



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

FINAL YEAR PROJECT

DESIGN AND CONSTRUCTION OF A CONDOMINIUM ONSITE WASTE

MANAGEMENT AND ENERGY RECOVERY SYSTEM

(Case Study: Kampala)

BY

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A final year project proposal submitted to the Department of Water Resources Engineering as a partial fulfilment for the award of Bachelor of Science in Water Resources Engineering.

ABSTRACT

The significant amounts of waste are generated annually by Cities worldwide, with the highest percentage generated by the household activities. At present, most of this waste is dumped in sanitary landfills, open pits or other open areas, streams and drainage channels, or are burnt in open areas with only one-fourth being recycled. Kampala, like many of such cities, is facing rapid population growth and urbanization. Due to this, there is need for proper utilization of land, one way being vertical expansion. This has led to construction of apartments and condominiums in Kampala and the nearby areas. Waste management in these areas is done by waste pickers both private and public, at a certain fee. The collected waste is mainly disposed off at Kiteezi Landfill which has run out of space and the people living around those areas are affected by high pollution levels which affect their day to day activities

Therefore, this study was carried out to design, construct, assemble, test, monitor and carry out economic evaluation of a condominium onsite waste management and energy recovery system, that handles waste at the location of its generation, and generate cleaner gas that can be used as fuel, generally reduce the amount of waste taken to the landfill and ensure that wastes generated are not left lying around waiting for handling. This will in turn reduce the need for a landfill.

The design of the bio digester and the gasifier was carried out basing on the analysis of energy content in the waste and rate of waste generation as the system requirements. This analysis helped in determining the energy demand and capacity of both parts. The design of the cooling system was based on temperature requirement and the design of other parts was based on amount of gas generated. Stainless steels of various grades were the main materials recommended to be used because they are, strong, durable, have high melting point and are readily available. Plastics were also recommended for their flexibility, light weight and easy maintenance. Engineering drawings for different component dimensions were done before construction, and a fully functional prototype resulted after all the above operations. Testing of the prototype for the system performance was carried, and was revealed that the bio digester and the gasifier generate combustible gases and reduce the volume of wastes. With the initial investment of 2,203,500 UGX, the economic analysis of the project was carried out using Net Present Value (NPV) method, and the project was evaluated to have the NPV of 12,349,257.13 UGX. This therefore, implies that the project is viable since the value was positive and greater than one.

DECLARATION

We, hereby declare to the best of our knowledge, that this project report is an outcome of our original work and that it has not been presented to any institution of learning for an academic award.

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APPROVAL

This final year project report has been submitted to the Faculty of Engineering for examination with approval of our supervisor.

SUPERVISOR: MR. MASERUKA S. BENDICTO

Signature.....

Date...../...../.....

ACKNOWLEDGEMENT

First, we thank the almighty God for his unspeakable grace, guidance and protection during the compilation of this project report.

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DEDICATON

We dedicate this report to all our family members, lecturers and friends for the love and supports rendered to us.

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