Plants, terminals and equipment for the entire LNG value chain.

Paving the way for LNG.

→ Natural gas and liquefied natural gas
Driven by increasing natural gas demand and decreasing costs along the whole LNG value chain (due to significant economies of scale, improvements in technologies, etc.), investments in LNG infrastructure are growing rapidly in the last years. LNG has turned from being an expensive and regionally traded fuel to a globally traded source of energy with rapidly diminishing costs.

In China, Norway and lately in particular in the US, petroleum fuels have been successfully substituted by LNG in various applications, mainly for heavy trucking, remote power generation and marine fueling. Today the volumes are still relatively small; however, studies indicate substantial demand for additional domestic LNG capacities in many countries. These include the entire Baltic Area (ECA) and South East Asia. As a consequence, an appropriate infrastructure consisting of small- to mid-scale LNG liquefaction plants, import terminals, refuelling stations will be built up and/or expanded.

With more than 125 years of comprehensive experience in the handling of cryogenic liquids, Linde Engineering has a track record in the design and performance of a wide range of natural gas projects including upstream natural gas liquids recovery (NGL plants), feed gas pre-treatment and liquefaction, transport and distribution of LNG and regasification in both bulk imports and export terminals.

Linde Engineering is well recognised as a reliable technology provider and EPC contractor, both by its customers and the financial world. In-house manufacturing capabilities for core cryogenic equipment, such as heat exchangers (both coil-wound and plate-fin type), evaporators, pumps, expanders and vacuum-insulated piping complement Linde Engineering’s unique profile and enable it to customise the process design and core equipment.

Linde Engineering’s integrated project management concept assures the handling of complex interfaces and delivers a plant, equipment or packaged unit in due time and quality.

The Linde Group offers innovative and economical solutions for the entire LNG value chain and has more than 40 years experience in designing, building and operating LNG plants and proprietary cryogenic equipment.
Linde along the LNG value chain. Cryogenic equipment and packaged units.

- Process units
- LNG tanks
- Complete small- to mid-scale LNG import terminals (design and manufacturing of main equipment)
- BOG compressors
- Turbines and expanders for liquefaction cycles
- Water-bath vaporisers (water-bath, air-heated or Sub-X® submerged pumps)
- LNG vaporisers (water-bath, ambient air vaporisers, submerged pumps)

Packaging and delivery by ship

- LNG shipping incl. FPSO, FSRU, supply-injection vessels
- LNG bunkers
- LNG terminals and regasification

- LNG processing (liquefaction and regasification)
- LNG storage (flat-bottom, bullets, spheres)
- LNG and biogas liquefaction units for capacities up to 100 tpd
- LNG processes
- Small-scale liquefaction cycles for capacities up to 10 tpd
- Water-bath vaporisers (for Nitrogen)
- LNG pumps SUBTRAN (60 kW) and VS pumps
- Ambient air vaporisers
- LNG dispensers incl. payment protocol
- Larger pumps for transfer and re-fuelling stations
- Truck loading pumps
- LIN booster and LIN HP pumps
- Return gas blowers/BOG compressors
- BOG handling systems, BOG compression, BOG FGSS incl. FPP pumps, Scantrol, Scantrol E/EPP packages
- Wobbe Index control
- LINORC™ (Linde Organic Rankine Cycle unit)
- LIN booster and LIN HP pumps
- Scantrol, Scantrol E/EPP packages
- BOG compression
- NG compression
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LNG processing (upstream) and LNG delivery by pipeline

<table>
<thead>
<tr>
<th>LNG value chain</th>
<th>Stateline I+II (USA) 2 x 100</th>
<th>McKenzie City (USA) 1 x 100</th>
<th>Cottonwood (USA) 1 x 60</th>
<th>Parachute Creek (USA) 1 x 350</th>
<th>Canadian County (USA) 1 x 150</th>
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<tr>
<td>NG liquefaction</td>
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| Process plants incl. pre-treatment, with and without collection systems, e.g. PFHE, coldbox or CWHE, at atmospheric flat-bottom tank, storage facility (atmospheric flat-bottom tank) with partners), LNG vaporiser and recondenser. | 180 tpd/0.06 mtpa | 120 tpd/0.04 mtpa | 1,840 tpd boil-off gas reliquefaction | 2 x 1.25 mtpa liquefaction | 07

Reference projects

- Hammerfest (Norway), basic engineering 1 x 4.3 mtpa liquefied natural gas (LNG) terminal: 2 x 160,000 m³ full containment LNG storage tanks with membrane technology, truck loading with 2 x 175,000 m³ loading bays
- Nynäshamn (Sweden) 12.7 tph regasification rate, 2 x 160,000 m³ full containment LNG storage tanks with membrane technology, truck loading with 2 x 175,000 m³ loading bays
- Lysekil (Norway), 21 tph regasification rate, 30,000 full containment LNG tank, truck loading with 2 x 100 m³/h loading bays
- Pori (Finland), FEED 2019, LNG bunker station with 4 x 1,000 m³ pressurised bullet LNG storage tanks, 2 x 75 m³/h loading bays
- Huskvarna (Sweden), 21 tph regasification rate, 5 x 1,000 m³ pressurised bullet LNG storage tanks, 2 x 75 m³/h loading bays
- Stavanger (Norway) 900 tpd | 07
Collaborate. Innovate. Deliver.

Linde’s Engineering Division is a leading player in the international plant engineering business. Across the globe, we have delivered more than 4,000 plants and cover every step in the design, project management and construction of turnkey industrial facilities. Our proven process and technology know-how plays an indispensable role in the success of our customers across multiple industries – from crude oil, natural gas extraction and refining to chemical and metal processing.

At Linde, we value trusted, lasting business relationships with our customers. We listen carefully and collaborate closely with you to meet your needs. This connection inspires us to develop innovative process technologies and equipment at our high-tech R&D centres, labs and pilot plants – designed in close collaboration with our strategic partners and delivered with passion by our employees working in more than 100 countries worldwide.

From the desert to the Arctic, from small- to world-scale, from standardised to customised builds, our specialists develop plant solutions that operate reliably and cost-effectively under all conditions.
You can always rely on us to deliver the solutions and services that best fit your needs – anywhere in the world.

Core competencies at a glance

Plant engineering
→ Air separation plants
→ LNG and natural gas processing plants
→ Petrochemical plants
→ Hydrogen and synthesis gas plants
→ Adsorption plants
→ Cryogenic plants
→ Carbon capture and utilisation plants
→ Furnaces, fired heaters, incinerators

Component manufacturing
→ Coldboxes and modules
→ Coil-wound heat exchangers
→ Plate-fin heat exchangers
→ Cryogenic columns
→ Cryogenic storage tanks
→ Liquefied helium tanks and containers
→ Air-heated vaporisers
→ Water bath vaporisers
→ Spiral-welded aluminium pipes

Services
→ Revamps and plant modifications
→ Plant relocations
→ Spare parts
→ Operational support, troubleshooting and immediate repairs
→ Long-term service contracts
→ Expert reviews for plants, operations and spare part inventory
→ Operator training

Discover how we can contribute to your success
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