The LNG liquefaction process starts with purified and highly filtered and dehydrated natural gas (nearly all methane), successively cooled through multiple refrigerant cooling and sub-cooling cycles to approximately −260°F (−162°C).

There are multiple proprietary liquefaction processes that can be used, with licenses offered by a number of companies including ConocoPhillips, Linde, Shell, Air Products. One process known as the multi-refrigerant (MR) process employs a propane pre-chilling cycle, a multi-refrigerant (MR) liquefaction cycle, and a nitrogen sub-cooling cycle.

Regardless of approach, all methods are energy intensive and make use of multiple compressors and heat exchangers to achieve cryogenic liquefaction of the methane gas.

Major equipment includes compressors, compressor drives (steam turbines, gas turbines or electric motors), expanders, heat exchangers, pumps, valves, compressor anti-surge valves, fans, storage tanks, and usually an on-site combined heat and power plant (CHP) for electric power to drive motors and pumps, and steam for steam turbines or other process heating applications. Large liquefaction plants can require 300 MWs or more of generation capacity for operation.

A typical liquefaction plant includes 3–5 mtpa (million tons per annum) of production capacity per train, with most new plants including multiple trains for highest LNG output.