

## Driving Change. Linde LNG for Fleet Transportation Fuel



### LNG in Transportation

Liquefied natural gas (LNG) is an economical alternative to diesel for heavy duty trucks and other modes of transportation. LNG offers a lower life-cycle cost for high fuel-use fleets and enables driving ranges up to 600 miles between refueling. With natural gas prices likely to remain low and stable for the foreseeable future, more fleets are testing – and converting to – LNG.

### Linde in Natural Gas Fueling

Linde has activities across the natural gas supply chain relevant to the production and use of natural gas fuels. Offering turnkey supply, including production from LNG plant networks, distribution and logistics, and mobile and permanent fueling stations, Linde delivers complete solutions for natural gas fueling.

- **LNG Production** – Linde builds, owns and operates natural gas liquefiers at small to medium scales using both pipeline natural gas and landfill gas. We are supported by Linde Process Plants, a leader in natural gas processing and upgrading technology engineering, procurement and construction.
- **LNG Supply Management** – As the LNG fueling market rapidly evolves, prospective customers will want to rely on fundamental expertise and capabilities to ease the transition. Linde draws upon world-class logistics and plant network capabilities to make this happen. We own and operate more than 1,000 plants worldwide and safely and reliably make several million deliveries of cryogenic gases each year. In North America alone, Linde makes more than 1,000 bulk cryogenic liquid deliveries a day, serving over 10,000 customers. Our National Operating Center provides customer service, coordinates deliveries and operates many of our plants remotely.
- **LNG Fueling Stations** – Linde designs, builds and operates LNG and LCNG (liquefied-to-compressed natural gas) fueling stations in conjunction with our Cryostar subsidiary. Cryostar produces and Linde services much of the cryogenic equipment necessary for transportation fueling, including submerged pumps and controls in LNG stations. Linde also provides systems to prospective LNG customers in order to demonstrate the viability of the fuel. For these customers, Linde will supply, install and maintain a complete mobile fuel station along with the LNG.

### A Success Story

Linde's first LNG plant in North America converts methane gas from a landfill into LNG fuel for Waste Management refuse vehicles across California. In a joint venture partnership with Waste Management, Linde designed and built a 13,000 gallon-per-day biofuel plant – the largest of its kind in the world. Since 2009, Linde has operated the plant, fueling over 300 LNG and LCNG trucks and providing numerous economic and environmental benefits.

**Commitment to LNG** Linde is expanding its LNG capabilities in North America by applying unique gas cleanup and liquefaction technology in plants that will create a network to support the growth of natural gas fueling infrastructure for transportation use. Our proven cryogenic distribution network, coupled with novel high-performance fueling equipment, enables Linde to offer turnkey LNG and LCNG supply and fueling solutions.

Linde, a large nationwide heavy-duty truck fleet operator, is also a dedicated LNG fuel customer. We have started converting our fleet to LNG and will have over 20 LNG-fueled tractors operating in 2012.

**Linde Traditions** For more than 100 years, Linde has led the way in cryogenic gas project development, plant operations, distribution and logistics, and management of assets and tools. For LNG and LCNG for transportation, Linde is your partner for safety, reliability, cost savings and excellent customer service.

**Safety** Because of the hazards that natural gas poses, Linde, a ResponsibleCare® company, provides specialized design and engineering expertise, and is skilled in HAZOP and emergency response planning. We offer major hazard reviews, process safety management and loss prevention programs, and emergency response and personnel safety protection systems. The results have led to world-class performance and numerous safety awards.

**Reliability** You can count on the reliability and quality of Linde products. We have a top rating in the cryogenic gases industry for on-time delivery, 24/7/365. Our world-class logistics skills ensure proper management of natural gas fuel supply networks. We optimize programs for product supply, including forecasting, scheduling and dispatch. For plant operations, we apply years of experience to specific customer situations. This results in reliable plant and field operations, consistent product output and quality, and peak performance. Linde has the expertise to manage multiple plants that form a natural gas fuel supply network.

**Cost Savings** Linde works with you to reduce costs through careful equipment selection and integration of our design and engineering solutions with your personnel. We evaluate site-specific needs and local product requirements and undertake ongoing remote monitoring and maintenance. Relying on Linde personnel allows fleet managers to avoid costly staffing and redundant training. A Linde-managed supply network can address demand variations at low cost.

**Growth of the LNG Sourcing Network** Linde exclusively licenses the small-scale liquefaction technology developed by the Gas Technology Institute (GTI), which provides the opportunity to produce LNG at scales suitable to serve fleets locally, minimizing distribution costs and reducing delivery times. It is also suitable for virtually any methane source.

**Service** ISO9002-certified since 1994, Linde provides remote operations capabilities, services support and coordination of deliveries and tank-related services, as well as predictive and preventive maintenance. Proprietary software enables us to efficiently deliver product when and where it is needed at any time, 365 days a year.

**Talk to Linde** Linde has the experience and know-how to enable world-class approaches to LNG supplies and natural gas-based fueling for transportation needs.

Learn more about LNG for transportation at [www.lindelng.com](http://www.lindelng.com).

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