



# Powering the Future Through LNG

## LNG as a Back-up Fuel



*Cooler By Design.®*

## LNG IS THE OPTIMUM BACK-UP FUEL SOLUTION

Installing a back-up fuel supply is a prudent move if you're looking to supplement insufficient or unreliable pipeline capacity, meet additional load and seasonal variations or provide emergency fuel back-up during outages. Not only does a back-up system eliminate risk but it can also result in avoiding severe financial penalties if you're otherwise forced to curtail supply.

Having made that decision Chart would like to help you take it to the next level by suggesting you choose liquefied natural gas (LNG) as your back-up fuel instead of diesel, LPG or any other heavy fuel oil. Here are the similarities:

- Liquid fuel is delivered by a local contractor and stored on site until it's needed
- Turning the system on seamlessly provides fuel at the point of use
- The price for the fuel storage and delivery system is broadly equivalent, regardless of fuel type

Choose LNG though and here are the differences:

- Greater efficiency as you're using stored natural gas to augment pipeline natural gas and hence utilizing the same delivery system to the point of use
- Generators maintain equivalent efficiency to when they're operating with pipeline gas
- No turbine upgrade is required
- No SCR equipment on the vent stack
- No air permitting changes required
- Alternatives can be difficult to permit in non-attainment areas
- You're improving your credentials as a good corporate citizen by typically reducing emissions of CO<sub>2</sub> by 25%, NO<sub>2</sub> by 90% and eliminating SO<sub>2</sub> and particulates
- Take advantage of financial inducements for maintaining supply

Cover Story - in the coldest days of winter the UMass Amherst campus is completely cut-off from the gas pipeline grid and relies on LNG to keep the facility operating.

The Chart engineered and built storage and regasification plant replaces the previous system that consumed 1.5 million gallons of ultra low sulfur diesel.

LNG is less expensive, more efficient and better for the environment and local community. Since it was installed the campus has reduced its carbon footprint by 3000 metric tonnes of carbon each year and realized savings of millions of Dollars, including payback on the plant.



Six horizontal tanks provide almost ½ million gallons of LNG storage at a diamond mine in Canada.

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We're sure you have many questions so let's see if we can help by answering those your peers have already posed:

## What is LNG?

LNG is natural gas that has been liquefied by refrigerating it down to -260°F (-162°C). It's liquid volume is 1/600th of its gaseous volume and means it can be economically stored and transported without a physical pipeline.

## How is LNG transported?

The Virtual Pipeline is a substitute to a physical pipeline whereby liquid natural gas is instead transported from its source to the point of use by sea, road, rail or a combination of one or more of these, in cryogenic containers.

## As the LNG has to be stored and regasified for use what does the physical system look like?

A regasification station, also referred to as an LNG Satellite Station, incorporates LNG storage, vaporization, pressure regulation and control systems to deliver natural gas exactly as if it were from a physical pipeline. All equipment is shop built and either supplied as a single composite unit or as modules that can easily be hooked up on site.

*By way of example, for a peak shaving facility with a nameplate capacity of around 50MW (9000 BTU/kw-hr heat rate), the solution required an LNG satellite station with 100,000 gallons of LNG storage, which is still a single Chart shop built cryogenic tank.*

## I don't want to be dealing with different equipment suppliers while trying to project manage this solution.

You won't have to. Chart provides complete end to end solutions, from the earliest pre-feasibility discussions right through to maintenance and service packages.

## I'm nervous about investing in a new and unproven technology.

You're not! Chart has been pioneering cryogenic technology for more than 70 years.

## I'm not familiar with Chart.

Chart (Nasdaq: GTLS) is a recognized global brand for the design and manufacture of highly engineered equipment used from the beginning to the end in the liquid gas supply chain. Our products and know-how are critical to the separation, delivery and end-use of liquid gases across a multitude of applications in industry and for energy.

*Visit <http://chartcity.chartindustries.com/> and see how Chart features in many of the daily processes and items we take for granted.*

To learn more visit [www.ChartLNG.com](http://www.ChartLNG.com) or contact us at [LNG@ChartIndustries.com](mailto:LNG@ChartIndustries.com)





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Chart holds the following international HSE and quality accreditations:

Quality Management System in accordance with ISO 9001:2008

Environmental Management System in accordance with ISO 14001:2004

Occupational Health & Safety Management System in accordance with BSOHSAS 18001:2007



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