**Selection of the Best Technology for LNG Re-gasification Plant in Egypt**

*M. Abu El Ela\*, T. S. Ahmed\*, S. Haddara\*\**

**Abstract**

The Natural Gas Holding Company (EGAS) intends to import LNG to cover the shortage of the gas production in Egypt. Therefore, the Mining Studies and Research Center (MSRC) at Cairo University executed this research work in an attempt to select the appropriate vaporization technology which can be installed in Egypt to re-gasify the imported LNG.

At present, there are four vaporizing technologies that can be used in the LNG re-gasification plants: intermediate fluid vaporizer using water mixed with glycol (IFV/GW) model, open rack vaporizer (ORV) model, submerged combustion vaporizer (SCV) model, and intermediate fluid vaporizer using hydrocarbon (IFV/HC) model. The main objective of this study is to select the best vaporization technology that takes into consideration the technical aspects, reliability and feasibility of the various available technologies. To achieve this objective, HYSYS model was developed to simulate the design of each of the four vaporization technologies. The research team performed a preliminary engineering design and identified the required mechanical, electrical and instrumentation systems for each of the four vaporizing technologies. Furthermore, in an attempt to conduct a techno-economic comparison between the four technologies, a preliminary cost estimate is performed for each technology. Finally, selectivity analysis was conducted to the technologies under study based on environmental impact, feasibility and technology suitability.

Feasibility study announced the IFV/GW technology to be of moderate total capital cost as compared to the ORV technology and the SCV technology, with total capital cost of 1.1 and 1.2 times the total capital cost of IFV/GW, respectively. In addition, the outcomes of the sensitivity analysis revealed that the IFV/GW technology is the most suitable and reliable technology to be applied in Egypt, as it is the most effective in high ambient temperature having the least impact on the environment, followed by the SCV technology which shows less suitability and reliability. Meanwhile, it is less environmentally benign. The other two technologies, ORV and IFV/HC, proved to be the least in ranking with respect to all selection criteria under consideration, exhibiting very close ranks, as concluded from the sensitivity analysis results. Eventually, the results of this research work indicated that a hybrid technology comprising IFV/GW as the main vaporization unit together with a backup unit of SCV represents the most suitable vaporization technology to be installed in Egypt.

\* Faculty of Engineering – Cairo University – Egypt

\*\* Former Egyptian Minister of Petroleum and Mineral Resources

This research work is an outcome of the cooperation protocol between the Egyptian Ministry of Petroleum and Cairo University, produced via the post graduate studies interdisciplinary program Natural Gas Engineering and Technology offered to engineers working in the Egyptian oil and gas sector. Gratitude and appreciation are due to the Egyptian General Petroleum Corporation (EGPC) and the Natural Gas Holding Company (EGAS) for providing the research team with the necessary data. The authors would also like to thank Natural Gas Engineering Diploma students – Class 2014 for the deliberate effort they exerted in conducting the current research work under the supervision and guidance of the authors.