William E. Maelia

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**Title:** Use of Waste Materials as Feedstock in the Design of a More Efficient Inverted Downdraft Gasifier

**Hypothesis / Problem Statement:** Cow manure and Municipal Solid Waste are viable options as feedstock for use in an Inverted Downdraft Gasifier in developing countries.

**Mentor:** Lynn Maelia PhD, Mount Saint Mary College

**Abstract:** Society has been producing more waste and there is a need for a new energy source. Waste-to-Energy (WTE) Technology solves both crisis.  Gasification/ Pyrolysis is a commonly studied method of WTE Technology. While many gasifiers are fed with wood, it would be easier for a person to collect the wastes produced directly in their homes than to find wood further away. In this experiment wood, municipal solid waste (MSW), and cow manure will be used as feedstock in an Inverted Downdraft Gasifier built out of cans to be used in Sri Lanka.  The apparatus will be made using similar methods of building to those in Sri Lanka.  Wood acts as the control, and for the MSW and cow manure, different proportions are mixed with the wood as the feedstock. Each experimental condition will be run five times. To measure the efficiency of each condition of feedstock, water will be boiled in a pot on top of the gasifier, and the less time it takes to boil, the more efficient the gasification process.  The best condition of each MSW/ wood and cow manure/ wood feedstock will then be tested in the same fashion for efficiency, but the gasifier apparatus itself will be changed as the new variable.  It is hoped that this data can be analyzed to create a more efficient inverted downdraft gasifier to be used in Sri Lanka and other developing countries using the wastes produced in their households.