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COMPARATIVE LIFE CYCLE ASSESSMENT OF AN INTEGRATED WASTE TREATMENT CENTRE

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Abstract

This paper aims to provide an exhaustive comparison of alternative waste management scenarios for the integrated waste treatment centre of Saliceti through a gate-to-grave comparative LCA study of four management scenarios of foreseen future streams of OFMSW (Organic Fraction of Municipal Solid Waste) and green waste. In the last decades using LCA results for waste management related decision making is starting to take traction. Compared scenarios are A) production of Biogas utilizing a biodigester, B) construction of a composting plant, C) current condition, i.e., sending the flows to treatment plants in other regions and, D) hybrid treatment plant consisting of a mix of B and C scenarios. The study was conducted on the operating phase only leaving out the construction phase through the application of the ReCiPe method at midpoint level using the EASETECH software through primary information provided by the plant managers and the manufacturer in collaboration with ARPAL, and secondary information collected from the Ecoinvent database. Results demonstrate that scenario A presents 25% less impacts than the average impacts of the other three scenarios averaging characterization results among all impact categories. Moreover, scenario A's impacts for all impact categories always present less or equal negative impacts and greater or equal positive impacts when compared to the other scenarios. This result is due to the Biogas generation process which allows scenario A to reduce air emissions from composting and at the same time to avoid the impacts associated with the generation of gas from other sources. The study demonstrates that building the biodigester is the least impactful scenario for the environment given all alternatives are considered equally valid on an industrial level.

Key words: comparative life-cycle assessment, EASETECH, environmental impact assessment, integrated waste treatment centre, waste treatment

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