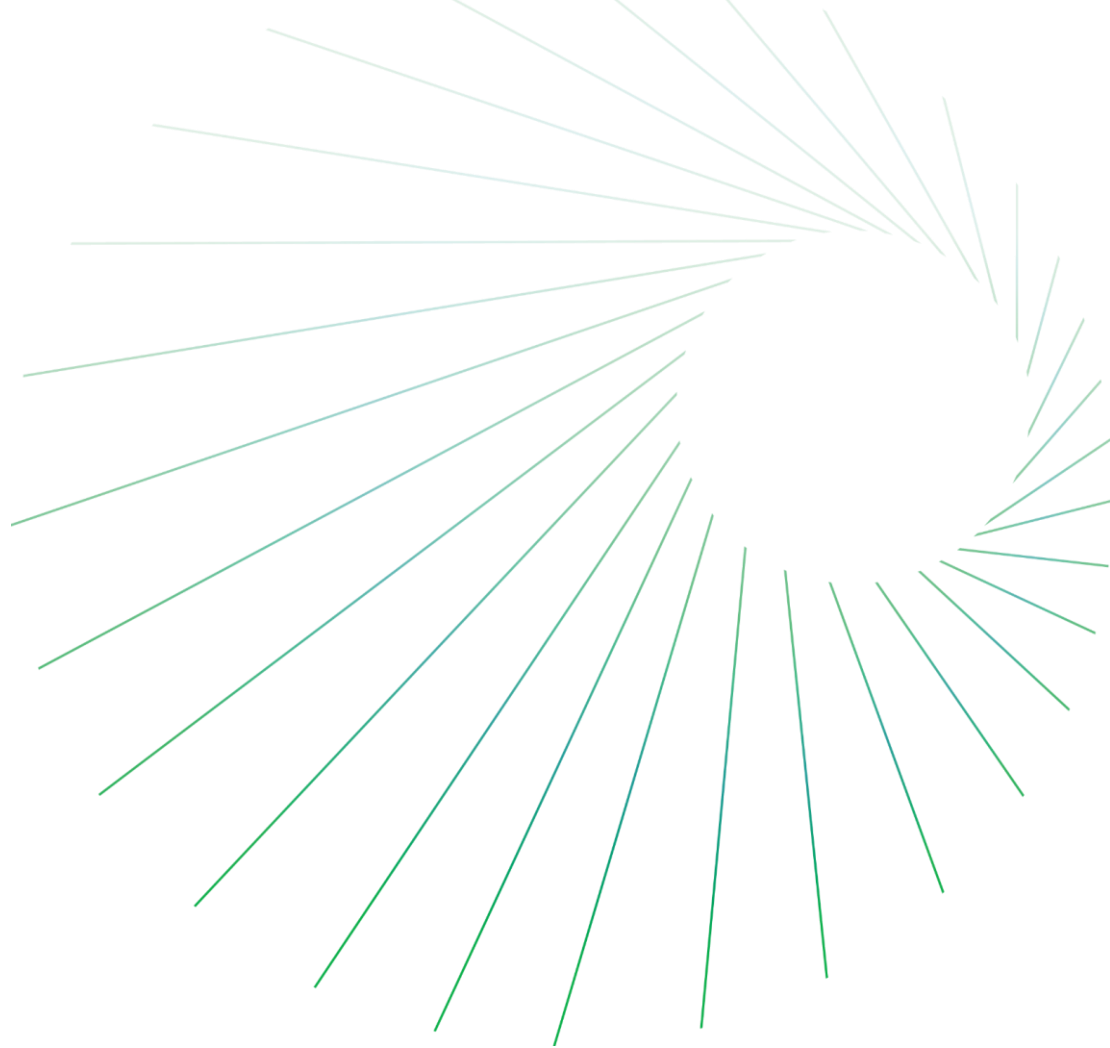


Economics of LNG Cold Energy Utilization by Generation of Electricity

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Abstract

Liquefied natural gas (LNG) is stored as liquid at -162°C . It must be gasified by heating before it is transported as natural gas to consumers in a pipeline. Approximately 220 kWh/Mt of heat energy is required to regasify LNG into natural gas. This heat is traditionally supplied by cooling seawater in an open rack vaporizer (ORV) or by the combustion of natural gas in a submerged combustion vaporizer (SCV).

It has long been recognized that this “cold energy” is a valuable energy resource and its utilization can improve the economics of an LNG regasification terminal. At present, the utilization of this cold energy is done to a significant extent only in Japan. However, in recent times, there is a growing interest in the recovery and utilization of this cold energy, as evidenced by the increasing number of publications on this subject [1].

In this review, IHS Markit PEP examines one such process—the production of electricity using LNG cold energy in an organic Rankine cycle (ORC). The base case considered is an LNG regasification terminal with a processing capacity of 4 MMtpa of LNG using open rack and submerged combustion vaporizers.

This review addresses the technology and economics of the generation of electricity using the cold energy of LNG regasification in an ORC using propane or ethane as the motive fluid. It includes the process flow diagram, material balance, major equipment sizes, and specifications. Cost data, including battery limits and offsites costs, variable costs, capex, opex, and the overall production costs are provided. This review will be beneficial for planners, producers, and designers who are looking for independent data of LNG cold recovery using propane/ethane ORC. An interactive iPEP Navigator module of the process is included, which provides a snapshot of the process economics and allows the user to select the units and the global regions of interest.

Contents

1	Introduction	5
2	Summary	6
3	Industry status	8
	Natural gas	8
	LNG import-export	8
	LNG—largest importing and exporting markets	9
	LNG regasification terminals—existing and under construction	10
	LNG regasification terminals—currently using cold energy for electricity generation	20
4	Technology review	22
	Cold energy of LNG	22
	Methods to utilize cold energy of LNG	22
	Water desalination (cryo-desalination)	22
	Air liquefaction and cryogenic air separation	22
	Power generation	23
	CO ₂ liquefaction or solidification	23
	Turbine inlet air cooling	23
	Space cooling	23
	Factors to consider for utilizing cold energy of LNG	23
	Reliability of availability of the “cold energy” receiver	23
	Demand matching	23
	Organic Rankine cycle	23
	Principle	23
	Steam Rankine cycle	24
	Organic Rankine cycle (propane)	25
	Organic Rankine cycle (ethane)	26
5	Process review	27
	Basis of design	27
	Base case	27
	Alternate case 1	28
	Alternate case 2	29
	Process description	29
	Section 100—Jetty, unloading arms	30
	Section 200—LNG storage	31
	Section 300—BOG handling system, metering	31
	Section 400—Vaporization (propane, ORC, SCV)	31
	Offsites and general service facilities	32
	Cost estimates	34
	Fixed capital costs	35
	Production costs	35
	Appendix A—Design and cost basis	40
	Appendix B—Cited references	45
	Appendix C—Process flow diagrams	47

Tables

Table 2.1 Pros and cons of the two considered alternate cases over the base case	6
Table 2.2 Unit costs/consumptions	7
Table 2.3 Carbon and water footprint ^[1]	7
Table 3.1 Existing LNG regasification terminals 2020—excluding decommissioned and mothballed [6]	11
Table 3.2 LNG regasification terminals under construction in 2021—region-wise	17
Table 3.3 LNG regasification terminals under construction in 2021—project-wise [6]	18
Table 3.4 Cryogenic power plants in Japan [8]	20
Table 5.1 Basis of design	27
Table 5.1(a) Basis of design of vaporizers—base case	27
Table 5.1(b) Basis of design of vaporizers—alternate 1 (propane ORC)	28
Table 5.1(c) Basis of design of vaporizers—alternate 2 (ethane ORC)	29
Table 5.2 Stream flows	33
Table 5.3 Major equipment	34
Table 5.4 Utility summary	34
Table 5.5 Total capital investment	36
Table 5.6 Capital investment by section	37
Table 5.7 Production costs	38

Figures

Figure 3.1 Primary energy demand by fuel	8
Figure 3.2 Natural gas transportation cost	9
Figure 3.3 Existing regasification capacity—end-2020 [7]	10
Figure 3.4 Regasification capacity under construction by market—February 2021 [7]	16
Figure 3.5 Number of publications per year related to cold energy recovery from LNG regasification	21
Figure 4.1 Heat input to gasify LNG	22
Figure 4.2 Basic steam Rankine cycle	24
Figure 4.3 Power plant steam Rankine cycle	25
Figure 4.4 Propane ORC for LNG regasification	26
Figure 5.1 Propane ORC for LNG regasification	28
Figure 5.2 Ethane ORC for LNG regasification	29

Appendix C Figures

Figure 5.1(a) Process flow diagram—LNG regasification termination with propane ORC for electricity generation	48
Figure 5.1(b) Process flow diagram—propane ORC (organic cycle) package	49

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