N$_2$-CO$_2$ Expander Cycle Design And Optimization for Offshore Natural Gas Liquefaction

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LNG is a clean and green fuel. Therefore demand of natural gas (LNG) has increased considerably. There are several ways to liquefy natural gas into LNG. In this paper, CO2 – N2 expander cycle is designed and optimized in order to liquefy the feed natural gas. As it is well known that space and safety are the main constraint for offshore LNG process, this process ensure fewer equipment count occupying less space and ensures safety because nonflammable gases N2 and CO2. Hysys is used for design and optimization purpose. The main design variables are CO2 cooling temperature, N2 flow rate, and suction and condensation pressure. Practically accepted, MITA is constrained to have a value of 3oC throughout in the simulation. Energy consumption of compressor in this process is found to be 0.4945 KW, which is less than C3MR process, so this process seems reasonably acceptable for offshore liquefaction of natural gas.