

The following is based on industry estimates and intended to show the potential regional economic impact of the construction and operation of a 100,000-gallon-per-day (GPD) LNG facility in the Twin Ports or surrounding area.

### Constructing the Facility\*

Capital Investment	\$60M
Direct Construction Jobs	200 FTEs
Direct Construction Wages	\$20M
Local Tax Impact	\$2.8M

### Operating the Facility

Direct Labor	25 FTEs
Direct Wages	\$1.75M/year
Indirect Labor	61 FTEs
Indirect Wages	\$2.8M/year
Local Tax Impact	\$630K

\* Impact During a 2-Year Construction Period.

# Liquefied Natural Gas It's right. Here and now.



## A Safe, Regulated Industry

LNG has been handled safely for many years and has an excellent safety record. The LNG industry is governed by numerous federal, state and local agencies, and LNG facilities are subject to stringent rules, regulations and environmental standards.

Facilities are designed with multiple layers of protection:

- Specially designed double walled tanks and piping
- Spill containment systems
- Fire protection systems
- Multiple gas, flame, smoke and temperature detectors and alarms
- Automatic and manual shutdown systems
- Video surveillance systems
- Highly trained personnel



## Transporting LNG

LNG is transported in the United States by truck, rail and vessel using specially designed cryogenic tanks. Trucks and vessels also carry ISO containers in the U.S. LNG is moved across oceans by LNG carriers with double hulls and cargo containment systems that protect and maintain the cargo at -260°F at atmospheric pressure. These vessels have an outstanding safety record with no fires or major cargo loss in more than a half century of operation.

LNG's low temperature, non-explosive nature and narrow range of concentrations at which its vapor will burn reduce the risk of fire and enhance safety during transport. Spills evaporate quickly and require no environmental cleanup—an important consideration in protecting the Great Lakes and natural resources of the Twin Ports and surrounding area.



## For more information, please contact:

Nancy Norr  
Director, Regional Development  
Minnesota Power  
nnorr@mnpower.com

Carol J. Wolosz  
Executive Director  
Great Lakes Maritime Research Institute  
cwolosz@d.umn.edu

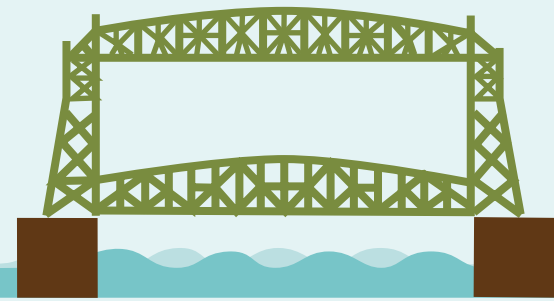
# Safe. Clean. Domestic.

## Fuel for the Future

Liquefied natural gas (LNG) is a safe, clean, competitive source of energy with a proven track record and enormous potential for future growth.

Essentially, LNG is the same environmentally responsible natural gas that people have trusted for generations to heat their homes and cook their meals—just cooled to -260°F at atmospheric pressure, where it condenses to a liquid. The volume of this liquid is about 1/600 that of natural gas, making it easier and more economical to store and transport by ship, rail or truck.

LNG's environmental benefits, cost advantages and availability from robust domestic natural gas reserves make it an attractive fuel for transportation companies, energy providers, mining operations and other core industries in Northeast Minnesota, Northwest Wisconsin and the Upper Peninsula of Michigan. Developing a regional capacity for natural gas liquefaction and distribution is the right opportunity—here and now.



## The Right Fit for the Northland

There are many compelling reasons to develop one or more LNG facilities in the Duluth/Superior or surrounding area.

- The region values environmental stewardship and clean energy initiatives that reduce emissions.
- An international port, four Class I railroads and dozens of trucking companies provide a large, built-in customer base for LNG transportation fuel as well as a distribution network.
- Mining companies and other regional industries could meet tightening emissions standards and save money by converting heavy vehicles to LNG fuel—if a competitive supply was readily available.
- Existing natural gas pipelines, an LNG peak shaving facility in nearby Wrenshall, Minn., and plans to convert a northeast Minnesota power plant to natural gas demonstrate regional confidence in this environmentally preferred fuel.
- Outstanding colleges and universities work with business and industry to graduate students with the right skill sets for immediate employment.

## Environmental Benefits of LNG

- Efficient natural gas is the cleanest burning fossil fuel (lower NOx, SOx, CO2 and particulates).
- The liquefaction process removes impurities that would freeze, resulting in an even cleaner burning fuel when LNG is returned to its gaseous state.
- LNG that is vaporized and used as fuel “reduces particle emissions to near zero and carbon dioxide emissions by 70% in comparison with heavier hydrocarbon fuels.”\*
- LNG evaporates and dissipates quickly. It is non-explosive, leaves no slick or residue if spilled on water or land, and requires no environmental cleanup.



\* The Role of LNG in North American Natural Gas Supply and Demand, a report by the Center for Energy Economics at the University of Texas at Austin.

## Why Now?



Tightening environmental standards



High domestic demand and industry interest in Great Lakes LNG supply



Need for U.S. energy security



Existing, proven technology



Access to robust natural gas deposits

## Why here?

### Strategic Advantages:

- Regional environmental ethic
- The #1 volume port on the Great Lakes
- Four Class I railroads
- More than 30 trucking companies
- Natural gas transmission infrastructure from multiple providers
- Direct access to I-35 and major highways
- Market of 4.3 million people within 250 miles

### Potential Markets:

- Marine industry
- Rail carriers
- Mining
- Trucking companies
- Public transit and other transportation fleets
- Agriculture
- Other industrial users



## The Right Time for Investing

- Tightening federal fuel efficiency and emissions standards for medium- and heavy-duty vehicles will impact semi trucks, delivery trucks, buses, garbage trucks and heavy-duty pickups and vans.
- Permissible levels of sulfur and nitrogen oxides in marine fuels are being significantly reduced for vessels operating in North American waters, including the Great Lakes.
- LNG liquefaction and refueling capabilities will give the Port of Duluth-Superior a competitive advantage as shipping companies explore upgrading their fleets to energy-efficient LNG.
- Investing in clean domestic energy technologies reduces dependence on foreign oil and benefits the environment.
- LNG is a proven transportation fuel that does not require research and development.
- Access to vast new domestic supplies of natural gas in adjacent states could bring an economic boom to regions that invest in LNG facilities.