Enbridge and PSE&G Power LLC	100-mile pipeline intended to bring lower cost natural gas produced in the Marcellus Shale region to homes and businesses in Pennsylvania and New Jersey. Designed to provide natural gas service to the equivalent of 4.7 million homes, up to 1 Bcf per day. PennEast is investing nearly \$1 billion to build the pipeline with the costs split among the four entities.	2021 for Phase I / 2023 for Phase II	Announced Aug. 2014. Open season held August 2014. Filed with FERC, Sept. 2015. FERC issued final EIS, 4-17. Approved by FERC, 1-18. State environmental review process continues. Developer files proposal with FERC for two-phased approach, 1-20. In Feb. 2020, FERC issues project extension, until Jan. 19, 2022.
<b>Northern Access</b>	National Fuel Gas Supply & Empire Pipeline	Capacity of 350,000 Dth/day on Empire, and 140,000 to be delivered to Tennessee 200 line. Approx. 99 miles of 24" pipeline, a compressor station upgrade and one new compressor station.	2022	Filed with FERC, March 2015. FERC issues environmental assessment, 7-16. Approved by FERC, 2-17. NYS DEC denies water quality certificates, 4-17. FERC denies rehearing, stating NYS DEC had waived its authority on water quality certificate by its delay in rendering decision, 8-18. Federal appeals court rules that NY DEC did not provide sufficient information to support its denial of project's water quality certificate, 2-19.
<b>ExC Project (Enhancement by Compression)</b>	Iroquois Gas Transmission	The ExC Project involves the addition of compression and associated gas cooling at existing Iroquois compressor station sites only. All new facilities will be constructed entirely within Iroquois' existing compressor station properties. No new pipeline is proposed as part of this project. Project is designed to receive an additional 125 million cubic feet per day of natural gas at Iroquois' interconnect with the TC Energy Canadian mainline in Waddington, NY for redelivery to New York utilities.	Nov. 2023	Filed with FERC, Jan. 2020.

*This table is based on publicly-available information as of Nov. 2020; project details may change.*

# INCREASING GAS POTENTIAL IN THE U.S.

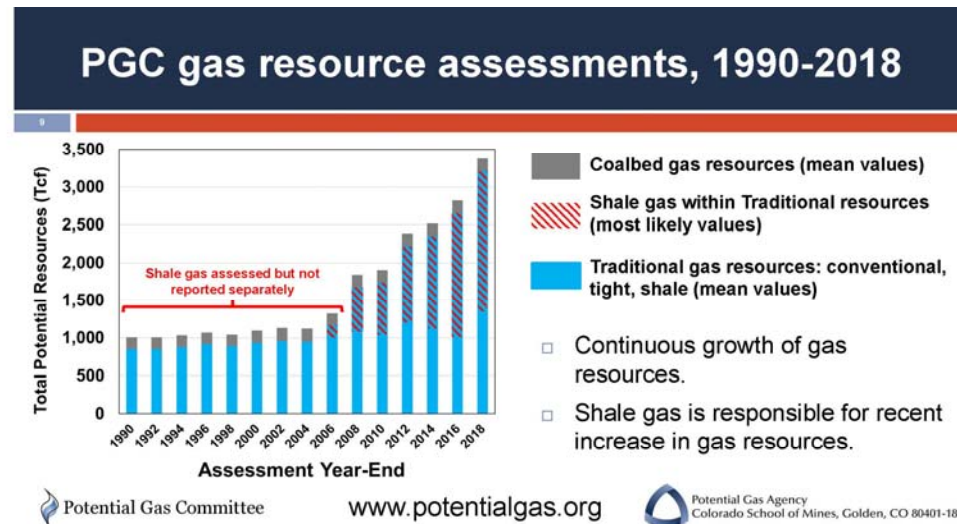


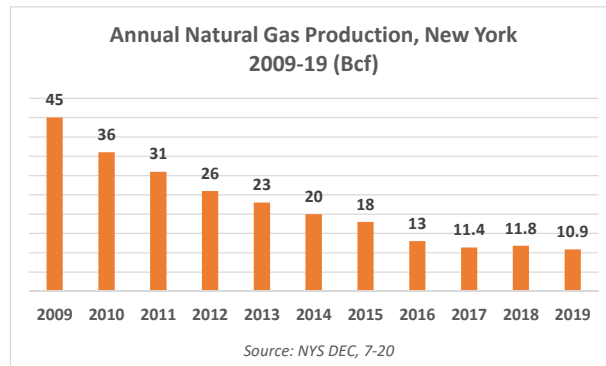
Chart: Potential Gas Committee, September 2019

Every 2 years, the Potential Gas Committee (PGC) of the Colorado School of Mines releases a long-term assessment of U.S. potential natural gas supply. Its 2018 assessment, released in September 2019, and illustrated in the PGC chart above, shows an increase in total estimated potential supplies from the previous study, due in large part to shale (shown in the red stripe). According to this latest assessment, the U.S. possesses a total technically recoverable resource base of 3,374 trillion cubic feet (Tcf). The 2018 assessment is “the highest resource evaluation in the Committee’s 54-year history.”

U.S. production set a new record in 2019, at 33.9 trillion cubic feet (total dry production), up 10% over 2018 levels, and up from 27 Tcf in 2015.



## NATURAL GAS PRODUCTION IN NORTHEAST U.S.

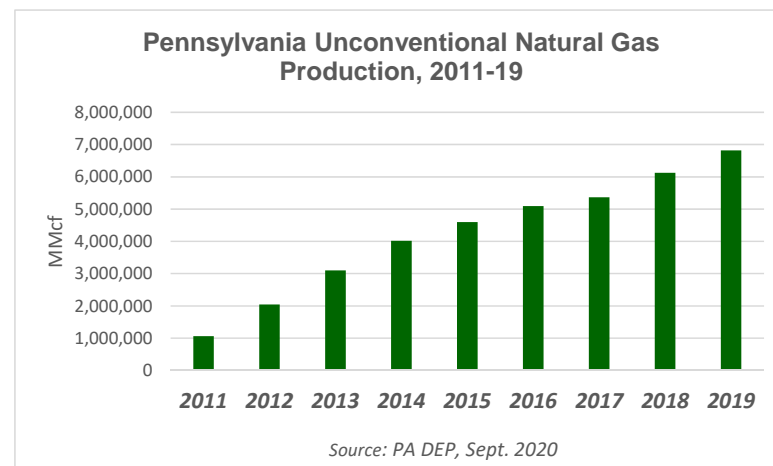


Source: NY State Dept. of Environmental Conservation/ Office of Oil & Gas

The New York State Department of Environmental Conservation / Division of Mineral Resources reports that gas production in the state in 2019 was 10.96 billion cubic feet (Bcf), a slight decline from the prior year. Annual production is less than one-third what it was in 2009. The production is from conventional gas wells; the hydraulic fracturing drilling process is not permitted in the state.

Natural gas production in the Northeast continues steady and rapid growth, as illustrated in the chart below based on data from the Pennsylvania DEP. State production in 2019 set a new record, at 6.8 trillion cubic feet (Tcf).

Pennsylvania is the second largest producing state in the U.S., behind only Texas. EIA noted in March 2020 that “the Appalachian region remains the largest gas producing region in the United States. Appalachian natural gas production from the Marcellus and Utica/Point Pleasant shales of Ohio, West Virginia, and Pennsylvania continue to grow...Within the Appalachian region, Pennsylvania had the largest increase in gross withdrawals of natural gas [in 2019].”



# LNG SERVING NEW ENGLAND MARKET

## Import facilities:

**Everett LNG facility**, Everett, MA (part of Exelon Generation/Constellation).

Began operation in 1971.

- Storage of 3.4 billion cubic feet.
- On a sustainable basis, the vaporization capacity is approximately 715 million cubic feet per day.
- Additional sendout capability of 100 MMBtu/d in liquid via truck.

**Canaport facility**, Saint John, NB, Canada. Began operation in 2009.

- Operated by Repsol in partnership with Irving Oil.
- Sendout capability of 1 Bcf/d in vapor via Brunswick Pipeline into Maritimes & Northeast.
- Three storage tanks of 3.3 Bcf each, or ~10 Bcf total.

**Northeast Gateway facility**, offshore Cape Ann, MA. Began operation in 2008.

- Operated by Excelerate Energy.
- Sendout capability of 0.8 Bcf/d in vapor via underwater HubLine.

## LDC satellite tanks/peak-shaving units:

- 43 tanks in 28 communities in 5 states (CT, ME, MA, NH, RI).
- LDCs' total LNG storage capacity is 16 Bcf.
- LDCs' vaporization capacity is 1.4 Bcf/day.
- Liquefaction is available at 5 LDC-owned facilities - total liquefaction capability is 43,500 MMBtu/day.

## LNG IN NEW JERSEY

- Storage capacity of approximately 3.7 Bcf.
- LDC tanks in 6 communities, owned by 4 LDCs, as well as one pipeline-owned facility.

## LNG IN NEW YORK

### **LDC-owned peak-shaving plants:**

- New York City area and Long Island, on Con Edison and National Grid systems.
  - Storage capacity of approximately 3.2 Bcf.
  - LNG obtained via liquefaction of pipeline gas.
- Vaporization capacity is approximately 0.56 Bcf/day.
- Liquefaction capacity is 19,850 MMBtu/day.

## LNG IN PENNSYLVANIA

- Two utilities, PECO Energy and PGW, utilize LNG peakshaving with storage capacity of approximately 5.45 Bcf.
  - UGI LNG has storage capacity of 1.25 Bcf, for sale into Mid-Atlantic market.

## NORTHEAST NATURAL GAS STORAGE

Storage is essential to the natural gas supply and delivery system. The principal storage system in the U.S. is underground storage, in salt caverns, aquifers, and depleted oil and gas fields. There are 414 such facilities in the U.S., with demonstrated peak working gas capacity of 4.8 Tcf.

For the Northeast, there are two main types of storage: underground, and liquefied natural gas (LNG).

Pennsylvania has considerable underground gas storage, 49 facilities totaling 763 Bcf, which represents 8.2% of total U.S. capacity.

New York has 26 underground storage facilities with 246 Bcf of working gas capacity. New York's underground storage represents 2.6% of the U.S. total.

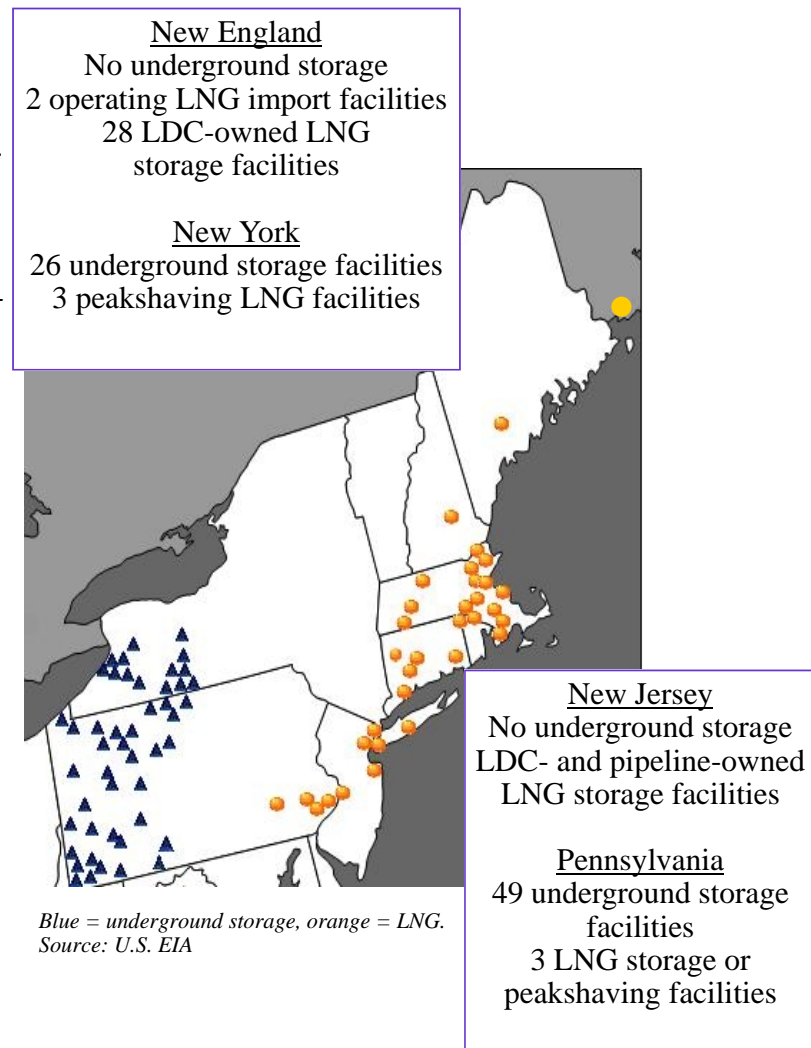
There is no underground storage in New England or New Jersey, as the map indicates, because of the unsuitability of the region's geology.

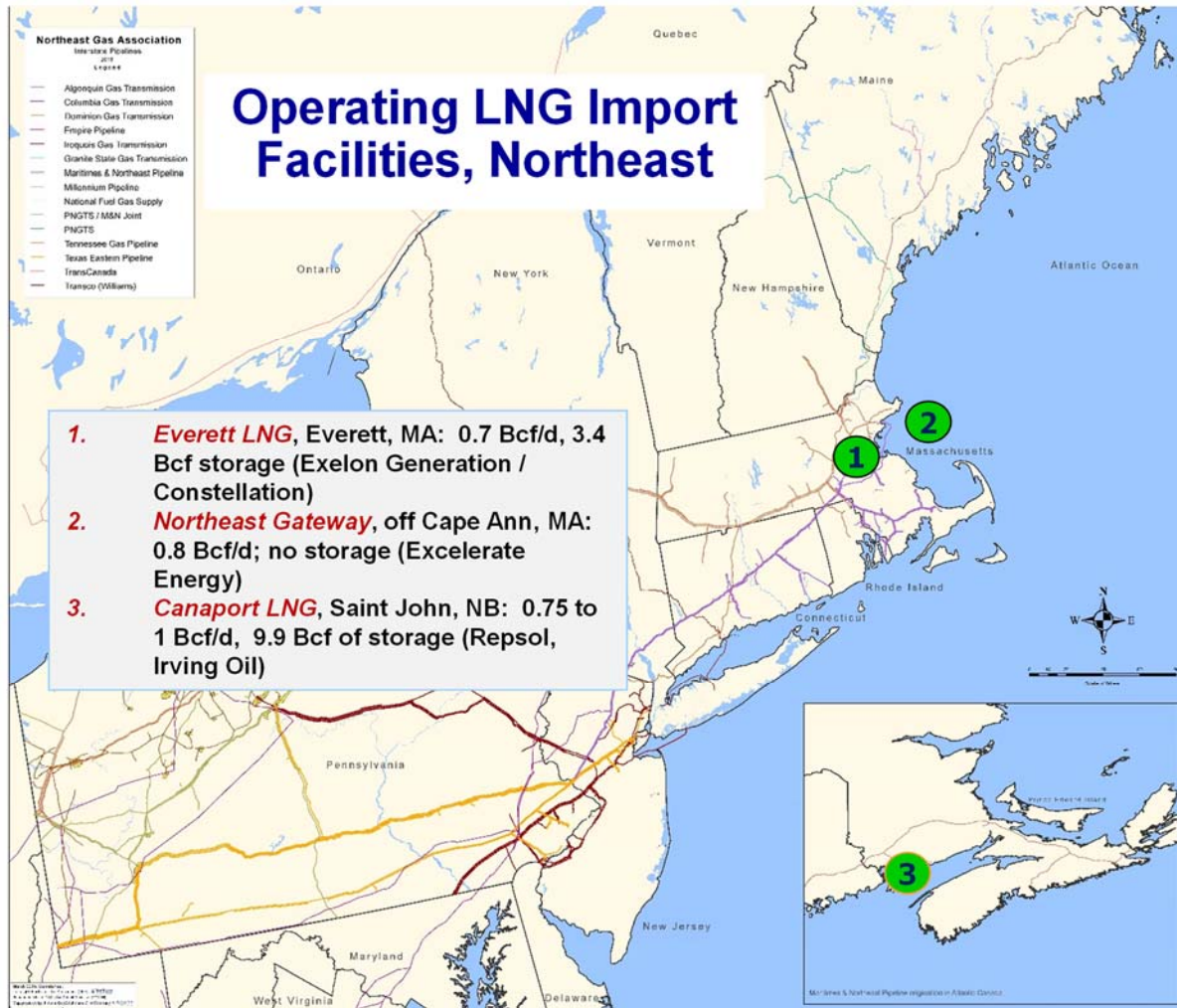
The region also accesses underground storage in Canada, notably the Dawn facility in Ontario.

New England and New Jersey do utilize LNG. There are two LNG import facilities currently operating in the greater Boston area. There is also a facility in New Brunswick, Canada, close to the U.S. border in Maine.

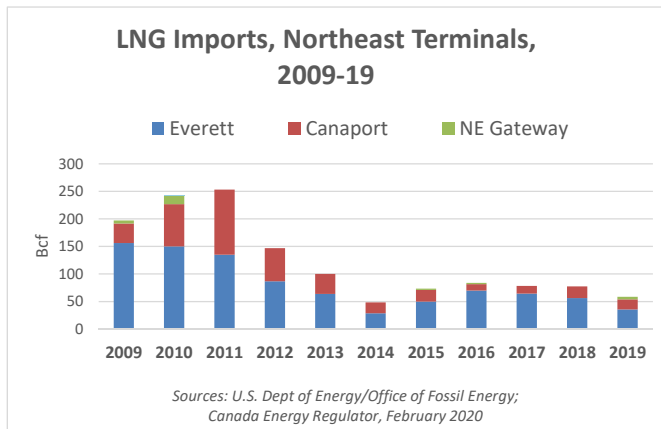
In addition, the LDCs operate above-ground LNG storage tanks for peak-shaving.

As noted in previous pages, gas utilities in several Northeastern states (CT, ME, MA, NH, NJ, NY, PA, RI) utilize LNG for peakshaving and system support.





## LNG ANNUAL VOLUMES IMPORTED INTO NORTH-EAST TERMINALS



LNG imports in 2019 by New England facilities totaled 40.2 Bcf, compared to 56 Bcf in 2018. The Everett LNG facility imported 35.4 of that total in 2019.

An offshore LNG facility - Northeast Gateway - imported no cargoes in 2017 or 2018, but did bring in volumes in January-February 2019, totaling about 5 Bcf. It has not imported any cargoes in 2020, as of August 2020.

The role of LNG remains critical to regional supply in the constrained Northeast market.

Source: U.S. Department of Energy, Office of Fossil Energy, Office of Natural Gas & Petroleum Import Activities.

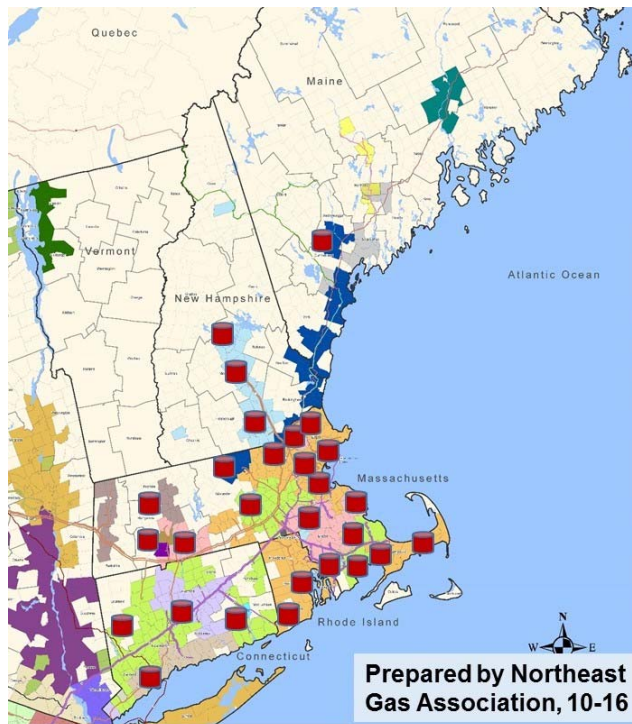
Liquefied natural gas (LNG) is an important component of the region's gas supply, especially for peak winter needs. The Everett LNG facility, a subsidiary of Exelon Generation, owns and operates a land-based facility at Everett, MA. There is also one operating facility located offshore near Gloucester, MA—Northeast Gateway—owned by Excelerate Energy. Another offshore facility owned by ENGIE called Neptune, also near Gloucester, MA, is currently decommissioned.

Repsol's Canaport LNG facility in nearby New Brunswick, Canada has supplied over 430 Bcf to the market since it began operations in 2009. It made 18 Bcf available to the regional market in 2019, via six marine cargoes (source: Canada Energy Regulator). It can reach the U.S. market via the Brunswick Pipeline and then the Maritimes & Northeast Pipeline System.



LNG delivery trucks fueling at the Everett LNG facility, for transport to a local gas distribution company facility.

## LNG STORAGE HELD BY NEW ENGLAND GAS UTILITIES



*Map prepared by NGA. Red tanks indicate LNG satellite tanks owned and operated by gas LDCs. Locations approximate.*

*Liquefied natural gas (LNG) is a key form of in-region storage for natural gas utilities in the Northeast—but particularly so in New England. Overall, it represents about 27% of peak day supply for the region’s natural gas utilities. For some utilities, LNG can represent 35 to 40% of peak day supply.*

*LNG on the gas utility system provides not only peak day supply but also pressure support at key points on the systems.*

*The map shows the location of LNG tanks in the New England region. LNG is stored by utilities in 28 communities in 5 New England states.*

## PROPANE / LP AIR: STORAGE CAPACITY AT NEW ENGLAND GAS LDCs

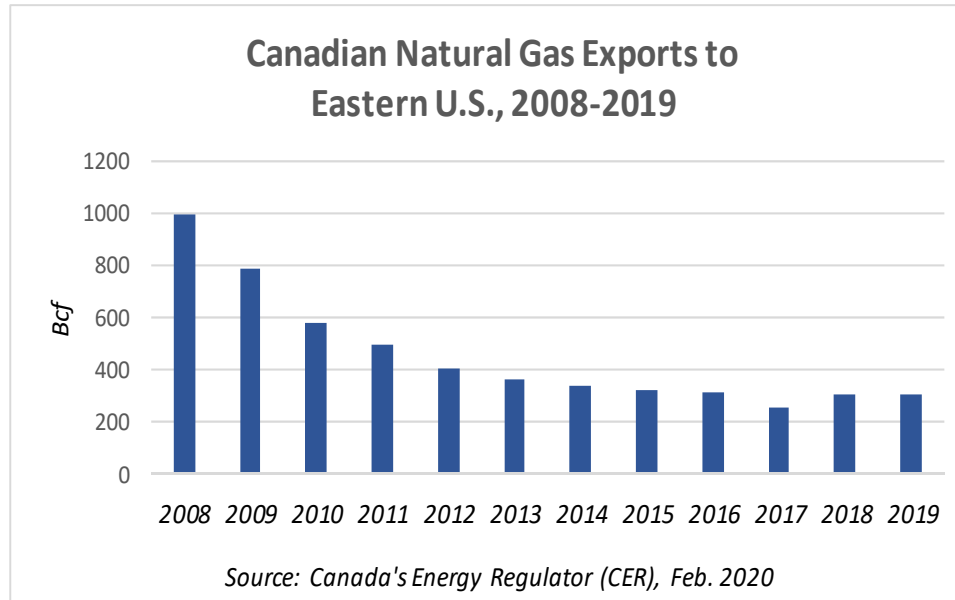
Year	Number of Communities with Facilities	Number of Tanks	Storage Capacity in MMBtu
2003	<b>36</b>	<b>274</b>	<b>1,066,778</b>
2019	<b>13</b>	<b>89</b>	<b>324,665</b>

*As natural gas pipeline capacity and LNG storage have increased in the region, propane storage at the natural gas utility level has declined. Propane/air was often used to supplement gas pipeline capacity for several utilities in the Northeast, particularly in New England. Five natural gas utilities in New England still utilize propane within their supply portfolio, although the overall capacity has decreased substantially in the last two decades. (PECO Energy in Pennsylvania also utilizes LPG as part of its supply portfolio, along with LNG.)*

*The rise of natural gas production in the Appalachian region meanwhile is creating opportunities for considerable propane development in the region.*



## CANADIAN GAS EXPORTS TO THE NORTHEAST U.S.



*Canadian imports have long been a major source of U.S. - and Northeast - natural gas supply. The Northeast has drawn supplies from Alberta, offshore Nova Scotia and New Brunswick. Increasingly however the supply dynamic is changing as U.S. domestic production rises, reducing the need for imports. As indicated in the chart above, Eastern U.S. imports have declined considerably over the last few years; Canadian gas exports to the Eastern U.S. are down by 60% since 2009.*

*Overall, Canadian gas exports to the U.S. declined by 4% in 2019, while its imports from the U.S. also decreased, by 13%.*

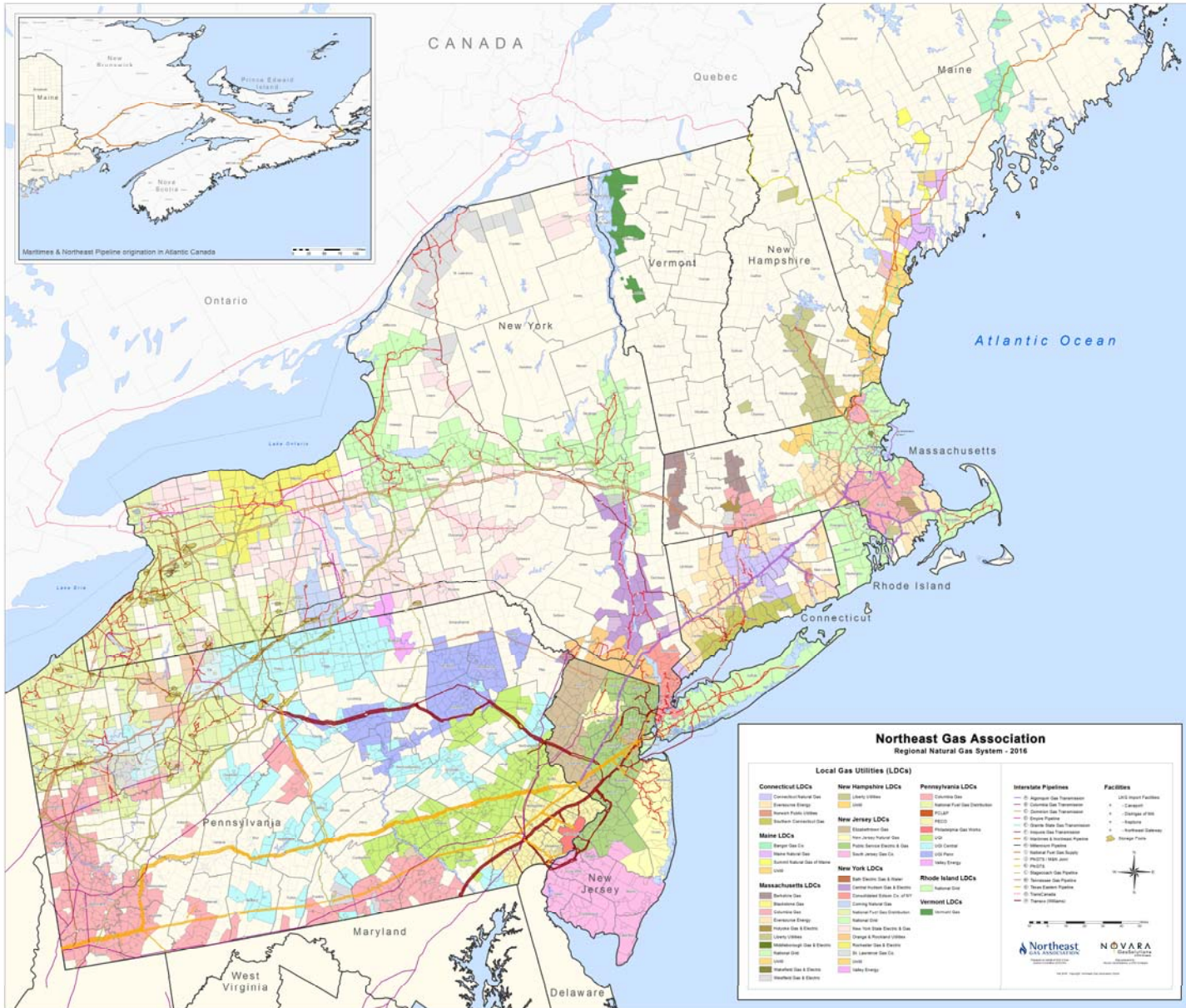
## IV.

# NATURAL GAS TRENDS IN THE NORTHEAST

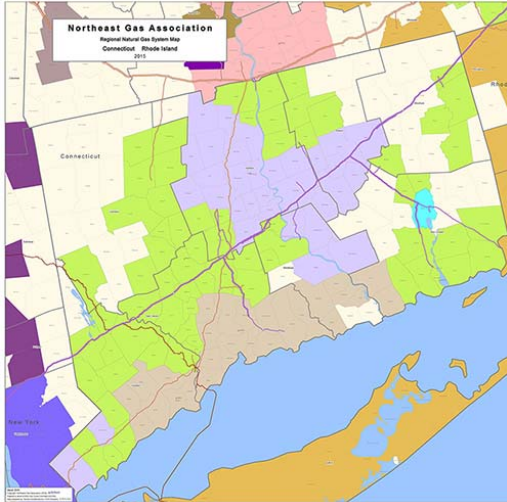
*This section provides an introduction to the natural gas industry in the Northeast.*

*Among the areas addressed are:*

- *Gas consumption by sector*
- *Price trends*
- *Growth areas*
- *Gas & power generation.*



# CONNECTICUT



## Natural Gas Utilities in Connecticut

There are 4 natural gas utilities:

### **Connecticut Natural Gas**

(purple area on map)

### **Eversource (Yankee Gas Services Co.)**

(lime-green area on map)

### **Norwich Public Utilities**

(aqua area on map)

### **The Southern Connecticut Gas Co.**

(light brown area on map)

## Natural Gas Utility Customers:

There are approximately 632,000 natural gas customers in the state.

## Natural Gas Efficiency Program

### Spending (2018):

\$42.9 million

## Natural Gas Use in Connecticut

**Primary energy:** 38%

**Electric generation via gas:** 41%

**% of households with gas as main heating fuel:** 36%

**Annual consumption:** 277 billion cubic feet (Bcf) of natural gas.

## Natural Gas Pipelines Serving Connecticut

- **Algonquin Gas Transmission**, a subsidiary of Enbridge.
- **Iroquois Gas Transmission.**
- **Tennessee Gas Pipeline Company**, a subsidiary of Kinder Morgan.

## LNG Storage in Connecticut

There are utility liquefied natural gas (LNG) storage facilities in four communities.

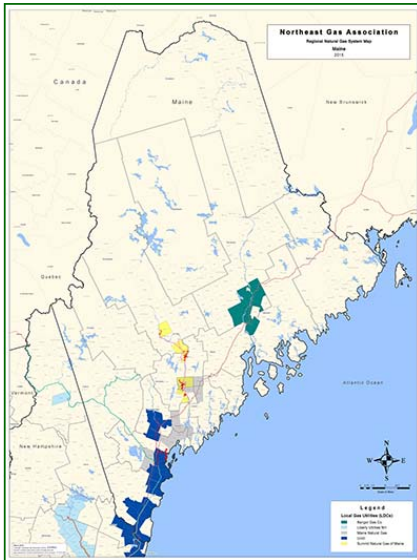
## Underground Storage

None.

## Natural Gas Production

None.

# MAINE



## Natural Gas Utilities in Maine

There are 4 natural gas utilities:

**Bangor Natural Gas**  
(green area on map)

**Maine Natural Gas**  
(grey area on map)

**Summit Natural Gas**  
(yellow area on map)

**Unitil**  
(blue area on map)

## Natural Gas Use in Maine

**Primary energy:** 12%

**Electric generation via gas:** 15%

**% of households with gas as main heating fuel:** 8%

**Annual consumption:** 43 billion cubic feet (Bcf) of natural gas.

## Natural Gas Utility Customers:

There are approximately 50,000 natural gas customers in the state.

## Natural Gas Pipelines Serving Maine

4 natural gas pipelines transport gas:

- **Portland Natural Gas Transmission (PNGTS).** It is owned by TC Energy and Energir.
- **Maritimes & Northeast Pipeline.** It is owned by Emera, Enbridge and Exxon Mobil.
- **Joint Facilities of PNGTS and Maritimes & Northeast Pipeline.**
- **Granite State Gas Transmission.** It is owned by Unitil.

## LNG Storage in Maine

There is a utility liquefied natural gas (LNG) storage facility in 1 community.

## Underground Storage

None.

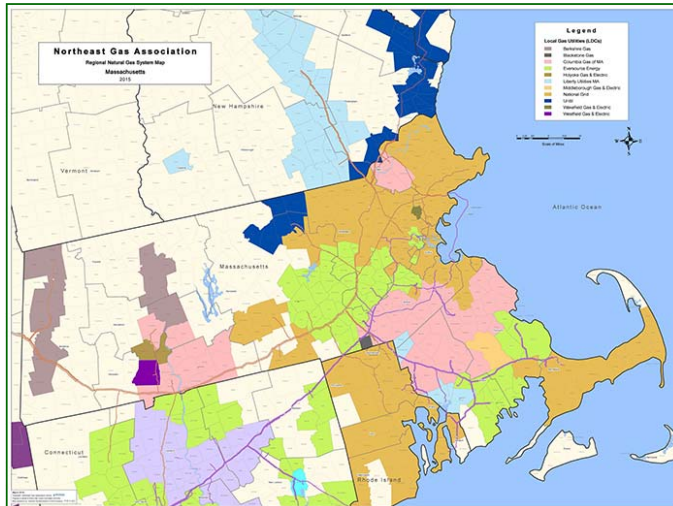
## Natural Gas Production

None (although plans for RNG).

## Natural Gas Efficiency Program Spending (2018):

\$1.5 million

# MASSACHUSETTS



## Natural Gas Pipelines Serving Massachusetts

- **Algonquin Gas Transmission**, a subsidiary of Enbridge.
- **Tennessee Gas Pipeline Company**, a subsidiary of Kinder Morgan.
- **Joint Facilities of PNGTS and Maritimes & Northeast.**

## LNG Import Facilities

There are two in operation —one onshore, one offshore.

- **Everett LNG**, a subsidiary of Exelon Generation/Constellation
- **Northeast Gateway**, a subsidiary of Exceleerate Energy

## LNG Storage in Massachusetts

There are utility liquefied natural gas (LNG) storage facilities in 18 communities.

## Underground Storage

None.

## Natural Gas Production

None.

## Natural Gas Use in Massachusetts

**Primary energy:** 31%

**Electric generation via gas:** 60%

**% of households with gas as main heating fuel:** 52%

**Annual consumption:** 424 billion cubic feet (Bcf) of natural gas.

## Local Gas Utilities:

There are ten natural gas utilities in the state.

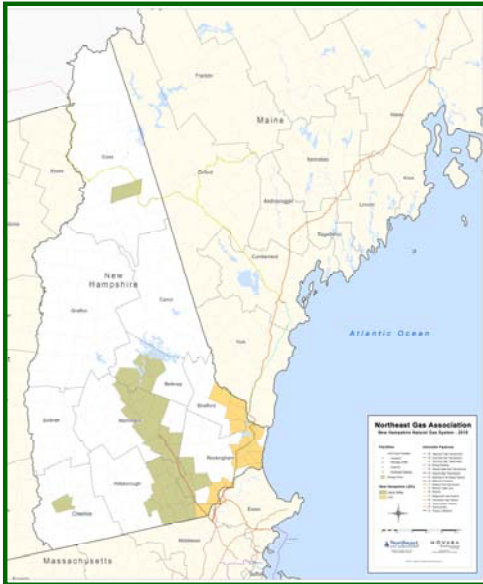
## Natural Gas Utility Customers:

There are 1.7 million natural gas customers in the state.

## Natural Gas Efficiency Program Spending (2018):

\$249.3 million

# NEW HAMPSHIRE



## Natural Gas Utilities in New Hampshire

There are 2 natural gas utilities:

### ***Liberty Utilities***

(brown area on map)

### ***Unitil Corp.***

(orange area on map)

## Natural Gas Use in New Hampshire

***Primary energy:*** 16%

***Electric generation via gas:*** 13%

***% of households with gas as main heating fuel:*** 21%

***Annual consumption:*** 53 billion cubic feet (Bcf) of natural gas.

## Natural Gas Utility Customers :

There are approximately 128,000 natural gas customers in the state.

## Natural Gas Pipelines Serving New Hampshire

4 natural gas pipelines transport gas:

- ***Portland Natural Gas Transmission (PNGTS).*** It is owned by TC Energy and Energir.
- ***Tennessee Gas Pipeline Company,*** a subsidiary of Kinder Morgan.
- ***Joint Facilities of PNGTS and Maritimes & Northeast Pipeline.***
- ***Granite State Gas Transmission.*** It is owned by Unitil.

## LNG Storage in New Hampshire

There are utility liquefied natural gas (LNG) storage facilities in 3 communities.

## Underground Storage

None.

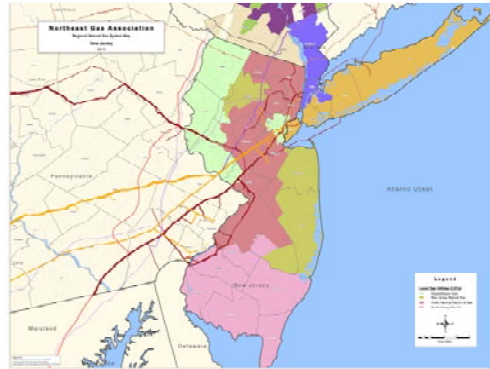
## Natural Gas Production

None (although plans for RNG).

## Natural Gas Efficiency Program Spending (2018):

\$7.9 million

# NEW JERSEY



## Natural Gas Utilities in New Jersey

There are 4 natural gas utilities:

### ***Elizabethtown Gas***

(pale green area on map)

### ***New Jersey Natural Gas***

(lime green area on map)

### ***PSE&G***

(light red area on map)

### ***South Jersey Gas***

(light purple area on map)

## Natural Gas Use in New Jersey

***Primary energy:*** 36%

***Electric generation capacity:*** 66%

***% of households with gas as main heating fuel:*** 75%

***Annual consumption:*** 759 billion cubic feet (Bcf) of natural gas.

## Natural Gas Utility Customers:

There are 3 million natural gas customers in the state.

## Natural Gas Pipelines Serving New Jersey

- ***Algonquin Gas Transmission and Texas Eastern Transmission,*** subsidiaries of Enbridge.
- ***Columbia Transmission,*** a subsidiary of TC Energy.
- ***Eastern Gas Transmission***
- ***Tennessee Gas Pipeline Company,*** a subsidiary of Kinder Morgan.
- ***Transcontinental Pipeline,*** a subsidiary of Williams.

## LNG Storage in New Jersey

There are utility liquefied natural gas (LNG) storage facilities in several communities.

## Underground Storage

None.

## Natural Gas Production

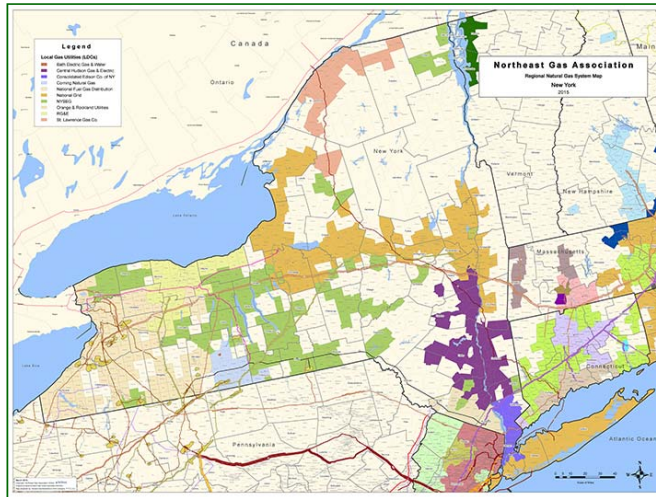
None.

## Natural Gas Efficiency Program Spending (2018):

\$90.1 million



# NEW YORK



## **Natural Gas Use in New York**

**Primary energy:** 36%

**Electric generation capacity:** 62%  
(with oil, dual-fuel)

**% of households with gas as main heating fuel:** 61%

**Annual consumption:** 1,287 billion cubic feet (Bcf) of natural gas.

## **Local Gas Utilities:**

There are ten natural gas utilities in the state.

## **Natural Gas Utility Customers:**

There are 5 million natural gas customers in the state.

## **Natural Gas Production**

In 2019, production was 11 Bcf.

## **Natural Gas Efficiency Program Spending (2018):**

\$141.7 million

## **Natural Gas Pipelines Serving NY**

- **Algonquin Gas Transmission and Texas Eastern**
- **Columbia Transmission**
- **Eastern Gas Transmission**
- **Empire Pipeline**
- **Iroquois Gas Transmission**
- **Millennium Pipeline**
- **National Fuel Gas Supply**
- **North County Pipeline**
- **Stagecoach Gas Pipeline & Storage**
- **Tennessee Gas Pipeline Company**
- **Transcontinental Pipeline.**

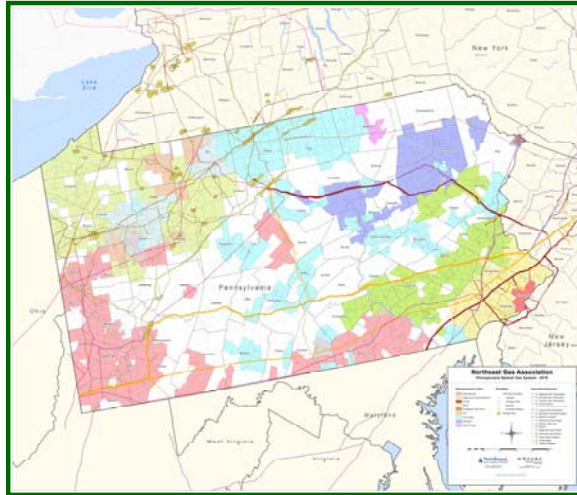
## **LNG Storage in New York**

There are utility liquefied natural gas (LNG) storage facilities in three communities.

## **Underground Storage**

246 Bcf.

# PENNSYLVANIA



## Natural Gas Use in PA

**Primary energy:** 34%

**Electric generation capacity:** 42%

**% of households with gas as main heating fuel:** 51%

**Annual consumption:** 1,324 billion cubic feet (Bcf) of natural gas.

## Local Gas Utilities:

There are eleven natural gas utilities in the state.

## Natural Gas Utility Customers:

There are 3 million natural gas customers in the state.

## Natural Gas Production

In 2019, production was 6.8 Tcf.

## Natural Gas Pipelines Serving PA

- **Columbia Transmission (TC Energy)**
- **Eastern Gas Transmission**
- **Equitrans**
- **National Fuel Gas Supply**
- **Stagecoach Gas Services**
- **Tennessee Gas Pipeline Company**
- **Texas Eastern Transmission**
- **Transcontinental Pipeline.**

## LNG Storage

There are four liquefied natural gas (LNG) facilities.

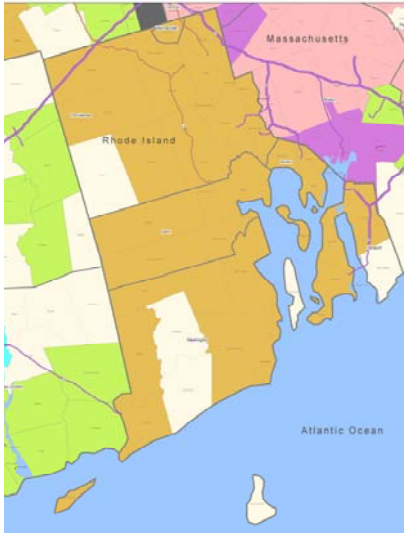
## Underground Storage

763 Bcf.

## Natural Gas Efficiency Program Spending (2018):

\$8.8 million

# RHODE ISLAND



## Natural Gas Utility in Rhode Island

There is 1 natural gas utility:

**National Grid**  
(tan area on map)

## Natural Gas Use in Rhode Island

**Primary energy:** 53%

**Electric generation capacity:** 91%

**% of households with gas as main heating fuel:** 55%

**Annual consumption:** 97 billion cubic feet (Bcf) of natural gas.

## Natural Gas Utility Customers:

There are approximately 271,000 natural gas customers in the state.

## Natural Gas Pipelines Serving Rhode Island

2 natural gas pipelines transport gas:

- **Algonquin Gas Transmission**, a subsidiary of Enbridge.
- **Tennessee Gas Pipeline**, a subsidiary of Kinder Morgan.

## LNG Storage in Rhode Island

There are utility liquefied natural gas (LNG) storage facilities in 2 communities.

## Underground Storage

None.

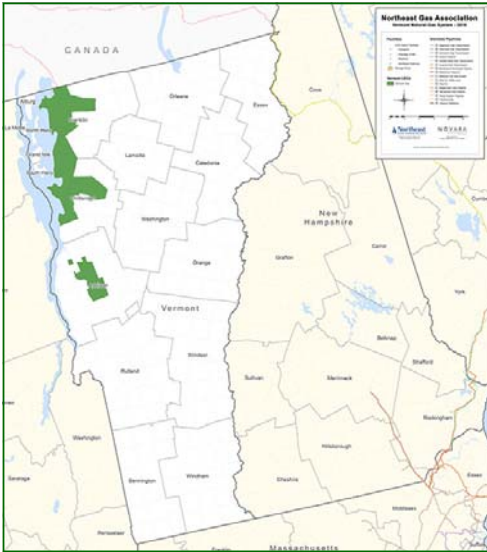
## Natural Gas Production

None.

## Natural Gas Efficiency Program Spending (2018):

\$27.2 million

# VERMONT



### Natural Gas Utility in Vermont

There is 1 natural gas utility:

**VGS**  
(dark green area on map)

### Natural Gas Use in Vermont

**Primary energy:** 10%

**Electric generation capacity:** 0%

**% of households with gas as main heating fuel:** 19%

**Annual consumption:** 13 billion cubic feet (Bcf) of natural gas.

### Natural Gas Utility Customers :

There are 53,000 natural gas customers in the state.

### Natural Gas Pipeline Supplying Vermont

1 natural gas pipeline transports gas to the VT border:

- **TC Energy**

### LNG Utility Storage in Vermont

None.

### Underground Storage

None.

### Natural Gas Production

None (although RNG process is in development).

### Natural Gas Efficiency Program Spending (2018):

\$2.9 million

## NORTHEAST STATES' ANNUAL NATURAL GAS CONSUMPTION BY SECTOR, 2019 (Bcf)

STATE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	ELECTRIC POWER	TOTAL*
CT	52	58	25	142	<b>277</b>
ME	3	10	21	9	<b>43</b>
MA	135	122	49	118	<b>424</b>
NH	8	10	10	25	<b>53</b>
NJ	239	156	65	299	<b>759</b>
NY	474	323	90	399	<b>1,287</b>
PA	237	162	249	675	<b>1,324</b>
RI	20	12	9	56	<b>97</b>
VT	4	7	2	—	<b>13</b>

*Source: U.S. Energy Information Administration, "Natural Gas Annual 2019," released September 2020. Numbers are rounded off. Delivered energy consumption. \* Vehicle fuel consumption not shown, which slightly increases total number for some states.*

# NATURAL GAS PRICE TRENDS

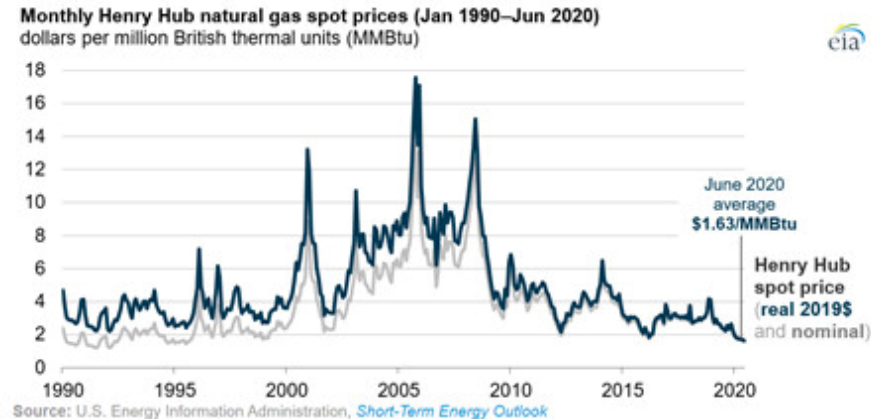


Chart:  
U.S. EIA,  
July 2020

*U.S. natural gas prices in 2019 were at their lowest level in three years, and in the first half of 2020 natural gas prices at the Henry Hub benchmark reached “record lows,” according to U.S. EIA. The key variable and point of uncertainty in 2020 has been the impact of the COVID-19 pandemic on energy markets. It has led to pull-backs on oil and gas production and projections by EIA that natural gas spot prices in the winter of 2020-21 will be higher, albeit still well within the range of the last decade.*

*The Northeast market in particular remains vulnerable to greater spot price volatility compared to the national average, reflecting infrastructure constraints in key part of the high-demand region. In its winter outlook released in October 2020 FERC staff noted that “electric and natural gas markets are expected to be constrained in the Northeast.”*

*The Northeast region has experienced periods of the highest gas and power spot price volatility in the U.S. over several recent winters - in 2013/14, 2014/15, and 2017/18.*

## RESIDENTIAL HEATING FUELS

*Natural gas continues to make inroads in the residential heating market in the region. This table illustrates the leading house heating fuels, by percentage, for the years 1990, 2000 and 2019.*

*For the 9 state region, natural gas in 2019 represented 55% of home heating, compared to 20% for heating oil and 16% for electricity.*

*According to the most recent data, natural gas represented 61% of the home heating market in New York state, and three-fourths of the home heating market in New Jersey. In Pennsylvania, gas heats 51% of homes.*

*In New England, gas's share is 39.9%. Heating oil is second at 34%. Electricity is 14.6%.*

*Source: U.S. Census Bureau, "Profile of Selected Housing Characteristics." Data is 2019, 1-year estimates.*

STATE	2019%	2000 %	1990 %
<b>Connecticut</b>	<b>Gas, 36</b> Oil, 39 Elec., 17	<b>Gas, 29</b> Oil, 52.4 Elec., 14.6	<b>Gas, 26.3</b> Oil, 54.4 Elec., 15.1
<b>Maine</b>	<b>Gas, 8</b> Oil, 60 Propane, 12	<b>Gas, 3.5</b> Oil, 80.2 Elec., 4.4	<b>Gas, 1.8</b> Oil, 69.5 Elec., 11.7
<b>Massachusetts</b>	<b>Gas, 52</b> Oil, 24 Elec., 17	<b>Gas, 43.9</b> Oil, 39.4 Elec., 12.4	<b>Gas, 38</b> Oil, 44 Elec., 13.5
<b>New Hampshire</b>	<b>Gas, 21</b> Oil, 42 Propane, 17	<b>Gas, 18.4</b> Oil, 58.1 Elec., 7.6	<b>Gas, 15.2</b> Oil, 55.8 Elec., 12.4
<b>New Jersey</b>	<b>Gas, 75</b> Oil, 7 Elec., 14	<b>Gas, 66.8</b> Oil, 19.4 Elec., 10.3	<b>Gas, 57.5</b> Oil, 29.2 Elec., 10
<b>New York</b>	<b>Gas, 61</b> Oil, 19 Elec., 12	<b>Gas, 51.7</b> Oil, 33.1 Elec., 8.7	<b>Gas, 45.7</b> Oil, 39.6 Elec., 8.5
<b>Pennsylvania</b>	<b>Gas, 51</b> Oil, 15 Elec., 24	<b>Gas, 51</b> Oil, 25.5 Elec., 16.5	<b>Gas, 49.5</b> Oil, 27.9 Elec., 14.8
<b>Rhode Island</b>	<b>Gas, 55</b> Oil, 29 Elec., 10	<b>Gas, 46.3</b> Oil, 42.1 Elec., 7.6	<b>Gas, 40.7</b> Oil, 47 Elec., 7.9
<b>Vermont</b>	<b>Gas, 19</b> Oil, 41 Propane, 18 Wood, 13	<b>Gas, 12.1</b> Oil, 58.6 Elec., 4.7 Wood, 9.4	<b>Gas, 8</b> Oil, 54.3 Elec., 9.1

## CHANGES IN NORTHEAST HOME HEATING CUSTOMER BASE, 2013-20



*Number of households by primary space heating fuel,  
Northeast states (in thousands)*

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
<b>Natural Gas</b>	11,529	11,705	11,802	11,918	12,063	12,167	12,389	12,516
<b>Heating Oil</b>	5,244	5,097	4,923	4,774	4,724	4,604	4,464	4,306
<b>Propane</b>	846	856	884	933	977	1,018	1,042	1,042
<b>Electricity</b>	3,038	3,093	3,253	3,326	3,387	3,478	3,597	3,713
<b>Wood</b>	585	569	511	471	469	461	352	218

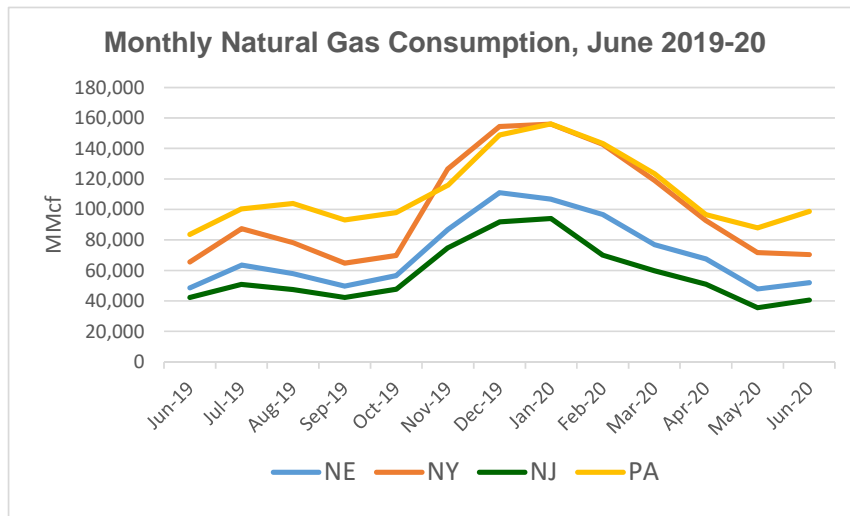
*U.S. EIA data indicates that the number of natural gas households in the Northeast U.S. has increased by just under 1 million since 2013. (Note: The 2020/21 numbers are still preliminary.)*

*In the same period, heating oil lost 938,000 households, electricity gained 675,000, and propane gained 196,000.*

*Source: U.S. EIA, October 2020*



## NEW ENGLAND / NEW JERSEY / NEW YORK / PENNSYLVANIA MONTHLY LOAD CURVE



Source: U.S. Energy Information Administration, "Natural Gas Monthly"

*This graph displays the monthly variations in gas consumption in New England, New Jersey, New York and Pennsylvania for the illustrative period of June 2019 through June 2020. As can be seen, all four regions are winter-peaking systems. December and January represent the highest monthly consumption period for all of the states.*

*It was a relatively mild winter with some very cold days but no real cold spells and thus no record sendouts.*

*The most notable aspect of the past year was COVID-19. It is hard to distinguish from one year of data but energy demand in all parts of the region dipped in March 2020 as the Northeast reacted to the first wave of the pandemic and the stay-at-home orders.*

# PROJECTED ADDITIONS BY ENERGY TYPE IN REGIONAL ELECTRIC GENERATION SECTOR

## PROPOSED GENERATOR ADDITIONS BY FUEL TYPE

### *Northeast Electric Power Systems*

	Natural Gas	Wind	Solar & Other Renewables	Energy Storage
<b>NY ISO</b>	5,098 MW	21,544 MW	10,013 MW	8,541 MW
<b>ISO-NE</b>	1,037 MW	14,256 MW	3,211 MW	2,265 MW
<b>NJ (PJM)</b>	2,655 MW	2,954 MW	2,954 MW	650 MW
<b>PA (PJM)</b>	7,067 MW	1,100 MW	8,405 MW	271 MW



*Natural gas has been an increasingly significant fuel in the Northeast electric power system over the last 20 years. The region’s three electric grid operators, as shown in the data table above, report that natural gas remains an option for proposed new generating capacity. Renewable energy, imported hydro from Canada, and efficiency (not portrayed) are the other leading projected future power sources at this time. Offshore wind is a source of particular interest to the states in the region, and the numbers via state procurements keep increasing.*

### Data sources for table:

*ISO-NE, January 2020 web posting*

*NY ISO, “2020 Power Trends.” As of March 2020.*

*“PJM 2019 Regional Transmission Expansion Plan,” released February 2020 by PJM (for NJ & PA data)*

*Note: capacity numbers for wind & solar are nameplate capacity.*

## V.

# TECHNOLOGY & ENVIRONMENTAL ISSUES

*New technologies and environmental issues have been key drivers in shaping the regional gas market in recent years.*

*Among the areas addressed are:*

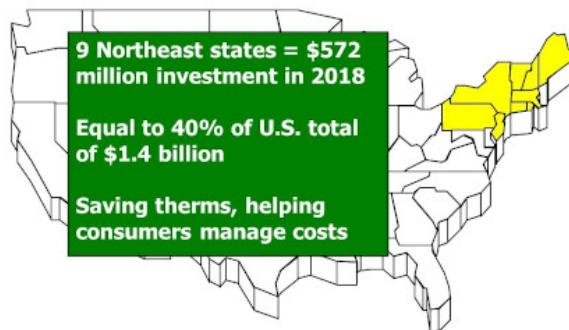
- *Natural gas vehicles*
- *Power generation technologies*
- *Efficiency investments*
- *Environmental issues*
- *RD&D advances.*

# NATURAL GAS EFFICIENCY

*Natural gas efficiency programs are a central part of the evolving national and regional natural gas supply/demand portfolio. Efficiency remains a resource of immense opportunity. The Northeast states already are national leaders in their per capita energy efficiency, and the utilities in the region, electric and gas, have been active for years in efficiency programs.*

*As the American Council for an Energy-Efficient Economy (ACEEE) has noted, efficiency opportunities exist in multiple sectors: “While the roots of natural gas efficiency programs lie within residential markets, there are now programs serving multiple types of natural gas customers - from homeowners to large industries. There are opportunities for improved energy efficiency across the spectrum of customers and technologies using natural gas.*

## Northeast States Lead U.S. in Gas Efficiency Investments



Source: ACEEE, "2019 State Energy Efficiency Scorecard", released Oct. 2019

*Programs may target specific technologies that use natural gas, such as furnaces, water heaters, boilers, and cooking equipment, or they may target the systems and facilities that are served by natural gas technologies. Improving the thermal envelope of buildings is one example of programs that address whole buildings.”*

*The 2019 annual ACEEE Scorecard for Energy Efficiency, which looks at both electric and natural gas programs, found that all the Northeastern states were ranked in the top 20. In 2018, \$1.4 billion was invested in natural gas efficiency programs nationwide, according to the ACEEE. Of that, over one-third of the national total (\$572 million, or 40%) was invested in the nine Northeast states (CT, ME, MA, NH, NJ, NY, PA, RI and VT).*

*In October 2020, ACEEE released a white paper on natural gas efficiency. It observes that “low natural gas market prices over the last few years have made it more difficult for some utility programs to demonstrate cost effectiveness using traditional tests.” It concludes though that “natural gas efficiency programs are sustainable and worth pursuing for both economic and environmental reasons.”*

## RENEWABLE NATURAL GAS

*Renewable Natural Gas (RNG) is a pipeline-compatible, gaseous fuel derived from biomass or other renewable sources. It has lower lifecycle CO<sub>2e</sub> emissions than geological natural gas and is compositionally equivalent and fully interchangeable with natural gas. It is the product of raw biogas (from anaerobic digestion) or syngas (from biomass gasification) that has been upgraded to pipeline quality.*

*Regardless of the biomass source or conversion technology, when the raw gas is appropriately upgraded to meet trace constituent compositional equivalency and interchangeability requirements, RNG is an overall low carbon product that facilitates meeting long-term decarbonization goals. In addition, in certain areas RNG recovery and introduction can be a viable option for meeting localized demand for pipeline natural gas.*

*In the Northeast, there is growing interest and initiatives toward implementing RNG, with numerous utilities proposing RNG initiatives, from farm sources to wastewater plants and landfills.*

*Last year, NGA and GTI released the “RNG Interconnect Guidance Document in NY State” intended to enhance understanding of both technical and policy issues to ensure RNG project interconnect success. While developed for New York State, this report provides a guideline for RNG pipeline interconnections that will be applicable and of value throughout the U.S. and Canada.*



# NATURAL GAS VEHICLES

*Natural gas fueled vehicles (also known as NGVs) remain an important part of the alternative-fuel vehicle market. NGVs provide environmental benefits, reliability, cost-effectiveness, and are sourced from domestic supplies. Natural gas is particularly useful in the heavy-duty vehicle market, including transit buses and refuse trucks.*

*As with most alternative fuels, the availability of public fueling stations remains a challenge. According to the U.S. Department of Energy's Alternative Fuels Data Center, Pennsylvania has 49 public compressed natural gas (CNG) stations, New York State has 33, New Jersey 17, and New England 20. Nationally, there are about 1,500 CNG fueling stations.*

*The private sector is at the same time establishing its own network for private fleets, from delivery vans to trucks. Companies with specific daily travel routes are finding it makes sense to use CNG or LNG, depending on weight and distance.*

*Finally, there is growing interest in “renewable natural gas (RNG)” as an input to the transportation fuel stream.*



*A new CNG fueling station opened in the Cape May area in spring 2020. (Photo: South Jersey Gas)*

*The U.S. Department of Energy notes that “like conventional natural gas, RNG can be used as a transportation fuel in the form of compressed natural gas (CNG) or liquefied natural gas (LNG). RNG qualifies as an advanced biofuel under the Renewable Fuel Standard.”*



*A refuse truck refueling at the iNatGas / AVSG station in Worcester, MA.*

## CNG AND LNG FOR OFF-SYSTEM SUPPLY

*Areas not currently served by pipeline (or distribution) infrastructure are looking at ways to gain access to the fuel—and increasingly opting for portable delivery systems, often referred to as a “virtual pipeline.”*

*In this process, CNG or LNG can be delivered via truck to serve institutional or industrial sites. The gas is transported via a trailer that also can serve to offload the gas into the facility.*

*This application is proving advantageous in areas of the region where natural gas pipeline infrastructure has yet to reach. The new fuel system can potentially be set up in a matter of several months.*

*The natural gas can be sourced from the local gas distribution utility, or via the interstate transmission company.*

*Local gas distribution utilities are also utilizing portable CNG or LNG to supplement supplies in areas of pipeline constraints. For example, the utilities in the greater New York City metro area are looking at these types of facilities as part of a broad portfolio of supply, efficiency and new technology options to meet customer demand.*

*Shown in the photo is a CNG fueling station in Pembroke, NH operated by Clean Energy. The station operates as a CNG refueling stations for vehicles, but also supplies CNG by truck—the white trucks in the photo are examples.*



## CHP & FUEL CELLS

*Natural gas is a key fuel input for energy systems that represent new technologies with opportunities for reduced air emissions, higher system efficiency, and greater reliability.*

**Combined heat and power (CHP)**, also known as cogeneration, is the simultaneous production of electricity and heat from a single fuel source – such as natural gas. Natural gas fuels the majority of existing CHP capacity in the U.S. Total generating capacity in the U.S. from CHP is around 81 gigawatts, representing about 7% of total capacity. The greatest potential for CHP use is in such markets as commercial, institutional, light manufacturing, government and military sites. In the Northeast, universities and hospitals are among the key customers.

*CHP is also seen as valuable for its capability in providing critical infrastructure resilience. It provides notable benefits (such as lower emissions) over traditional backup generation, which generally runs on diesel fuel.*



*A university application is shown in the photo to the left. Harvard University completed a new district energy facility in 2020 that uses energy-efficient CHP technology. As the university notes: “The facility currently relies on natural gas because that’s the dominant lowest carbon fuel source available for this scale of facilities in the New England region. As low and zero carbon technologies are tested and proven, they can be evaluated for incorporation into the new DEF because of its flexible design.”*

**Fuel Cells** use “hydrogen as the fuel in an electrochemical process, similar to what occurs in a battery, that generates electricity” (EPA). The primary fuel source for the fuel cell is hydrogen, which can be obtained from natural gas and other fuels containing hydrocarbons. Fuel cells provide great advancements in efficiency and lower emissions.



## NYSEARCH: Innovative R&D

*NGA's NYSEARCH is recognized as one of the leading gas industry research and development organizations in the U.S., with pioneering programs that have received national and international recognition. NYSEARCH has recorded significant RD&D achievements - monitoring technology developments, identifying common needs, performing market research, evaluating potential technical solutions, and conducting product development.*

*Program areas include: Improved Installation, Maintenance & Repair; Pipeline Integrity/Direct & Remote Assessment; Pipe Location & Damage Prevention; Leak Detection, Real-time Sensing & Inspection for Distribution; Environment/Reducing Greenhouse Gas Emissions; and Gas Quality, among others.*

*For further information, visit the NYSEARCH web site at [www.nysearch.org](http://www.nysearch.org).*



*This photo illustrates field installations of MetGlas® in National Fuel Gas territory in Buffalo, NY in 2019 - part of a project to evaluate amorphous metal tape as a practical application for PE pipe location. Source: NYSEARCH*

## ADDRESSING CARBON EMISSIONS

*Natural gas is a contributor to greenhouse gas emissions but is the cleanest of all fossil fuels - and as a result natural gas is recognized in many quarters as part of the solution to the climate change challenge.*

*As part of their decarbonization efforts, utility companies are implementing efficiency programs to reduce usage and emissions. Furthermore, natural gas companies are striving to reduce their emissions of methane, which is a greenhouse gas. Companies at all levels of the natural gas production and transmission chain are working to reduce pipeline leaks, fugitive emissions, and impacts from venting. For example, methane emissions from natural gas distribution systems in Massachusetts declined by two-thirds between 1990 and 2018.*

*One highly successful program has been the “Natural Gas STAR” program of the U.S. EPA. The program invites voluntary participation from industry segments to reduce methane emissions. Over 1,600 billion cubic feet (Bcf) of methane emissions have been reduced by participating companies in the last two-and-a-half decades. A number of LDCs from the Northeast participate in this program.*

*EPA reports that "reducing methane emissions can result in environmental, economic, and operational benefits."*

Source: U.S. EIA, 5-20

### State Energy-Related CO2 Emissions (million metric tons carbon dioxide)

State	1990	2017	Percentage Change
CT	40.6	33.4	-17.8%
ME	19.0	15.4	-18.9%
MA	83.2	63.3	-23.9%
NH	14.7	13.4	-8.7%
NJ	108.1	101.1	-6.6%
NY	206.6	156.7	-24.2%
PA	262.0	215.3	-17.8%
RI	8.8	10.0	12.9%
VT	5.5	5.8	6.3%
US	5,038.8	5,133.4	1.9%

## ACHIEVING EMISSIONS REDUCTIONS IN THE POWER SECTOR

*The electric utility sector in the Northeast has achieved major reductions in several air emission areas in recent years—in part thanks to new, more efficient power sources, from natural gas to renewables.*

*In New York State over the last two decades, NY ISO reports that emissions rates from the power sector dropped by 55% for CO<sub>2</sub>, 92% for NO<sub>x</sub>, and 99% for SO<sub>2</sub>.*

*ISO-NE reports that from 2001 to 2018, total emissions from power plants in New England dropped by 98% for sulfur dioxide (SO<sub>2</sub>), 74% for nitrogen oxides (NO<sub>x</sub>), and 36% for CO<sub>2</sub>.*

*PJM emissions data indicates a significant drop in SO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub> for its entire region, which includes declining trends for all three pollutants in both New Jersey and Pennsylvania. CO<sub>2</sub> emissions are down about one-third in PJM since 2005, for example.*

*U.S. electric power sector carbon dioxide emissions have fallen by 33% since 2007, with the substitution of natural gas for coal a key driver.*

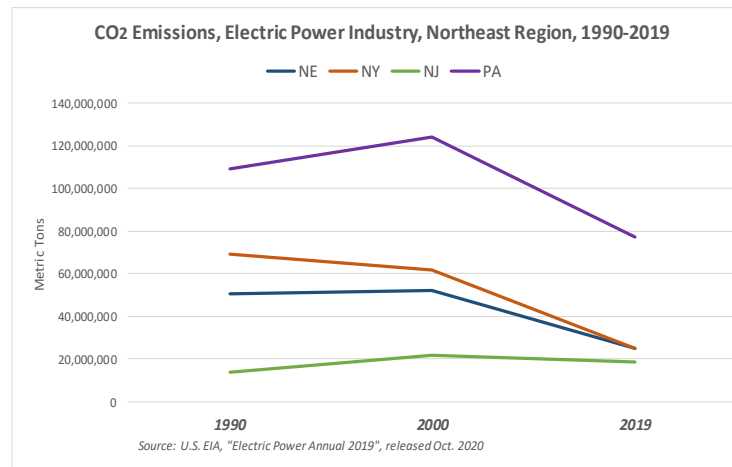


Photo: Exelon Generation

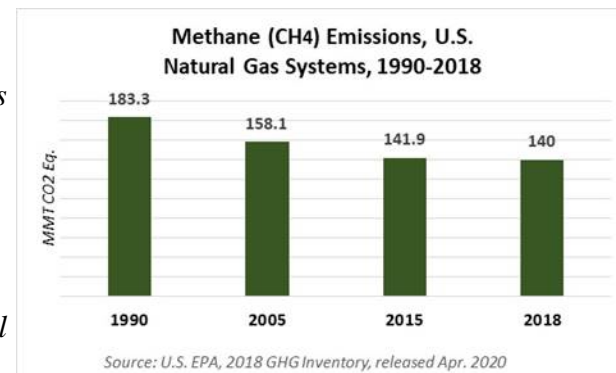
## REDUCING METHANE EMISSIONS IN NATURAL GAS SYSTEMS

*Natural gas systems are a leading contributor to CH<sub>4</sub> or methane emissions in the U.S., along with agriculture, landfills and coal mining. But methane emissions from natural gas have been trending lower overall in recent decades. CH<sub>4</sub> emissions from natural gas systems declined by 24% from 1990 to 2018, according to the U.S. EPA's 2018 Greenhouse Gas Inventory, released in April 2020.*

*EPA notes: "The decrease in CH<sub>4</sub> emissions is largely due to decreases in emissions from distribution, transmission, and storage. The decrease in distribution emissions is due to decreased emissions from pipelines and distribution station leaks, and the decrease in transmission and storage emissions is largely due to reduced compressor station emissions (including emissions from compressors and equipment leaks)...An increased use of plastic piping, which has lower emissions than other pipe materials, has reduced both CH<sub>4</sub> and CO<sub>2</sub> emissions from this stage, as have station upgrades at metering and regulating (M&R) stations. Distribution system CH<sub>4</sub> emissions in 2018 were 73 percent lower than 1990 levels." [EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018, pages ES-16 and 3-84-86]*

*Individual states continue to record progress as well in reducing methane emissions. For example, **Connecticut** reports that the contribution of methane emissions from leakage from natural gas distribution and transmission systems is less than one percent (0.6%) of all statewide GHG emissions (source: Connecticut 2017 GHG Inventory, released Jan. 2020). Natural gas system leakage has declined by two-thirds since 1990 in Connecticut.*

*Reducing methane emissions further through infrastructure replacement, new technology applications, and best practices at all stages of the production and delivery process, is an industry priority.*



## ACCELERATING REPLACEMENT OF OLDER PIPE MATERIALS

**Miles of Distribution Main Considered “Replacement Candidates” by Type**

State	Bare Steel	Cast / Wrought Iron	Percentage of Total Main %
CT	130	1,173	15.8%
ME	0.09	30	2.2%
MA	1,218	2,809	18.5%
NH	6	64	3.5%
NJ	423	3,853	11.4%
NY	4,852	2,947	15.8%
PA	6,102	2,405	17.6%
RI	192	690	27.6%
VT	--	--	0.0%

*Accelerated repair and replacement of more “leak-prone” natural gas distribution system components is an issue of high priority. The Pipeline and Hazardous Materials Safety Administration (PHMSA) of the U.S. Department of Transportation is urging action on repairing older pipe systems, which are considered more vulnerable to potential leaks.*

*Accelerating repair and replacement would meet safety, environmental and efficiency goals.*

*In early 2020, NARUC, the national state regulatory association, released a new informational handbook on natural gas distribution infrastructure replacement programs. It notes progress in replacing aging bare steel and cast iron but said that continued action is needed.*

*Utilities in the Northeast are working aggressively to accelerate this replacement process, in concert with efforts to reduce emissions and strengthen systems to meet market demand.*

*2019 data, released 2020 by PHMSA*

## NGA's MEMBER LOCAL DISTRIBUTION COMPANIES

*(as of November 2020)*

### **Bangor Natural Gas Company**

21 Main Street  
Bangor, ME 04402  
(207) 941-9595  
[www.bangorgas.com](http://www.bangorgas.com)

### **The Berkshire Gas Company**

115 Cheshire Road, P.O. Box 138  
Pittsfield, MA 01202  
(413) 442-1511  
[www.berkshiregas.com](http://www.berkshiregas.com)

### **Blackstone Gas Company**

61 Main Street, P.O. Box 162  
Blackstone, MA 01504  
(508) 883-9516  
[www.blackstonegas.com](http://www.blackstonegas.com)

### **Central Hudson Gas & Electric Corp.**

284 South Avenue  
Poughkeepsie, NY 12601  
(845) 452-2000  
[www.cenhud.com](http://www.cenhud.com)

### **Columbia Gas of Pennsylvania**

121 Champion Way, Suite 100  
Canonsburg, PA 15317  
[www.columbiagaspa.com](http://www.columbiagaspa.com)

### **Connecticut Natural Gas Corp.**

77 Hartland Street, 4th floor  
East Hartford, CT 06108  
(860) 727-3000  
[www.cngcorp.com](http://www.cngcorp.com)

### **Consolidated Edison Co. of NY, Inc.**

4 Irving Place  
New York, NY 10003  
(212) 460-4600  
[www.coned.com](http://www.coned.com)

### **Corning Natural Gas Corp.**

330 West William Street  
Corning, NY 14830  
(607) 936-3755  
[www.corninggas.com](http://www.corninggas.com)

### **Elizabethtown Gas**

520 Green Lane  
Union, NJ 07083  
(800) 242-5830  
[www.elizabethtowngas.com](http://www.elizabethtowngas.com)

### **Eversource Energy**

One NSTAR Way  
Westwood, MA 02090  
(800) 592-2000

107 Selden Street  
Berlin, CT 06037  
(800) 286-5000  
[www.eversource.com](http://www.eversource.com)

## NGA's LDC MEMBERS *(as of 11-20)*

### **Fillmore Gas Company, Inc.**

10577 New York 19  
Fillmore, NY 14735  
(585) 567-2272

### **Hamilton Municipal Gas**

3 East Broad Street, PO Box 119  
Hamilton, NY 13346-0119  
(315) 824-1111  
[www.hamilton-ny.gov](http://www.hamilton-ny.gov)

### **Holyoke Gas & Electric Dept.**

99 Suffolk Street  
Holyoke, MA 01040  
(413) 536-9300  
[www.hged.com](http://www.hged.com)

### **Liberty Utilities MA**

PO Box 911  
Fall River, MA 02722  
(508) 324-7811  
[http://  
massachusetts.libertyutilities.com/fall-river](http://massachusetts.libertyutilities.com/fall-river)

### **Liberty Utilities NH**

15 Buttrick Road  
Londonderry, NH 03053  
(800) 833-4200  
[www.new-  
hampshire.libertyutilities.com](http://www.new-hampshire.libertyutilities.com)

### **Liberty Utilities NY**

33 Stearns Street  
Massena, NY 13662  
(315) 769-3511  
[libertyutilities.com](http://libertyutilities.com)

### **Maine Natural Gas**

PO Box 99  
Brunswick, ME 04011  
(207) 729-0420  
[www.mainenaturalgas.com](http://www.mainenaturalgas.com)

### **Middleborough Gas & Electric Dept.**

32 South Main Street  
Middleborough, MA 02346  
(508) 947-1371  
[www.mged.com](http://www.mged.com)

### **National Fuel Gas Distribution Co. (NY)**

6363 Main Street  
Williamsville, NY 14221  
(716) 857-7000  
[www.natfuel.com](http://www.natfuel.com)

### **National Fuel Gas Distribution Co. (PA)**

1100 State Street  
Erie, PA 16512  
(814) 871-8200  
[www.natfuel.com](http://www.natfuel.com)

### **National Grid**

25 Hub Drive  
Melville, NY 11747  
(718) 643-4050  
[www.nationalgridus.com](http://www.nationalgridus.com)

40 Sylvan Road  
Waltham, MA 02451  
(781) 466-5000  
[www.nationalgridus.com](http://www.nationalgridus.com)

## NGA's LDC MEMBERS *(as of 11-20)*

**New Jersey Natural Gas Co.**

1415 Wyckoff Road  
Wall, NJ 07719  
(732) 938-7977  
www.njng.com

**New York State Electric & Gas**

4500 Vestal Parkway East  
Binghamton, NY 13902  
(607) 762-7200  
www.nyseg.com

**Norwich Public Utilities**

173 North Main Street  
Norwich, CT 06360  
(860) 887-2555  
www.norwichpublicutilities.com

**Orange & Rockland Utilities, Inc.**

One Blue Hill Plaza  
Pearl River, NY 10965  
(914) 352-6000  
www.oru.com

**PECO Energy**

2301 Market Street  
Philadelphia, PA 19103  
(800) 841-4141  
www.peco.com

**Philadelphia Gas Works (PGW)**

800 W. Montgomery Avenue  
Philadelphia, PA 19122  
(215) 235-1000  
www.pgworks.com

**Public Service Electric & Gas Co.**

80 Park Plaza  
Newark, NJ 07101  
(973) 430-7000  
www.pseg.com

**Rochester Gas & Electric Corp.**

89 East Avenue  
Rochester, NY 14649  
(585) 546-2700  
www.rge.com

**The Southern Connecticut Gas Co.**

855 Main Street, P.O. Box 1540  
Bridgeport, CT 06604  
(203) 382-8111  
www.soconngas.com

**South Jersey Gas**

3800 Atlantic Avenue  
Atlantic City, NJ 08401  
(609) 561-9000  
www.southjerseygas.com



## NGA's LDC MEMBERS *(as of 11-20)*

**Summit Natural Gas of Maine**  
442 Civic Center Drive, Suite 100  
Augusta, ME 04330  
(207) 621-8000  
[www.summitnaturalgasmaine.com](http://www.summitnaturalgasmaine.com)

**UGI Utilities, Inc.**  
2525 N. 12th Street, Suite 360  
Reading, PA 19612  
(610) 337-1000  
[www.ugi.com](http://www.ugi.com)

**Unitil**  
6 Liberty Lane West  
Hampton, NH 03842  
(888) 886-4845  
[www.unitil.com](http://www.unitil.com)

**Valley Energy, Inc.**  
523 S. Keystone Avenue  
Sayre, PA 18840  
(570) 888-9664  
[www.valley-energy.com](http://www.valley-energy.com)

**VGS**  
P.O. Box 467  
S. Burlington, VT 05402  
(802) 863-4511  
[www.vermontgas.com](http://www.vermontgas.com)

**Wakefield Municipal Gas & Light  
Department**  
480 North Avenue  
Wakefield, MA 01880  
(781) 246-6363  
[www.wmgld.com](http://www.wmgld.com)

**Westfield Gas & Elect. Light Dept.**  
100 Elm Street  
Westfield, MA 01085  
(413) 572-0100  
[www.wgeld.org](http://www.wgeld.org)

## TRANSMISSION COMPANIES AND LNG MEMBERS *(as of 11-20)*

**Algonquin Gas Transmission Co.**  
890 Winter Street, Suite 300  
Waltham, Massachusetts 02451  
(617) 254-4050  
[www.enbridge.com](http://www.enbridge.com)

**Exelon Generation (Everett LNG)**  
18 Rover Street  
Everett, Massachusetts 02149  
(617) 381-5700 *(Everett terminal)*  
[www.exeloncorp.com](http://www.exeloncorp.com)

**Granite State Gas Transmission, Inc.**  
1075 Forest Avenue  
Portland, Maine 04104  
(207) 797-8002  
[www.unitil.com](http://www.unitil.com)

**Iroquois Gas Transmission System**  
One Corporate Drive, Suite 600  
Shelton, Connecticut 06484  
(203) 925-7200  
[www.iroquois.com](http://www.iroquois.com)

**Maritimes & Northeast Pipeline**  
890 Winter Street, Suite 300  
Waltham, Massachusetts 02451  
(617) 254-4050  
[www.mnp-usa.com](http://www.mnp-usa.com)

**Millennium Pipeline**  
One Blue Hill Plaza, 7th floor  
Pearl River, NY 10965  
(800).572-7515  
[www.millenniumpipeline.com](http://www.millenniumpipeline.com)

**Portland Natural Gas  
Transmission System (PNGTS)**  
One Harbour Place, Suite 375  
Portsmouth, NH 03801  
(603) 559-5500  
[www.pngts.com](http://www.pngts.com)

**Repsol USA**  
2455 Technology Boulevard  
The Woodlands, Texas 77381  
(832) 442-1000  
[www.repsol.us/en](http://www.repsol.us/en)

**TC Energy**  
700 Louisiana, Suite 1300  
Houston, TX 77002  
(800) 661-3805  
[www.tcenergy.com](http://www.tcenergy.com)

**Tennessee Gas Pipeline Company**  
1001 Louisiana  
Houston, TX 77002  
(713) 420-2600  
[www.kindermorgan.com](http://www.kindermorgan.com)

## VII. ABOUT NGA

**The Northeast Gas Association (NGA)** is a regional trade association that focuses on education and training, operations, planning, technology research and development, and increasing public awareness of natural gas in the Northeast U.S.

NGA represents natural gas distribution companies, transmission companies, liquefied natural gas and compressed natural gas providers, and manufacturers and suppliers to the industry. These member companies provide natural gas to over 13 million customers in nine states (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont).

### **Mission Statement**

*The Northeast Gas Association's mission is to promote and enhance the safe, reliable, efficient, and environmentally responsible delivery of natural gas to customers in the region, and to advocate for the industry from production to delivery.*

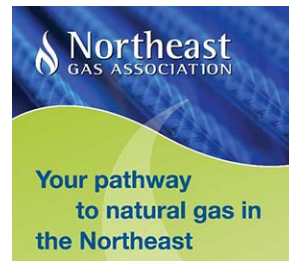
Its web site is [www.northeastgas.org/](http://www.northeastgas.org/)

For further information, contact NGA at:

Northeast Gas Association  
75 Second Avenue, Suite 510  
Needham, Massachusetts 02494  
Tel. 781-455-6800

Its NYSEARCH office is located at:

20 Waterview Boulevard, 4th floor  
Parsippany, NJ 07054  
Tel. 973-265-1900  
[www.nysearch.org](http://www.nysearch.org)



## *DATA SOURCES*

The data sources used in the Guide are referenced on each page. NGA is grateful to the many agencies and individuals from a variety of sectors who provided information and guidance in the preparation of this report.

Documents of particular interest include the following:

Pennsylvania Public Utility Commission

- "Pennsylvania Natural Gas Outlook Report"

U.S. Department of Energy, Office of Fossil Energy, Office of Natural Gas & Petroleum Import and Export Activities

- "Natural Gas Imports and Exports"

U.S. Energy Information Administration ([www.eia.gov](http://www.eia.gov))

- "Annual Energy Outlook 2020"

- "Natural Gas Annual 2019"

- "Natural Gas Monthly"

- "State Energy Data Report"

Canada Energy Regulator (formerly the NEB)

- "Statistics: Natural Gas Exports and Imports"

NGA will continue during the year to provide up-to-date summaries of regional gas industry developments, and will make that information available on its web site at:

[www.northeastgas.org](http://www.northeastgas.org).



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[www.northeastgas.org](http://www.northeastgas.org)