

26th National Symposium on Cryogenics and Superconductivity

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Invited Talk: IT: "LNG TECHNOLOGY: PRESENT SCENARIO AND FUTURE POSSIBILITIES IN INDIA"

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Content :

Global demand of natural gas is growing faster than that of other fossil fuels (coal and Oil), because of its environmental advantages (cleanest burning). Liquefaction of natural gas (LNG) makes economical to transport (due to its 600 times lesser volume than NG's) through cargo ships. LNG is unloaded from ship, stored at LNG terminals and regasified before distributing to consumers through pipelines. India being an LNG importing country requires focus on process improvement and optimization on regasification and LNG/CNG distribution facilities. LNG regasification terminal includes LNG unloading facility, LNG storage tanks, LNG pumps, boil-off gas recondensing system, vapor-return system and vaporization systems. Regasification is an important process in LNG receiving terminal due to its relatively high capital investment and operational cost. Usually, LNG is vaporized by heat sources such as seawater, ambient air, and combustion of natural gas (heat from combustion). Depending on the availability of natural resources, suitability of environment and logistics of operation, different configurations of LNG vaporizers such as open rack vaporizers (ORVs), submerged combustion vaporizer (SCVs), ambient air vaporizers (AAVs) and Intermediate fluid vaporizers (IFVs) are used. In such conventional regasification operations, entire cold of liquefied natural gas (LNG) is wasted as it is dissipated into the environment (into air or sea-water) without doing any gainful work. It is thermodynamically possible to utilize the cold energy of LNG such options are deep freezing or cold storage, liquefaction separation of air, seawater desalination, and liquefaction, solidification of carbon dioxide and generation of power. Thermodynamic cycles, such as Direct Expansion (DE) and (Organic Rankine Cycle), either alone or as a combination, are now used for power extraction at some LNG receiving terminals in Asia and Europe. There is future possibility to integrate the cold energy utilization system in India. Another area where India needs to explore is possibility for small scale LNG distribution centers (LNG/CNG refuelling stations) that may consist of LNG storage and in-situ gasification arrangement. LNG can be transported through specially designed trucks, trains or through double-walled insulated cryogenic pipelines pressurised by pumps instead of compressed gas (CNG) to

end-customers. Storing LNG involves generation of BOG in small quantities due to heat in-leak which could be recondensed by small capacity closed cycle cryorefrigerators. Cryogenics has a major role in developing BOG recondensation and vaporization techniques in both large scale import terminals as well as future small scale LNG refuelling stations.

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