

Assessment of Environmental Impact of Alternative Shipping Fuels

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Abstract

Now more than ever, reduction of the ship pollution and emissions, maximization of the energy efficiencies, enhancement of the safety requirements and minimization of the operational expenditure are required. Particularly the heavy reliance on sea-borne trade in global freight transport has significantly contributed to exacerbating the marine pollution. The greenhouse gas emissions (GHGs) from shipping activities are predicted to triple by 2050 (ICCT, 2011).

Such adverse environmental prospects have played as the driving force behind the introduction of a series of stringent maritime regulations aiming to limit the marine pollution from world fleet (MARPOL, 2011). Those environmental regulations urge shipbuilders, marine engineers and researchers to strive to develop cleaner technologies and alternative fuels, suggesting that the green shipping is one of the most urgent issues in the marine industry.

As international shipping was excluded from the Paris Agreement, the International Maritime Organization (IMO) has developed a roadmap for the reduction of GHGs. Consequently, it seeks to assess opportunities for GHGs reductions, explicitly including the development of zero-carbon or fossil-free fuels to enable the shipping sector to consider decarbonisation in the second half of the century (IMO, 2018).

In this study, alternative clean fuels are investigated to replace diesel and heavy fuel oils in the engines of maritime transportation vehicles and to quantify the reduction potential of GHGs and assess the environmental impact.

Keywords: Marine pollution, Greenhouse gas (GHG), Alternative fuels, Zero-carbon fuels, Environmental impact

References

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Biography

Dr Mingyu Kim had worked for Hyundai Heavy Industries as a senior research engineer at their Research Institute since 2001. In 2008, he moved to the Preliminary Ship Design Department at Hyundai as a senior naval architect. Since 2014 he had worked as a Research Associate at the University of Strathclyde, UK, and as a Research Professor at the Pusan National University, Korea.

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