

### Development of a thermodynamic model for simulation of LNG liquefaction amenities

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Liquefaction of natural gas to LNG requires significant power requirements for the cooling process while the global LNG production and consumption has been growing toward supply of NG as an energy carrier. This motivates for finding alternative technologies for NG liquefaction. The Carnot engine was originally derived to describe the conversion of heat to work while in reverse operation Carnot engine act as a model for refrigerators. Hence, the use of non-ideal Carnot model to represent typical refrigeration systems, which can be of two phase or single phase, single -component refrigerant or mixed refrigerant configurations, has been carried out in this study.

The non -ideal Carnot model is used to illustrate the end flash system of an LNG plant, in lieu of rigorous simulations. It is demonstrated that a model using 55% Carnot efficiency is suitable for representing the performance of the commercial LNG refrigeration systems.

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