

Building an organic biogas business in Kenya

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Concept for a biogas pilot for the use of urban organic waste in Nairobi.

Part of the Wageningen/LEI, ECM Centre, ETC East Africa and Carbon Africa contribution to the UNEP/NCC ISWM project.

BACKGROUND

Currently there are around ten to twelve existing biogas companies and NGOs in Kenya. Of these, only five are entities trying to operate on a commercial basis. All five entities receive technical support or subsidies from donors and have not yet succeeded in expanding the biogas market sufficiently.

While a combination of fixed-dome, floating-drum and plastic tubular technologies are being promoted, the large majority of these target rural domestic and institutional users. Livestock dung is the primary feedstock, though examples using other agricultural residues and human manure do exist. Approximately 2,000 biogas units of all types have been installed to date in Kenya (www.biogasafrica.org).

ARTI TECHNOLOGY

In this regard, there is a possibility to partner with a Tanzanian company, Joint Environmental Techniques (JET) and acquire a licence to their ARTI (Indian) floating-dome technology for distribution in Kenya. The ARTI (<http://www.arti-india.org/content/view/45/52/>) technology uses municipal organic and market green waste as a feedstock. At present, installed costs for the ARTI technology range from USD 800 for a single domestic unit to USD 8,000 for a modular large-scale system that produces enough cooking gas to feed 300+ people at the institutional level. At the household level, the ARTI digesters require 2 square meters of space and a daily input of 2-4 kg of organic waste.

Within one year of operation, 40 ARTI units have been installed by JET in Tanzania, and the company has recently launched joint ventures with partners in Rwanda, Uganda and Burundi. JET is in discussions with plastic tank manufactures (Aquasan / Kentainers in Kenya) for the development of digester moulds and with sufficient economies of scale, JET believes that they can reduce the cost of the household size ARTI unit to less than USD 500 installed.

BIOGAS FOR WASTE MANAGEMENT

Urban (and rural) households, schools, hotels, lodges, etc are the most likely initial market for the ARTI technology. The technology could play an important role in a wider waste management strategy for urban African centres such as Nairobi. This is because not only would its uptake provide an "on-site" solution for waste processing (hence avoiding transport issues for bulky wet waste) but also by encouraging separation at source of organic waste for biogas production, source segregation of other waste streams could be promoted (and bins provided) concurrently.

THE PILOT

Generally one of the biggest barriers to the uptake of biogas digesters, even with subsidies, sponsors and micro-finance loans, is the upfront investment costs. However, there are existing private sector models that have not been much tried in Africa, which could be applied to this problem. Before this can be done, a number of questions and

gaps remain which a pilot project could help to address through (a) demonstration, testing and analysis of the ARTI technology in Kenya and (b) market surveys and analysis.

QUESTIONS/ACTIVITIES FOR THE PILOT PHASE

1. *Technology review* – installation of a pilot ARTI unit in Nairobi and assessment of the technology including answering the following:
 - Is the ARTI technology reliable, appropriate and cost effective to fabricate locally?
 - What are the technical parameters of the ARTI technology?
 - What are the advantages and disadvantages of the ARTI technology? How can existing problems with floating-drum biogas be rectified?
 - Is there a similar competitive technology on the market?
 - Where would an ideal pilot unit be installed?

2. *Market analysis* – literature review and door-to-door surveys of potential clients, tours of the demonstration unit:
 - What is the potential market size for the ARTI technology (considering interest, space availability, sufficient quantities of organic waste)?
 - Which types and sizes of clients should be targeted? Urban or rural or both?
 - What do potential biogas users currently spend on LPG (cylinders), charcoal and/or fuelwood per month?
 - What is the target customer willingness to pay for reliable biogas?
 - What is the most viable end-use for the biogas (e.g. cooking)?
 - What are the services that clients expect from the biogas provider (e.g. feasibility studies, fabrication and installation, maintenance, collection/sorting/feeding of the waste, etc)?
 - What sort of awareness and marketing strategy would need to accompany the technology?
 - What regulations and bylaws will need to be adhered to?

PROPOSED PARTNERS FOR THE PILOT PHASE

- a) *BioAfrica or another biogas/waste treatment company* – market surveys
- b) *JET Tanzania* – provision of the test unit and technical support
- c) *ECM Centre/ETC East Africa* – market surveys, assessing effectiveness of ARTI technology (and/or? Open to suggestions...)
- d) *Carbon Africa* – analysis of market data, assessment of the business case

INDICATIVE BUDGET [cost estimates to be confirmed]

Item	Cost (USD)	Comment
Installation of one ARTI household size demonstration unit	5,000	Cost is high because it is a one-off unit
Market surveys (at least 100 interviews)	5,000	BioAfrica and ECMC/ETC (if latter interested)
Assessment of ARTI technology	5,000	Master's student, ECMC or ETC?
Data analysis and design of biogas programme	Nil	Carbon Africa to do
Other??		
Total	USD 15,000	