INTEGRATED SOLID WASTE MANAGEMENT SYSTEM FOR PRODUCTION OF BIO-METHANE, SOIL CONDITIONER AND MANURE

By: David Birimumaso[1], MSc. RENEWABLE ENERGY (MUK, Uganda), BSc. Mech Eng. (MUK, Uganda) – Executive Director REFADA[2]

ABSTRACT

The interest in alternative municipal solid waste (MSW) management strategies has continued to intensify because the production of MSW continues to grow day by day. In response to this, REFADA through its Bio Inc team has developed and designed an integrated solid waste management system that will not only manage waste but also convert waste into useful products, which are also environmentally friendly. The **Ultimate Goal** is to produce Biomethane (similar to and a good substitute for LPG), soil conditioner and manure. The system involves three comprehensive programmes: a waste collection Programme where putrescible and non-putrescible solid waste is collected separately in waste collection bins; a waste conversion Programme which involve **anaerobic digestion** in a digester (for putrescible solid waste) and **incineration** (for non-putrescible solid waste) and a manure and soil conditioner Programme, where the Digestate from the digester is stabilized for production of **manure and soil conditioner**. The following are the accrued benefits of the system.

- It reduces the volume of MSW and stabilizes it, thus reduces on the health risks
- It produces a residue that can be used for soil conditioning and manure production
- It recovers energy from MSW in the form of methane (Bio-methane) that can be used for cooking, to help in regulating the rate of deforestation for charcoal production

Anaerobic digestion is becoming more and more attractive for the treatment of high strength organic wastes such as **municipal solid waste**, since it produces renewable energy, Bio-methane, and valuable digested residues, liquid fertilizer/ manure and soil conditioner.

After conversion of waste into biogas in the digester, it is the biogas which is conditioned to produce **Bio-methane** which is thereafter packaged in portable bottles for cooking purposes at off-site.

The impacts of the entire system to the environment and the local population are highly positive in that: the whole system has minimal emissions (PM, GHG) to the environment, and operates a nearly closed carbon cycle. In addition, operation of the system promotes improved health and sanitation management since strategies undertaken help to stabilize waste and reduce odourness of the waste, offers employment to the local population (transportation of waste, machine operators), and offers training services to the local community for development of small biogas systems.

Biomethane gas can be conveniently packaged into bio-methane cylinders and distributed for cooking purposes to Hotels and restaurants, Schools and institutions, Households and Individual food vendors

Soil conditioner and manure will be used by farmers for soil amendment as well as by Agro based factories as an additive for their fertilizers.

[1] Contact email: maasodavid@gmail.com; Tel: +256776836984.

[2] REFADA is an acronym for Renewable Energy Foundation and Development Agency.