ENERGY FOR LIFE - BEST PRACTICE AWARD 2011

System / Location

Biogas support for Tanzania "BiogaST" / Tanzania

Biogas support for Tanzania (BiogaST) helps to improve the rural population's living conditions in the Kagera region, one of the poorest regions in Tanzania. This is to be reached by the development and construction of a decentralized energy supply through small, adapted biogas digesters for the use of fermentation gas used as cooking energy. The sustainability of this project is ensured by accompanying training and education on this environmentally friendly technology to ensure the acceptance of this project within the local population. BiogaST is implemented as a cooperation project between Ingenieure ohne Grenzen e.V. and the Tanzanian non-governmental organization MAVUNO Project.

Planning/Installation
Ingenieure ohne Grenzen e.V.
http://www.ingenieure-ohne-grenzen.org

Donation/Support
BayWa Stiftung
http://www.baywastiftung.de
Hessisches Ministerium für Wirtschaft Verkehr und Landesentwicklung
http://www.wirtschaft.hessen.de
Büchting + Streit
http://www.buechting-streit.de

Operator
MAVUNO Project
http://www.mavunoproject.org

PROJECT DATA SHEET

Year the installation started operating	2010
Type of system	Biogas
Type of energy produced	Gas
Location	Ihanda, Karagwe, Kagera, Tanzania
Geographical position	1° 575200 S; 31° 123000 E
Size of installation	Biogas digester 5 m³, gasholder 1.6 m³
Thermal Power of installation	Approx. 12 kWh per day; 2.5 kW (thermal)
Use of energy produced	Cooking
Quantity of energy produced per day	2 m³ biogas
Type of financing	Grant
Source of financing	Donations
system investment cost	Total project cost (including education and training, research etc.): approx. $ 25,000 out of which plant costs (material, labour): approx. $ 3,700
System cost per watt	Approx. USD 1.48 per watt
Income generated from installation	approx. USD 120 per year (due to the substitution of fire wood and charcoal for cooking)
Maintenance cost per year	Approx. USD 30 per year (3 man days for cleaning and inspection per year)
Fossil fuel savings per year	Approx. 2,500 kg fire wood per year
CO2 reduction per year	Approx. 8 tons per year
Number of beneficiaries	5 persons
Presence of renewable energy country programme	No

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LEGAL FRAMEWORK

BiogaST is implemented in cooperation with the Tanzanian NGO MAVUNO Project. It has set itself the task of improving the situation in the fields of education, health care, agriculture, equal rights for women, support for children, water supply and AIDS education in the Kagera region in the northern part of Tanzania. Ingenieure ohne Grenzen e.V. and MAVUNO Project have been cooperating successfully since 2006 in the installation of water supply systems in Kagera by using water cisterns. Thus, good relations to the local community and the responsible governmental representatives are ensured.
The initial idea for BiogaST came up in 2007 when MAVUNO Project approached Ingenieure ohne Grenzen e.V. with an enquiry concerning scientific development cooperation focused on an extensive introduction of biogas for cooking throughout the rural areas in Tanzania. A tailor made plant concept was developed taking into account all the local requirements. To find a plant design able to address the rural population in Tanzania, intensive communication with MAVUNO Project was necessary and valuable. During the implementation phase, the local government has been invited and sensitized regarding the advantages of biogas.

FEASIBILITY, SUSTAINABILITY AND REPLICABILITY

The outstanding feature of this project is its truly sustainable concept. The decentralized supply of biogas for cooking can be achieved and maintained since the applied technical solution is tailor made for the local conditions. It is a simple and robust design that is constructed with locally available materials, easy to handle, while it requires low maintenance and can be operated at very low costs. The application of this plant type entails the substitution of fossil energy carriers and therefore significantly supports the reduction of deforestation. Minimized usage of firewood for cooking does not only directly reduce CO2 emissions but also indirectly helps to reduce the greenhouse effect.
The sustainable aspect of the project includes a sophisticated education concept designed to train locals in plant construction and operation. It is targeted to realize a financing concept that enhances independence from foreign funding through micro credits and CDM accreditation. The plant type is highly reproducible as a demand of 132,000 micro biogas plants exits in the Kagera region alone. A similar situation exists in other regions of Tanzania and in neighbouring countries.

SOCIAL IMPACTS

The Kagera Region is one of the poorest regions in Tanzania. Approximately 95% of its population lives on subsistence agriculture. Wood, dung or plant residuals are used for cooking. Meals are cooked in open wood fires. The health risk by using open wood fires indoors is immense: smoke exposure due to indoor fires is the third frequent cause of death worldwide.
This risk can be mitigated through this project by using biogas for cooking. In addition, the collection of firewood is no longer necessary: in the Kagera region an average 2 km walk every day is necessary to obtain the fire wood. This is mostly done by children. Another by product of the biogas plant operation is the opportunity to use fermented substrates as fertilizer to enhance soil quality and soil fertility which in turn has a positive effect on local agriculture.
BiogaST could even propel local small businesses with the construction of the plants done by local craftsmen, the local purchase of the needed material and not least, through the creation of a local biogas market.

FINANCING AND FINANCIAL IMPACT

By today, the monetary basis of the BiogaST project is granted by prospective donors, individuals and companies. The main financial supporters are the BayWa foundation, Hessisches Ministerium für Wirtschaft, Verkehr und Landesentwicklung, and the company Büchting + Streit. A financial volume of around EUR 90,000 is ensured safeguarding the construction of in total 65 plants by the end of 2013. For future plants, an innovative financing model is being developed to promote the sustainable and independent character of the BiogaST project and eventually create a market for this plant type. This model is based on three pillars: own contribution by the buyer, micro credits and gains from CDM certificates. An initial funding to introduce the micro credit system will be provided by NGOs or funds in the starting phase. Starting from 2014, the financing of each plant is planned to be composed of 20% from grants, 40% from micro credits and 40% from the sale of CO2 allowances. A contribution of the users in the form of internal activities is also planned.

ADDED VALUE

Open wood fires are by far dominating energy sources in the Kagera region in Tanzania. The cutting of trees and bushes as well as collecting wood for cooking or for selling as firewood or charcoal leads to considerable deforestation. As a consequence more wood is required than wood can actually grow again. The results are devastating since deforestation not only rapidly decreases the soil quality while increasing the run-off of rainwater which does not seep into the ground where it would feed the plants. As forests are multifunctional, this affects both, the direct habitat and the global ecosystem. Many people are directly or indirectly dependent on agriculture. Above all, the people have to cope with the dramatic changes in soil fertility and soil quality. The crop yields are hardly sufficient for survival - already today - and still further declining. The basis for food security is endangered. One of the main reasons for migration in our days is escape from such environmental changes and conditions. The BiogaST project directly entails the substitution of wood as the main energy source and therefore significantly supports the reduction of deforesting.