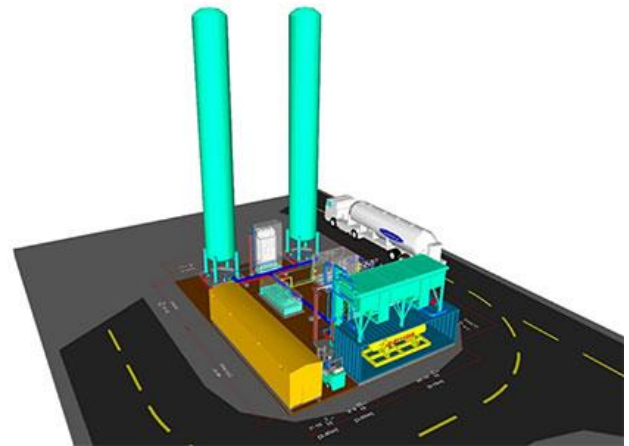
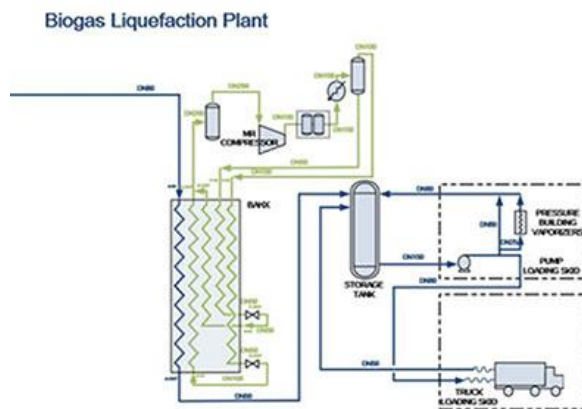




Special Feature

Chart's Micro Liquefiers for Biogas- C15MR and C15

April 5, 2022



As LNG users increasingly look to add BioLNG to their supply, Chart has vertically integrated our technologies to add Micro Liquefaction with the option for LBG Liquefaction on the C15 Mixed Refrigerant (MR) Series.

BioLNG is defined as the highly sustainable version of liquefied natural gas (LNG). Also known as liquefied biomethane with almost identical chemical properties as LNG. The methane is produced during the anaerobic digestion (AD) process, which is the breaking down of the organic matter, such as agricultural and food waste. It is broken down in an oxygen-free environment to produce the methane rich biogas.

Seen as a cleaner renewable energy source than other off-grid biofuels, various EU government policies are increasing focus on development of biomethane. In the EU alone, with policies to boost production of BioLNG to help meet climate action targets for reducing CO₂, BioLNG is expected to increase tenfold by 2030, according to S&P Global.

In the past couple of years, we have seen an increased demand for micro-scale liquefaction in Europe. The first pilot micro liquefaction plants were constructed in Italy with single (5-10 TPD) production capacity, either using a closed loop nitrogen cycle or mechanical refrigeration technology. There have been 14 plants constructed (8-30 TPD) in the Scandinavian market, and in the long-term outlook, another eight are in the pipeline. Most of the plants are closed-loop design and use LN₂ or MR as the refrigerant.

Chart can offer for microscale liquefaction either open-loop sacrificial nitrogen technology or closed-loop MR technology. Customer selection depends on focus on either investment costs or operating costs

Our C15 Micro-Scale Liquefaction Plant features:

- Nameplate capacity of 15,000 GPD (25 tons per day).
- Shop built and shop tested equipment.
- IPSMR technology, Chart built processing and storage.
- Skid mounted for shipping over the road and easy site install.

- Over-all equipment only plot size approx. 67 ft x 86 ft (20x26m).
- Production capacity features turn-down in range of 50% to 100% of nominal power.

The option for Biogas Liquefaction with C15 Unit is designed with flexibility in mind. Equipment package includes proven biogas upgrade.

Features include those listed above, plus

- Simple and Low-Cost Liquefaction System designed for the processing of biomethane in the micro scale.
- C15 LBG Liquefaction Plant & Storage based on using LN2 sacrificial solution.
- Turndown and Operational Flexibility, allowing it to produce LBG anywhere from 0% to 124% of its design capacity.
- Uses membrane technology (PSA outsourced)
- Liquefaction Unit is also designed to handle reasonable changes in the Cryomethane feed flowrate.

Germany, as the leading producer of biogas, has incentives, tax privileges and toll exemptions for using biomethane as a fuel, making it an important component for climate protection. One of the German companies Chart is proud to work with in developing the Biogas and BioLNG market is VERBIO, a biofuel and technology company.