Veraporn Karom 2009: Environmental and Energy Performance Comparison of Compressed and Liquefied Natural Gas using Life Cycle Assessment Technique. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Thumrongrut Mungcharoen, Ph.D. 160 pages.

This research is aimed to assess and compare environmental and energy impacts of compressed natural gas (CNG) and liquefied natural gas (LNG) using life cycle assessment technique, with SimaPro 7.0's software and Eco-Indicator 95 method. Functional Unit is specified as 1 MJ of CNG and LNG. System boundary is considered from exploration and production of natural gas from well, separation, liquefaction, distribution and usage. The results show that the highest environmental impact comes from LNG produced from associated gas, followed by LNG imported (LNG-IM to LNG), LNG produced from sales gas, and LNG imported (LNG-IM to CNG), respectively, while the lowest environmental impact comes from CNG. The main environmental impacts are acidification and global warming from the natural gas combustion during usage. With the functional unit of 1 person-kilometer for life cycle CNG and LNG, the results show that the highest environmental impact comes from LNG produced from associated gas, followed by LNG imported (LNG-IM to CNG), LNG imported (LNG-IM to LNG), and LNG produced from sales gas, respectively, while the lowest environmental impact comes from CNG. Concerning life cycle assessment with global warming impact only, the highest environmental impact which comes from LNG produced from sales gas is 4.31×10^{-2} kg CO_2–Eq, and the lowest environmental impact which comes from CNG is 3.84×10^{-2} kg CO_2–Eq. For energy efficiency study, CNG has the highest net energy ratio (NER), which is 1.79, followed by LNG produced from sales gas, LNG imported (LNG-IM to LNG), LNG imported (LNG-IM to CNG) and LNG produced from associated gas which has the lowest NER of 1.02

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