A Cost Effective and Distributed '*Mtaani-Tech*' Bin for Sustainable Waste Management Procedures and Bridging the Gap of Access to Clean Energy in Slum Areas: A Case of Kibera Slums.

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Solid waste management and access to affordable and clean energy remains a challenge in most slum areas. Specifically, in Kibera, the cost of proper sanitation is quite high. Owing to the economic status of the population in the slum area, access to these services is expensive. Open dumping and burning of solid waste are the preferred methods of waste management because it is the cheapest alternative. However, these practices are not safe. Neither they are environmentally friendly. Access to cheap and reliable energy sources in slum areas is also a challenge. Electricity cost is equally expensive in slum areas. Illegal and dangerous connections sprawl the skies of Kibera slums. If one cannot afford to get these illegal connections, they end up using unsafe and non-environmentally friendly alternative sources of energy for lighting and cooking like kerosene and charcoal. We appreciate that waste management covers awareness, change in perception on waste management and proper waste management equipment and facilities. Most of this is not provided for in slum areas. If they are provided, they are not done in a decentralized manner and accessible to the people. This work proposes to solve this waste management problem by decentralizing waste management facilities closer to 10-20 household level. We propose a distributed '*Mtaani-Tech*' bin, that will help collect solid waste, store it, recycle and dispose waste in a safe, harmless and odourless way while at the same time providing electricity for home use. The proposed '*Mtaani-Tech*' bin will be designed to be small enough to be stored within the households, well equipped and designed to keep bad smell inside the bin and burn the solid waste in a safe manner to provide free electricity to light up the houses in the slum area. We aim to make idea behind solid waste management to be communal and collaborative. Each household contributing to waste management procedure and creating awareness among themselves for their own benefit. This solution will be based on the principles of how waste to energy plants work. However, these waste to energy plants are too big and too expensive to set up. The proposed approach in building the ambitious '*Mtaani-Tech*' bin will be to build a decentralized, small and cost-effective waste to energy plants to serve 10-20 households. The philosophy of the design will be anchored on lowering costs, frugality in innovation, ease of access of waste management services and sustainable waste management procedures. This work aims the '*Mtaani-Tech'* bins to be built from recycled and readily available material in the slum area like soil, asbestos sheets to make the incinerator while scrap and recycled steel pipes will make mini turbines to act electricity generators. The implementation of this solution contributes to the SDGs number 6: clean water and sanitation, 11: sustainable cities and communities, and 13: climate action.