GREENHOUSE GAS EMISSIONS (GHG) FROM RESIDENTIAL SOLID WASTE MANAGEMENT IN GENTENG DISTRICT, CENTRE SURABAYA

Name : Fina Binazir Maziya  
NRP : 3309 100 081  
Supervisor : Susi Agustina Wilujeng, ST, MT

Abstract

Solid waste generation produced greenhouse gas emissions (GHG), which consists of methane (CH$_4$), carbon dioxide (CO$_2$), and nitrous oxide (N$_2$O). GHG emissions were released into atmosphere and considered as important components that contribute to global warming. This research was conducted to calculate the emissions of solid waste generated in Genteng District and determine the solid waste management, based on the lowest potential emissions.

GHG emissions were calculated from solid waste management that started from solid waste generation, waste transportation, until final disposal at Benowo landfill. Solid waste management scenarios included direct landfilling scenario without recycle (Scenario 1), recycle from the community participation through composting and Bank Sampah program (Scenario 2) and recycle based on the maximum potential recovery of solid waste (Scenario 3). The Life Cycle Assessment (LCA) with an approach of IPCC (Intergovernmental Panel on Climate Change) method was used in GHG emission calculations.

The domestic waste compositions in Genteng District were 52.8% of compostable solid waste, 19.81% of plastics, 11.97% of paper, 2.26% of metals, 0.87% of glass, 1.13% of fabric, 0.66% of rubber, 3.59% of diapers, 1.16% of hazardous waste and 5.69% of other waste. Based on this research, GHG emissions were 1.72 Gg CH$_4$/year and 2.4 Gg CO$_2$/year for solid waste landfill (Scenario 1). GHG emissions for scenario 2 were 0.83 Gg CH$_4$/year, 1.1 Gg CO$_2$/year and $6.3 \times 10^{-6}$ Gg N$_2$O/year.
GHG emissions for scenario 3 was 0.82 Gg CH$_4$/year, 1.2 Gg CO$_2$/year, and 6.3 x10$^6$ Gg N$_2$O/year. The GHG emissions from solid waste transport emissions from scenario 1 were 1.2 Gg CH$_4$/year, 0.2 Gg CO$_2$/year and 0.9 Gg N$_2$O/year. GHG emissions of scenario 2 was 0.81 Gg CH$_4$/year, 1.1 Gg CO$_2$/year and 0.61 Gg N$_2$O/year. Based on calculation, waste transport emissions from scenario 3 were 0.82 Gg CH$_4$/year, 1.1 Gg CO$_2$/year and 0.62 Gg N$_2$O/year.

Keywords: Genteng District, GHG emission, solid waste management, Surabaya.