

Life Cycle Greenhouse Gas Emissions of Liquefied Natural Gas

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Department of Energy (DOE) estimates suggest that in the coming decades U.S. demand for natural gas (NG) will increase. Supply of this NG will increasingly come in the form of liquefied natural gas (LNG) produced in countries like Russia and Qatar, and brought by oceanic tankers. By 2030 LNG is expected to be 16% of the total supply of NG in the U.S. During the same period, the awareness of global climate change will become more noticeable and the importance of reducing emissions of the greenhouse gases (GHG) will equally increase. NG has been widely identified as a cleaner alternative to coal for electricity generation, as it has lower combustion GHG emissions. Although emissions at the power plant make up most of the natural gas life cycle emissions, it is important to identify emissions from the entire life cycle.

Several studies have performed emission inventories for the NG life cycle from production to distribution. Usually these analyses have been performed for domestic NG, so that emissions from the liquefaction to LNG, tanker transport, and re-gasification have not been considered. If, as the DOE estimates suggest, larger percentages of the supply of NG will come from these imports, emissions from these steps in the life cycle could influence the total life cycle emissions. Thus, comparisons between coal and NG that concentrate only on the emissions at the utility plant may not be adequate. The objective of this study is to perform an analysis of the NG life cycle GHG emissions taking the emissions from LNG into consideration. Different scenarios for the percentage of NG as LNG will be analyzed. Moreover, a comparison with the coal fuel cycle GHG emissions will be presented, in order to have a better understanding of the advantages and disadvantage of using coal versus NG for electricity generation.