

# Biogas International Ltd

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## BIOGAS FOR INSTITUTIONS, CAMPS & PRISONS

### THE CHALLENGE

In most of sub-Sahara Africa and other developing economies around the globe, large institutions use huge amounts of freshly cut firewood for their cooking requirements. Without sustainable tree planting programs, this is leading to wanton destruction of natural forests. The situation is at a critical stage with the effects already being felt in erratic rainfall, climate change and Global warming. The unpredictable rainfall patterns not only make crop production extremely risky, but also threaten food security in already struggling poor countries.

The most practical and sustainable alternative to wood fuel is biogas.

### THE BIOGAS SOLUTION

At Biogas International Ltd we have developed a range of anaerobic biogas digester plants - Flexi Biogas Technology, to suite any environment and situation, and will run on most any biodegradable material.

You **DO NOT** need cow dung to produce biogas.

### NOTE

The most important element to the sustainability of gas production is the availability of feedstock.

#### Sources

1. Kitchen waste from the institution
2. Kitchen waste from nearby hotels and restaurants
3. Energy crops that can be grown within the institution
4. Market waste can be brought in from the local market place
5. Animal waste from a farm within the institution
6. Animal waste from a farm outside the institution
7. Human waste

### OUR PRODUCTS

#### T-REX DIGESTER - *Large Capacity Digester*

Our Large capacity T-Rex range of systems are designed to run on any biodegradable material such as animal dungs and abattoir waste, kitchen and market waste, energy crops (once invasive weeds) such as Water Hyacinth, Prosopis Juliflora, Prickly Pear Cactus etc



*Main Mess Kitchen in Pwani University - Kilifi Kenya.*

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*T-Rex module*



*Modular = Scalability*

T-Rex systems are 100% prefabricated and install in a few days. Once primed with cow dung culture, gas formation begins and is in high gas production within a few weeks.

Contrary to common belief that animal dungs produce the highest volumes of gas, actually fresh feedstock has the highest gas production. As you can see from the chart below, the higher the calories of the feed material, the higher the gas production.

## **BIOSANGAS TECHNOLOGY - *Hygienic human sanitary biogas systems***

Our human waste management system is specifically designed to run on human waste. Primarily designed to provide clean hygienic toilet facilities, the efficient digestion process and design also captures all the biogas potential from the waste.



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For ease of cleaning and prevention of rusting, the toilet cubicles are prefabricated from plastic corrugated sheets. Assembly onsite is very rapid.



*BioSanGas Toilet block*



*BioSanGas Digester*



*Public toilet in Mogotio Market, Baringo District  
Background – PAYG Toilet block. Foreground - Market day as venders display their merchandises on the  
BioSanGas digester*

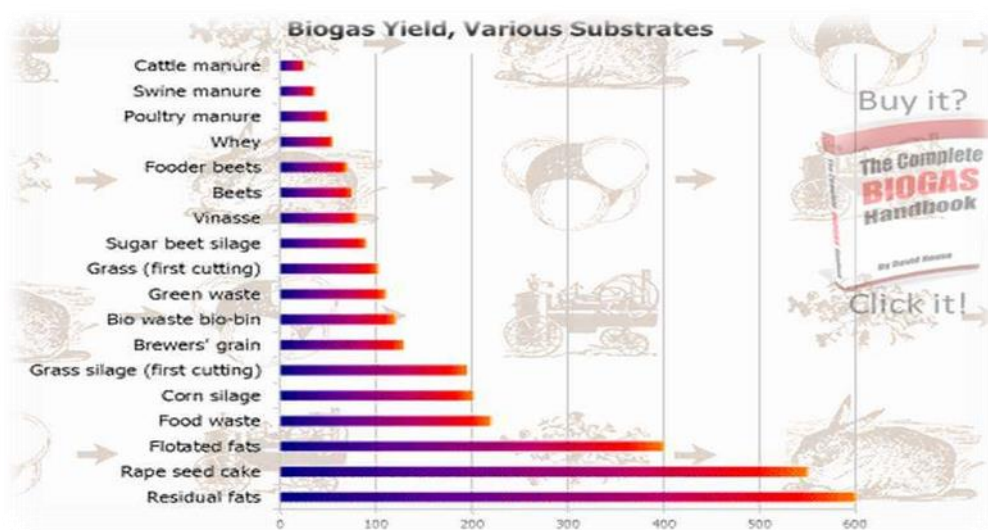
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## Note

1. Biogas from the BioSanGas system is piped directly into external storage balloons, or in the case of a dual system setup, the gas is piped to the balloons of the T-Rex system.
2. Although human waste appears to be the most available feedstock in institutions, only 15 - 20% of the volume of gas necessary for cooking can be derived from an efficient human waste management biogas digester. *(We humans don't eat a lot so we don't poop a lot either.)*
3. To avoid any contact with human waste, the BioSanGas systems are sealed and designed to run purely on human waste. This also reduces any chances of blockage.
4. T-Rex systems are designed to run on all other organic matter except human waste.



1 ton feed-stock vs gas potential in m<sup>3</sup>

## Dual Digester Model for total energy solution and waste management

Our energy solution incorporates a T-Rex plant to produce the bulk 85% of the energy demand derived from animal dung, kitchen waste etc, and a BioSanGas plant designed to primarily provide sanitary toilets and secondarily, the deficit 15 - 20% of the energy bill.

Although human waste is a good source of biogas, traditionally there is a lot of taboo associated with its use for human food preparation. By combining the gasses from both the T-Rex systems and the BioSanGas system, this is quickly overlooked and forgotten.

There is even more taboo associated with the use of exhausted bio-slurry from the BioSanGas system as a fertiliser for food crops. For this we channel this bio-slurry into shallow French drains arranged over a large soak area, and plant fruit trees along the drains. The fruits will provide vital minerals and vitamins to the residents.

The bio-slurry from the T-Rex system provides fertiliser for vegetable production and for sale.



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## *Permaculture Practices - Organic food production*

### FEEDSTOCK OPTIONS

#### 1. Poultry Farming in Institutions.

Poultry droppings have the highest biogas potential of all dungs. Chicken are also the easiest animal husbandry practice to manage at institutional levels. They also supply eggs and meat for the residents, and excess can be sold to generate income.

2. As the school are normally purchasing vegetables in mass from markets, a couple of sacks of market waste ( that is normally free), can also be collected and transported to the institution at no extra costs, and fed to the digester.

3. Certain plants, sometimes considered as menacing invasive "weeds" can be harvested from the environs, or even farmed as energy crops, and fed to the digester. A good example is castor oil plant with very high gas yields due to the high oil content in the seeds.

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*Castor plant*



*Prickly Pear*



*Prosopis Juliflora*



*Water Hyacinth*

## **BIO- SLURRY FERTILISER USAGE**

As a fertiliser the slurry can be applied as top dressing, through drip irrigation systems, as well as sprayed on a foliar feed.

When sprayed on a foliar feed, the slurry also doubles as an extremely effective pest repellent.

Of pure organic origin, of course there is no pre-harvest period.

The best application is when the slurry is added to compost immediately before applying the compost to the top-soil.

Bio-slurry for a system running on kitchen and market waste can also be fed to animals as a feed booster.

"Liquid Slurry" and "Slurry Enriched Compost" can also be sold as an organic fertiliser.



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## *Applications*



*Cooking*



*Ovens for baking and efficient energy cooking pots*

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*Poultry brooding*



*Biogas Power Generation*



*Water pumping, milking machines*



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*Chaff cutters, grain millers, maize sheller's & thrashers*



*A Place Called Home*