

The Role of LNG in the Northeast Natural Gas (and Energy) Market

Introduction

Liquefied natural gas (LNG) is natural gas (primarily methane) that has been liquefied by reducing its temperature to minus 260 degrees Fahrenheit. It can be compressed, stored and transported over long distances by ship; and then stored on land in specially-designed storage facilities. The liquefied gas can then be reheated, converted to vapor, and injected into a pipeline system, for distribution throughout a gas system. It can also be transported to local utility storage tanks via truck.

LNG has traditionally been used for supplemental supplies, particularly for winter peak periods. It is also important in particular areas (like parts of New England) to help maintain system pressures at different points of the regional natural gas system. It has increasingly become a baseload fuel with multiple applications, from fueling electric power plants to fueling heavy-duty trucks.

There has been growing interest in LNG in the last few years in the region and nationally - to meet growing demand for natural gas, and to provide supply flexibility to an increasingly competitive natural gas and energy marketplace.

LNG has an excellent safety record in all its facets - shipping, trucking and storage. The Northeast Gas Association (NGA) runs an annual program with the Massachusetts Firefighting Academy on LNG. The school has been in operation over 20 years, training personnel from utilities, pipelines, and local fire departments.

U.S. Import Facilities

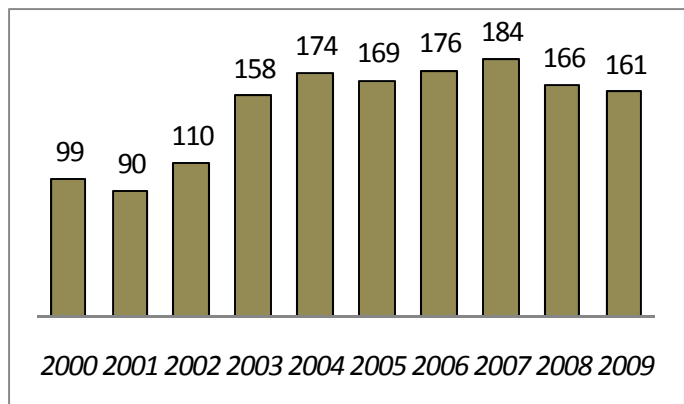
There are currently 9 LNG import facilities in the continental U.S. Six are located onshore:

- Everett, Massachusetts (Distrigas/GDF SUEZ)
- Cove Point, Maryland (Dominion)
- Elba Island, Georgia (El Paso)
- Lake Charles, Louisiana (CMS Energy)
- Freeport, TX (Freeport LNG)
- Sabine Pass, LA (Cheniere).

There are also three offshore import facilities. Two are owned and operated by Exceleerate Energy: the Gulf Gateway Energy Bridge located offshore Louisiana in the Gulf of Mexico, and the Northeast Gateway located 13 miles offshore Cape Ann, Massachusetts. The third, Neptune, is owned and operated by GFD SUEZ, and is also located offshore Cape Ann, MA.

In addition, there are several proposals for new receiving terminals throughout North America - coastal U.S. (including New England and New Jersey), Canada and Mexico.

**ANNUAL LNG IMPORTS INTO NEW ENGLAND
2000-2009 (Bcf)**



Source: U.S. Department of Energy, Office of Natural Gas



LNG ship in Boston Harbor (photo: Distrigas)

In the Northeast North American region, new facilities are advancing.

In June 2009, the Canaport LNG terminal in Saint John, New Brunswick, Canada began operations. It was developed by Repsol and Irving Oil. It has 3 storage tanks; each tank can hold about 3.3 Bcf. It is capable of injecting as much as one billion cubic feet (Bcf) of gas per day into the pipeline system, with its gas going to markets in the Maritimes, New England and the Northeast.

Also, a new facility was recently completed offshore Gloucester, MA: the Neptune LNG project of GDF SUEZ, located approximately 10 miles off the coast.

There is one LNG export terminal in the U.S., located in Alaska; its export market is Japan.

In 2009, U.S. imports of LNG totaled 452 Bcf. This is nearly one-third higher than the 2008 total of 352, but still shy of the annual record of 771 Bcf reached in 2007.

The countries supplying LNG to the U.S. in 2009, ranked by volume, were:

- Trinidad & Tobago (236 Bcf)
- Egypt (160 Bcf)
- Norway (29 Bcf)
- Nigeria (13 Bcf)
- Qatar (13 Bcf).

[Use of LNG in the Northeast](#)

LNG is a major fuel for New England - providing nearly 30% of daily peak supply in the winter for local gas utilities. LNG provided about 20% of New England's total gas supply in 2008, according to U.S. Department of Energy statistics (166 Bcf of supply against an annual regional consumption of 770 Bcf—although some of this gas goes to markets outside New England).

There is no underground storage located in New England (geologic unsuitability.) LNG is thus an important part of the region's supply and deliverability network.

There are liquefaction and satellite storage tanks in localities in the region that are owned and operated by the local distribution companies (LDCs).

In 2009, according to NGA, the LNG storage capacity in New England among the local distribution companies (LDCs) was 16.2 Bcf (which does not include the storage at the Distrigas terminal). Vaporization capacity for daily sendout was approximately 1.4 Bcf/day; and liquefaction capability by the LDCs was 51,000 MMBtu/day.

LNG is also important to New York's natural gas market, particularly in the downstate area, although not nearly to the extent as in New England. (Unlike New England, New York has underground storage, and is well-situated to the even larger gas storage fields in Pennsylvania and Ontario.)

LNG in New York is obtained by liquefaction of pipeline gas. Two LDCs maintain LNG peak-shaving plants. The facilities provide service area system reliability as well as assist in meeting Peak Day Re-

quirements. These facilities have storage capacity of approximately 3.2 Bcf, liquefaction capability of 16,800 Mcf/day, and a vaporization rate of approximately 26,100 Mcf/hr.

LNG is also utilized by several LDCs in New Jersey, with total state storage capacity of about 4 Bcf.

Operating Import Facilities in New England

There are three operating facilities in New England: the Distrigas facility in Everett, MA; the Northeast Gateway facility offshore Cape Ann, MA; and the Neptune facility offshore Cape Ann, MA.

Distrigas is a subsidiary of GDF SUEZ. Its Everett, MA facility has been in operation since 1971. It has storage of 3.4 billion cubic feet (Bcf). The terminal's maximum installed vaporization capacity is about one billion cubic feet per day; on a sustainable basis, the vaporization capacity is approximately 700 million cubic feet per day. Distrigas also has sendout capability of 100,000 MMBtu/day by truck, which supports local storage refills for local gas utilities throughout the region. The terminal is directly connected to the interstate pipeline network and to National Grid's local distribution system in the Boston area. In the spring of 2003, a nearby power plant with two units, with total nameplate capacity of about 1,500 megawatts, entered service, fueled by LNG from the Distrigas facility.

For the last decade, essentially all shipments to Distrigas have been from the Atlantic LNG development of Trinidad & Tobago in the Caribbean. In 2009, Distrigas also had several cargoes from Egypt; and in 2010, Distrigas has added another supply source in Yemen.

The **Northeast Gateway** facility is owned and operated by Exceleerate Energy. The facility began commercial operations in May 2008. Operating approximately 18 miles east of Boston in Massachusetts Bay, the offshore LNG facility is capable of injecting vaporized natural gas into the existing offshore HubLine natural gas pipeline system operated by Spectra Energy. Exceleerate Energy and Spectra Energy teamed up to extend a 16-mile, 24-inch pipeline lateral from Spectra Energy's HubLine to the Deepwater Port.

The regasification system developed by Exceleerate Energy allows its purpose-built vessels, referred to as Regasification Vessels, to regasify its cargo of LNG using existing technology in a new application and deliver vaporous natural gas through one of two turret loading buoys located approximately 90 feet below the water surface. The vessel draws one of the buoys into a specially designed compartment and connects it to the onboard regasification equipment. The buoys not only act as a conduit for the gas delivery, but also act as a mooring for the vessels, eliminating the need to anchor the ships at the Deepwater Port. In 2009, it had three shipments, sourced from Egypt.



LNG ship making delivery at Canaport facility, June 2009 (photo: Canaport LNG)

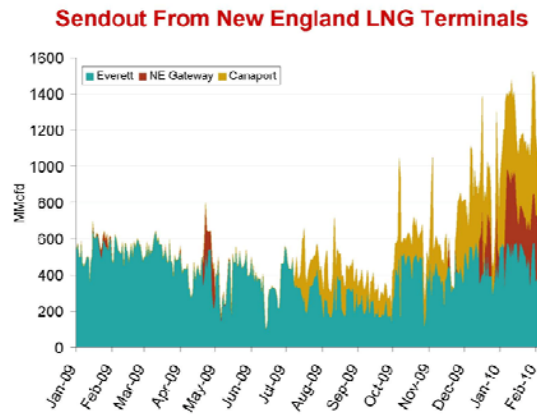
The **Neptune LNG** facility is owned and operated by GDF SUEZ, which also operates Distrigas. The facility is located approximately 10 miles off the coast of Gloucester, Massachusetts.

The *Neptune* port consists of a buoy system where LNG vessels will moor and discharge natural gas by using onboard vaporization equipment. The natural gas will be transported via a 13-mile-long sub-sea pipeline lateral connecting to the existing Spectra Energy pipeline system's HubLineSM,

LNG sendout into the New England market increased strongly this past winter with the input of supplies from Repsol's Canaport LNG in New Brunswick (illustrated in gold) and Exceleerate Energy's Northeast Gateway offshore Gloucester, MA (in red), in addition to Distrigas in Everett, MA (in aqua).

A comparison to the January-March period of 2009 shows a marked increase in early 2010, reflecting the new LNG facilities' impacts.

(Chart source: U.S. FERC)



Source: Derived from Iberdrola data

Updated February 5, 2010

which will deliver the natural gas to consumers in Massachusetts and throughout New England. It will be capable of injecting about 0.4 Bcf per day of gas into the pipeline system from a special regasification system on-board its delivery vessels.

LNG Imports into New England in 2009

According to data from the U.S. Department of Energy, Office of Natural Gas Import and Export Activities, 161.4 Bcf of LNG was imported into New England in 2009. Of that total, Distrigas imported 155.8 Bcf and Northeast Gateway about 5.6 Bcf. The Distrigas imports represented 34% of all U.S. LNG imports in 2009.

A further boost to New England LNG availability has been achieved via the start-up of the nearby Canaport LNG facility in Saint John, New Brunswick, located about 60 miles from the Maine border. Canaport, a joint enterprise of Repsol and Irving Oil, received about a dozen shipments in 2009 following its inauguration in June, totaling approximately 38 Bcf. Its supply sources in 2009 were Trinidad, Egypt, and Qatar. It is capable of moving over 700 million cubic feet per day into the Brunswick Pipeline and then the Maritimes & Northeast Pipeline into Maine and New England.

LNG Imports to Date in 2010

In its July 2010 "Short-Term Energy Outlook," the U.S. Energy Information Administration (EIA) observed: "Forecasted imports of liquefied natural gas (LNG) average 1.37 Bcf/d in 2010, a downward revision of about 0.14 Bcf/d from last month. Projected imports increase to 1.52 Bcf/d in 2011. While imports are expected to grow, higher prices in European and Asian markets will likely divert LNG cargoes from the United States."

Imports into New England are expected to be essentially on track with previous years, however, and perhaps higher, owing to Distrigas's contractual and market arrangements, as well as the start-up of the Neptune LNG facility, and the inputs of the Canaport facility from neighboring New Brunswick, Canada, and Exceleerate's Northeast Gateway.

According to U.S. Department of Energy data for January-June 2010, total U.S. imports were 250 Bcf, compared to 241 Bcf in the same six-month period in 2009. Of that U.S. total, Distrigas imported about 77 Bcf in the first six months of 2010; Northeast Gateway imported about 15 Bcf; and Neptune just under

1 Bcf. (Canaport's exports are not included in U.S. government data as it is a Canadian facility.)

In the coming years it is anticipated that the global LNG market will be well-supplied. Indeed, the International Energy Agency (IEA) has noted the potential of a "global gas glut" in the coming decade. In November 2009, the IEA released its updated "World Energy Outlook." Among its observations:

- "The unexpected boom in North American unconventional gas production, together with the current recession's depressive impact on demand, is expected to contribute to an acute glut of gas in the next few years."
- "We estimate that the under-utilization of pipeline capacity between the main regions and global LNG liquefaction capacity combined rises from around 60 bcm in 2007 to close to 200 bcm in the period 2012-2015. The utilization rate of this capacity drops from 88% to less than three-quarters. The fall in capacity utilization is likely to be most marked for pipelines; the owners of new LNG capacity are likely to be more willing to offer uncontracted supplies onto spot markets at whatever price is needed to find buyers."

Potential of LNG



Canaport LNG facility, New Brunswick, Canada (photo: Repsol)

In a January 2003 report, the U.S. Energy Information Administration (EIA) noted, among other points:

- "[I]n New England and the coastal areas of the Middle Atlantic states, where underground storage is lacking, LNG is a critical part of the region's supply during cold snaps."
- "LNG facilities throughout the world generally have had an excellent safety record."
- "The need for additional supply sources to meet projected U.S. demand generally coincides with numerous developments in LNG trade on a worldwide basis. These developments include lower liquefaction costs as well as lower ship-

ping costs. LNG storage facilities will also continue to be important in meeting peak demand needs of local utilities and as a way to store gas until needed."

The Value of LNG

LNG is seen as one of the best options for increasing U.S. natural gas supplies in the near to mid-term, not only providing valuable supply diversity, but also helping to mitigate volatility in commodity prices.

The Need for New LNG Supplies in the Northeast

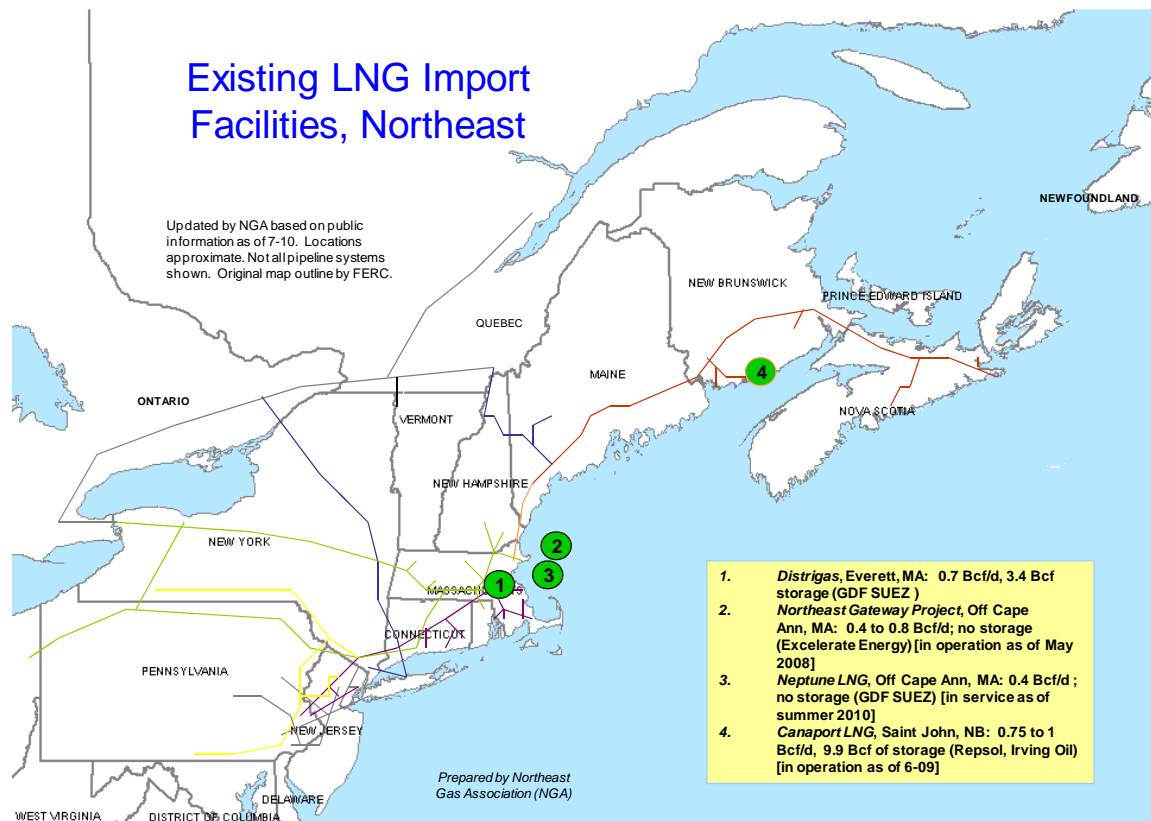
The Northeast Gas Association (NGA) urges the addition of new infrastructure in the Northeast region to support additional LNG imports and supplies. LNG, along with traditional North American supplies (from such areas as the Gulf, the Rockies, and western Canada, and increasing developments of unconventional, i.e., shale gas) - as well as efficiency investments - are all essential to helping the region meet the demand for natural gas, and to helping address price and environmental impacts of energy.

NGA notes eight fundamental reasons that highlight the value of additional LNG in the Northeast region:

- Provides needed supply
- Backfeeds existing delivery system
- Supplements regional pipeline system
- Increases diversity of supply sources
- Strengthens region's energy security
- Helps mitigate price volatility
- Contributes to economic growth
- Contributes to improved environmental air quality.

LNG Terminals in Northeastern North America: Existing & Proposed

Several proposals are in the development and regulatory process for import terminals for liquefied natural gas (LNG) in Northeastern North America. Maps of the operating facilities—as well as the various project proposals—are shown below.



Proposed LNG Import Facilities, Northeast

