

ABSTRACT

Greenhouse gas (GHG) emissions associated with solid waste management practices are one of the critical concerns in rapidly developing cities. Landfill sites throughout the world are considered a primary source of GHG emissions, contributing to global warming and climate change. This is due to the existence of methane (CH₄) and carbon dioxide (CO₂) within landfill gases. The aim of this research is to examine scenarios for municipal solid waste (MSW) management in Hanoi to enable progression towards a low carbon economy.

Life Cycle Assessment (LCA) is a method used to evaluate the potential of environmental impacts of landfill regarding CH₄ emissions. Based on the framework of LCA, scenarios for MSW management in Hanoi were developed to express possible options for the future management. Potential for CH₄ emissions and the variation in generation of CH₄ with time for emission inventory in the Nam Son Landfill site in Hanoi, Vietnam were modelled by using two accounting models: the IPCC Default and Triangular model.

Five scenarios were designed (S0, S1, S2, S3, S4). The baseline scenario describes the current "Business as usual", and the rest of the scenarios presented alternative options to explore the potential reduction of CH₄ emissions through composting, recycling, and gas capture. The results obtained from the calculation by using two accounting models for all scenarios confirm that a combination of composting, recycling and flaring gas is the best solution to improvement of the existing MSW management in Hanoi by reducing CH₄ emissions by 83% in comparison to the "Business as usual" scenario. In addition, the emission process of the Nam Son Landfill site in scenario S4 will reach a peak in 2009, the age of Landfill will extend to 2030.