

INTEGRATED



Energy Systems



Liquefied Natural Gas

Chart is developing the LNG infra-structure right across the value chain, by building the plants that liquefy natural gas and the terminals for its off-loading, storage and distribution. We're also the company that engineer and provide the total solutions that are bringing LNG power to off-grid locations and displacing diesel and heavy oils for a range of high horsepower applications in industry and as a clean-burning, economic transport fuel for trucks, ships and rail.

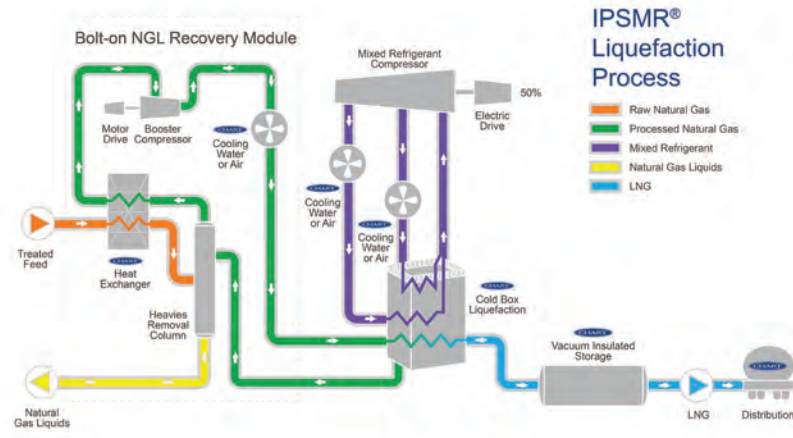


Chart proprietary IPSMR process technology is less complex than dual mixture process and provides process optimization for liquefaction of natural gas, ethane, propane, butane and air.

The high heat transfer surface area and multi-stream capability of Chart brazed aluminum heat exchangers deliver operating efficiencies and reduced power consumption.

Chart liquefaction plants are challenging the paradigm that a single large custom engineered, stick built facility provides the best economy of scale.

Small-scale liquefaction is ideal for liquefying pipeline quality gas and Chart's solution for capacities, nominally from 80 to 725 tons per day (50,000 to 450,000 gallons per day) comprises a choice of standard plant designs.

Larger plant capacities are obtained through multiple 'scale adapted' liquefaction modules. Each modular train is typically engineered to provide between 0.5 to 3 MMTPA (900,000 to 4,500,000 gallons per day) that can be matched to the gas turbine power available.

Modular solutions offer lower risk profiles and CAPEX exposure than a traditional base load approach and also reduce on-site labor and camp costs by up to 30%.

Chart small-scale LNG terminals cryogenically store off-loaded LNG and can incorporate modules for bunkering, NGV fueling, loading into road and rail tankers and re-gasification for pipeline transmission.



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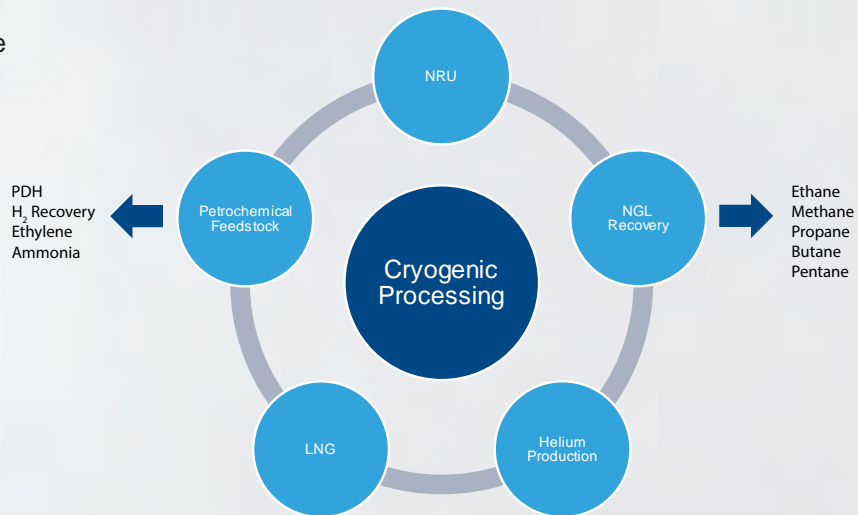
The IEA is predicting that global energy demand will increase by around 30% between today and 2040. The challenge is to produce a lot more energy without worsening air quality conditions and, with renewable technologies still not sufficiently developed, Chart's integrated energy systems are maximizing the value of natural gas resources, which are fundamental to this transition.

It is the vertical integration of our process technology, proprietary equipment and relationships with key strategic sourcing partners for balance of plant requirements, that enables Chart to deliver complete solutions and makes us unique in the industry.

Principal in-house engineered and built products:

- Brazed Aluminum Heat Exchangers
- Core-in-Kettle®
- Cold Boxes
- Air Cooled Heat Exchangers (Fin-Fan®)
- Cryogenic storage tanks
- Vaporizers
- Vacuum Insulated Pipe

Chart's Engineering Center of Excellence for integrated energy systems is in the Woodlands, TX supplemented by regional offices in North America, Europe and Asia. In addition to the specialist proprietary equipment manufacturing locations, our New Iberia, LA facility packages large assemblies and offers direct waterside access. Chart also packages major equipment in Indiana, Europe and Changzhou, China.



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8665 New Trails Drive, Suite 100
The Woodlands, TX 77381 USA

Tel: +1 281-364-8700
Fax: +1 281-364-8706
processsystems@chartindustries.com
www.chart-ec.com

Natural Gas Processing

Forecast demand for natural gas will continue to rise as consumers seek a cost efficient, environmentally friendly source of energy and unconventional sources, including stranded gas reserves and associated gas, will have a bigger stake in the overall supply picture. Chart's natural gas processing technology is perfectly pitched to support these worldwide developments.



Nitrogen Rejection

Chart has delivered more large scale NRUs than any other supplier of nitrogen rejection technology. Our experience, with in-house design and fabrication of NRUs spans more than 40 years and draws on our proprietary process technology.

From the first integrated NRU/NGL unit to handle variable nitrogen content to the world's largest single train NRU, Chart's integrated systems to separate and remove nitrogen and recover natural gas liquids and helium, guarantee our position at the vanguard of nitrogen rejection technology.

Moreover Chart's NRU design knowhow extends to adjunct systems that recover high purity LNG and refrigeration grade liquid nitrogen if desired.

NGL Recovery

Chart process technology facilitates recovery of high value Natural Gas Liquids (NGL) that are ideal feedstocks for steam crackers producing olefins.

Our engineering expertise resides in our ability to tackle the most onerous applications where NGL recovery is integrated with additional gas processing operations. Integrated systems provide significantly reduced energy consumption versus separate NGL recovery and nitrogen rejection units (NRU) delivering up to 95% ethane recovery and almost 100% recovery of propane and heavier hydrocarbons.

Helium Recovery

Helium is largely recovered as a by-product of natural gas processing and Chart's process expertise and proven experience in providing integrated NRU systems that enrich and recover helium is highly regarded by companies around the world seeking to exploit their valuable helium resources.



Petrochemical Processing

Whether it's a grassroots complex, plant revamp, debottlenecking or energy conservation project, Chart is the right partner for maximizing product recovery and energy efficiency in your cryogenic processing systems.

Propane Dehydrogenation

Approximately 5% of the world's propylene supply is produced commercially by on-purpose dehydrogenation of propane. Chart is a pre-qualified supplier of the mission critical cryogenic separation systems for the principal propane dehydrogenation processes and offers conventional and advanced reliable and efficient separation system packages.

Ethylene Production

Chart supplies brazed aluminum heat exchangers, Core-in-Kettle® and cold boxes custom designed for all cryogenic separation and liquefaction processes offered by the industry's technology licensors. We also provide in-kind replacement systems for existing and revamped facilities. Key to Chart's success is the ability to design and fabricate systems which make use of our proprietary heat transfer knowledge and equipment.

Hydrogen Recovery

Chart is a leader in cryogenic process design in the areas of Hydrodealkylation, purge gas processing and hydrogen - hydrocarbon separation systems where hydrogen recovery is essential. We offer design and fabrication of process systems for hydrogen recovery, purification, liquefaction and re-liquefaction.



Chart Lifecycle, Inc.

A Chart integrated energy system is a complete package solution comprising process technology, detailed mechanical design, Chart manufactured proprietary equipment and ancillary items sourced from partner companies. Through Chart Lifecycle we extend our level of service through the entire life cycle of our products and systems focused on their optimized performance and lifespan.

- Single point turn-key project accountability
- BAHX and cold box services - including installation, commissioning, repair, emergency response, operator training, process control, DCS analysis, service plans
- Fin-Fan® cooler services - one-stop shop for all Fin-Fan parts, servicing, performance upgrades, retrofits and replacements
- Turnarounds and installations for the energy, petrochemical, refinery, syngas and power industries
- Fabrication and refurbishment for the energy, petrochemical, refinery, syngas and power industries
- Safety and rescue services

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Tel: +1 281-364-8700
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