

THE ROLE OF LIQUEFIED NATURAL GAS (LNG) IN THE NORTHEAST U.S. GAS AND ENERGY MARKETS

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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.

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 4 on-shore LNG import facilities in the continental U.S., in the following states:

- Everett, Massachusetts (Distrigas/SUEZ LNG NA)
- Cove Point, Maryland (Dominion)
- Elba Island, Georgia (El Paso)
- Lake Charles, Louisiana (CMS Energy)

The MA and LA facilities have been operating for decades; the other two were reopened in recent years after being inactive for several years.

A fifth import facility, located offshore Louisiana in the Gulf of Mexico, operated by Exceleerate, went into operation in 2005.

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

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

The leading supply areas to the U.S., ranked by volume, 2005, were:

- Trinidad & Tobago
- Algeria
- Egypt
- Malaysia
- Nigeria.

Use of LNG in the Northeast

LNG is a major fuel for New England - providing nearly 30% of daily peak supply in the winter. LNG provided about 20% of New England's total gas supply in 2006, according to U.S. Department of Energy statistics.

There is no underground storage located in New England, for geological reasons. LNG is 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 2006, according to NGA, the LNG storage capacity in New England among the local distribution companies (LDCs) was 15 Bcf (which does not include the storage at the Distrigas terminal). Vaporization capacity for daily sendout was approximately 1.3 Bcf/day; and liquefaction capability by the LDCs was 45,000 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 Requirements. 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 3.5 Bcf.

About SUEZ LNG NA / Dstrigas

The LNG importer to the New England region is SUEZ Energy Resources NA. Its subsidiary is Dstrigas of Massachusetts (also known as DOMAC).

The region's import facility is the Dstrigas of Massachusetts facility in Everett, MA. It has storage of 3.4 billion cubic feet (Bcf). The terminal's maximum installed vaporization capacity was recently increased, to one billion cubic feet per day; on a sustainable basis, the vaporization capacity is approximately 700 million cubic feet per day. DOMAC also has sendout capability of 100,000 MMBtu/day by truck. The terminal is connected to the interstate pipeline network and to KeySpan's local distribution system. Furthermore, in the spring of 2003, a nearby power plant with two units, with total nameplate capacity of about 1,600 megawatts, entered service, fueled by LNG from the DOMAC facility. In May 1999, Dstrigas received its first shipments of LNG from the Atlantic LNG Project, from Trinidad & Tobago in the Caribbean. Dstrigas holds a 20-year contract for 60% of the plant's design capacity of approximately 400 million cubic feet per day. Further finds in this Caribbean region indicate substantial reserves (perhaps as much as 65-70 trillion cubic feet). A fourth production train at the Atlantic LNG facility in Trinidad went into operation in December 2005.

LNG Imports to New England

According to data from the U.S. Department of Energy, Office of Natural Gas Import and Export Activities, in 2006 Dstrigas imported 176 Bcf, a new annual record (exceeding the previous record of 174 Bcf in 2004).

LNG imports into New England have risen substantially in recent years: 176 Bcf in 2006 compared to 37 Bcf in 1998.

The U.S. Department of Energy reports that LNG represented about 14% of total U.S. natural gas imports in 2005, compared to 5.6% of the U.S. total in 2002. LNG represented about 3% of all U.S. natural gas consumption in 2005.

Future Potential of LNG

In a December 2001 report on U.S. natural gas markets, the U.S. Energy Information Administration (EIA) included the following observations about LNG:

- "LNG has become a more viable source of future natural gas supply because of the extent of world natural gas resources and the significant decline in LNG costs in all segments of the supply chain."
- "Between 1996 and 2000 the cost of a new [LNG] tanker dropped by approximately 30 percent. The construction costs for regasification terminals have seen similar decreases. Because of the capital-intensive nature of LNG trade, more than 70 percent of the cost of regasified, delivered natural gas is made up of processing and transportation costs."
- "The results of EIA's analysis suggest that increased imports of LNG could have a positive effect on U.S. natural gas markets, especially in an environment of high demand. LNG can meet demand that otherwise would have to be met by higher cost sources, thus tempering price increases."

In a January 2003 report, 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 shipping 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."

In January 2007, the U.S. Energy Information Administration (EIA) released a paper entitled: "U.S. LNG Imports – The Next Wave." Among the observations:

- "After substantial increases early this decade (including more than doubling between 2002 and 2003), the volume of LNG imports has decreased over the past 2 years. LNG still accounts for less than three percent of total U.S. natural gas supplies, but the global market is growing, and EIA foresees another wave of U.S. LNG import growth over the next 2 years."
- "Recent competition from buyers in Western Europe and Asia for LNG cargoes has resulted in LNG prices exceeding the corresponding natural gas market price in the United States. During periods of high global LNG demand and rising prices, LNG cargoes will continue to be diverted to countries that are more willing to pay the highest prices. However, increasing global LNG supplies will ease price pressure in the world market over time, and as a result the United States will likely attract a greater share of available NG cargoes."

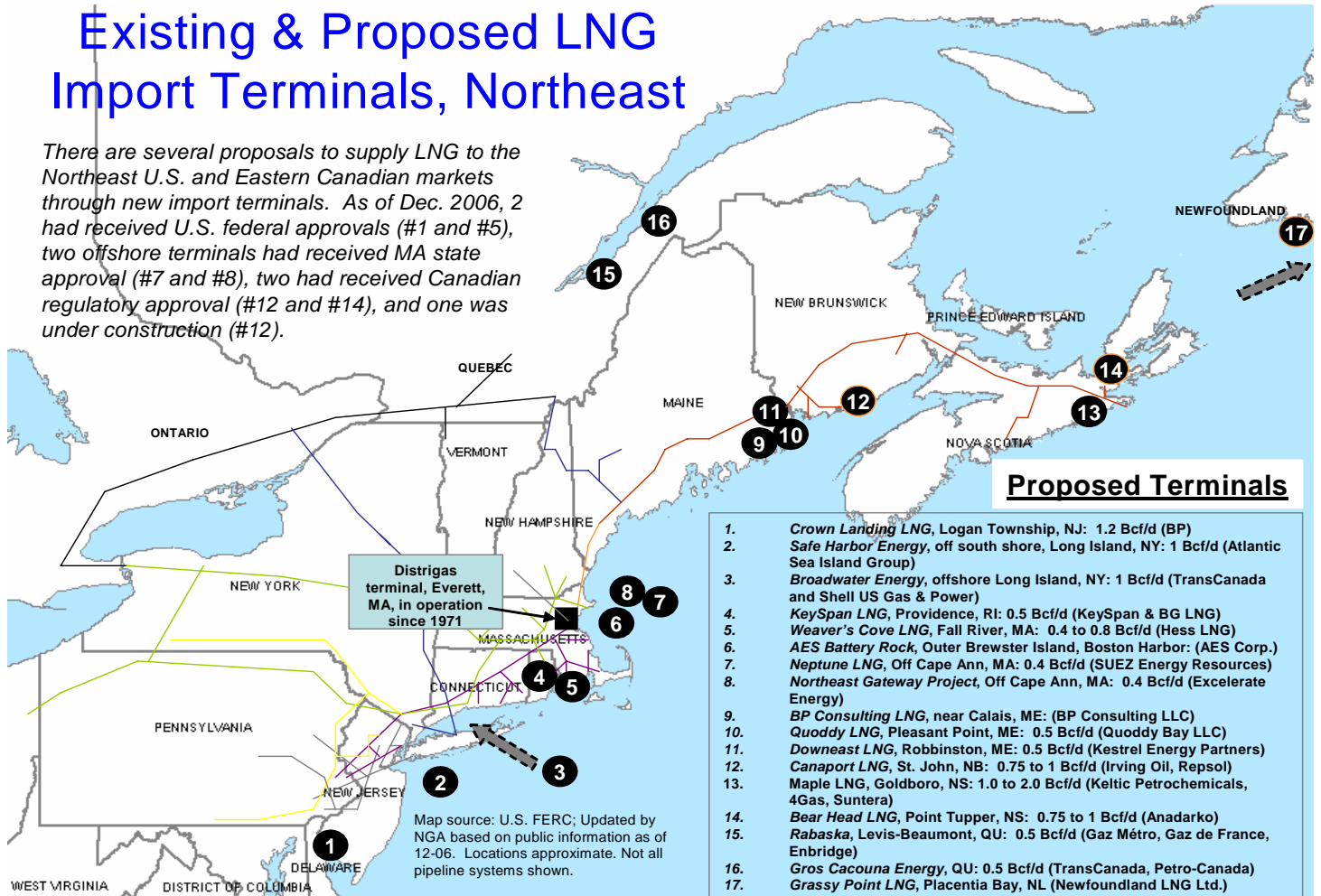
Recently-Proposed LNG Terminal for Northeastern North America

Several proposals have been announced for import terminals for liquefied natural gas (LNG) in Northeastern North America.

A map of the various project proposals is found on the next page.

Existing & Proposed LNG Import Terminals, Northeast

There are several proposals to supply LNG to the Northeast U.S. and Eastern Canadian markets through new import terminals. As of Dec. 2006, 2 had received U.S. federal approvals (#1 and #5), two offshore terminals had received MA state approval (#7 and #8), two had received Canadian regulatory approval (#12 and #14), and one was under construction (#12).



LNG is seen as the best option for increasing U.S. natural gas supplies in the near to mid-term.

LNG is seen as not only providing needed supply, but also helping to mitigate the recent volatility in commodity prices in national natural gas markets. This aspect of the issue was addressed by former Federal Reserve Board Chairman Alan Greenspan, in a speech in April 2005. Among his observations:

- “The difficulties associated with inadequate [natural gas] domestic supplies will eventually be resolved as consumers and producers react to the signals provided by market prices. Indeed, the process is already under way. As a result of substantial cost reductions for liquefaction and transportation of LNG, significant global trade in natural gas is developing. This activity has accelerated sharply over the past few years as profitable arbitrage has emerged in natural gas prices across international markets.”

- “The larger question, of course, is what will increased world trade in LNG and expanded U.S. import capacity do to currently uncompetitive natural gas prices in the United States? During the past couple of years, when U.S. prices of natural gas hovered around \$6 million Btu, import prices of LNG in Europe have ranged between \$2 and \$4 per million Btu, and those in Japan and Korea have generally been between \$3 and \$5 per million Btu. Estimates of production and delivery costs of LNG to North America appear to hover around \$3 per million Btu. In the short run, exporters to the United States are likely to receive our domestic price, currently above \$7 per million Btu. But unless world gas markets tighten aggressively, competitive pressures will arbitrage the U.S. natural gas price down, possibly significantly, through increased imports.”
- “In addition to increased supplies from abroad, North America still has numerous unexploited sources of gas production. Significant quantities of recoverable gas reserves are located in Alaska and the northern territories of Canada. Negotiations over the construction of pipelines connecting these northern supplies to existing delivery infrastructure are currently under way.”

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 and efficiency, is essential to helping the region meet the demand for natural gas, and to addressing price impacts.

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.