Overview of LNG in New England
September 22, 2010
What is LNG?

- LNG is simply natural gas in its liquid form. It is the same natural gas more than 64 million American homeowners use every day.

- Natural gas is converted to LNG by cooling it to \(-260^\circ F\), at which point it becomes a liquid. This process reduces its volume by a factor of more than 600 – similar to reducing the volume of a beach ball to the volume of a ping-pong ball. This allows natural gas to be transported efficiently by sea.

- Once it reaches the United States, LNG is unloaded from ships at import terminals where it is stored as a liquid until it is warmed back to natural gas. The natural gas is then sent through pipelines for distribution to businesses and homeowners.

- One LNG vessel carries enough natural gas to serve more than 30,000 homes for a year.

- The ability to convert natural gas to LNG, which can be shipped on specially built ocean-going ships, provides U.S. consumers with access to vast natural gas resources worldwide.

- LNG does not burn or explode and is not stored or shipped under pressure. Natural Gas vapors ARE flammable, BUT NOT explosive unless they are in a confined space.
LNG Supply Chain

Supply

Exploration & Production

Liquefaction

Terminalling

Shipping

Marketing & Distribution

Regasification

End Users
Who is GDF SUEZ Gas NA / Distigas of Massachusetts?

➢ The top importer of LNG into the U.S.

➢ Owns and operates the Everett LNG Terminal north of Boston – essential to New England’s energy supply.
  • Provides 20% of New England’s annual supply of natural gas.
  • Natural gas from the Everett LNG Terminal meets as much as 40% of the New England natural gas supply on peak demand days (includes liquid trucked to regional LNG peaking storage tanks).
  • Mystic Power Generation Station provides 30% of Greater Boston’s power and is fully dependent on Everett LNG Terminal for fuel supply.
  • Longest operating LNG import terminal in the U.S.

➢ The company’s new Neptune LNG Deepwater Port now provides greater flexibility for the Everett Terminal.
The Everett LNG Import Terminal

The Everett LNG Import Terminal is the longest-operating in the U.S., and the only continuously operating one.

Opened in 1971 as a peak shaving facility to help meet New England’s relatively small natural gas demand.

Today it is an essential part of the region’s energy supply mix.

- Trucking capacity: 100 million cubic feet/day
- Vaporization capacity:
  - 715 million cubic feet/day – sustainable
  - 1 billion cubic feet/day – maximum installed
New England’s Natural Gas Picture

“There are gas transmission constraints in New England from all geographic directions, effectively isolating the region and calling for more pipeline capacity or reliance on Liquefied Natural Gas (LNG) import terminals …”

- FERC Conference, June 2004

- New England has no natural gas production or underground storage.
- Instead, the region relies on imports from the Gulf of Mexico and Canada, and also LNG from overseas.
  - One LNG vessel carries enough natural gas to serve more than 30,000 homes for a year.
- Total deliverability into New England is ~4.2 Bcf/day.
- Interstate pipelines are fully loaded, exceeding 90% capacity during the peak winter months.

New England Interstate Natural Gas Transmission System

![Map of New England's natural gas infrastructure](image)
The U.S. Energy Information Administration forecasts an annual average growth rate of about 1% in natural gas demand in New England through 2035.

Power generation has been the key driver.

Since 1998, New England has added some 10,000 MW of new generation, most of which is gas-fired.

About 40% of New England’s electric power generation is derived from natural gas.
Importance of LNG to Greater Boston & New England

LNG’s role in power production is critical.
- Diversity of energy supply is essential, and LNG is a clean option.
- Distrigas supplies the fuel for the 1,600 MW Mystic Power Station, the largest in New England.

New England is at the far end of U.S. interstate pipeline system and near the end of Canadian pipelines.
- The Distrigas terminal in Everett provides the necessary back pressure on the pipeline system.
- Only with LNG is New England “first in line.”

Distrigas serves most gas utilities in New England.
The Everett Terminal directly connects into:

- Algonquin Pipeline
- Tennessee Gas Pipeline
- National Grid local distribution system
- Mystic Power Station

The Everett Terminal supplies LNG via truck to nearly all of the 47 customer-owned LNG storage tanks in region. (LNG is how natural gas is stored in New England.) Today, LNG from Everett and these facilities can meet as much 40% of the natural gas demand on peak days.
Everett Marine Terminal – Center of Distribution

- **Tennessee Gas Pipeline**
  - 150 MMSCF/D
  - @ 750 PSIG
  - 15-20% Typical

- **Algonquin Gas Pipeline**
  - 150 MMSCF/D
  - @ 433 PSIG
  - 15-20% Typical

- **National Grid Greater Boston distribution**
  - 135 MMSCF/D
  - @ 220 PSIG
  - 1-2% Typical

- **Mystic Station (1,600 MW)**
  - direct connect
  - 300 MMSCF/D
  - @ 750 PSIG
  - 30-40% Typical

- **Liquid delivery via truck/trailer**
  - 1 million gals/day
  - 100 MMSCF/D
  - 8-10% Typical

- **Boil-off direct connection**
  - Local distribution
  - 50 MMSCF/D
  - @ 22 PSIG
  - 1-2% Typical

- **Typical flow rates**
  - 8-10% Typical
  - 30-40% Typical
  - 1-2% Typical
Additional LNG Deliverability: Neptune Deepwater Port

The shuttle and re-gasification vessel is based on a modified standard LNG ship.
DistriGas, Neptune, and Regional Pipelines

- Boston Harbor LNG transit route
- Tennessee Gas Pipeline (Interstate)
- Mystic Station direct connect
- Algonquin Gas Pipeline (Interstate)
- National Grid Greater Boston distribution
- National Grid local distribution
- Liquid delivery

Deliveries of LNG to Everett Terminal using traditional routes

Deliveries of natural gas using onboard regasification technology at Neptune port