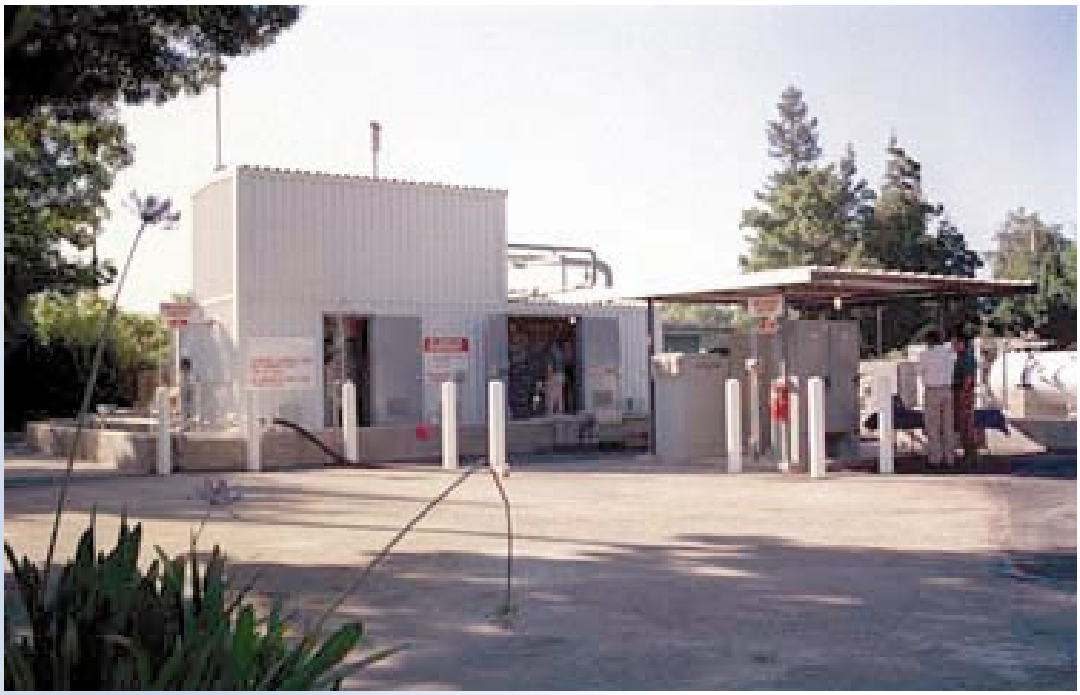
New LNG Plant Technology



Small-scale liquefied natural gas plants, that draw from existing natural gas lines, are becoming increasingly attractive.

As liquefied natural gas (LNG) advances toward widespread commercial use, the prospect of producing it where it will be distributed commercially has become increasingly attractive.

An invention by the LNG research team at the U.S. Department of Energy's Idaho National Laboratory has made this prospect a reality by developing a small-scale methane liquefaction plant. Small-scale liquefaction plants are advantageous because their compact size enables the production of LNG close to the location where it will be used. This proximity decreases transportation and LNG product costs for consumers.

The small-scale LNG plant also allows localized peak-shaving to occur – balancing the availability of natural gas during high and low periods of demand. It also makes it possible for communities without access to natural gas pipelines to install local distribution systems and have them supplied with stored LNG.

INL liquefaction technology is designed to draw natural gas from a transmission pipeline at a point where the pressure is dropped to accommodate commercial distribution. The plant is powered mainly by the energy created through this pressure drop. As the gas enters the plant, some of it is allowed to expand, and as it expands, it cools. This allows the process to use the natural gas as a coolant in the liquefaction process.

A plant installed in Sacramento removes contaminants from the methane stream as it progresses through the plant. The stream is injected with methanol, which bonds to the water. When the temperature drops to the point where the methanol vapor becomes liquid – the water and methanol are separated out of the methane stream. During the final cooling of the LNG product, solid CO_2 is formed and separated from the methane stream.

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This significantly decreases the work involved with pre-cleaning the methane. The water/methanol mix and solid CO_2 are vaporized into the distribution line without significantly changing the BTU of the line.

The natural gas is liquefied and moved into a storage tank where it stays until used, trucked away, or re-injected into the pipeline.

The Sacramento plant is designed to interact with the distribution line at a pressure let-down station, remove water and CO_2, and liquefy 10-20% of the gas entering the plant. Other plant models are being designed to adapt to higher CO_2 concentrations, nitrogen content, higher and lower pressure distribution lines, connections at non let-down points, and to liquefy a higher percentage of incoming gas.

No gas is consumed by the plant during this process. The plant requires little oversight, and future plants may require very little manual operation, if any.

A full-scale methane liquefaction plant can require hundreds of acres and cost billions of dollars. A small-scale liquefaction plant can fit into a cargo container at a cost of less than two million dollars.

The Sacramento plant was developed and designed under the terms of a Cooperative Research and Development Agreement (CRADA) with Pacific Gas and Electric Company and Southern California Gas Company. The technology has been successfully tested and is now available to be licensed for commercial manufacturing.

INL is a multiprogram national laboratory dedicated to supporting DOE's missions in energy and national security, environmental quality, and science.

For more information

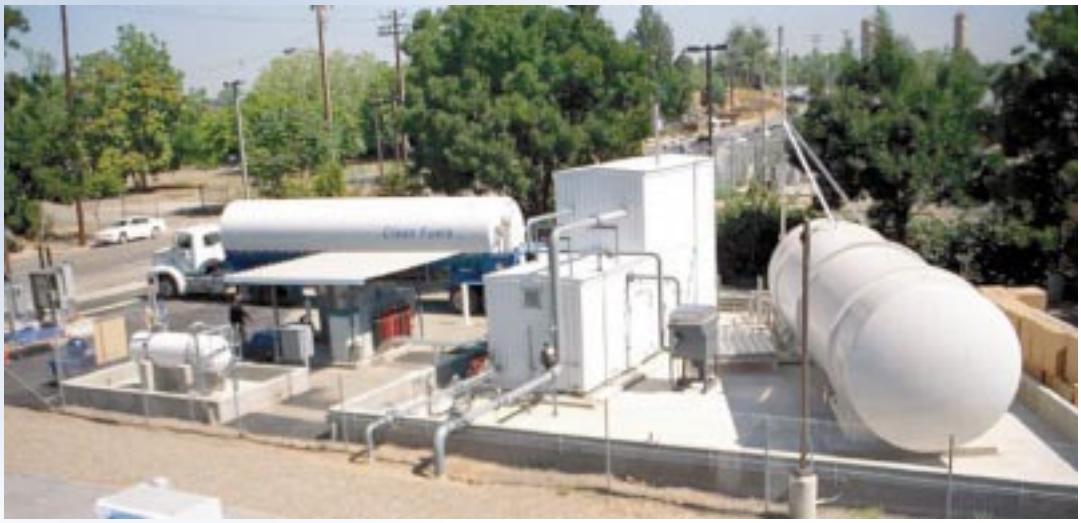
Technical Contact:

Bruce Wilding
(208) 526-8160
Bruce.Wilding@inl.gov

Technology TransferContact:

David Anderson
(208) 526-0837
David.Anderson@inl.gov

INL is a U.S. Department of Energy national laboratory operated by Battelle Energy Alliance



The first LNG demonstration plant was constructed in Sacramento, California. After having been successfully tested, the technology is available for licensing and commercial manufacturing.