World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:17, No:02, 2023

Techno-Economic Study on the Potential of Dimethyl Ether (DME) as a Substitute for LPG

Authors : Widya Anggraini Pamungkas, Rosana Budi Setyawati, Awaludin Fitroh Rifai, Candra Pangesti Setiawan, Anatta Wahyu Budiiman, Inayati, Joko Waluyo, Sunu Herwi Pranolo

Abstract : The increase in LPG consumption in Indonesia is not balanced with the amount of supply. The high demand for LPG due to the success of the government's kerosene-to-LPG conversion program and the Covid-19 pandemic in 2020 led to an increase in LPG consumption in the household sector and caused Indonesia's trade balance to experience a deficit. The high consumption of LPG encourages the need for alternative fuels as a substitute or which aims to substitute LPG; one of the materials that can be used is Dimethyl Ether (DME). Dimethyl ether (DME) is an organic compound with the chemical formula CH 3. OCH 3 has a high cetane number and has characteristics similar to LPG. DME can be produced from various sources, such as coal, biomass and natural gas. Based on the economic analysis conducted at 10% IRR, coal has the largest NPV of Rp. 20,034,837,497,241 with a payback period of 3.86 years, then biomass with an NPV of Rp. 10,401,526,072,850 and a payback period of 5.16. the latter is natural gas with an NPV of IDR 7,401,272,559,191 and a payback period of 6.17 years. Of the three sources of raw materials used, if the sensitivity is calculated using the selling price of DME equal to the selling price of LPG, it will get an NPV value that is greater than the NPV value when using the current DME price. The advantages of coal as a raw material for DME are not only because it is profitable, namely: low price and abundant resources, but has high greenhouse gas emissions.

Keywords : LPG, DME, coal, biomass, natural gas
Conference Title : ICCBEE 2023 : International Conference on Chemical, Biological and Environmental Engineering
Conference Location : Tokyo, Japan
Conference Dates : February 20-21, 2023