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Case Study: Biogas Plants

Project:

Up scaling the Smaller Biogas Plants for Agricultural Producers and Processors

Location:

This action addressed Nyanza, Eastern, Western, Central and Rift Valley provinces of Kenya

Dome and expansion chamber

Project objective and target-groups

The specific objective of the project was to improve the living conditions for small to medium level rural dairy farmers, pastoralists and other beneficiaries in the target areas through adequate supply of energy from biogas technology.

Minimum 350 biogas plants were to be established providing biogas energy to at least 6750 direct beneficiaries. The project aimed at ensuring that poor rural agricultural producers and processors have efficient energy for cooking, heating, lighting and possibly electricity for income generating activities.

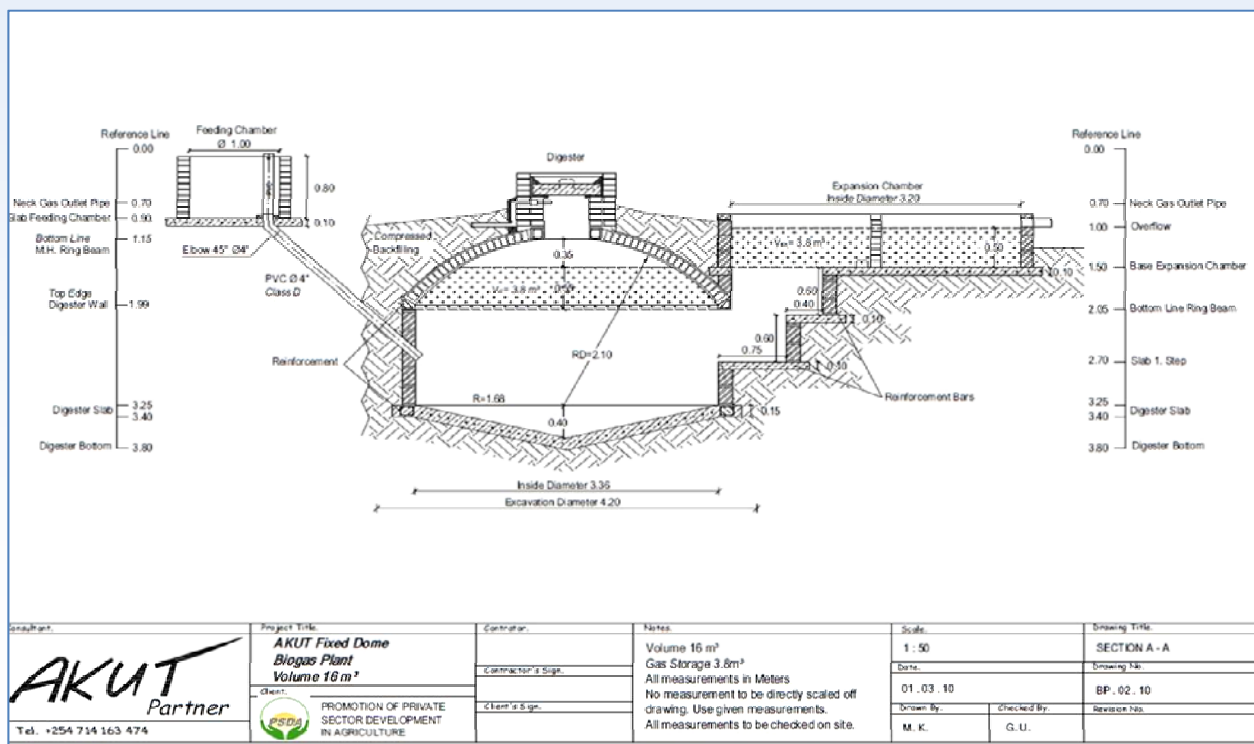
Furthermore, savings were expected to be accrued from reduced cost for waste and waste water treatment; substituting traditional energy sources with biogas and mineral fertilisers with bio-fertiliser.

Main activities

1. Create awareness of biogas energy and technology among end-users/consumers and extension agencies
2. Train selected companies and artisans in promotion of biogas and construction of biogas plants
3. Provide technical assistance in design and maintenance of biogas plants for artisans and companies
4. Up-scale construction and installation of biogas plants
5. Rehabilitation of malfunctioning biogas plants
6. Establish follow up and maintenance system for biogas plants
7. Promote availability of appliances for biogas units in the local market such as lamps and burners
8. Support relevant government officials in promoting biogas technology

Technologies applied and design

The biogas plants are fixed dome type with digester volume ranging from 8 to 124 m³ and gas storage ranging from 2 to 17 m³. It is non-compartmentalized with cone shaped slab; cylindrical wall (quarry stones); dome with neck (casted concrete bricks); gas tight plaster and round expansion chamber. The median size of the biogas plants is 16 m³ with an annual gas production of 1.2 mills. m³; an energy content of 7,200 MWh per year; and an electricity production of 1,800 MWh.



Financial facts

Average cost of median biogas plant: € 1,500

Average payback period: 2-3 years

Size of plant (cbm)	Material Cost (KES)	Labour (KES)	Total costs (KES)	In Euro (Dec 10)
8	94,622.00	35,000.00	129,622.00	1,180.92
12	108,669.00	40,000.00	148,669.00	1,354.44
16	125,933.50	45,000.00	170,933.50	1,557.28
24	141,394.00	53,000.00	194,394.00	1,771.02
31	176,275.00	65,000.00	241,275.00	2,198.13
48	209,638.00	75,000.00	284,638.00	2,593.18
59	230,829.50	80,000.00	310,829.50	2,831.80
70	264,379.50	90,000.00	354,379.50	3,228.56
90	291,192.00	100,000.00	391,192.00	3,563.94
124	342,430.00	120,000.00	462,430.00	4,212.95

Successes

- A market based approach has been used with good results, focusing on improved private sector development and less involvement of Government personnel in construction.
- Incentives/subsidies accompanied by intensive follow-up created a strong interest and demand for biogas energy, specifically from smallholder farmers.
- Trained artisans and those who were willing to make biogas construction their business showed good adherence to required standards.
- By September 2011 (end of project) 780 biogas plants had been constructed, thus more than double the expected number.

Challenges

- Reduced transparency due to several designs and variety of promoters in an uncoordinated market.
- Information on quality and quality assurance procedures is not shared among promoting organizations resulting in different procedures and practice.
- Contractors driven by desire for money at the expense of quality.
- Weak position of customers/end-users to deal with contractors, needing continuous support from a project.



Feeding chamber



Cooking using biogas in a school kitchen

Background Facts

- **Country:** Kenya
- **Applicant:** Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- **EU Contribution:** The total cost of the project was € 1,970,259.69 of which the ACP-EU Energy Facility contributed with € 1,325,358.69, which represents 68% of the total cost.
- **Estimated number of direct beneficiaries:** 6,500
- **Contact person:** Reimund Hoffmann reimund.hoffmann@giz.de, Kenda Mwenja kenda.mwenja@giz.de

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For more information:

European Union Energy Initiative (EUEI)
<http://www.euei.net>

ACP-EU Energy Facility
<http://ec.europa.eu/europeaid/energy-facility>

Monitoring of the ACP-EU
<http://www.energyfacilitymonitoring.eu>

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