2021

STATISTICAL GUIDE

Northeast
GAS ASSOCIATION

NORTHEAST NATURAL GAS MARKET AT-A-GLANCE

	NEW ENGLAND	*NEW JERSEY*	*NEW YORK*	*PENNSYL-VANIA*
Gas Customers	**2.85 million**	**3.1 million**	**5 million**	**3.1 million**
Annual Consumption (2020)	**865 Bcf**	**649 Bcf**	**1,235 Bcf**	**1,412 Bcf**
Miles of transmission pipeline (2020)	**2,695**	**1,568**	**4,593**	**10,488**
Underground Storage	**-**	**-**	**246 Bcf**	**763 Bcf**
LNG operating import facilities	**2**	**-**	**-**	**-**
Gas production in-state, annual (2020)	**-**	**-**	**10 Bcf**	**7,091 Bcf**
Gas Efficiency Program Budgets (2019)	**$366.8 million**	**$89.5 million**	**$177.4 million**	**$11.4 million**
Primary energy consumption, leading fuels, % (2019)	**Natural Gas, 30%** Oil, 42% Nuclear, 10% Coal, <1% Renewables, 13%	**Natural Gas, 38%** Oil, 40% Nuclear, 13% Coal, <1% Renewables, 4%	**Natural Gas, 35%** Oil, 36% Nuclear, 12% Coal, <1% Renewables, 13%	**Natural Gas, 37%** Oil, 25% Nuclear, 19% Coal, 13% Renewables, 5%
Gas as a share of residential home heating fuels (2019)	**40%**	**75%**	**61%**	**51%**
Population (2020)	**14.8 million**	**8.8 million**	**19.3 million**	**12.8 million**
Gross state domestic product (GDP, 2021, 2nd qtr; % of U.S)	**$1,188 billion** ***5.2%***	**$671 billion** ***3.0%***	**$1,868 billion** ***8.2%***	**$833 billion** ***3.7%***

Sources: NGA, American Council for an Energy Efficient Economy, U.S. EIA, PHMSA, U.S. Census Bureau, U.S. BEA. Updated by NGA, October 2021

STATISTICAL GUIDE TO THE NORTHEAST U.S. NATURAL GAS INDUSTRY *2021*

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

Northeast GAS ASSOCIATION

November 2021

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 2020, 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 the Canada Energy Regulator.

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SECTIONS

		Page
I.	The Year in Review	*1*
II.	Regional Energy Overview	*28*
III.	Supplies & Infrastructure	*35*
IV.	Natural Gas Trends in the Northeast U.S.	*54*
V.	Technology & Environmental Issues	*71*
VI.	Distribution & Transmission Company Members	*81*
VII.	About NGA	*86*

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The Year in Review
2021

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 highlights several current market issues.

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 million (17% of the U.S.). Total state domestic product for the region is $4.6 trillion (20% of the U.S. total).

Regional Natural Gas Market

The nine-state region has 14 million natural gas customers (19% of the U.S. total of 74 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 30% of the primary energy consumption of the six New England states, 38% of New Jersey, 35% of New York, and 37% of Pennsylvania, compared to the national average of 31% (based on 2019 U.S. EIA data).

Gas Customers

New England has 2.85 million natural gas customers. Residential customers total 2.57 million; commercial and industrial customers are about 285,000.

New Jersey has 3.1 million natural gas customers. Residential customers total 2.87 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 3.1 million natural gas customers. Residential customers number 2.8 million; commercial and industrial customers number about 255,000.

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

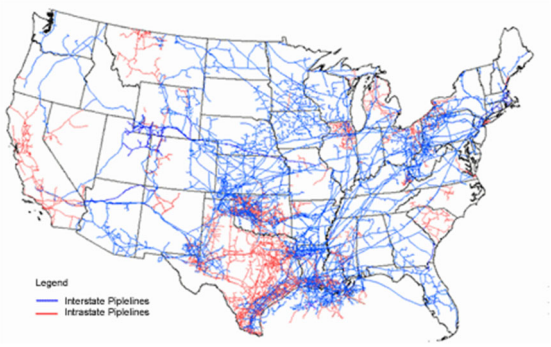
Total annual sendout in New England is about 865 billion cubic feet (Bcf), in New Jersey about 650 Bcf, in New York about 1,235 Bcf, and in Pennsylvania 1,400 Bcf (2020 EIA annual data).

In New England, gas consumption by end-use sector is 23% residential, 23% commercial, 13% industrial, and 41% power generation. In New Jersey, it is 34% residential, 21% commercial, 9% industrial, and 35% power generation. In New York, it is 35% residential, 23% commercial, 7% industrial, and 34% power generation. In Pennsylvania, it is 16% residential, 10% commercial, 18% industrial, and 58% power generation.

In New England, the local gas distribution company (LDC) design day demand is 4.8 Bcf per day, in New Jersey over 4 Bcf/d, and in Pennsylvania 5.6 Bcf/d. In New York, gas system peak demand is close to 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.

Electricity Generation Sector

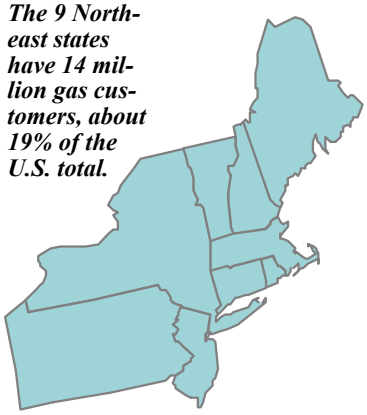
Based on annual fuel mix and generator applications in the queues at ISO-NE, NYISO, and PJM, natural gas is the leading current fuel source for electricity generation, and some proposed plants remain in the mix as well. In New England, natural gas represents 52% of current regional electric generating capacity, in New Jersey, 67% (in-state generation), in New York, over 50%, and in Pennsylvania, 44%.



The U.S. interstate natural gas pipeline system includes 302,000 miles of transmission pipeline, according to the U.S. DOT's PHMSA.

The EIA map on the left illustrates the extensive system.

"NGA Year in Review 2021"



The 9 Northeast states have 14 million gas customers, about 19% 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).

"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 few 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. Appalachian production has reached over 34 Bcf/d in 2021.

Exports from Canada to the Eastern U.S. have declined from 2.8 Bcf/d in 2007 to 0.8 Bcf/d in 2020, due to Marcellus and Utica shale gas availability.

LNG imports into the U.S. were 49 Bcf in 2020, substantially lower than the high point of 771 Bcf in the previous decade. The Everett LNG facility outside Boston imported 29.4 Bcf in 2020, which represented about 60% 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 30.7 Bcf to the regional market in 2020. The offshore Northeast Gateway terminal imported about 5 Bcf in early 2019 but no volumes in 2020.

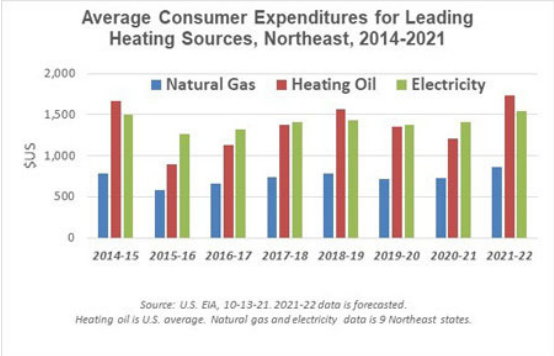
Pipeline and LNG Deliverability

New England

New England has 2,695 miles of gas transmission pipeline, according to the U.S. Department of Transportation / Pipeline and Hazardous Materials Safety Administration (PHMSA).

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

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 Exelon (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 connec-



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: 85% of new single-family homes built in the Northeast in 2020 were constructed to run on natural gas, according to the U.S. Census.

Chart source: U.S. Energy Information Administration, Oct. 2021

tions with a large gas utility and a major power plant. LNG is also transported to multiple LDCs' satellite storage tanks by trucks that fuel at the Everett facility. The terminal's vaporization capability is 715 MMcf/d; it also has daily sendout by trucks 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 and 2018, and about 5 Bcf to meet cold weather demand in early 2019. Through the first nine months of 2020 it has not imported any cargoes.

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 operated by Repsol. It can deliver up to 1 Bcf/d into the Brunswick Pipeline, which connects with the Maritimes & Northeast Pipeline, which then transports the volumes into New England. Since its inception, it has delivered over 450 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." (In November 2021, Repsol announced a new name for the facility: Saint John LNG.)

New Jersey

New Jersey has 1,568 miles of gas transmission pipeline.

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

The LDCs utilize local LNG storage for peak day support.

New York

New York has 4,593 miles of gas transmission pipeline. The pipeline companies serving New York State are: Algonquin Gas Transmission, Columbia Gas Transmission, Eastern Gas Transmission & Storage (formerly Dominion), Empire State Pipeline Company, Iroquois Gas Transmission System, Millennium Pipeline Company, National Fuel Gas Supply Corporation, North Country Pipeline, Stagecoach Gas Services, Tennessee Gas Pipeline Company, Texas Eastern Gas Transmission, and Transcontinental Gas Pipe Line Corporation. 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 10,488 miles of gas transmission pipeline. The pipeline companies serving Pennsylvania are: Columbia Gas Transmission, Eastern Gas Transmission & Storage, National Fuel Gas Supply Corporation, Tennessee Gas Pipeline Company, Texas Eastern Gas Transmission, and Transcontinental Gas Pipe Line Corporation. 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.

Historically 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 has become a significant production region.

As noted, Appalachian production, centered in Pennsylvania, Ohio, and West Virginia, is currently over 34 Bcf/d. Pennsylvania's annual production grew to 7.1 Tcf in 2020 (compared to 0.6 Tcf in 2010); it is the second-largest state producer of natural gas in the U.S. The Appalachian region, noted EIA in March 2021, "remains the largest natural gas-producing region in the United States."

Interstate pipeline companies serving the Appalachian region continue to seek to add interconnects from area producers to the market

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 about 10 Bcf in 2020. The state's conventional production has steadily declined since 2007, when annual production totaled 55 Bcf.

There is some limited conventional production in eastern Canada.

However, as summarized by Canada's CER in June 2021: "The Maritimes was once supplied by natural gas produced in offshore Nova Scotia, with some volumes of gas imported during peak times from the U.S. and globally from the Canaport LNG terminal in New Brunswick. Nova Scotia's offshore natural gas

production declined since 2014 and was finally shut down in mid-2018. Since 2015, natural gas has been increasingly imported through St. Stephen, New Brunswick, from the U.S. on the bi-directional M&NE Pipeline. Today, St. Stephen primarily imports natural gas, after mostly exporting until 2015."

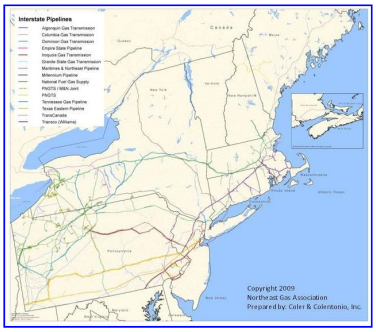
In New Brunswick, the McCully field of Corridor Resources, which began production in 2007, provides small amounts of gas for delivery into the Maritimes & Northeast Pipeline.

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.) The Dawn storage field in Ontario, Canada is also quite extensive and located very close to this Northeast market.

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 (Saint John) LNG facility has 9.9 Bcf of storage. LNG is also produced and supplied by companies in Québec and Pennsylvania.

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 underground storage in Pennsylvania, New York and Ontario.



Recent System Upgrades

Siting remains a challenge for the regional energy market, but even with some notable project cancellations over the last few years, some valuable incremental new capacity has continued to be added to the natural gas system. In 2021, some of the infrastructure additions included:

- Enbridge/Texas Eastern: "Appalachia to Market" in PA
- Enbridge/Texas Eastern: "Middlesex Extension" in NJ
- TC Energy/PNGTS: "Westbrook XPress" [phases 2 & 3], in ME
- Kinder Morgan/Tennessee Gas: "Station 261 Upgrade" [phase 2], in MA.

By year-end 2021, some further projects are scheduled to enter service:

- National Fuel Gas Supply: "FM100" in PA
- New Jersey Resources: "Adelphia Gateway" in PA
- Williams/Transco: "Leidy South Project" in PA.

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 downstate 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

Challenges faced by new project developments include siting, environmental concerns, and securing market position. Contract commitments in New England have been a vexing market issue, as the largest consuming sector, power genera-

tion, 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 Corporation in Pennsylvania, through its subsidiary, UGI LNG, has LNG storage, associated peak shaving services, and an LNG tanker truck-loading terminal. Energir (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; the upgrade is expected to be completed in 2022. 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. In October 2021, the Energy Facilities Siting Board in Massachusetts approved a proposal by Northeast Energy Center LLC to construct a new LNG storage and trucking facility in central MA, with storage of 2 million gallons; the LNG would be sourced off the nearby Tennessee Gas Pipeline system. The anchor customer is the utility National Grid, but supplies could be available to other utilities in the region as well.

Another supply/delivery option is portable or mobile compressed natural gas (CNG) or LNG. These "virtual pipeline" options are designed to bring natural gas to communities and businesses that are not located near a pipeline or distribution system. In this approach, large tube trailers are filled at compression facilities and the CNG is delivered by truck to the customer's facility, where the gas is depressurized, off-loaded, and flowed into the customer's gas (or dual-fuel) equipment. CNG is also being employed by several gas utilities as another supply input into the distribution network at particularly constrained points, such as the greater New York City area and Long Island. LNG can be utilized in the same manner, to supplement existing system supply and meet local demand.

Industry Mergers & Acquisitions

Some industry realignments occurred over the past year.

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. Nationally and regionally, LNG imports are down, as U.S. domestic production is on the increase. LNG remains especially important to New England for peak days. This photo is of an LNG storage tank in Boston owned and operated by National Grid.

Photo: National Grid

"NGA Year in Review 2021"

On January 1, 2021, Blackstone Gas Company, a small utility in Massachusetts, became part of Liberty Utilities.

In March 2021, National Grid announced the sale of its natural gas and electric utilities in Rhode Island to PPL. The transaction is expected to be completed in the first half of 2022.

In July 2021 Kinder Morgan (KMI) acquired Stagecoach Gas Services from Crestwood and Con Edison. The Stagecoach assets include 4 natural gas storage facilities with a total FERC-certificated working gas capacity of 41 billion cubic feet and a network of FERC-regulated natural gas transportation pipelines with multiple interconnects to major interstate natural gas pipelines, including Tennessee Gas Pipeline (TGP), a KMI subsidiary.

MARKET ISSUES

Supply Outlook

The recovery from the COVID-19 pandemic has continued to shape the nation's economy and the natural gas production market since March 2020. U.S. natural gas production set new records in 2019, as did gas consumption levels; but production and consumption both declined in 2020 along with the economic contraction. Dry natural gas production fell but only by about 1% in 2020 (whereas U.S. oil production declined by 8%).

While the national trend showed decline, natural gas production growth actually continued last year in Appalachia. In an issues brief in March 2021, EIA observed: "Natural gas production from the Marcellus and Utica/Point Pleasant shales of Ohio, West Virginia, and Pennsylvania continued to grow despite low regional natural gas spot prices. Natural gas production from these three states increased from 32.1 Bcf/d in 2019 to 33.6 Bcf/d in 2020."

Appalachian growth has continued in 2021. Looking at production trends there for the first part of 2021, EIA stated: "The Appalachian Basin… accounted for 34% of all U.S. dry natural gas production in the first half of 2021. On its own, the Appalachian Basin would have been the third-largest natural gas producer in the world the first half of 2021, behind Russia and the rest of the United States."

Meanwhile, the U.S. resource base for natural gas remains extensive. In October 2021, the Potential Gas Committee (PGC) at the Colorado School of Mines released its 2020 biennial report, *Potential Supply of Natural Gas in the United States.* The new assessment finds that the United States possesses a technically recoverable natural gas resource potential of 3,368 trillion cubic feet (Tcf).

When the PGC's assessments of technically recoverable resources are combined with EIA's latest determination of proved reserves (495 Tcf of natural gas as of year-end 2019), the U.S. future supply of natural gas stands at a record 3,863 Tcf, a modest increase of 25 Tcf (<1%) over the previous PGC evaluation. The PGC also noted that shale gas accounts for 63% of the country's total potential resources, at 2,130 Tcf.

"On its own, the Appalachian Basin would have been the third-largest natural gas producer in the world the first half of 2021, behind Russia and the rest of the United States."

- U.S. EIA, June 2021

Canada, which has considerable natural gas reserves, remains an important energy partner, even though its share of the U.S. natural gas market is expected to decline. In its November 2020 report, *Canada's Energy Future 2020*, the Canada Energy Regulator (CER) projected that natural gas production will likely remain steady over the next decades, driven by the power generation market and LNG exports. The CER observed: "Natural gas use differs greatly between the two scenarios. The large increase in the Reference Scenario is driven by strong growth in production of oil and natural gas (natural gas is often used in the production process for these commodities). In addition, natural gas plays a greater role in electricity generation in the Reference Scenario. Natural gas use declines in the Evolving Scenario, driven by lower oil and natural gas production, a greater share of renewables in electricity generation, and higher blending of renewable natural gas."

Higher 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 2020, the U.S. *exported* far more LNG (2.4 Tcf) than it *imported* (49 Bcf), a trend that will continue.

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 nationally recognized as a leader in per capita energy efficiency. A December 2020 report by the American Council for an Energy Efficient Economy (ACEEE) noted that $1.5 billion was invested in natural gas efficiency programs nationwide in 2019 (latest data). Over 40% ($645 million) of the national total was invested in the nine Northeast states alone.

The ACEEE also noted 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

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

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, the 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," but concludes that "natural gas efficiency programs are sustainable and worth pursuing for both economic and environmental reasons."

Efficiency is a core part of utilities' decarbonization efforts.

Infrastructure Siting Challenges and Changing Regulatory Processes

Energy infrastructure of all types has long encountered siting issues, and natural gas is no exception.

In the U.S., project delays at the state level, particularly regarding the issuance of state water quality certificates, have added to project costs and market uncertainty. In 2020-21 the siting challenge continued, as several pipeline proposals were withdrawn after multiple years of navigating the permitting process, including the Constitution Pipeline, the NESE Project, the Atlantic Coast Pipeline, and PennEast. The developers noted the costs of delay and the uncertainty of the regulatory process. (As well, several projects proposed in eastern Canada were withdrawn in 2021, including planned LNG export terminals in Quebec and Nova Scotia, and a proposed underground storage facility in Nova Scotia.)

FERC's policy direction for project development is also under review, with implications for the energy industry. In February 2021 the agency announced it is revisiting its past policy statement on interstate natural gas pipeline proposals; and in March it noted that it has "for the first time assessed the significance of a proposed natural gas pipeline project's greenhouse gas emissions and their contribution to climate change."

The public policy framework is also being shaped by government, industry, community and broader stakeholder participants to address such issues as equity, inclusion and environmental justice in energy project considerations.

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 of energy development and seek balanced and reasonable solutions.

"NGA Year in Review 2021"

Price Trends

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

The natural gas price trend in recent years has been 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 2020 the average natural gas commodity price was around $2.00/MMBtu.

The pandemic year of 2020 led to production cutbacks and very low commodity prices amid lower market demand. 2021 has seen higher commodity prices for all fuels, including natural gas, as economic demand has increased, while supply chain and transport issues challenge the global delivery market. U.S. production is higher but producers still seem relatively cautious on drilling expansions; as noted by The New York Times in November 2021 in regards to the oil market: "American producers have also been cautious, in part because investors are demanding that they focus on reducing debt and raising dividends rather than increasing production only to oversupply the market and reduce prices again."

The "2021-22 Winter Fuels Outlook" of EIA projects the Henry Hub price, which averaged $2.03 per MMBtu in 2020, to average $3.07 per MMBtu in 2021. However, the winter months will reflect current market volatility and higher prices. In October, the FERC projected that "natural gas prices are also expected to increase across the U.S., with futures prices at Henry Hub (national benchmark in Louisiana) as of October 13, 2021 averaging $5.63 per million British Thermal Units (MMBtu) for November 2021 through February 2022, a $2.85/MMBtu, or 103%, increase compared to winter 2020-2021 settled futures prices."

While the U.S. market will reflect expected higher prices this upcoming winter, natural gas prices have spiked considerably more in European and Asian markets as they compete for global LNG amidst lower-than-average local storage levels. U.S. natural gas storage levels going into winter are only slightly below average by comparison.

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

As will be discussed below, extreme cold weather in the midsection of the U.S. this past February led to extraordinary if short-term price spikes; the Northeast, usually the highest price hub in the nation, was relatively moderate.

Winter Challenges & Market Constraints

In its outlook for winter 2021/22, the FERC projects that Northeast gas market hubs will be the highest-priced in the U.S. In October 2021 the agency stated that: "[The] Algonquin Citygate, outside Boston, has the largest expected year-over-year futures price increase, at $13.98/MMBtu, where futures prices more than quadrupled (from $4.20/MMBtu for winter 2020-2021, to $18.18/MMBtu for winter 2021-2022). While Algonquin Citygate prices are often discounted to Henry Hub most of the year, Algonquin Citygate prices typically increase above Henry Hub prices in January and February due to the winter-peaking New England region's limited natural gas pipeline capacity."

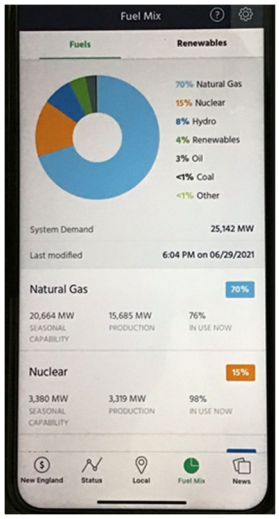
It's a long-standing regional market characteristic: a high demand region with infrastructure constraints in particular market areas such as New York City/Long Island and New England. It is evidenced in the winter months when demand is highest and system capacity is at peak.

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 2020/21 winter were once again expected to be at their highest in the Northeast region. There were instances of local volatility this past winter, notably on Algonquin, but nothing like the severe cold winter weather that impacted the Midwest, Texas, and parts of the South in mid-February 2021, which led to stunningly high spot prices for both natural gas and electricity in those areas. On February 17, for example, when the New England natural gas spot price was about $12 and the New York City price about $15/MMBtu, the Midwest price was $23 and the Houston price was $350. In Texas especially, severe weather crippled energy and electric generation facilities and resulted in rolling blackouts over several days with widespread impacts, including fatalities.

In the winter months, natural gas utility customers in the Northeast 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.



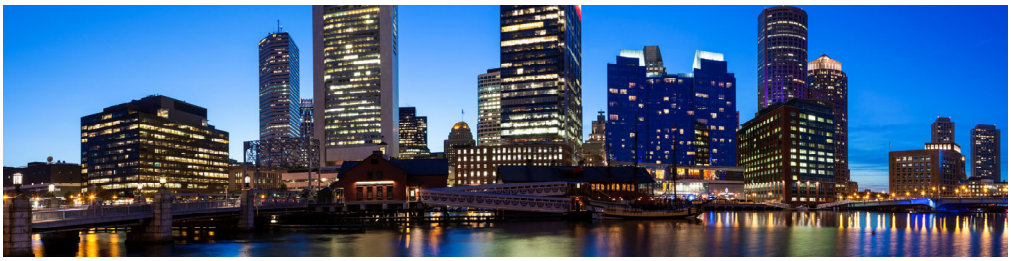
Natural gas continues to be key to meeting power demand in the region. The photo above shows the peak hour on the ISO-NE system on June 29, 2021; natural gas at that time represented 70% of the regional power generation mix.

Gas & Electric Power Generation

The regional power generation fleet, highly reliant on natural gas, is positioned to remain so for several more years, as the regional power grids transition to a cleaner energy profile.

Combined-cycle technology (CCT) made the natural gas power plant the energy system of choice over 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. In recent year, natural gas power plants have continued to be added in the region, as numerous oil, coal and nuclear plants retired.

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 new combined cycle plant 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), came online in New York. It entered service in the same timeframe that one of the last units of the Indian Point nuclear plant closed; Indian



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

Photo: Cricket Valley Energy Center

Point's last nuclear unit closed in April 2021.

Natural gas units continue to provide important baseload and fast-start capability, and remain pivotal to grid reliability.

In its "2020 Regional Transmission Expansion Plan," released in early 2021, PJM noted that its "interconnection process is showing trends of increasing renewable generation." At the same time, one of the other key trends in its "changing capacity mix" is "new generating plants powered by Marcellus and Utica shale natural gas."

The New York Independent System Operator (NYISO) noted in its May 2021 report "*Power Trends 2021*" that the portion of New York's installed capacity from natural gas and dual-fuel facilities rose from 47% in 2000 to 64% in 2021. As the ISO noted in 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 Northeast region are prioritizing non-fossil fuel units for new generation and encouraging electric utilities to contract for offshore wind and imports of Canadian hydro. Solar continues to make inroads behind-the-meter as its technology costs decline.

The central role of natural gas in the region nevertheless was underscored in the FERC's summer energy market assessment released in May 2021: "Natural gas fired generation is expected to continue to play a pivotal role in the summer of 2021 at an average market share of 48% across organized wholesale electric markets, making it the largest source of electric capacity…NYISO and ISO-NE are the most natural gas dependent regions with over 55% of their electricity being generated by natural gas-fired power plants this summer."

Natural gas offers baseload service with a generally lower air emissions profile and relatively stable prices. As the power grid shifts to greater reliance on new clean energy sources, natural gas can support system reliability, given the intermittent characteristics of the anticipated new resources.

The states in the Northeast continue to assess the role of natural gas going forward, as they seek to implement aggressive carbon reduction goals. In October 2021, the NYS Department of Environmental Conservation rejected two proposed natural gas power facilities, one in Queens, one upstate, declaring that the projects "would be inconsistent with the statewide greenhouse gas emissions limits established in the Climate Leadership and Community Protection Act (CLCPA)."

In June 2021 the NY ISO highlighted some of the market challenges: "As the

state reviews a potential moratorium on any new or repowered gas generation, we have to ask the question of how to maintain reliability during the iterative, multi-step process to a carbon-free grid as contemplated by the CAC [Climate Action Council]. At the NYISO, we've performed studies to examine how a zero-emissions grid will perform, modeling a number of scenarios in which renewable resources (such as solar and wind) and non-emitting resources (such as energy storage) exclusively supply the grid. We've presented some of these studies to the CAC in order to help plan for the 2040 grid of the future. These studies show that fossil fuel-powered resources will continue to be needed on the road to 2040 to offset this intermittency until new, cleaner technologies can provide the responsiveness now fulfilled primarily by natural gas generation. Limiting options at the start of the transition could actually stifle progress toward our climate goals and produce higher emissions along the way."

States' Regulatory Review of "The Future" of Natural Gas

Natural gas demand in the region continues to increase due to its advantageous price, reliability, and efficiency. About 12.5 million customers heat their homes with natural gas in the Northeast region. U.S. Census data for 2020 indicated that the natural gas furnace remains the predominant heating choice for new home construction in the Northeast. Natural gas now heats 55% of the homes in the region.

However, greater demand and new customer additions are beginning to run up against system delivery constraints in some areas, as new infrastructure development is itself constrained. As the states define their greenhouse gas (GHG) emissions reduction plans, they are also reassessing the role of natural gas in power generation, as noted above, and in the building sector.

This year, both Massachusetts and Rhode Island enacted new GHG legislation with more aggressive timeframes for achieving reductions economy-wide. Other states in the region have likewise embraced comprehensive legislation and regulatory reviews.

This section briefly reviews the processes underway in two Northeastern states - New York and Massachusetts - both of which explicitly focus on reducing and/or transforming the role of natural gas.

New York's climate legislation, the CLCPA, which was enacted in 2019, mandates that GHG emissions be reduced to 40% of 1990 levels by 2030 and to 85% by 2050. The power grid is planning to run on 70% renewables by 2030 and be net-zero

A natural gas distribution line being upgraded and about to be installed, outside Boston, in spring 2021.

by 2040. New York's Climate Action Council (CAC) is holding panel and committee meetings to develop recommendations on how to transform the power, building and transportation sectors. Public hearings are planned for 2022 and the final scoping plan on how to achieve the required reductions is expected in 2023.

Concurrently, the New York State Public Service Commission (PSC) is proceeding with its own review of the planning procedures used by New York's natural gas local distribution companies (LDCs) and how they align with the CLCPA. In March 2021 the PSC issued its "first-ever gas planning process proposal to combat climate change" (20-G-0131). It envisions a different planning model for gas utilities going forward, as illustrated by these quotes from the PSC's press release:

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

"Importantly, this improved planning process should help guide utilities into New York State's low carbon future by maximizing the use of energy efficiency, new technologies (such as electric heat pumps) and demand response programs, and limiting unnecessary infrastructure investment and the potential for stranded costs that might result."

"As part of this planning process, each utility must propose a 'no-infrastructure option', in addition to any other options that address identified needs in the filing. This option should include a mix of utility-sponsored demand reduction measures that will close any gap between the projected load and available supply. This option should also include one or more contingency solutions, such as compressed natural gas or peaking services, which can be called upon if necessary."

In August 2021 the PSC issued an order in a gas utility rate case that also highlights a new emphasis on reducing natural gas usage in the state (quotes from the PSC's press release):

> "The Commission ruled that CLCPA requirements apply to this rate case and all future rate cases. Based on the CLCPA requirements, the Commission today directed the utility to discontinue natural gas marketing efforts and promotional programs, and provide educational information to customers about alternative heating options and the emission reduction requirements of the CLCPA. The goal is to have the utility sell less gas in the future, a clear-cut indication of what will happen at other gas utilities in New York State as CLCPA requirements take effect."

"NGA Year in Review 2021"

> "Through approval of the joint proposal, the Commission is requiring the companies to prioritize energy efficiency and demand response as part of an effort to avoid construction of capital projects that may increase greenhouse gas emissions, with the overall goal of reducing demand for natural gas."

In Massachusetts, there are also regulatory and legislative/administrative reassessments underway.

In October 2020, the Department of Public Utilities (DPU) announced its own investigation into the future role of natural gas, stating it "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." As part of this effort, LDCs will prepare a report and solicit stakeholder feedback as a means to safeguard customer interests and secure safe, reliable, and affordable energy solutions long into the future. That stakeholder process is underway and the initial report is due in March 2022.

The Northeast states have added over 1.5 million new natural gas customers since 2010.

The Commonwealth's 2030 Energy and Climate plan, released by the Energy & Environmental Affairs (EEA) Secretariat in late 2020, envisions adding 750,000 electric vehicles by 2030 and retrofitting one million existing homes with clean heat technology. The 2030 Plan states that "the number of buildings using natural gas, fuel oil, and propane for space and water heating must begin to steadily and permanently decline, and the deployment of heat pumps and building envelope improvements retrofits must become widespread."

The MA Department of Energy Resources (DOER) is meanwhile coordinating the development of a new "Stretch Energy Code" as called for in the state's 2021 climate legislation, to include a "definition of net-zero buildings and to set [a] performance standard." The new code is anticipated to be announced in mid- to late-2022.

Making the Case for Natural Gas in the Energy Transition

What is the role of natural gas in this era of energy transition? This section highlights some different perspectives on natural gas's future.

Several studies released by the ACEEE in recent years have identified value in converting homes heated with heating oil and propane to electricity, but found less benefit in converting those heated with natural gas, especially in colder climates. In a September 2018 blog post, ACEEE observed that: "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, the ACEEE observed that: "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 an April 2021 article in Scientific American entitled "Can Natural Gas Be Part of a Low-Carbon Future," Michael Webber reviews some of the possible technological pathways to help decarbonize the existing gas network. He concludes: "Reining in climate change requires many solutions. Declaring who cannot be part of those, such as natural gas companies, only raises resistance to progress. Because decarbonized gas can complement renewable electricity and because it might be a faster, cheaper and more effective path for parts of society that are difficult to electrify, we should not discard gas as an option. We have a massive gas infrastructure, and we have to figure out what to do with it. Scrapping it would be slow, expensive and incredibly difficult, but we could instead put it to work to help create a low-carbon future."

Also in April 2021, The Columbia Center on Global Energy Policy released a new report entitled: "Investing in the U.S. Natural Gas Pipeline System to Support Net-Zero Targets," written by Erin M. Blanton, Melissa C. Lott, and Kirsten Nicole Smith. This paper, part of the work by Columbia University's Center on Global Energy Policy on natural gas and the energy transition, examines projections of continued natural gas use and the zero-carbon fuels that are poised to become a bigger part of the energy mix. The authors note: "…while it may seem counterintuitive, investing more in the domestic natural gas pipeline network could help the US reach net-zero emission goals more quickly and cheaply. Fortifying and upgrading the system could prepare the existing infrastructure to transport zero-carbon fuels as they become available and, in the meantime, reduce harmful methane leaks from natural gas."

An op-ed by Ken Costello (former economist with the National Regulatory Research Institute (NRRI)), which was published by the *San Francisco Chronicle* after that city's Board voted to ban natural gas in new buildings, summed up the case for natural gas as follows:

"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."

Natural Gas Utilities & Decarbonization Pathways

The natural gas industry is committed to being part of the solution to achieving a clean, reliable, affordable energy system. The Northeast region's natural gas utilities are actively working to reduce the carbon content of their systems – through increased efficiency, the incorporation of renewable natural gas (RNG) and hydrogen, and the replacement of older pipe components, such as cast-iron and bare steel. This section highlights several current areas of activity.

Energy Efficiency

Energy efficiency has been a key part of the utilities' energy and environmental planning for decades, and has been a national success story. The Northeast states remain leaders in both electric and natural gas efficiency programs, and they believe that the continued emphasis on efficiency is critical to future progress. The most recent annual state efficiency study by ACEEE, released in December 2020, observes that the nine Northeast states collectively invested 42% of all investments nationwide in natural gas efficiency programs. The commitment to these types of deep and sustaining efficiency investments helps consumers save on their energy bills while also maximizing the use of the existing natural gas distribution system. "Efficiency first" is a sensible concept and practice.

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 that: "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."

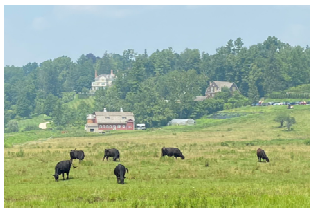
In February 2020, the National Association of Regulatory Utility Commissioners (NARUC) published an informational handbook summarizing natural gas distribution infrastructure replace-

ment programs in 41 states and the District of Columbia. The handbook cited substantial progress in replacing aging bare steel and cast-iron main miles and service counts across the U.S. in recent years, while noting: "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."

PHMSA continues to urge action on repairing older, potentially more leak-prone systems. The gas utilities in the Northeast are committed to modernizing the region's distribution systems.

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 is projected to 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. An interesting project that was commercialized this summer occurred in Vermont, with the start of gas production at "the largest anaerobic digester in the Northeast," located at the Goodrich dairy farm in Salisbury, Vermont. The digester, built, owned, and operated by Vanguard Renewables (of Wellesley, MA), can recycle daily more than 180 tons of unavoidable food and beverage waste from manufacturers, retailers, and distributors, and 100 tons of dairy manure into renewable natural gas (RNG). The Goodrichs' 900 cows provide the manure and Vermont businesses - including Ben and Jerry's and Cabot/Agri-mark - supply the food waste. Middlebury College will buy the majority of the RNG generated by the digester as part of its Energy2028 project, which calls for the College's use of 100 percent renewable energy by 2028. VGS, the gas utility, installed the infrastructure to transport the RNG and make it available to Middlebury College as well as other customers who want to lower their carbon footprint.

Governor Phil Scott at the commissioning ceremony stated: "Think about it – we've got a Vermont farm, a Vermont utility, a Vermont college, and national energy innovators all coming together to build a model for our region. And it can be replicated in other parts of the state, and country, as well. This is truly transformative work that Vermonters can be proud of."

RNG is also seen as a potential source for natural gas in the transportation sector. According to the U.S. Department of Energy, "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."

Hydrogen's Potential

Hydrogen is seen as a potentially significant source in a low-carbon energy future. 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_2) 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."

Image: U.S. Dept. of Energy

Hydrogen is currently used in the transportation sector as a vehicle fuel as well, notably in California, but on a very limited basis.

In a June 2021 "Market Snapshot" paper on hydrogen, the Canada Energy Regulator summarized the hydrogen opportunity this way:

> "Hydrogen has the potential to play a key role in the transition to a low-carbon economy and net-zero emissions. It may provide a way to leverage some existing energy and infrastructure, including fossil fuel resources and natural gas pipelines. Yet, work is still needed for hydrogen to be deployed at mass scale, including to increase cost-competitiveness with other fuels. Globally, efforts are focused on developing and harmonizing regulations, standards, and codes and addressing hydrogen storage and transportation challenges."

Research work continues. GTI's Hydrogen Technology Center is evaluating effects of a hydrogen-natural gas blend on non-metallic material properties and operational safety, as well as determining operational impacts of a hydrogen blend in pipelines, such as leak detection. GTI is also working with the Electric Power Research Institute (EPRI) on a joint "Low-Carbon Resources Initiative (LCRI)", a five-year R&D commitment focused on the advancement of low-carbon technologies for large-scale deployment across the energy economy. The joint initiative began in 2020.

NGA's NYSEARCH is also conducting timely research into low carbon fuels and pipeline integrity – see below.

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Environmental Considerations

Environmental issues are central to regional decision-making with respect to energy system usage and infrastructure expansion. This section reviews the natural gas industry's past progress and actions to support the transition to a lower-carbon future.

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.

The rise in natural gas use in power generation has contributed to lower air emissions, from sulfur dioxide to carbon dioxide. In June 2021, U.S. EIA noted that CO_2 emissions from the U.S. electric power sector fell by 32% from 2005 to 2019. EIA observed: "Although both the increased use of renewables and the shift from coal-fired to natural gas-fired generation contributed to reductions in electric power sector CO_2 emissions, the shift from coal to natural gas had a larger effect." EIA estimates that almost 65% of the decline in CO_2 power sector emissions nationally over this time period is attributable to the shift from coal-fired to natural gas-fired electricity generation.

At the regional level, air emission trends remain favorable. NY ISO reported in 2021 that emissions rates from its power sector dropped by 52% for CO_2, 93% for NO_x, and 99% for SO_2 over the last two decades. ISO-NE reported that total emissions from power plants in New England declined by 99% for SO_2, 78% for NO_x, and 42% for CO_2 since 2001. The ISO has 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-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."

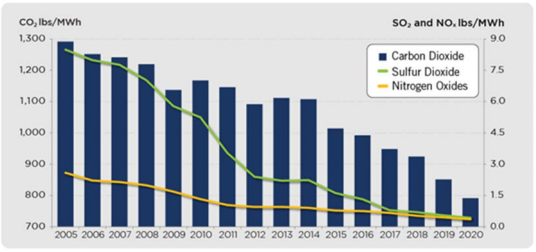


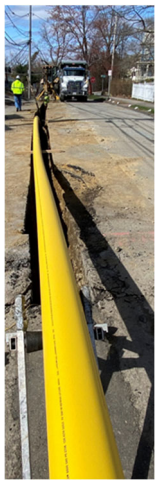
Chart: PJM, 2021

PJM reports that between 2005 and 2020, CO_2 emission rates fell 39% across its footprint, while nitrogen oxides dropped by 86% and sulfur dioxide by 95% (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 2019, Natural Gas STAR partners reported methane emissions reduction of 46.1 Bcf in the U.S., which provided "cross-cutting benefits" according to EPA.



Natural gas systems in total account for about a quarter (24%) of all U.S. methane emissions. Since 1990, methane emissions from the U.S. natural gas system have declined by 15.7%, according to the EPA's April 2021 national GHG inventory report. The report, reflecting data through 2019, noted that: "The decrease in CH_4 emissions is largely due to decreases in emissions from distribution, transmission, and storage ...Distribution system emissions, which accounted for 9 percent of CH_4 emissions from natural gas systems and less than 1 percent of CO_2 emissions, result 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_4 and CO_2 emissions from this stage, as have station upgrades at metering and regulating (M&R) stations. Distribution system CH_4 emissions in 2019 were 69 percent lower than 1990 levels...Distribution system CO_2 emissions in 2019 were 69 percent lower than 1990 levels."

In the distribution sector, as noted above, the main emphasis is on accelerating the replacement of older, potentially more "leak-prone" pipe, and progress in that regard continues.

Addressing methane emissions more broadly has been a key focus of the U.S. government this year. In June, the U.S. Congress approved legislation to restore limits on methane emissions from new oil and gas wells. Also in June, PHMSA issued an advisory bulletin reminding pipeline operators to update their inspection and maintenance plans to address the elimination of hazardous leaks, and to minimize natural gas releases from pipeline facilities. PHMSA stated: "The updated plans must also address the replacement or remediation at facilities that historically have been known to experience leaks. This action is only one piece of PHMSA's ongoing efforts to minimize methane emissions."

In November, the Biden Administration announced its "Methane Emissions Reduction Action Plan" to identify and cost-effectively reduce methane emissions from all major sources. As part of this effort, EPA is proposing new regulations that will significantly broaden and strengthen methane emissions reduction for new oil and gas facilities. In addition, for the first time ever, it will require that states develop plans that will reduce methane emissions from existing sources nationwide - including from an estimated 300,000 oil and gas well sites. The Administration stated: "Overall, the proposed requirements would reduce emissions from covered sources, equipment, and operations by approximately 75%."

Also in November the COP26 climate change summit in Glasgow highlighted efforts led by the U.S. and others to implement a coordinated multi-nation effort

to reduce global methane emissions substantially over the next decade – in energy systems, agriculture, and land management. About 100 nations agreed to "the Global Methane Pledge" to reduce methane emissions 30% by 2030. Meaningful methane reduction is seen as an achievable goal given available technology.

Shale gas development

Development of shale gas in the U.S. continues to merit analysis and technological improvements.

Reducing the use of flaring of gas at the production stage (principally during the drilling process for oil, where "associated gas" is flared) is a primary focus and a commonly-agreed, long-overdue step.

The Pennsylvania DEP's "2017 Oil and Gas Annual Report" released in August 2018 noted that: "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."

In its "2020 Annual Report," released in June 2021, the PA DEP noted: "Hydraulic fracturing fluid is comprised mostly of water with a small amount of chemicals to help lubricate and to prevent mold and scale from building up in the well bore. Fluids that return to the surface after the hydraulic fracturing process are generally called produced fluids. In 2020, about 86 percent of all produced fluids was recycled and/or reused in the production/hydraulic fracturing of other natural gas wells. If produced fluids are unable to be reused to hydraulically fracture other wells, they are typically disposed of in Class II Underground Injection Control disposal wells. In 2020, about 14 percent of produced fluids were disposed of in Class II UIC disposal wells."

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.

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.

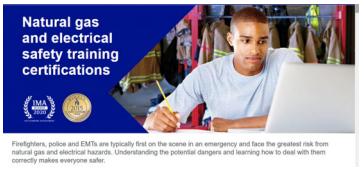


Image: National Grid

Both industry and government regulators prioritize worker and contractor training, including addressing the prevalence of "third party damage"; 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; and works with member utilities each year on a coordinated safety awareness advertising campaign through both traditional media (TV, cable, radio) and digital media platforms (e.g., Google).

After the 2018 Merrimack Valley incident north of Boston which had widespread impact in three communities, Governor Charlie Baker directed the state's gas utilities to implement 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 a multi-year initiative of Massachusetts and member utilities from other states in the region and in the U.S. to implement PSMS. The collaborative approach is one of the largest coordinated PSMS implementation programs underway in the country. A central part of the work is helping members collaborate and participate in a true learning environment, through sharing leading practices gathered from and used by a broad cross section of operators, both large and small.

This year NGA created an online Resource Center for PSMS (https://www.ngapsms.com/).

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 (in 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. Its current portfolio is addressing such topics as leak detection, pipe location, improved installation, maintenance and repairs, and real-time sensing for distribution.

NYSEARCH is also conducting an evaluation and test program for methane emissions technology, and evaluating residential methane detector technology.

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

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

The Year Ahead

NGA will continue to post updates throughout the year at:

www.northeastgas.org

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

Large Magellanic Cloud, a satellite galaxy of the Milky Way, located 163,000 light-years away. Photo released in April 2020 by NASA. Credits: NASA, ESA and STScI

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 (2020)	HOUSE-HOLDS (2019)	LABOR FORCE (Aug. 2021) [thousands]	GDP (2021, 1st qtr) [$ billions]	GDP as % OF U.S. TOTAL (2020)	PER CAPITA PERSONAL INCOME (2020)
Connecticut	3,557,006	1,377,166	1,810	287	1.3	**$78,609**
Maine	1,350,141	573,618	678	72	0.3	**$54,211**
Massachusetts	6,893,574	2,650,680	3,709	607	2.8	**$78,458**
New Hampshire	1,366,275	541,396	751	91	0.4	**$67,097**
New Jersey	8,882,371	3,286,264	4,431	652	3.0	**$73,460**
New York	19,336,766	7,446,812	9,340	1,814	8.2	**$74,472**
Pennsylvania	12,783,254	5,119,249	6,295	809	3.7	**$61,700**
Rhode Island	1,057,125	407,174	535	62	0.3	**$60,825**
Vermont	623,347	262,767	317	35	0.2	**$59,187**
U.S.	**331,449,281**	**122,802,852**	**161,788**	**22,038**	**100**	$59,729

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

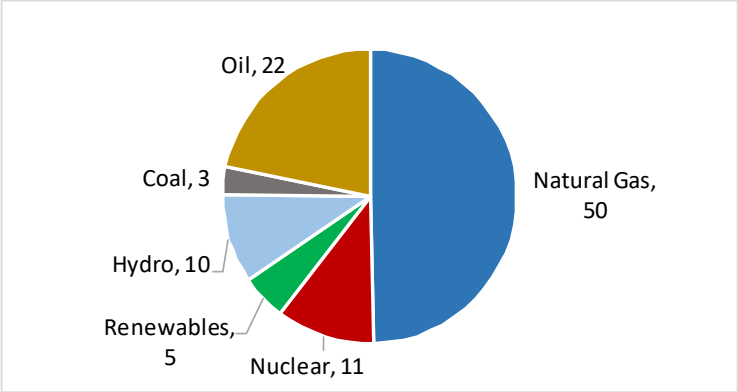
	Natural Gas	Oil	Nuclear	Renewables	Coal	Electric Flows
CT	**39**	**42**	**24**	**7**	**<1**	**- 12**
ME	**12**	**43**	**-**	**40**	**-**	**3**
MA	**30**	**39**	**2**	**7**	**-**	**22**
NH	**17**	**48**	**36**	**19**	**1**	**- 21**
NJ	**38**	**40**	**13**	**4**	**<1**	**4**
NY	**35**	**36**	**12**	**13**	**<1**	**2**
PA	**37**	**25**	**19**	**5**	**13**	
RI	**51**	**41**	**-**	**6**	**-**	**2**
VT	**11**	**57**	**0**	**32**	**-**	**- 34**
US	***31***	***37***	***9***	***11***	***11***	

*Sources: U.S. Energy Information Administration (EIA), "State Energy Data Report 2019," released 2021. Electric flows shown for states where numbers make material difference. * Vermont imports substantial amount as well.*

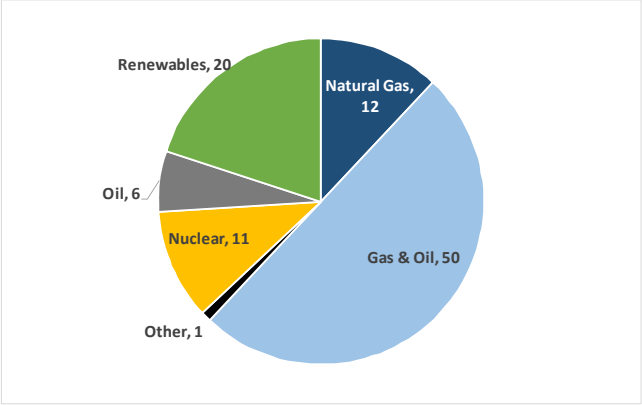
ELECTRIC GENERATION FUEL SOURCE

(% of total)

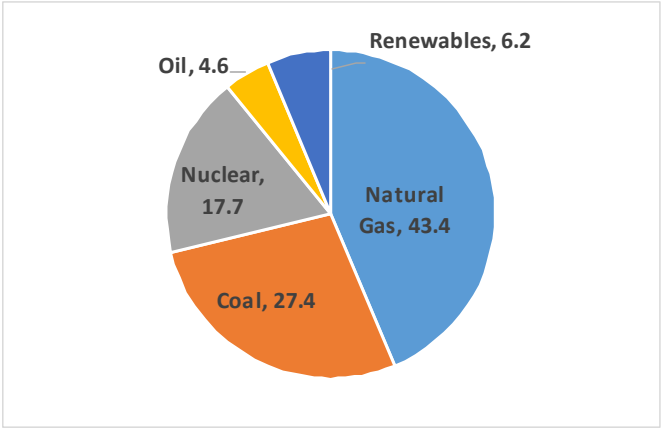
NEW ENGLAND



NEW YORK



PJM



Sources:
ISO New England, 2021 "Regional Electricity Outlook," March 2021;
NY ISO, 2021 "Load & Capacity Data Report," April 2021;
PJM, "2020 Regional Transmission Expansion Plan," released Feb. 2021.

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 2019," released 2021. 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 2019.

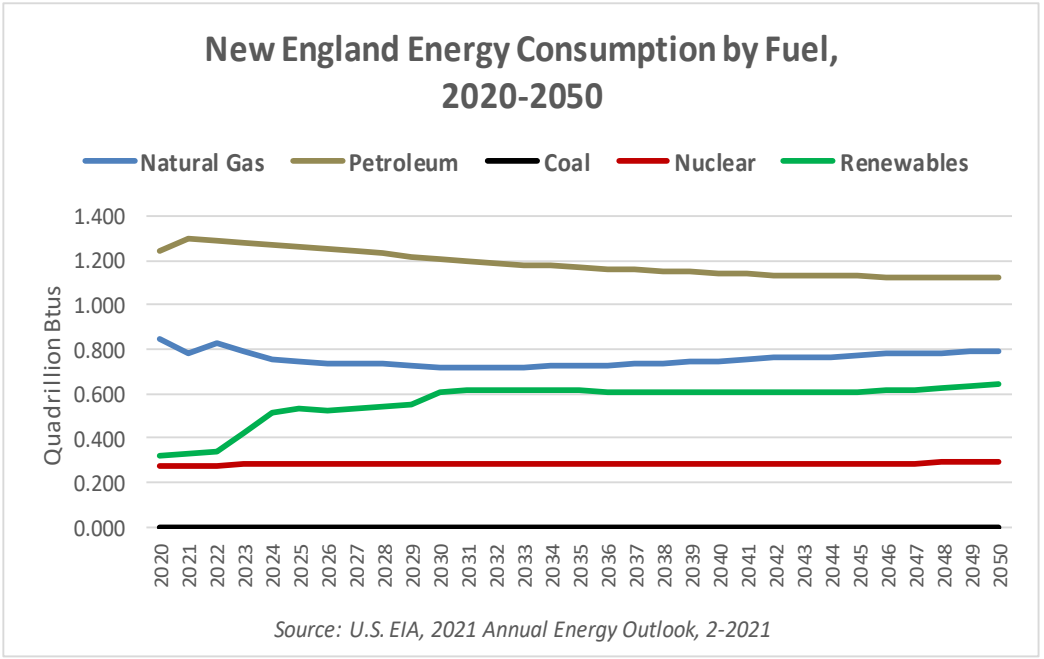
	Per Capita, 2019, Consumption		***Natural Gas***		***Petroleum***		***Coal***		***Renewable Energy***	
	MMBtu	**Rank**	**TBtu**	**Rank**	**TBtu**	**Rank**	**TBtu**	**Rank**	**TBtu**	**Rank**
CT	206	*47*	293.1	*36*	305.7	*34*	0.9	*47*	48.9	*45*
ME	285	*30*	46.3	*48*	166.5	*44*	2.2	*46*	154.6	*29*
MA	213	*45*	441.4	*22*	577.1	*21*	0.1	*48*	99.5	*37*
NH	235	*41*	55.3	*47*	152.6	*46*	4.2	*43*	62.4	*41*
NJ	236	*40*	789.3	*12*	848.6	*12*	13.8	*41*	85.0	*38*
NY	198	*49*	1,333.0	*6*	1,401.4	*5*	13.6	*42*	497.9	*5*
PA	298	*27*	1,671.3	*4*	1,141.1	*7*	568.8	*8*	234.3	*16*
RI	180	*51*	97.6	*43*	77.5	*49*	-	*50*	11.8	*49*
VT	219	*43*	14.4	*50*	77.4	*50*	-	*51*	43.8	*46*
Northeast			***4,741.7***		***4,747.9***		***603.6***		***1,238.2***	
U.S.	305		***32,169.8***		***36,885.1***		***11,314.8***		***11,332.5***	

PROJECTED ENERGY CONSUMPTION GROWTH, NEW ENGLAND

U.S. EIA projects natural gas to grow at an annual rate of -0.2% 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, 2.4%
Coal, 0.2%
Nuclear, 0.2%
Oil, -0.3%.



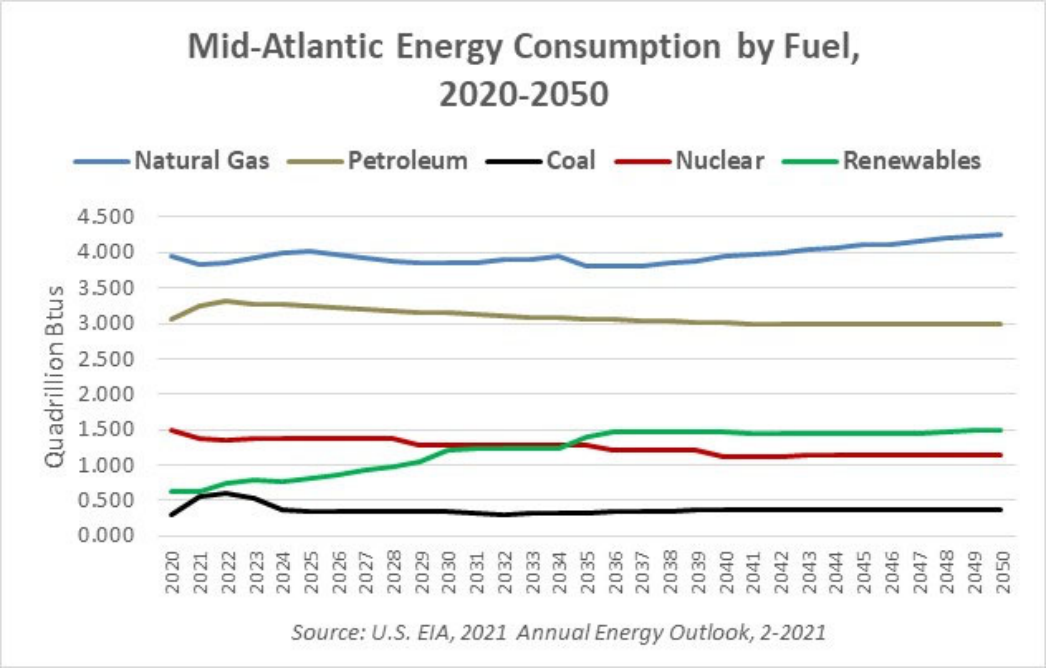
Source: U.S. Energy Information Administration, "2021 Annual Energy Outlook"

PROJECTED ENERGY CONSUMPTION GROWTH, MID-ATLANTIC

U.S. EIA projects natural gas to grow at an annual rate of 0.3% in the Mid-Atlantic region through 2050.

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

Renewables, 3.0%
Coal, 0.8%
Nuclear, -0.9%
Oil, -0.1%.



Source: U.S. Energy Information Administration, "2021 Annual Energy Outlook"

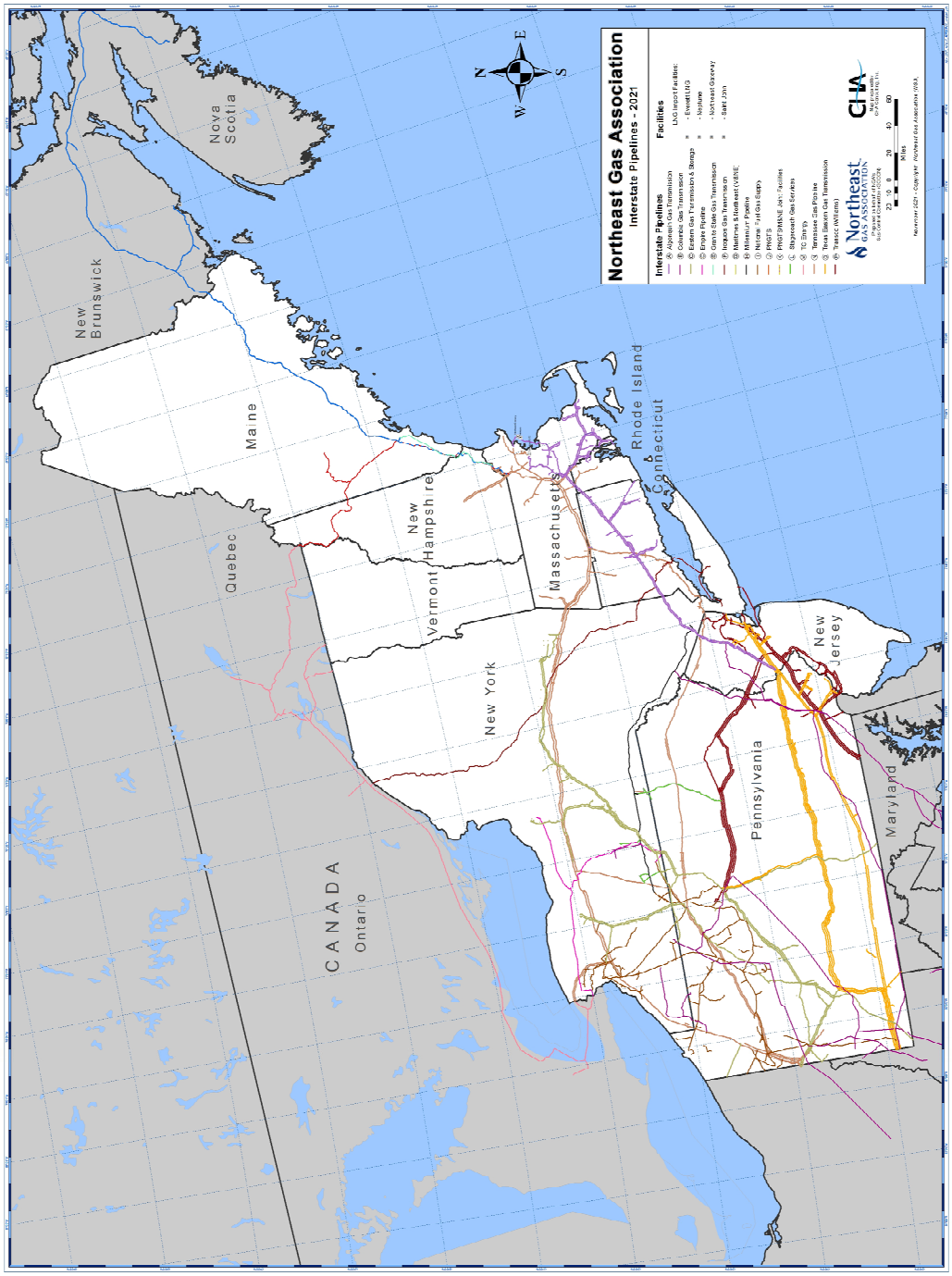
III.

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.*


Northeast Gas Association
Interstate Pipelines - 2021
Interstate Pipelines
Facilities
Nova Scotia
New Brunswick
Maine
Quebec
CANADA
Ontario
New Hampshire
Vermont
Massachusetts
Rhode Island
Connecticut
New York
Pennsylvania
New Jersey
Maryland
N
E
S
W
Miles

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 Charleston, WV. 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.

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 5,500 miles of pipeline, with 420 Bcf of working gas capacity in storage. 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 buoysystem 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 600 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 jointly owned by a partnership of 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, Eastern Gas Transmission, Tennessee Gas 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 Dracut, MA and to Maine/Atlantic Canada markets at Westbrook, ME. On the U.S. side, it involves approximately 188 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 approximately 381,000 Dth/d. It interconnects with the Maritimes & Northeast Pipeline at Westbrook, ME; from there, the Joint Facilities line extends to Dracut, MA.

Saint John LNG (formerly Canaport LNG) is located in Saint John, New Brunswick, Canada; it is owned and operated by Repsol. 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 450 Bcf to the market. It was originally developed by Repsol and Irving Oil; in November 2021, Repsol acquired 100% of the assets and the facility was renamed from Canaport to Saint John LNG.

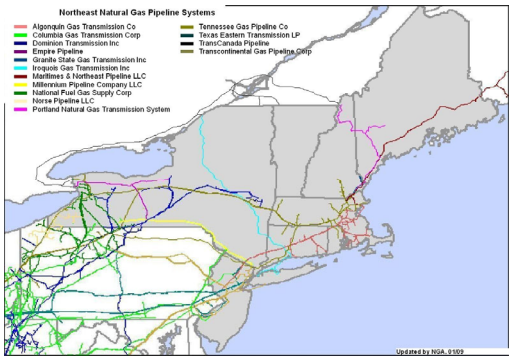
Stagecoach Gas Services is a business unit of Kinder Morgan (KMI). The Stagecoach assets include 4 natural gas storage facilities with a total FERC-certificated working gas capacity of 41 billion cubic feet and a network of FERC-regulated natural gas transportation pipelines with multiple interconnects to major interstate natural gas pipelines, including Tennessee Gas Pipeline (TGP), a KMI subsidiary.

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.

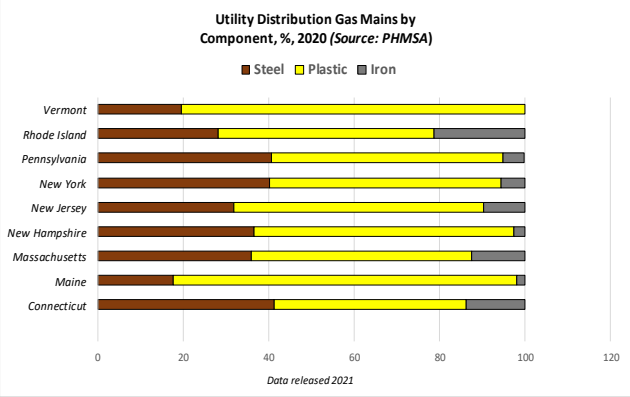
Transcontinental (Transco) is a subsidiary of Williams Company. The Transco pipeline comprises a 10,000-mile pipeline system, extending from South Texas to New York City. The system design capacity is approx. 18 billion cubic feet per day. In the Northeast, it provides gas service to New York City, New 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 continues to invest in upgrades to its transmission and distribution systems.

The chart below shows percentage of pipeline mains by material by state as of 2020. 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 59% of all U.S. miles of main and 75% of services.



STATE / U.S.	DISTRIBUTION MAIN MILES	TRANSMISSION MILES
Connecticut	8,355	598
Maine	1,382	502
Massachusetts	21,798	1,130
New Hampshire	2,036	251
New Jersey	35,608	1,568
New York	49,533	4,593
Pennsylvania	48,588	10,488
Rhode Island	3,204	95
Vermont	877	119
U.S. total	1,328,372	301,909

Source: PHMSA, U.S. Department of Transportation, 2020 data. Numbers rounded off.

NORTHEAST PIPELINE PROJECTS IN PROCESS

Some infrastructure projects were placed into service in the region in 2021, 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 2022 and beyond, and are summarized below. This list changes with market conditions—please visit NGA's web site during the year for updated listings.

PROJECT	COMPANY	DESCRIPTION	EST. IN-SERVICE	STATUS
Adelphia Gateway Project	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.	Late 2021 for a number of related facilities	Filed with FERC, 1-18. Approved by FERC, 12-19. Construction began Oct. 2020.
East 300 Upgrade	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. 2021; project details may change.

NORTHEAST PIPELINE PROJECTS IN PROCESS (cont'd)

PROJECT	COMPANY	DESCRIPTION	EST. IN-SERVICE	STATUS
ExC Project (Enhancement by Compression)	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.
Regional Energy Access	Transco / Williams	The preliminary design consists of additional compression and selected new loop segments along the existing Transco corridor. The project will help ease supply constraints affecting customers in PA, NJ and MD. Designed to increase natural gas transportation capacity by up to 829,000 dekatherms per day. Planned to be in service for the winter of 2023/24.	2023	Filed with FERC, Jan. 2020.
Northern Access	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.	2023	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.

This table is based on publicly-available information as of Nov. 2021; project details may change.

SUBSTANTIAL GAS RESOURCE BASE IN THE U.S.

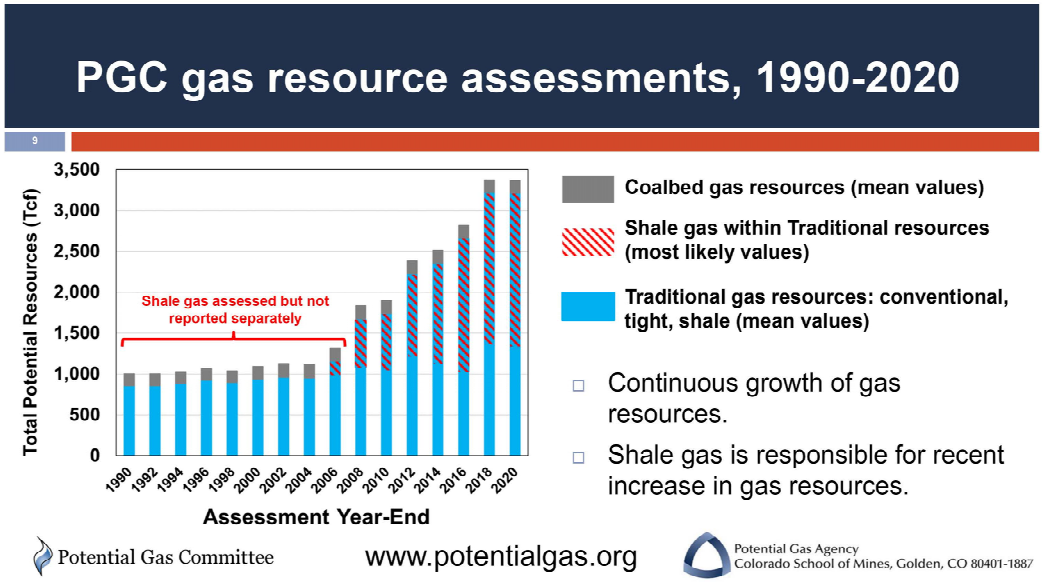
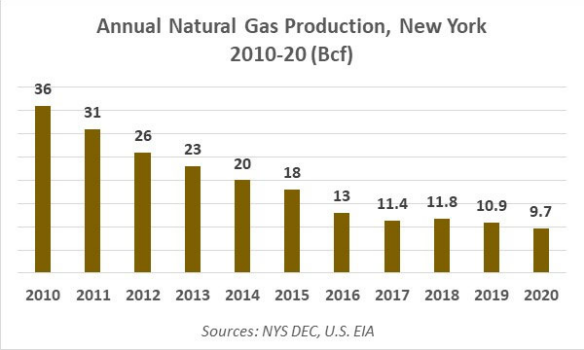


Chart: Potential Gas Committee, October 2021

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 2020 assessment, released in October 2021, and illustrated in the PGC chart above, shows a slight decrease in the total estimated resource base compared to two years ago, but the extent of the base remains significant. According to this latest assessment, the U.S. possesses a total technically recoverable resource base of 3,368 trillion cubic feet (Tcf). Shale gas, shown in the blue/red stripes in the chart, represent 63% of the country's total potential.

Meanwhile, U.S. production continues to be strong. It set a new record in 2019, at 33.9 trillion cubic feet (total dry production), up from 27 Tcf in 2016. In 2020, the COVID year, production declined slightly, to 33.5 Tcf; production in the Appalachian region actually increased in 2020.

NATURAL GAS PRODUCTION IN NORTHEAST U.S.



Sources: NY State Dept. of Environmental Conservation/ Office of Oil & Gas; U.S. EIA

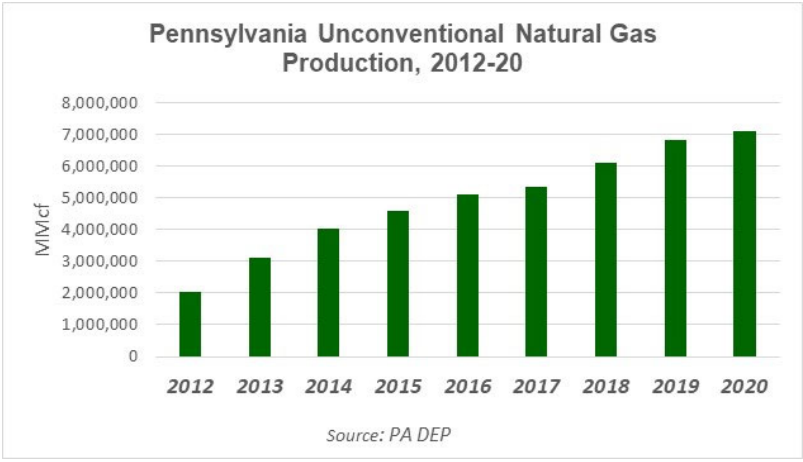
Natural gas production in New York State in 2020 was just under 10 billion cubic feet (Bcf), a slight decline from the prior year.

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 2020 set a new record, at 7.1 trillion cubic feet (Tcf).

Pennsylvania is the second largest producing state in the U.S., behind only Texas. U.S. EIA noted in March 2021 that "The Appalachia region remains the largest natural-gas producing region in the United States. Natural gas production from the Marcellus and Utica/Point Pleasant shales of Ohio, West Virginia, and Pennsylvania continued to grow despite low regional natural gas spot prices. Natural gas production from these three states increased from 32.1 Bcf/d in 2019 to 33.6 Bcf/d in 2020."



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.

Saint John LNG facility, Saint John, NB, Canada. Began operation in 2009.
• Owned and operated by Repsol. Facility formerly known as "Canaport LNG."
• Sendout capability of up to 1.2 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 regional 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 412 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.

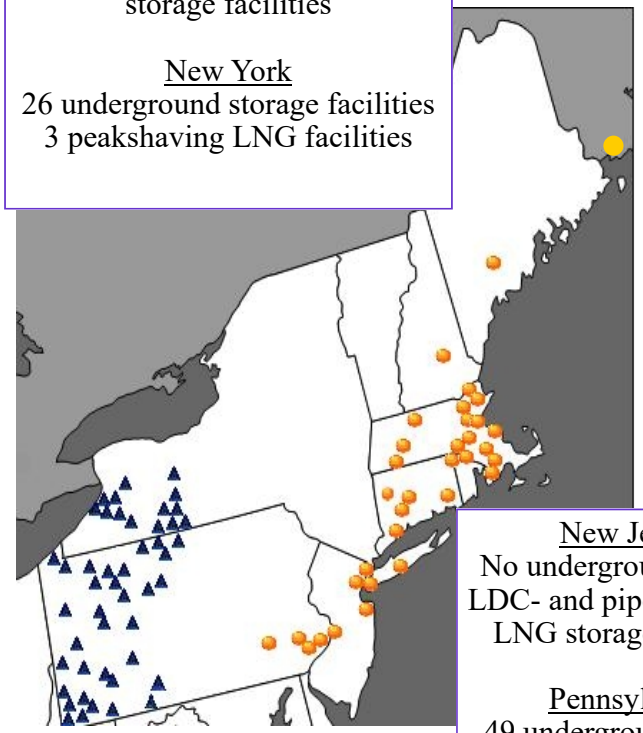
New England and New Jersey do utilize LNG. There are two LNG import facilities currently operating in the greater Boston area. There is also a facility in New Brunswick, Canada, close to the U.S. border in Maine.

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.

New England
No underground storage
2 operating LNG import facilities
28 LDC-owned LNG
storage facilities

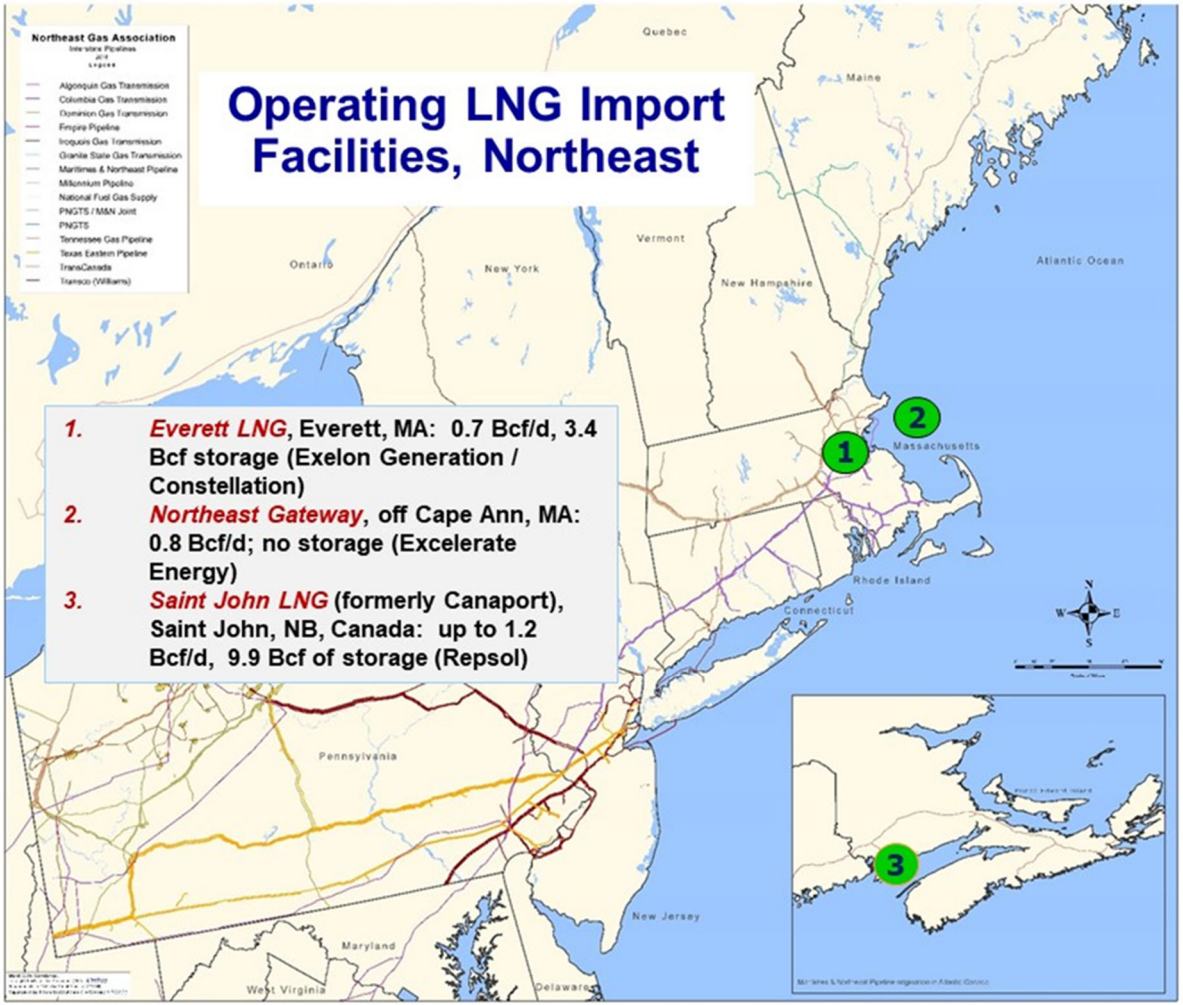
New York
26 underground storage facilities
3 peakshaving LNG facilities



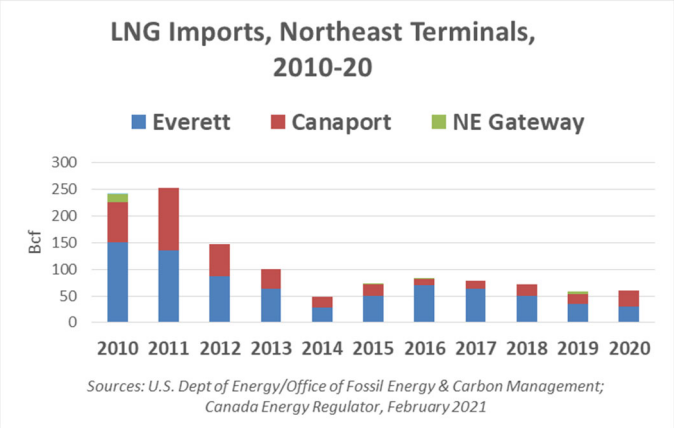
Blue = underground storage, orange = LNG.
Source: U.S. EIA

New Jersey
No underground storage
LDC- and pipeline-owned
LNG storage facilities

Pennsylvania
49 underground storage
facilities
3 LNG storage or
peakshaving facilities


Operating LNG Import Facilities, Northeast
Northeast Gas Association
Quebec
Maine
Vermont
New York
New Hampshire
Ontario
Atlantic Ocean
Massachusetts
Rhode Island
Connecticut
Pennsylvania
New Jersey
Maryland
West Virginia
Delaware
1. Everett LNG, Everett, MA: 0.7 Bcf/d, 3.4 Bcf storage (Exelon Generation / Constellation)
2. Northeast Gateway, off Cape Ann, MA: 0.8 Bcf/d; no storage (Excelerate Energy)
3. Saint John LNG (formerly Canaport), Saint John, NB, Canada: up to 1.2 Bcf/d, 9.9 Bcf of storage (Repsol)

LNG ANNUAL VOLUMES IMPORTED INTO NORTH-EAST TERMINALS



LNG imports in 2020 by the Everett LNG facility totaled 29.4 Bcf, compared to 35.4 Bcf in 2019.

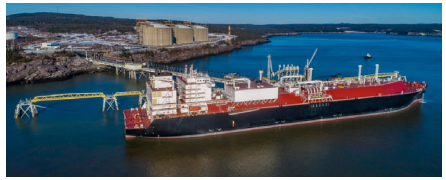
An offshore LNG facility - Northeast Gateway - imported about 5 Bcf in 2019 but did not bring in any cargoes in 2020.

The role of LNG remains critical to regional supply in the constrained Northeast market. LNG is also provided by truck from other points in the region.

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

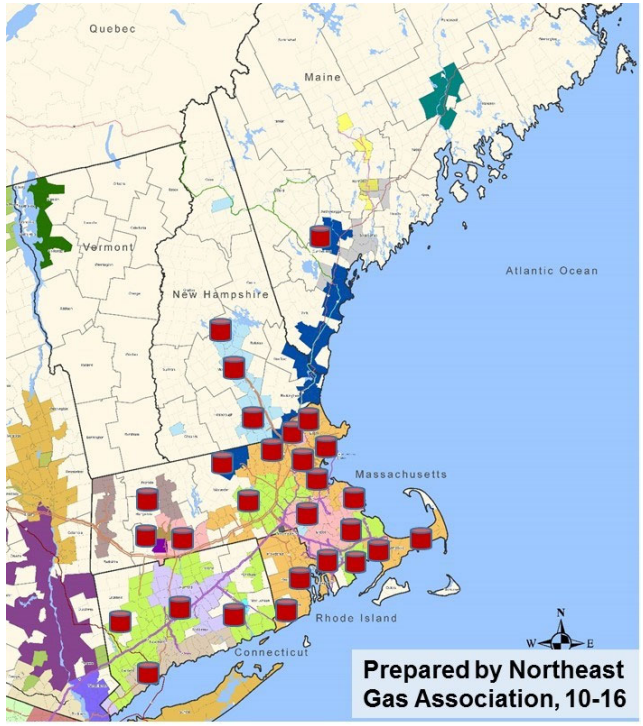
Liquefied natural gas (LNG) is an important component of the region's gas supply, especially for peak winter needs. The Everett LNG facility, a subsidiary of Exelon Generation, owns and operates a land-based facility at Everett, MA. There is also one operating facility located offshore near Gloucester,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

Repsol's Saint John LNG facility (formerly known as Canaport) in New Brunswick, Canada has supplied over 450 Bcf to the market since it began operations in 2009. It made 30.7 Bcf available to the regional market in 2020 (source: Canada Energy Regulator). Its supplies can reach the market in regasified form 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.

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 originally 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 and supply constraints. For example, the utilities in the greater New York City metro area are incorporating these types of facilities as part of a broad portfolio of supply, efficiency and new technology options, to meet existing customer demand and avoid moratoria wherever possible. It reflects in part the difficulty of adding new interstate pipeline capacity given permitting and siting challenges, as well as a new regulatory paradigm being developed in New York. In February 2021, the New York State Public Service Commission announced a revamped gas planning process. The Commission observed: "As part of this planning process, each utility must propose a 'no-infrastructure option', in addition to any other options that address identified needs in the filing… This option should also include one or more contingency solutions, such as compressed natural gas or peaking services, which can be called upon if necessary."

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

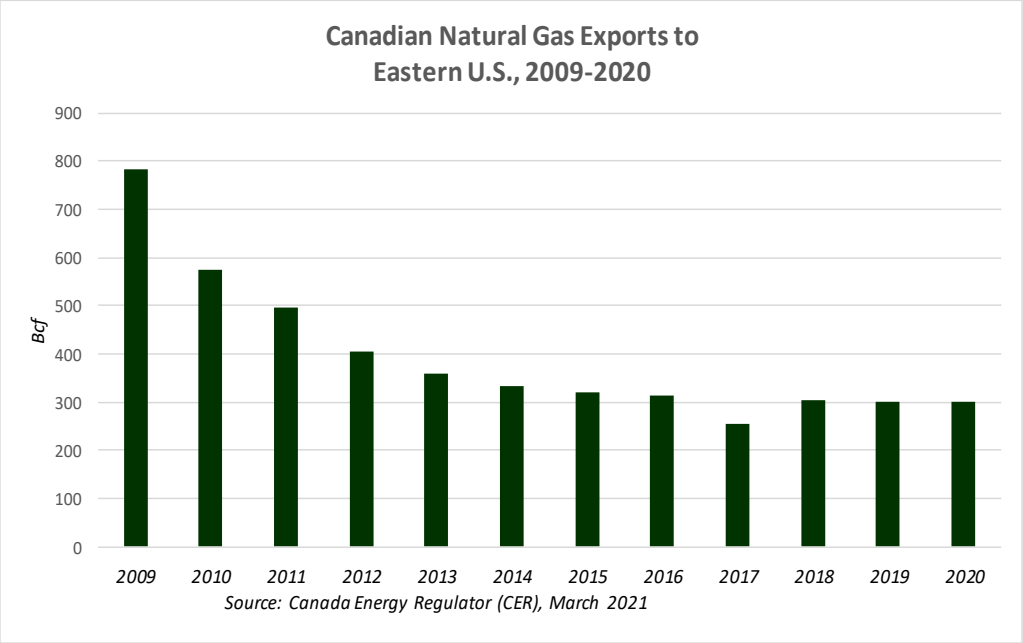
PROPANE / LP AIR: STORAGE CAPACITY AT NEW ENGLAND GAS LDCs

Year	Number of Communities with Facilities	Number of Tanks	Storage Capacity in MMBtu
2003	**36**	**274**	**1,066,778**
2021	**13**	**87**	**312,989**

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 and PSE&G in New Jersey also utilize LPG as part of their supply portfolios, 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 has increased, 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 7% in 2020, while its imports from the U.S. also decreased, by 11%.

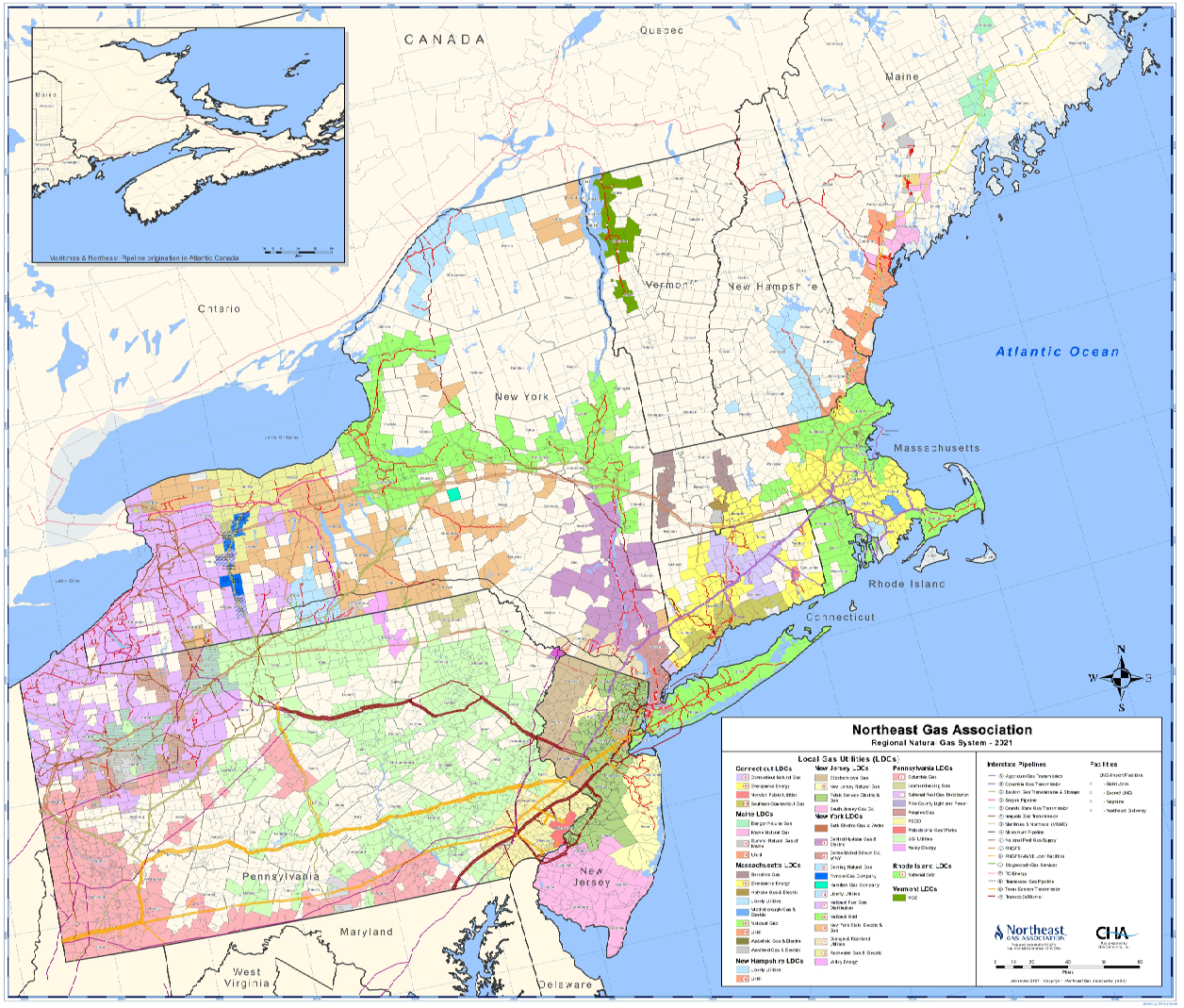
IV.

NATURAL GAS TRENDS IN THE NORTHEAST

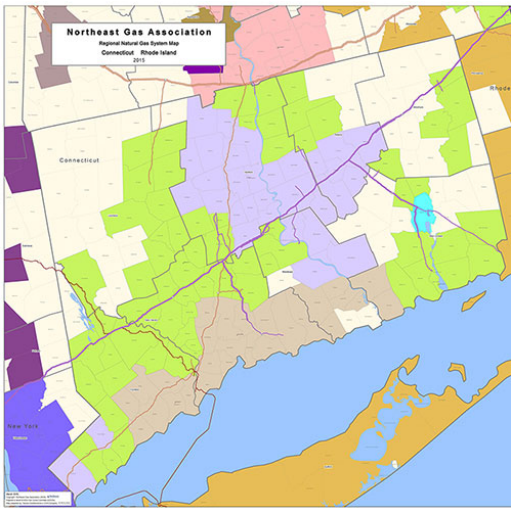
This section provides an introduction to the natural gas industry in the Northeast.

Among the areas addressed are:

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


CANADA
Quebec
Maine
Vermont
New Hampshire
Ontario
Atlantic Ocean
New York
Massachusetts
Rhode Island
Connecticut
Pennsylvania
New Jersey
Maryland
West Virginia
Delaware
Maritimes & Northeast Pipeline origination in Atlantic Canada
Northeast Gas Association
Regional Natural Gas System - 2021
Local Gas Utilities (LDCs):
Connecticut LDCs
Maine LDCs
Massachusetts LDCs
New Hampshire LDCs
New Jersey LDCs
New York LDCs
Pennsylvania LDCs
Rhode Island LDCs
Vermont LDCs
Interstate Pipelines
Facilities
Miles

CONNECTICUT



Natural Gas Utilities in Connecticut

There are 4 natural gas utilities:

Connecticut Natural Gas
(purple area on map)

Eversource
(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 642,000 natural gas customers in the state.

Natural Gas Efficiency Program Spending (2019):

$44.9 million

Natural Gas Use in Connecticut

Primary energy: 40%

Electric generation via gas: 43%

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

Annual consumption: 281 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.

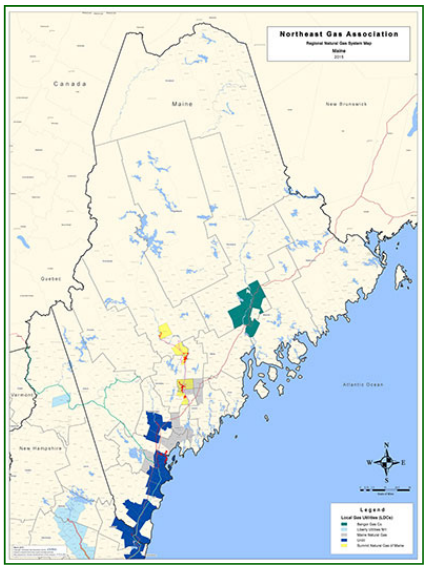
Underground Storage

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: 11%

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

Annual consumption: 45 billion cubic feet (Bcf) of natural gas.

Natural Gas Utility Customers:

There are approximately 53,000 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.

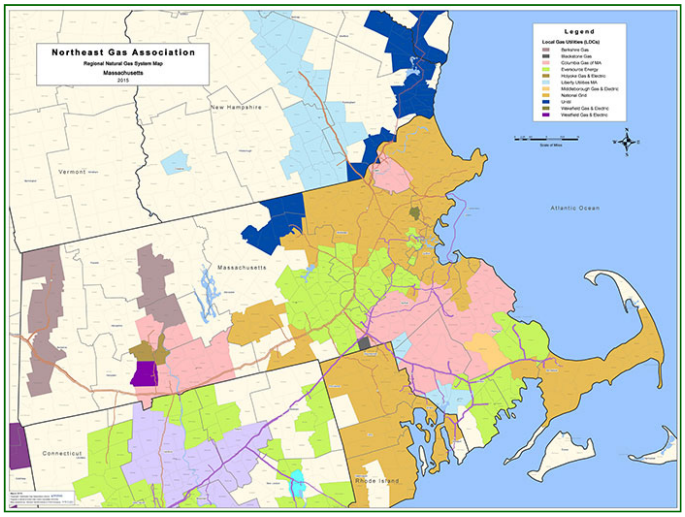
Natural Gas Production

None (although plans for RNG).

Natural Gas Efficiency Program Spending (2019):

$1.3 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***.

Natural Gas Use in Massachusetts

Primary energy: 30%

Electric generation via gas: 65%

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

Annual consumption: 380 billion cubic feet (Bcf) of natural gas.

Local Gas Utilities:

There are nine 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 (2019):

$279.5 million

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 Excelerate Energy

LNG Storage in Massachusetts

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

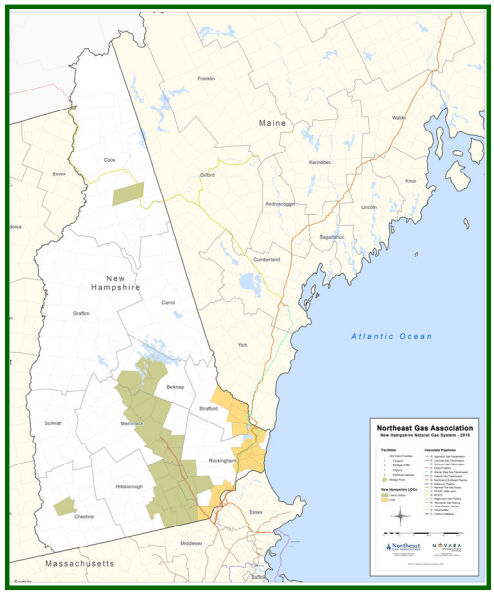
Underground Storage

None.

Natural Gas Production

None.

NEW HAMPSHIRE



Natural Gas Utility Customers :

There are approximately 133,000 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.

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: 17%

Electric generation via gas: 15%

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

Annual consumption: 52 billion cubic feet (Bcf) of natural gas.

LNG Storage in New Hampshire

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

Underground Storage

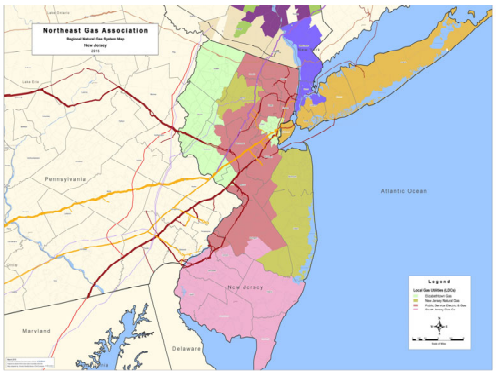
None.

Natural Gas Production

None (although plans for RNG).

Natural Gas Efficiency Program Spending (2019):
$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: 38%

Electric generation capacity: 67%

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

Annual consumption: 649 billion cubic feet (Bcf) of natural gas.

Natural Gas Utility Customers:

There are 3.1 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.

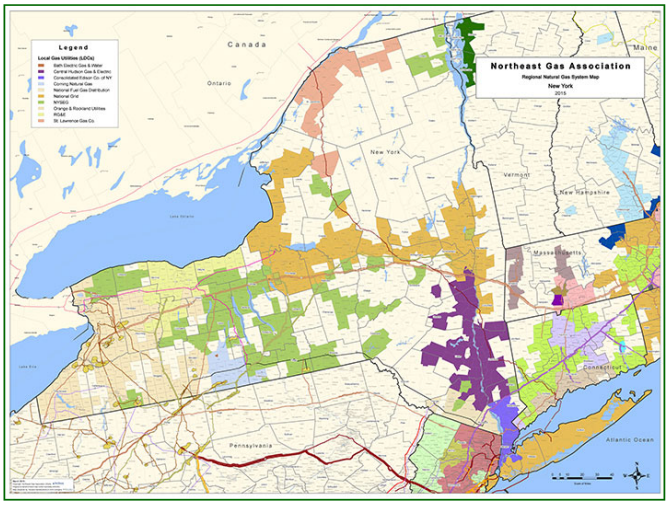
Natural Gas Production

None.

Natural Gas Efficiency Program Spending (2019):

$89.5 million

NEW YORK



Natural Gas Use in New York

Primary energy: 35%

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

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

Annual consumption: 1,235 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 2020, production was 10 Bcf.

Natural Gas Efficiency Program Spending (2019):
$177.4 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.***

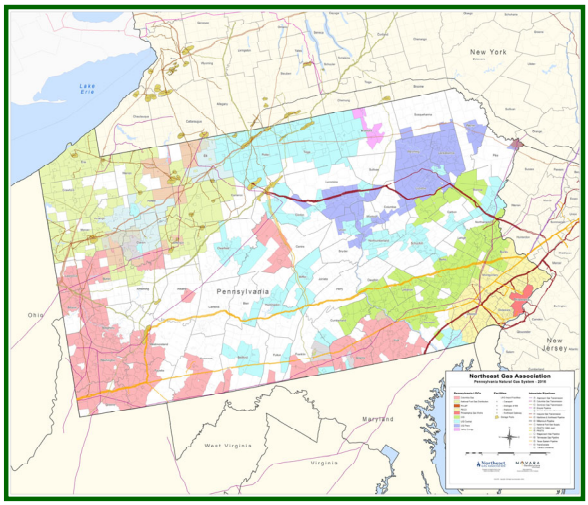
LNG Storage in New York

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

Underground Storage

246 Bcf.

PENNSYLVANIA



Natural Gas Use in PA

Primary energy: 37%

Electric generation capacity: 44%

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

Annual consumption: 1,412 billion cubic feet (Bcf) of natural gas.

Local Gas Utilities:

There are seven main natural gas utilities in the state according to the PA PUC, as well as some smaller companies.

Natural Gas Utility Customers:

There are 3.1 million natural gas customers in the state.

Natural Gas Production

In 2020, production was 7.1 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

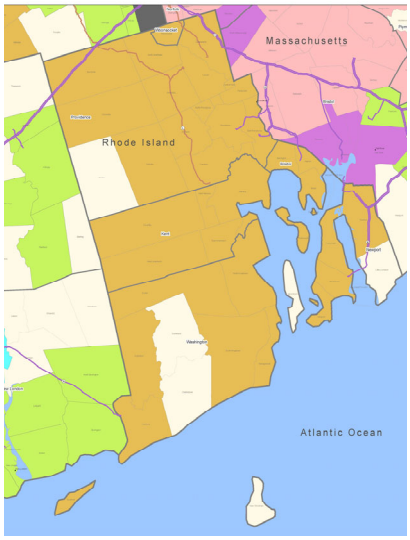
There are four liquefied natural gas (LNG) facilities.

Underground Storage

763 Bcf.

Natural Gas Efficiency Program Spending (2019):
$11.4 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: 51%

Electric generation capacity: 92%

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

Annual consumption: 94 billion cubic feet (Bcf) of natural gas.

Natural Gas Utility Customers:

There are approximately 272,000 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

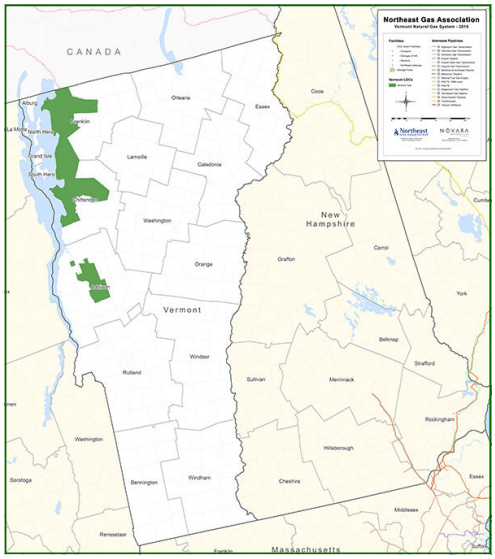
None.

Natural Gas Production

None.

Natural Gas Efficiency Program Spending (2019):
$30.1 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: 11%

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

No conventional production but RNG process is being utilized.

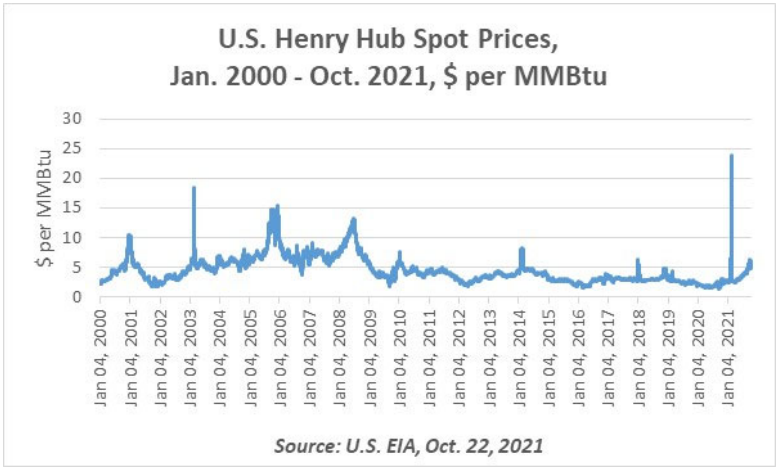
Natural Gas Efficiency Program Spending (2019):
$3.1 million

NORTHEAST STATES' ANNUAL NATURAL GAS CONSUMPTION BY SECTOR, 2020 (Bcf)

STATE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	ELECTRIC POWER	TOTAL*
CT	48	52	23	157	***281***
ME	3	9	23	10	***45***
MA	120	110	46	104	***380***
NH	7	9	9	26	***52***
NJ	223	138	59	229	***649***
NY	437	289	86	422	***1,235***
PA	221	148	256	826	***1,412***
RI	18	11	8	56	***94***
VT	4	7	2	—	***13***

*Source: U.S. Energy Information Administration, "Natural Gas Annual 2020," released September 2021. Numbers are rounded off. Delivered energy consumption. * Vehicle fuel consumption not shown, which slightly increases total number for some states.*

NATURAL GAS PRICE TRENDS



Source:
U.S. EIA,
October 2021

U.S. natural gas prices in the first half of 2020 at the Henry Hub benchmark reached "record lows," according to U.S. EIA. The key variable in 2020 was the impact of the COVID-19 pandemic on energy markets, which led to pullbacks on oil and gas production. In 2021, the economy is recovering, demand is higher, and natural gas production is on the increase, although not as high as the record-setting 2019 levels. The latter half of 2021 is experiencing considerable volatility in global energy markets, with constrained global supply chains, concerns over energy stock levels, inflation, and rising energy prices heading into the winter of 2021-22.

The Northeast market generally experiences 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 2021 FERC staff noted that "winter 2021-2022 futures prices at the Algonquin Citygate hub, outside Boston... are the highest prices expected this winter across major hubs."

As seen in the chart above, on the far right, the greatest volatility in natural gas markets in recent years occurred in February 2021, not in New England or the Northeast, but rather in Texas, due to an extreme cold snap and operational issues across the energy chain in that region.

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. The Bureau announced in mid-2021 that it would not be releasing its "standard 2020 ACS 1-year estimates because of the impacts of the COVID-19 pandemic on data collection."

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

CHANGES IN NORTHEAST HOME HEATING CUSTOMER BASE, 2014-21

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

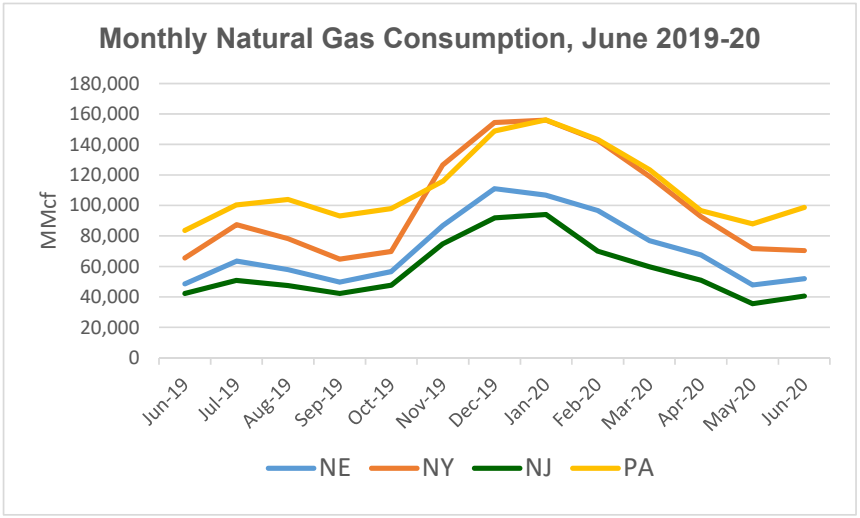
	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Natural Gas	11,705	11,802	11,918	12,063	12,183	12,349	12,516	12,670
Heating Oil	5,097	4,923	4,774	4,724	4,610	4,448	4,304	4,144
Propane	856	884	933	977	1,019	1,039	1,042	1,077
Electricity	3,093	3,253	3,326	3,387	3,482	3,585	3,713	3,818
Wood	569	511	471	469	462	351	218	162

U.S. EIA data indicates that the number of natural gas households in the Northeast U.S. continues to increase annually. About 55% of households in the region utilize natural gas as their primary heating fuel. Over the period from 2010 to 2020, EIA estimates that the number of natural gas households in the Northeast increased by 1.7 million.

As the table above indicates, the number of heating oil customers in the region continues to decline, while electricity and propane increase.

Source: U.S. EIA, October 2021. 2021/22 data is preliminary.

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 send-outs.

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
NY ISO	1,267 MW	2,808 MW	1,594 MW	771 MW
ISO-NE	925 MW	19,705 MW	4,918 MW	4,096 MW
NJ (PJM)	1,178 MW	2,243 MW	724 MW	1,283 MW
PA (PJM)	4,113 MW	170 MW	7,531 MW	988 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, new technology like battery storage, 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, ISO Interconnection Queue, June 2021

NY ISO, "2021 Power Trends." Released May 2021.

"PJM 2020 Regional Transmission Expansion Plan," released February 2021 by PJM (for NJ & PA data)

Note: capacity numbers for wind & solar are rated at "capacity interconnection rights" levels by PJM. This is lower than nameplate capacity, to reflect intermittency.

V.

TECHNOLOGY & ENVIRONMENTAL ISSUES

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

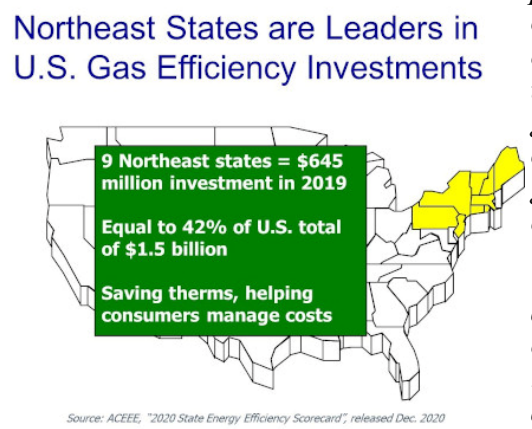
Among the areas addressed are:

- *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. 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 2020 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 2019, the most recent data year, $1.5 billion was invested in natural gas efficiency programs nationwide, according to the ACEEE. Of that, over one-third of the national total ($645 million, or 42%) 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 "natural gas efficiency programs are sustainable and worth pursuing for both economic and environmental reasons."

RENEWABLE NATURAL GAS (RNG)

Renewable Natural Gas (RNG) *is a pipeline-compatible, gaseous fuel derived from biomass or other renewable sources. It has lower lifecycle CO_2e 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.

The Goodrich dairy farm, Vermont (photo: Vanguard Renewables)

In the summer of 2021, for example, an innovative project went online in the State of Vermont. The project involves a dairy farm whose waste is processed through an anaerobic digester–built, owned, and operated by Vanguard Renewables. The digester can recycle daily more than 180 tons of unavoidable food and beverage waste from manufacturers, retailers, and distributors, and 100 tons of dairy manure into renewable natural gas (RNG). The Goodrichs' 900 cows provide the manure and Vermont businesses, including Ben and Jerry's and Cabot/Agrimark, supply the food waste. The facility at the Goodrich Farm is the company's first in Vermont and marks the first time it has supplied renewable natural gas to a college. Vanguard Renewables completed construction on the facility in June 2021. Middlebury College will buy the majority of the RNG generated by the digester as part of its Energy2028 project, which calls for the College's use of 100 percent renewable energy by 2028. VGS installed the infrastructure that will transport the RNG and make it available to Middlebury College as well as other customers who want to lower their carbon footprint.

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. According to the U.S. Department of Energy's Alternative Fuels Data Center, there were approximately 21,000 transit buses in the U.S. running on natural gas, or 30% of the market; the leading fuel source is diesel.

Fueling stations remain key to any market development. Again, according to the U.S. DOE, there are 1,500 compressed natural gas (CNG) fueling stations in the U.S.; 102 LNG fueling stations; and 49 hydrogen stations.

Finally, there is growing interest in "renewable natural gas (RNG)" as an input to the transportation fuel stream. 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 new CNG fueling station opened in the Cape May area in spring 2020. (Photo: South Jersey Gas)

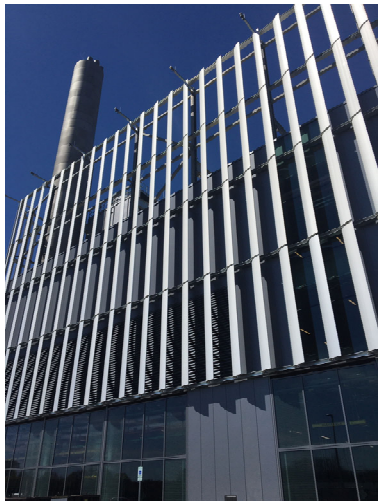
In a 2020 paper on the use of RNG in the transportation sector, the Argonne National Lab of the U.S. Department of Energy noted: "States are beginning to incentivize the use of RNG...Increasingly, communities and businesses view RNG as a key tactic for meeting their sustainability goals and demonstrating their commitment to GHG reduction."

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

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 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.

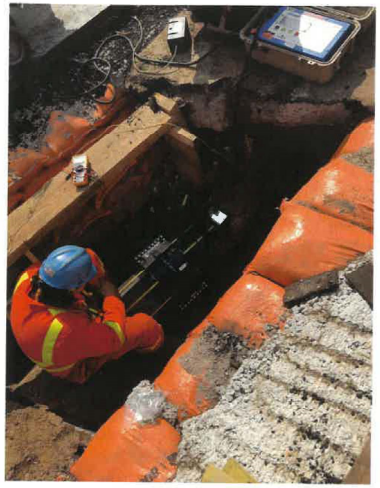


Figure 2: Field installation of a 12" BFRS on a HDPE low-pressure gas pipeline.

Source: NYSEARCH

ADDRESSING CARBON EMISSIONS

Natural gas is a contributor to greenhouse gas emissions but is the cleanest of all fossil fuels - and its use in key economic sectors such as power generation has helped substantially reduce air emissions in recent years.

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

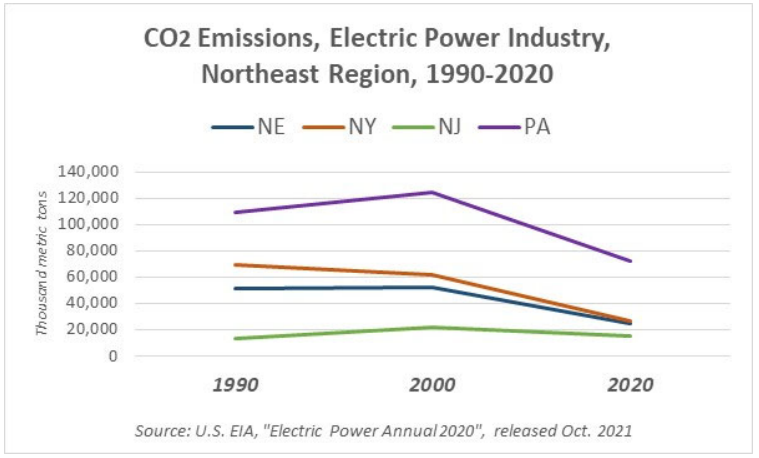
The electric utility sector in the Northeast has achieved major reductions in several air emission areas in recent years—in great part thanks to new, more efficient power sources, from natural gas to renewables.

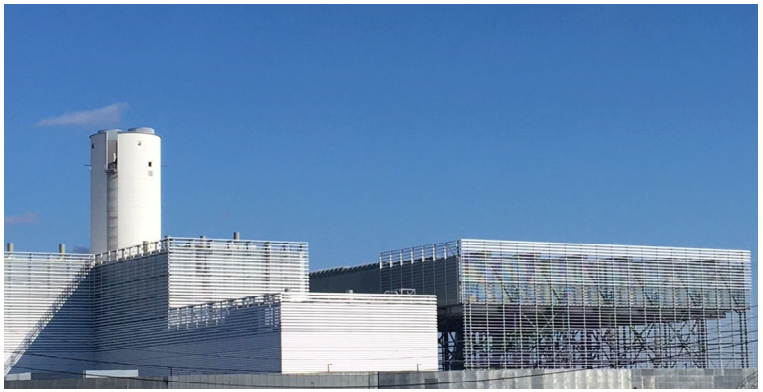
In New York State over the last two decades, NY ISO reports that emissions rates from the power sector dropped by 52% for CO_2, 93% for NOx, and 99% for SO_2.

ISO-NE reports that since 2001, total emissions from power plants in New England dropped by 99% for sulfur dioxide (SO_2), 78% for nitrogen oxides (NOx), and 42% for CO_2.

PJM reports that between 2005 and 2020, CO_2 emission rates fell 39% across its footprint, while nitrogen oxides dropped by 86% and sulfur dioxide by 95%.

In June 2021, U.S. EIA noted that CO_2 emissions from the U.S. electric power sector fell by 32% from 2005 to 2019. EIA observed: "Although both the increased use of renewables and the shift from coal-fired to natural gas-fired generation contributed to reductions in electric power sector CO_2 emissions, the shift from coal to natural gas had a larger effect." EIA estimates that almost 65% of the decline in CO_2 power sector emissions nationally over this time period is attributable to the shift from coal-fired to natural gas-fired electricity generation.



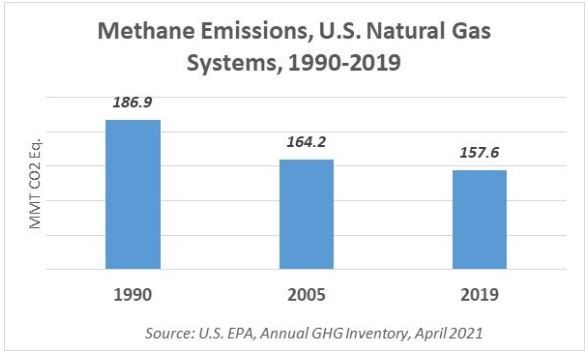


REDUCING METHANE EMISSIONS IN NATURAL GAS SYSTEMS

Natural gas systems are a leading contributor to CH_4 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_4 emissions from natural gas systems declined by 16% from 1990 to 2019, according to the U.S. EPA's 2019 Greenhouse Gas Inventory, released in April 2021.

EPA notes: "The decrease in CH4 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 CH4 and CO2 emissions from this stage, as have station upgrades at metering and regulating (M&R) stations. Distribution system CH4 emissions in 2019 were 69 percent lower than 1990 levels." [EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019, pages ES-16 and 3-91, April 2021]

Individual states continue to record progress as well in reducing methane emissions. For example, ***Connecticut*** *reports that emissions from leakage from natural gas distribution and transmission systems accounted for 0.6% of all statewide consumption-based GHG emissions (source: Connecticut 2018 GHG Inventory, released Sept. 2021). Natural gas system leakage in Connecticut has declined by two-thirds since 1990.*



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	123	1,132	**15.1%**
ME	0.09	25	**1.8%**
MA	1,150	2,713	**17.7%**
NH	4	50	**2.7%**
NJ	338	3,412	**10.5%**
NY	4,693	2,773	**15.1%**
PA	5,821	2,280	**16.7%**
RI	174	668	**26.2%**
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 secure systems to meet market demand.

2020 data, released 2021 by PHMSA

NGA's MEMBER LOCAL DISTRIBUTION COMPANIES

(as of October 2021)

Bangor Natural Gas Company
21 Main Street
Bangor, ME 04402
(207) 941-9595
www.bangorgas.com

The Berkshire Gas Company
115 Cheshire Road, P.O. Box 138
Pittsfield, MA 01202
(413) 442-1511
www.berkshiregas.com

Central Hudson Gas & Electric Corp.
284 South Avenue
Poughkeepsie, NY 12601
(845) 452-2000
www.cenhud.com

Columbia Gas of Pennsylvania
121 Champion Way, Suite 100
Canonsburg, PA 15317
www.columbiagaspa.com

Connecticut Natural Gas Corp.
77 Hartland Street, 4th floor
East Hartford, CT 06108
(860) 727-3000
www.cngcorp.com

Consolidated Edison Co. of NY, Inc.
4 Irving Place
New York, NY 10003
(212) 460-4600
www.coned.com

Corning Natural Gas Corp.
330 West William Street
Corning, NY 14830
(607) 936-3755
www.corninggas.com

Elizabethtown Gas
520 Green Lane
Union, NJ 07083
(800) 242-5830
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

NGA's LDC MEMBERS *(as of 10-21)*

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/natural-gas

Holyoke Gas & Electric Dept.
99 Suffolk Street
Holyoke, MA 01040
(413) 536-9300
www.hged.com

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

Liberty Utilities NH
15 Buttrick Road
Londonderry, NH 03053
(800) 833-4200
www.new-
hampshire.libertyutilities.com

Liberty Utilities NY
33 Stearns Street
Massena, NY 13662
(315) 769-3516
www.stlawrencegas.com

Maine Natural Gas
PO Box 99
Brunswick, ME 04011
(207) 729-0420
www.mainenaturalgas.com

Middleborough Gas & Electric Dept.
32 South Main Street
Middleborough, MA 02346
(508) 947-1371
www.mged.com

National Fuel Gas Distribution Co. (NY)
6363 Main Street
Williamsville, NY 14221
(716) 857-7000
www.natfuel.com

National Fuel Gas Distribution Co. (PA)
1100 State Street
Erie, PA 16512
(814) 871-8200
www.natfuel.com

NGA's LDC MEMBERS *(as of 10-21)*

National Grid
25 Hub Drive
Melville, NY 11747
(718) 643-4050
www.nationalgridus.com

40 Sylvan Road
Waltham, MA 02451
(781) 466-5000
www.nationalgridus.com

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

NGA's LDC MEMBERS *(as of 10-21)*

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

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

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

Unitil
6 Liberty Lane West
Hampton, NH 03842
(888) 886-4845
www.unitil.com

Valley Energy, Inc.
523 S. Keystone Avenue
Sayre, PA 18840
(570) 888-9664
www.valley-energy.com

VGS
P.O. Box 467
S. Burlington, VT 05402
(802) 863-4511
www.vermontgas.com

Wakefield Municipal Gas & Light Department
480 North Avenue
Wakefield, MA 01880
(781) 246-6363
www.wmgld.com

Westfield Gas & Elect. Light Dept.
100 Elm Street
Westfield, MA 01085
(413) 572-0100
www.wgeld.org

TRANSMISSION COMPANIES AND LNG FACILITY MEMBERS *(as of 10-21)*

Algonquin Gas Transmission Co.
890 Winter Street, Suite 300
Waltham, Massachusetts 02451
(617) 254-4050
www.enbridge.com

Excelerate Energy (Northeast Gateway)
2445 Technology Forest Boulevard
The Woodlands, TX 77381
(832) 813-7100
www.excelerateenergy.com/

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

Granite State Gas Transmission, Inc.
1075 Forest Avenue
Portland, Maine 04104
(207) 797-8002
www.unitil.com

Iroquois Gas Transmission System
One Corporate Drive, Suite 600
Shelton, Connecticut 06484
(203) 925-7200
www.iroquois.com

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

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

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

TC Energy U.S.
700 Louisiana, Suite 1300
Houston, TX 77002
(800) 835-7191
www.tcenergy.com

Tennessee Gas Pipeline Company
1001 Louisiana
Houston, TX 77002
(713) 420-2600
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 approximately 14 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/

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

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 & Carbon Management, Office of Natural Gas & Petroleum Import and Export Activities
- "Natural Gas Imports and Exports"

U.S. Energy Information Administration (www.eia.gov)
- "Annual Energy Outlook 2021"
- "Natural Gas Annual 2020"
- "Natural Gas Monthly"
- "State Energy Data Report"

Canada Energy Regulator
- "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.

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