

Impact of Life Cycle Assessment for Municipal Plastic Waste Treatment in South Africa

Authors : O. A. Olagunju, S. L. Kiambi

Abstract : Municipal Plastic Wastes (MPW) can have several negative effects on the environment, and this is causing a growing concern which requires urgent intervention. Addressing these environmental challenges by proffering alternative end-of-life (EOL) techniques for MPW treatment is thus critical for designing and implementing effective long-term remedies. In this study, the environmental implications of several MPW treatment technologies were assessed using life cycle assessment (LCA). Our focus was on four potential waste treatment scenarios for MPW: waste disposal via landfill, waste incineration, waste regeneration, and reusability of recycled waste. The findings show that recycling has a greater benefit over landfilling and incineration methods. The most important environmental benefit comes from the recycling of plastics, which may serve as reliable source materials for environmentally friendly products. Following a holistic evaluation, five major factors that influence the overall impact on the environment were outlined: the mass fraction in waste, the recycling rate, the conversion efficiency, the waste-to-energy conversion rate, and the type of energy which can be utilized from incineration generated energy

Keywords : end-of-life, incineration, landfill, life cycle assessment, municipal plastic waste, recycling, waste-to-energy

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