

**Life Cycle Assessment of Solid Waste Collected
from Household in Macau**

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Abstract

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With economic development and urbanization process accelerating, the generation of solid waste collected from household is increasing rapidly. Because Macau is a city with small land area and very high population density, the management of collection, classification, recycling and final disposal of solid waste generated in daily life from household is essential. Therefore, the research of all stages on solid waste management by life cycle assessment (LCA) and other tools, including assessing the current environmental management deficiencies is urgently needed towards giving improvement and suggestion for the management of solid waste in Macau. The solid waste collected from household, which includes garbage, electronic waste, fluorescent tubes and recyclable waste in this research, is an important part of municipal solid waste.

LCA, as an important decision-supporting tool, has been widely used in environment planning but not much on integrated solid waste management. This thesis tries to use the LCA method to analyze the solid waste collected from household in Macau. The research is divided into two parts: the analysis and comparison of classification of solid waste collected from household to select the best classification scenario; the

analysis and comparison of various treatment and disposal methods of incineration fly ash, electronic waste and fluorescent tubes to select the best treatment and disposal methods for Macau.

The result of life cycle assessment shows that the environmental impact potential value responding to the three scenarios are 0.308, 0.10, 0.088 separately. The scenario that classifies solid waste into household wastes, electronic waste, fluorescent tubes and recyclables has a lowest environmental impact in Macau, and the scenario of mixture solid waste has a highest one. The activity is the best scenario and environmental behavior.

The second result is that, fly ash and bottom ash include lots of hazardous element, so they caused a large of the environmental impact load to the resources and ecological quality. Solidified technology of fly ash is carried out can reduce the environmental impact load; the best treatment technology of electronic waste is manual dismantling technology; the best treatment technology of fluorescent tubes is shredding and recycling. These results can provide reliable data and technical advice for the environmental authority in Macau.

KEYWORD: LCA, Solid Waste, Treatment, Disposal, Recycling

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