Liquefied Natural Gas (LNG)
Basic Properties & Applications

Natural Gas 101
Northeast Energy & Commerce Association

May 2025

Liquefied Natural Gas (LNG) 101

Properties of LNG

- Natural gas becomes liquid when it is chilled to -162°C (-260°F)
- In liquid form, it takes up 600 times less space than vapor form.
- It is ½ the unit weight of water.
- LNG is easily pumped in liquid form.
- LNG is not stored or shipped under pressure.
- Not flammable as a liquid.
- Natural gas vapors are flammable, but not explosive unless they are in a confined space.
- It is heavier than air up to -100°C.
- The cold fumes are heavy and if released can migrate in the form of clouds; when they warm, the fumes rise and dissipate rapidly.
- LNG is colourless and lightly odorized (the same Mercaptan odor as natural gas); methane detectors should be used.
- It is non-toxic and non-corrosive.

Why is LNG Important to the Northeast?


Source: Saint John LNG


Source: WBUR

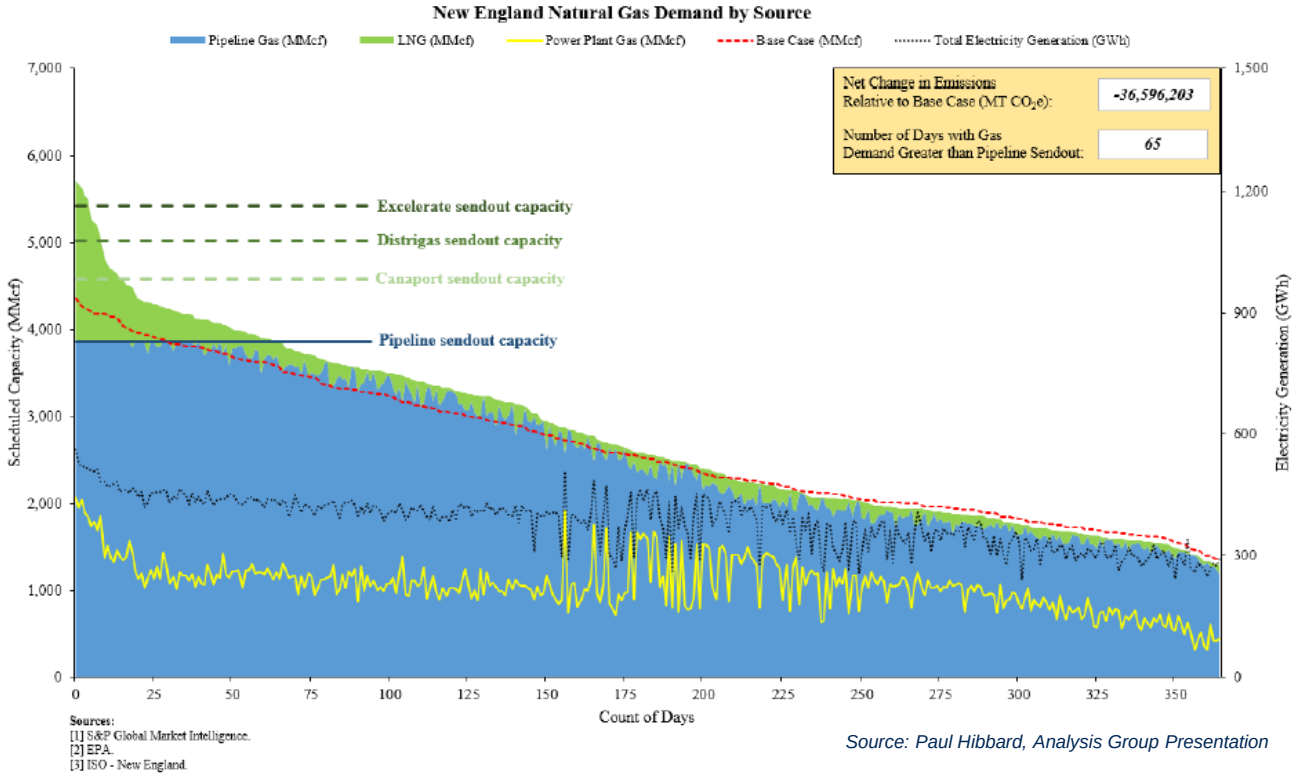

Source: Holyoke Gas & Electric, Google Earth

Source: Gaz Metro LNG L.P.

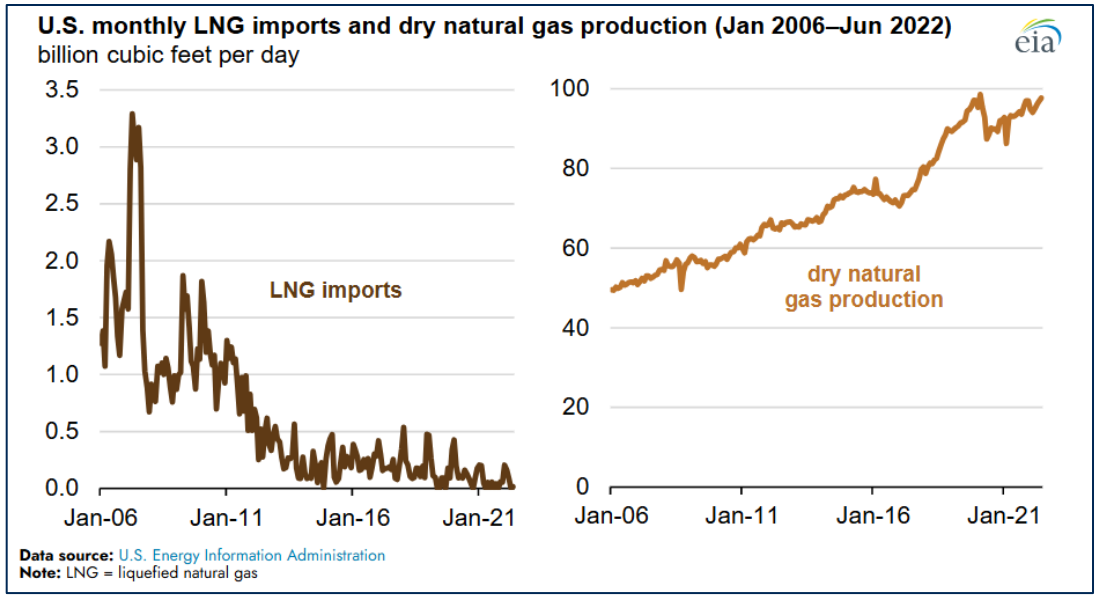
1. Three (3) LNG import facilities
2. 16+ Bcf of LNG storage for utility peak shaving service
3. Four (4) merchant LNG production facilities
4. Four (4) operating LNG facilities for commercial & industrial

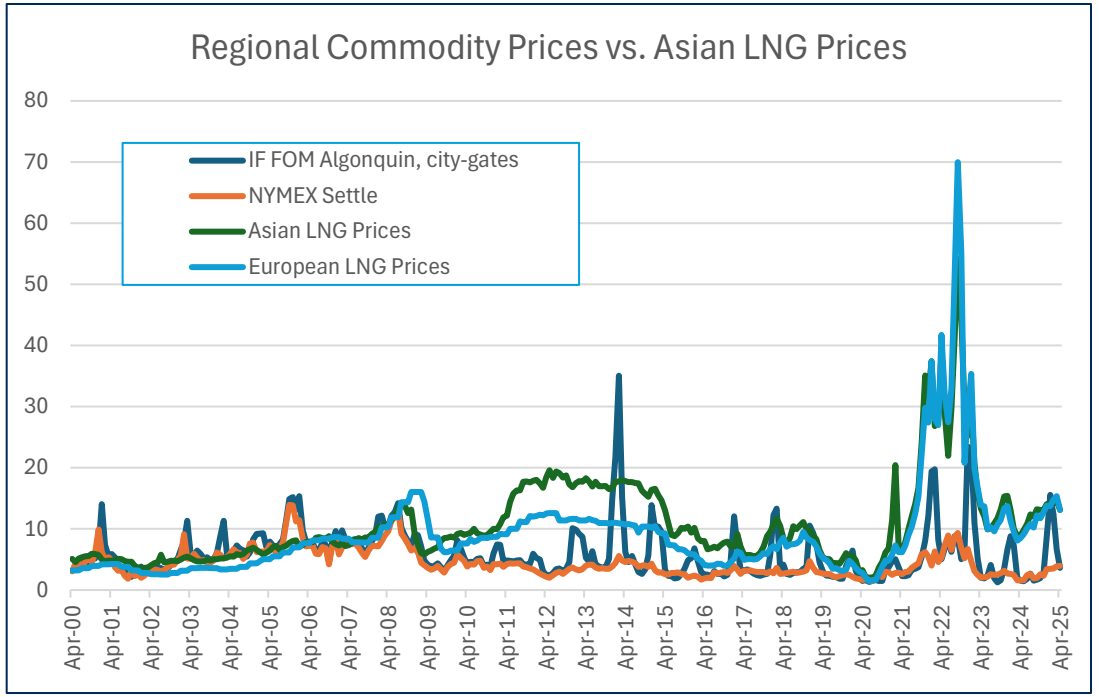
LNG Import Facilities

Name	Start	Storage	MAX Sendout
Everett Marine Terminal (Constellation LNG)	1971	3.4 BCF	0.7 Bcf/D
Saint John LNG (Repsol)	2009	10.0 BCF	1.2 Bcf/D
Northeast Gateway (Excelerate Energy)	2008	3.0+ BCF	0.8 Bcf/D



Source: Paul Hibbard, Analysis Group Presentation

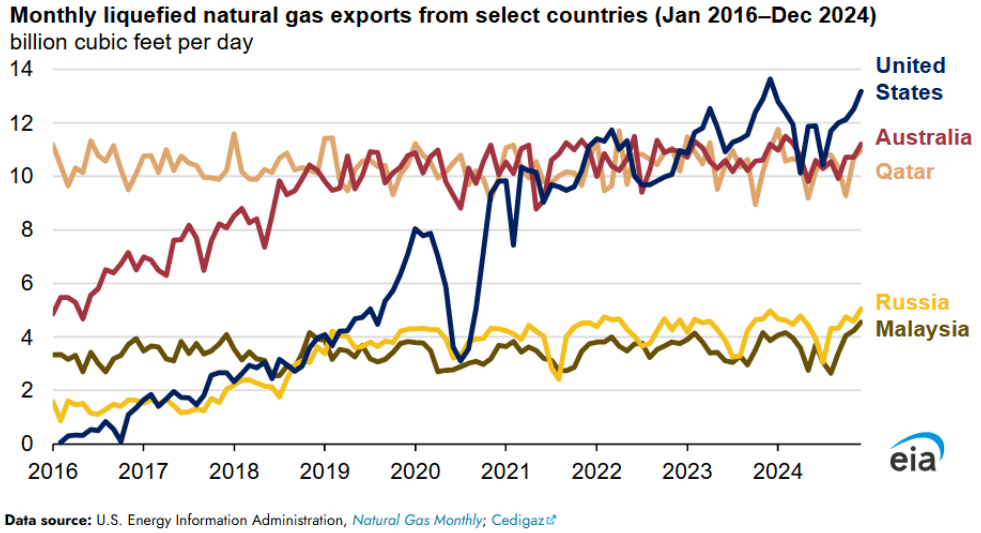




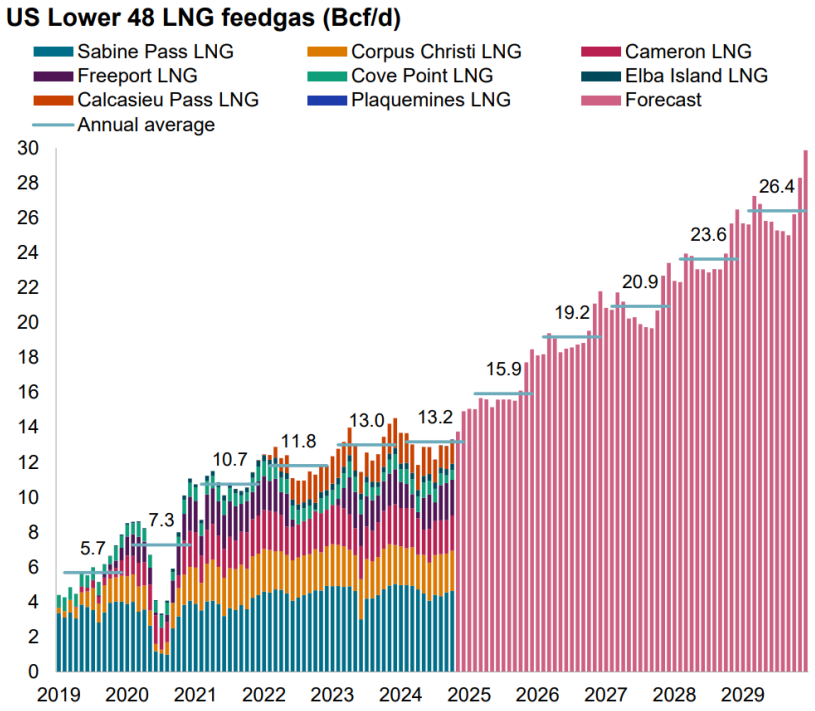
Data Source: S&P Global, Platts Connect

LNG Export Facilities

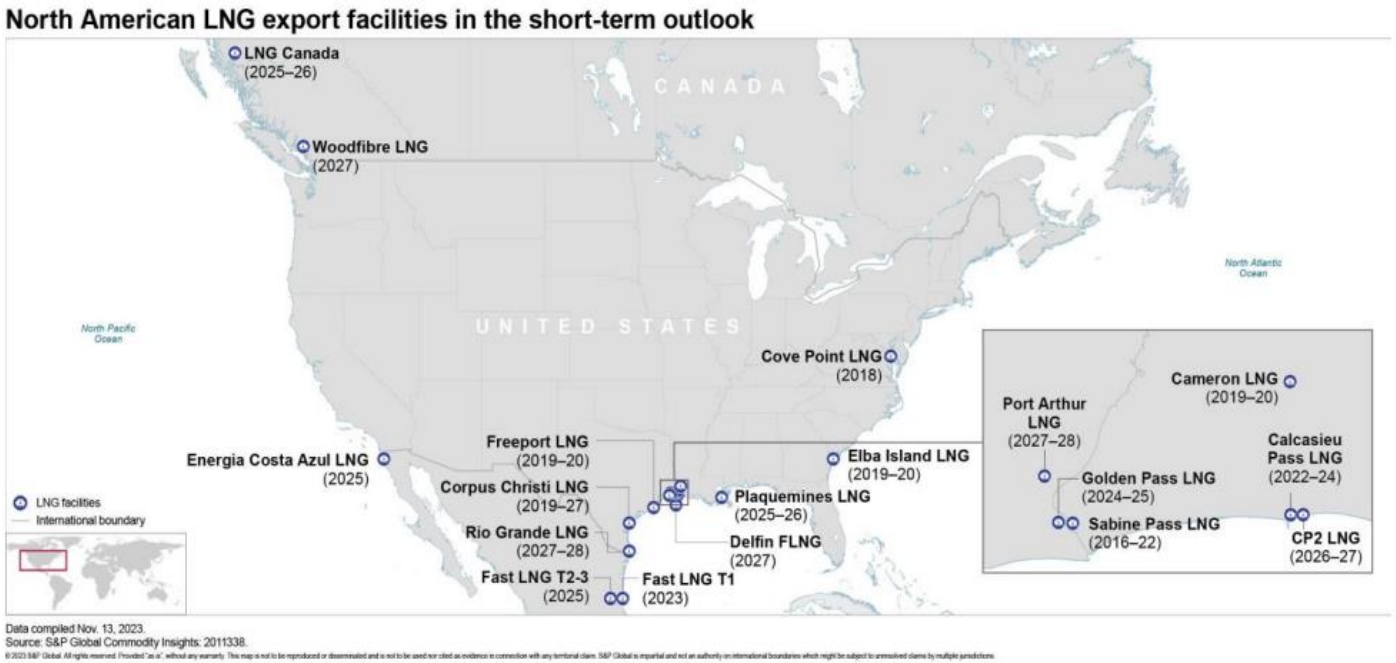
- Exponential growth of U.S. LNG exports.
- Northeast must compete with global markets to attract cargoes.
- Jones Act restricts domestic shipping in the United States by requiring goods transported between US ports to be shipped on vessels that are US-built, US-owned, and US-crewed.



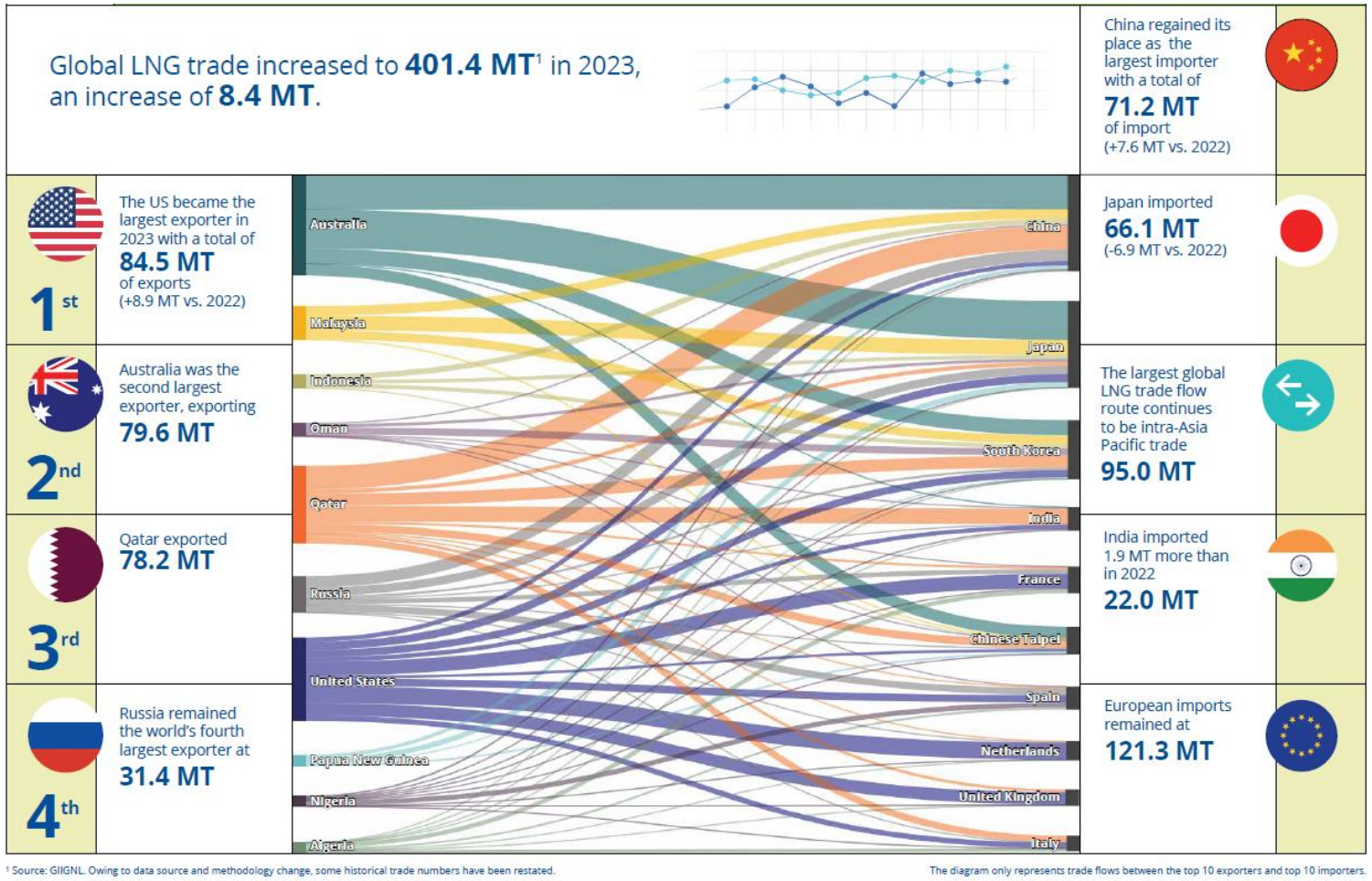
Data source: U.S. Energy Information Administration, *Natural Gas Monthly*; Cedigaz



Source: S&P Global Commodity Insights

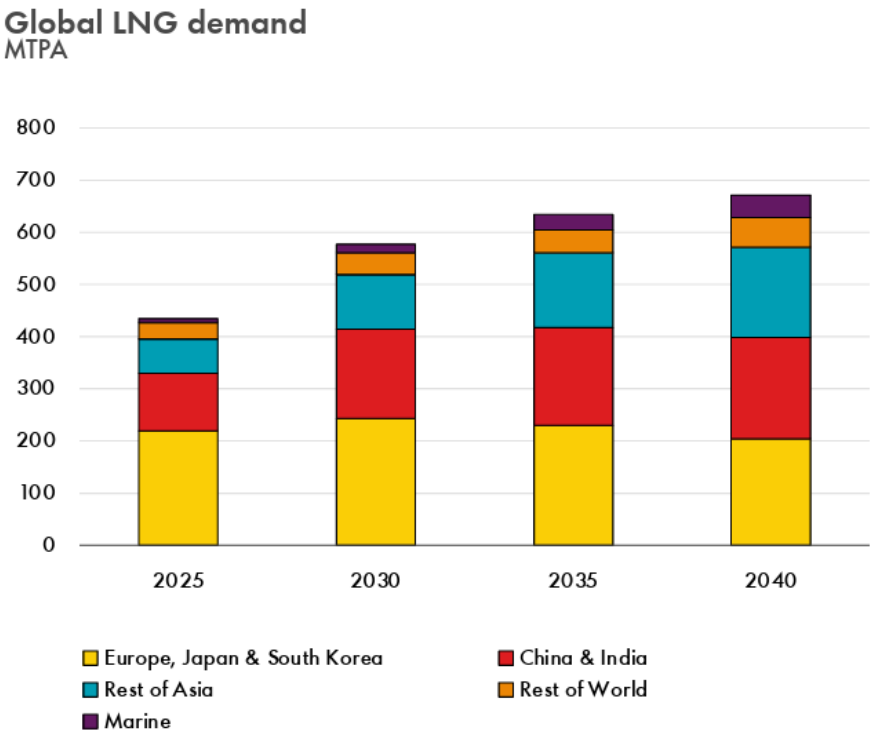


Global LNG Trade



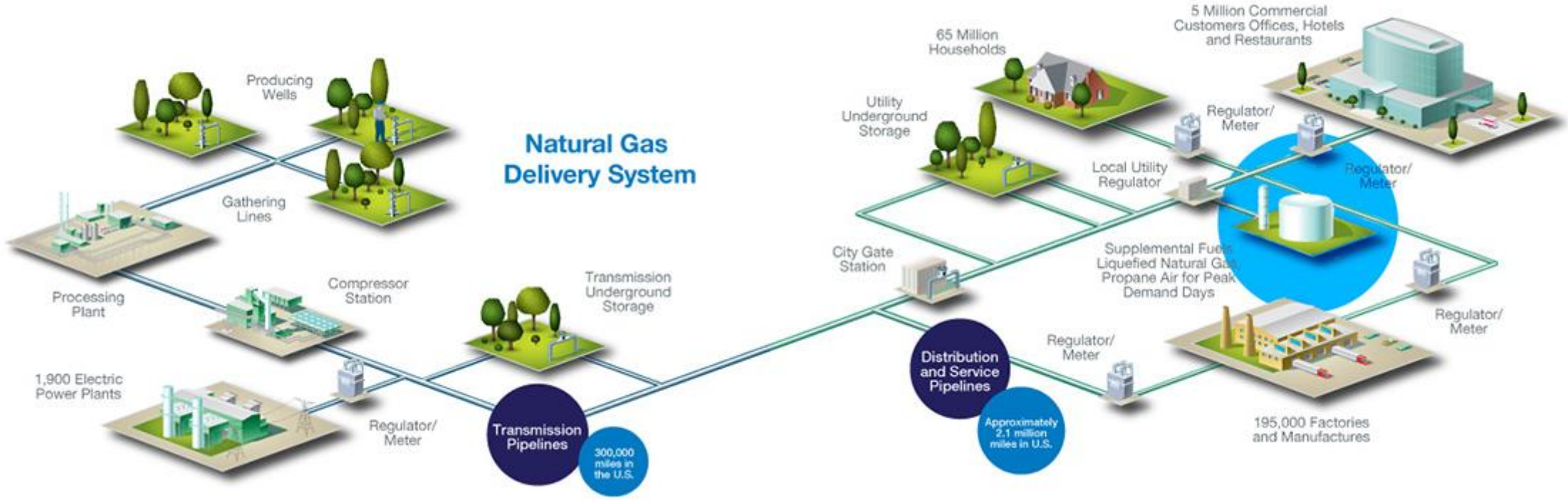
[1] Source: GIIGNL. Owing to data source and methodology change, some historical trade numbers have been restated.

The diagram only represents trade flows between the top 10 exporters and top 10 importers.



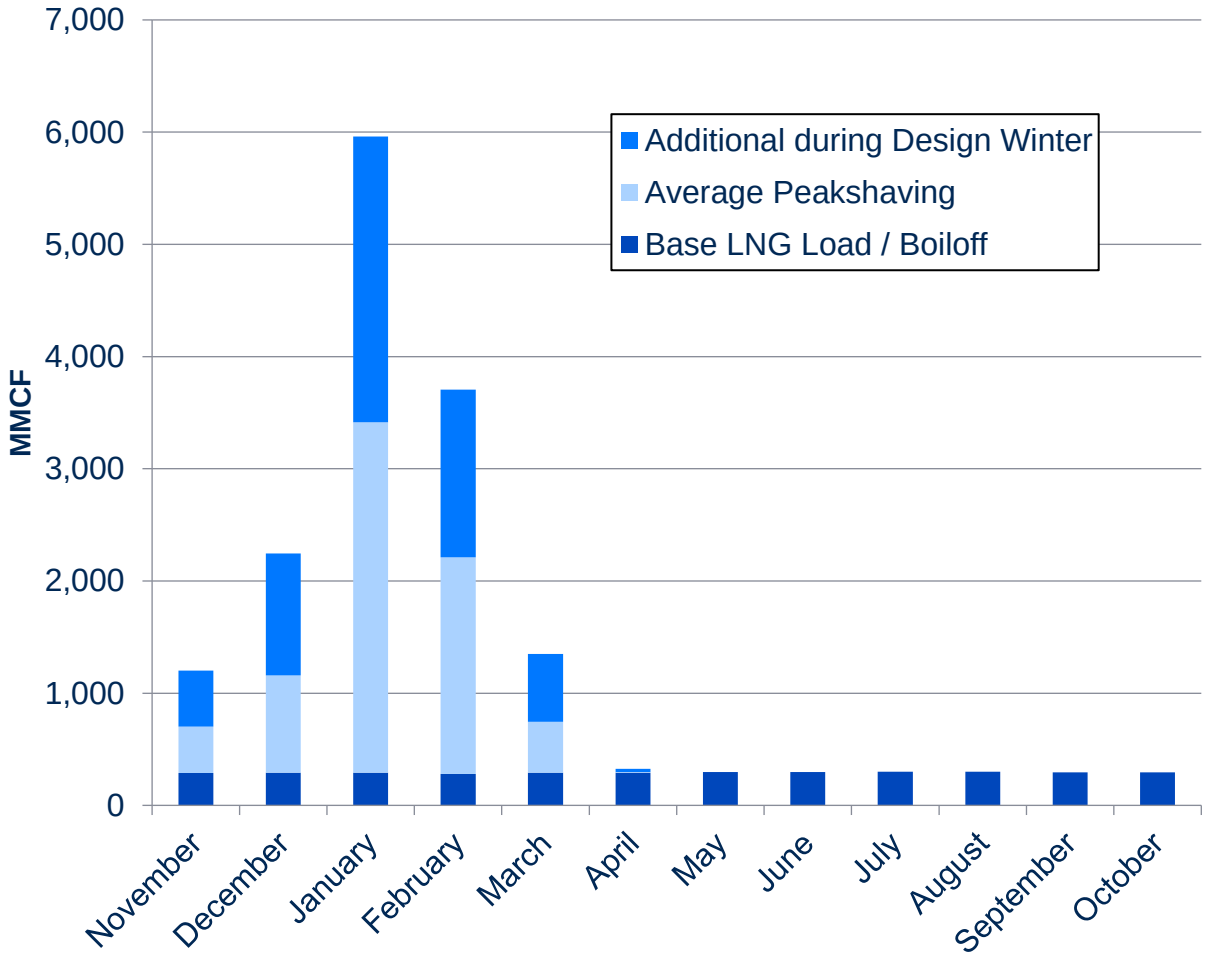
Source: Shell LNG Outlook 2025

LDC Peak Shaving



Source: 2025 National Grid USA Service Company, Inc.

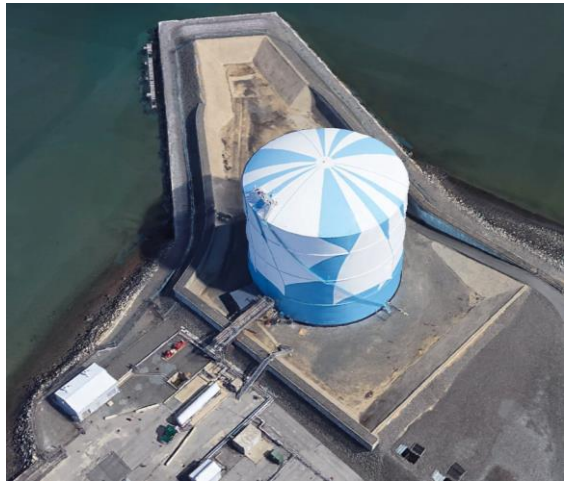
LDC Peak Shaving Facilities - Sendout



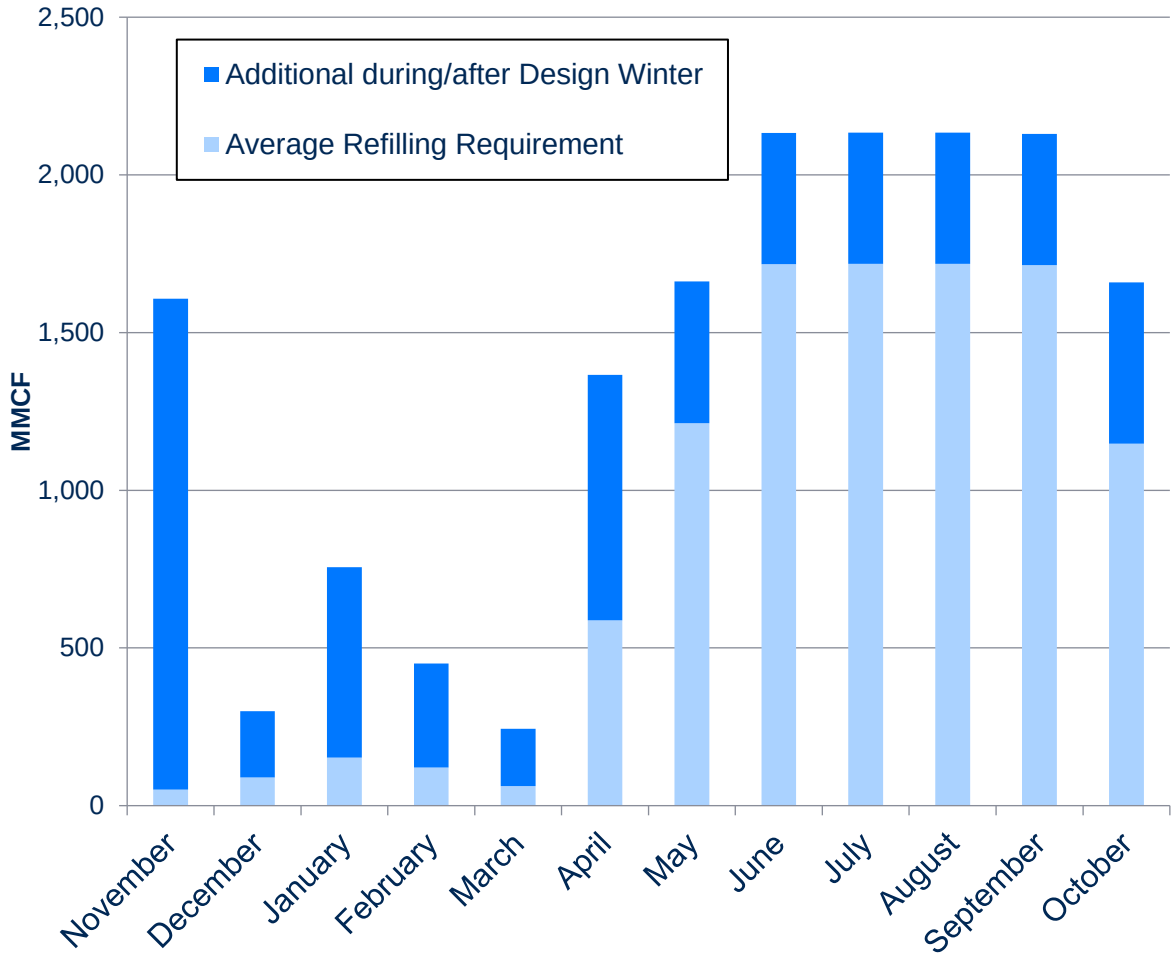
- Flexible, customized solutions
- Complementary to pipeline service
- Pressure support
- Supplement gas supply

LDC Peak Shaving Facilities - Refill

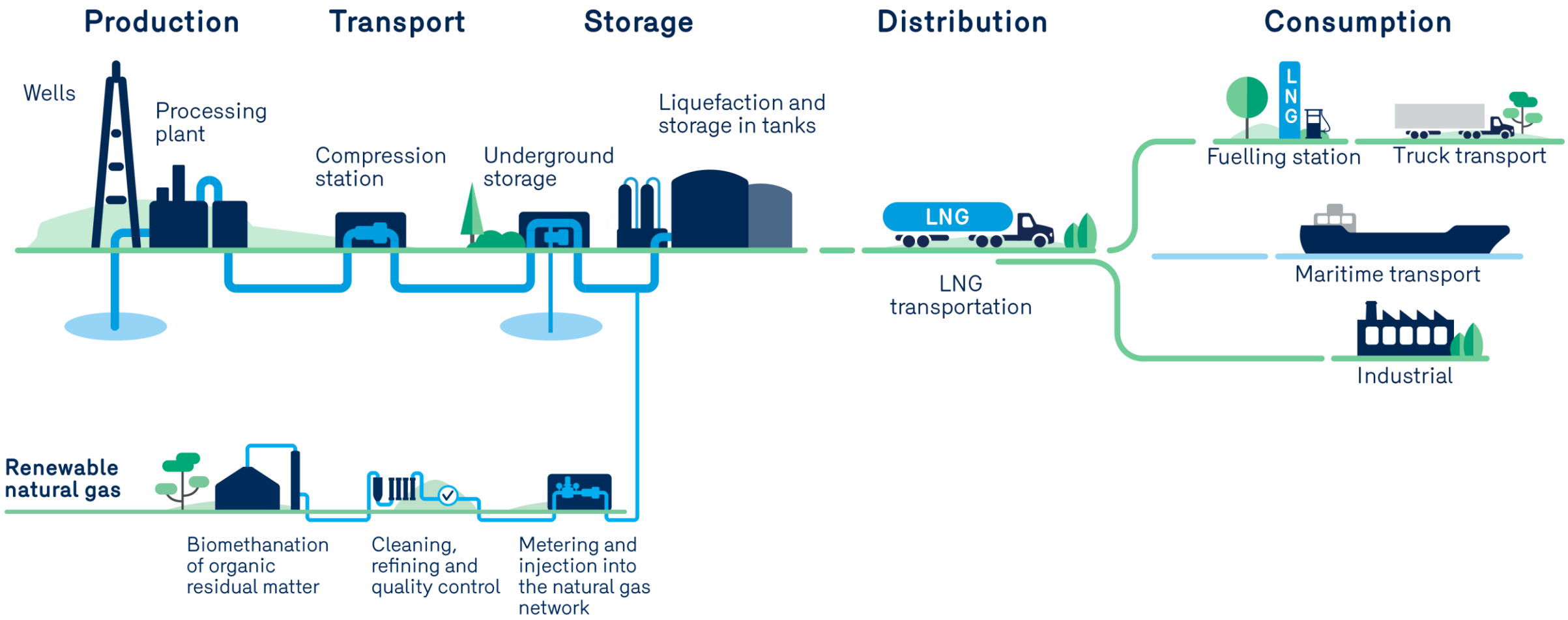
Source: Gaz Metro LNG L.P.


Source: Boston Gas Company, Google Earth


Source: Holyoke Gas & Electric, Google Earth



LNG Supply Chain



Commercial & Industrial Applications

- Direct heating of buildings, manufacturing, food processing and heavy industry.
- Back-up systems for critical and sensitive process technologies.
- Peak shaving systems to handle deficiencies in gas delivery.
- Numerous economic and environmental advantages over heavy fuel oil:
  - GHGs reduced by up to 32% on combustion;
  - Significant reductions in nitrogen oxide and sulphur dioxide emissions;
  - Significant reduction in annual energy costs.


Source: Gaz Metro LNG L.P.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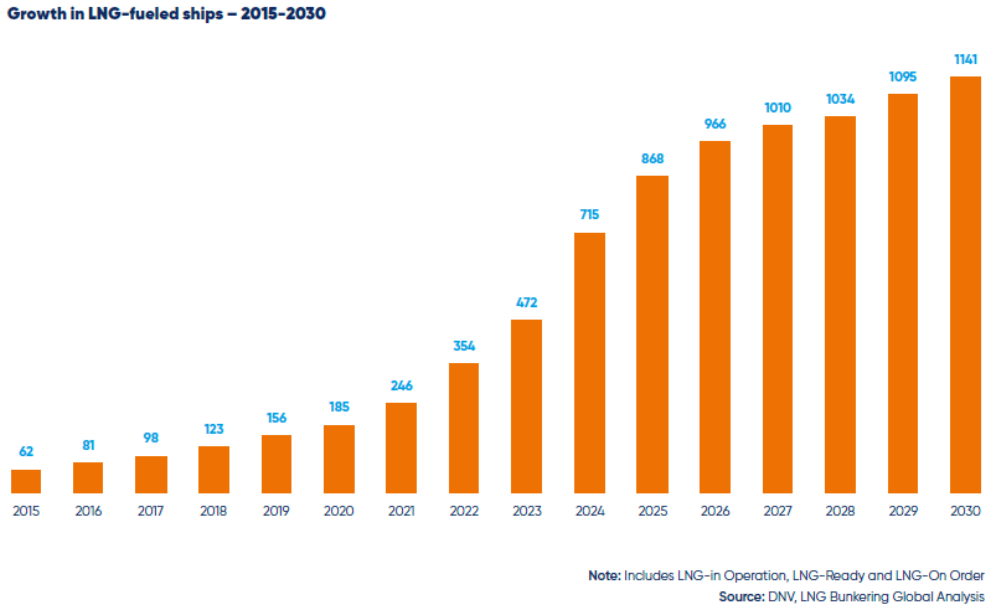
Marine Bunkering Applications

- LNG is increasingly being used as a marine fuel to reduce emissions and comply with international regulations.
  - 20–30% less CO2
  - 15-25% less total GHG
  - 90% less NOx
  - 99% less SOx
  - Almost no particulate matter (PM)
  - LNG engines are also quieter.
- Bio-LNG is considered a renewable fuel and can further reduce the carbon footprint of ships using LNG fuel systems.




Source: Gaz Metro LNG L.P.

Source: CMA CGM

Source: Carnival Cruise Lines

CNG Virtual Pipeline

- Natural gas can also be delivered as compressed natural gas (CNG). CNG is compressed to a fraction of its volume and typically transported via high-pressure cylinders on trucks. CNG is often used for smaller-scale delivery or as a fuel for vehicles in areas where pipelines or LNG infrastructure are unavailable.

Source: Algas SDI

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Source: Mead & Hunt

LNG Quick Facts

General Conversion Figures
• 1 LNG Gallon = 82.6 standard cubic feet of natural gas
• 1 LNG Gallon = 82,644 Btu
• 1,000,000 Btu ÷ 82,644 Btu per gallon = 12.1 LNG gallons per MMBtu
• 1 LNG Gallon = 3.5 lbs
• 1 LNG road tanker = 10,000 LNG gallons = 826 MCF = 35,000 lbs
• Typical LNG composition = 97mol% C1, 1.5% C2, <0.25% C3+, balance N2

Comparison Between LNG and Other Fuels			
	LNG	Propane	Diesel
Btu Per Gallon	82,644	91,000	139,000
Gallons per MMBtu	12.10	10.99	7.19
Relative Energy Density	1.00	1.10	1.68
Ignition Temperature (˚F)	1004	842	437
Leaks & Spills	Vaporizes to atmosphere	Gathers in low areas	Puddles on ground
Boiling Point (˚F)	-260	-44	370+

Thank You!

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