

Consideration of Emission Ratios in Sustainable/Integrated Municipal Solid Waste Management Planning

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Key words: Process generated emissions; emissions inventory; emissions inventory model; Municipal Solid Waste Management; sustainable/integrated municipal solid waste management.

SUMMARY

The treatment and disposal of Municipal Solid Waste (MSW) may cause environmental pollution and expose humanity to harmful substances and bacteria that affects human health and the ecosystem. Therefore, accurate quantification and detailed documentation of emissions data from Municipal Solid Waste Management (MSWM) will enables a city or region to demonstrate transparency and enhance the credibility of its corporate environmental and climate change strategy. Establishing a comprehensive corporate emissions inventory is an important first step in developing an environmental and climate change strategy. This is justified if adequate resource utilization and environmental implications are considered in planning the collection, transportation and treatment/disposal of MSW, hence developing a city wide, regional or national sustainable/integrated MSWM system. This paper presents a methodological approach for emissions inventory with case study in conducting a baseline emissions inventory using Life Cycle Assessment Model (LCAM). The paper presents best practices in establishing the organizational and operational boundaries of a MSWM scenario emissions inventory in a sustainable city, region or national environment using three active landfills in Waikato Region of New Zealand. In this study, site-depended data for the landfills together with regional waste composition are used with associated collection, transportation and treatment/disposal data, to determine the emission levels associated with the landfills. Hence the environmental profile of the three MSW landfills were evaluated and compared in relation to their total waste intake over twenty years period (19720157.6 tonnes, 3533333.528 tonnes and 43538.452 tonnes for Hampton Downs, Tirohia and Taupo landfills respectively). Using the impact categories as classified in EASEWASTE, the emission ratios per tonne of waste are compared to assess the contributions of the landfills to the emissions associated with MSWM in the region. Finally, the paper provides guidance on continuous improvement and maintenance of the emissions inventory in the MSWM sector to guide stake holders in reducing the impact of MSW through a sustainable/integrated manner. The need for zoning MSW collection/transportation system using available disposal/treatment sites as focal points is therefore advocated. A modified generalized emissions inventory model for the MSW sector is suggested.