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Utilization of the physical exergy of cryogenic fluids

Liquefaction of cryogenic fluids (such as air or natural gas) consumes large amount of energy. Some of the energy used for liquefaction is stored in the cryogenic fluid as its cryogenic exergy and may be recovered during the regasification process. Increasing popularity of liquefied natural gas (LNG) results in large number of new LNG vaporization facilities where physical exergy of cold LNG may be recovered. Also recovery of exergy stored in liquid nitrogen (LN2) should be investigated, as development of oxygen enriched combustion technologies may result in increased production of LN2 as a byproduct of oxygen production in air separation units. In this research several cryogenic exergy recovery systems were modeled and compared.

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