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PROJECT COMPLETION REPORT AND HANDOVER NOTES

Project Title:
Palm oil Waste to Biogas Energy and Vegetable Oil Genset for Productive activities
(Ilagala-Kigoma)

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For:
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ANNEXE: PROJECTS HAND OVER NOTES

PROJECT BACKGROUND

UNIDO under the UN JP6.1 has supported several projects particularly in North Western Tanzania with the palm oil processing project and the biogas centre for productive use to Kigoma. JP 6.1 was launched in 2009, as a successor programme to the UN Joint Project on Human Security in the two main refugee host regions, with the aim to support transition from scaling down of humanitarian capacity to development support for the communities.

This project in Ilagala is among others in Zanzibar and Lindi initiated by UNIDO under the concept of clean energy production centres, aimed at showcasing the different clean energy technologies for upscale, accelerate rural electrification, while increasing household incomes to small scale farmers.

It identified the following as priority objectives:-

- a. Improve the living conditions and welfare of the people, especially those with low income who live in relatively remote rural areas;
- b. To increase private sector opportunities, competitive environment and productive capacity;
- c. To generate employment for the people;
- d. To increase the capacity of vulnerable groups, including women, to contribute to development; and
- e. To promote the management of natural resources in an appropriate and environmentally sustainable manner.

PROJECT ACTIVITIES

Site assessment

A physical site assessment visit was conducted in June 2011 - the physical dimensions measured and the following physical attributes were noted:-

- ❖ The biogas site is considerably small, but with the great advantage of community power access, and demonstration
- ❖ The access paths are well maintained, wide, and are characterized by irregular topography and the open drainage channels that run along most pathways are in good condition to avoid over flooding during rainy seasons.
- ❖ The site is in open environment, with long access to sunshine making it very ideal for biogas production due to temperature requirement.

Community meeting

The technical team held discussion on 5th June 2011, with community leaders which was attended by YATAKAMOYO members and other officials, it had two major activities; -

1. Preliminary agreement on site location.
2. Process the site allocation documents, community mobilization on the project

Training session

During the training, for operators and supervisors particular focus was on equipment operation and maintenance, as it was clearly discernible that this was the community's main areas of concern as regards the move to attaining a full ownership.

Construction and installation works

This stage saw considerable delay resulting from several factors, but mainly rain.

However, the main logistical and contractual issues were resolved, and this ensured a smooth flow. The project team undertook community based contracting mechanism, by hiring community artisans and casual workers, where the project was divided into structural elements as follows-

- Site clearance
- Excavation
- Foundation
- Walling
- Roofing
- Finishes (painting and fixtures)
- Landscaping

Procurement for Materials

All the necessary materials (natural stones, sand, cement, ballast, electrical and PVC fittings) were procured locally transported and stored at the site compound.

The construction team consisted of a project manager and a foreman, 5 community artisans and 10 casual workers - all residents of ilagala-mutoni.

PROJECT DESCRIPTION AND PROCESS

The project considered strengthening development through positive utilization of available resources, as well as enhancing community participation in development efforts, as a necessary means to implement the various strategies to achieve sustainable rural development. This initiative acts as acceleration to the establishment of cottage and small-scale industries in rural areas and promotion of rural infrastructure.

Located 70 km North West of Kigoma, stretching on the shores of Lake Tanganyika, with a population of 140,000 farming and fishing are the main economic activities, with palm oil processing being a major source of employment and revenue.

Each project development phase has been pursued as part of a cycle for effective technology transfer achieve broader benefits, and upscale electrical connections, as means to achieve development for overall community well-being.

As designed, the project would respond to the needs of the community that include, waste management, support to increased agricultural production and availability of electricity for domestic lighting and productive use.



Due to continued advocacy to the project, several initiatives have been aligned to the project area; these include delivery of farm waste from the prisons farm, various household wastes. Both the household and market waste will be used in the biogas digesters, giving in return electricity and converted liquid fertilizers to the community.

The immediate project benefits to the community are:

- 1) Provision of electricity with a total of a 30kw/h engines with a maximum 12 hours running capacity, to electrify different economic activities, increase and improve service at the community level.

- 2) Value addition to farmers whose produce historically has been going for less pay, due to lack of refrigeration or storage facilities especially the fishing community.
- 3) Increased farm production and job creation through the provision of homemade organic fertilizers about 2 tons weekly to nearby farmers, consolidate or further strengthen farmland harvests.

TECHNOLOGY REVIEW

Apart from the palm oil processing machines, both the biogas and straight vegetable run generator technologies are supplied by Biomasse Energie BME a Germany company, contracted by UNIDO to design and install for demonstration, the systems are very appropriate to the developing part of the world as the major beneficiaries for sustainable development.

Palm oil processing Technology



The equipment's installed at the palm oil processing centre are all motor driven, just turn on and the Oil is pressed and leave it unattended as it efficiently presses a variety of crops into clean oil. Screw type oil press creates clean oil for fuel or food use and extruded meal for pellet fuel, biogas, animal feed, or fertilizer. Plugs into 3 phase outlets. A real advantage, before it would take the 3- 5 hours to crack 20 kilograms palm nuts, with the nut cracker machine this process takes 10 minutes.

Includes, Specs

- Oil Press Designed for 24/7 Operation
- Electric Control Cabinet
- Attachments for a Variety of Crops Interchangeable Fitting press a wide Variety of Crops

Biogas from palm oil waste



Availability of energy is critical for development especially in rural areas, where majority of the people live and have no access.

To make a positive contribution, BME GmbH developed the high performance temperature controlled (HPTC) biogas systems for the production of cooking and a side genset for electricity. The design is adapted to the different locally available resources, digestible waste as feedstock and simplified operation and maintenance which a local farm equipment repairer can easily attend. The process ensures full time availability on energy for production, creates jobs for operators and energy crops or waste business

SVO Genset technology

Straight Vegetable Oil concept seeks to empower rural community to use their resources for production. Diesel generators are now cheap and everywhere, diesel to put expensive to poor communities in the long run. The use of straight crop oil ensure capital retain, vain for produce and reduce on operating cost overheads.

The highest efficiency of genset is under full load. Full load is the cheapest operation mode, because it produces the most electricity from one litre oil. Bigger gensets, which runs with part load, are less efficient and waste money. After a period of economic development with following higher electricity demand the 8 kW SVO genset can be replaced by a bigger one. For the start in the economic development an 8 kW SVO genset is sufficient.

POST COMPLETION ACTIVITIES

After completion of the project work, the community cooperative YATAKAMOYO in close collaboration with the structure have constituted the project management committees. The committees constitute of 1 representative of each cell of beneficiary and three representatives of the local structures.

The electricity distribution plan is being finalized, with a detailed budget, in full consultation with district officials, and ensuring a cost sharing plan is acceptable.

Business operation skills and machinery management follow up training to be provided by SIDO

The project was officially commissioned on 23rd October 2011 by the local area chairman on behalf of the Kigoma District Executive Director and the Chairperson, of the group among others.

LESSONS LEARNT

- i. Community involvement when incorporated in the project design framework is very effective, encourages ownership and proper/responsible management.
- ii. Community contracting and labour based interventions add value to poverty reduction strategies and need to be broadened in the next project phase
- iii. Project integration gives more utility and offers coherence in implementation and management i.e. the case of palm oil processing and waste use for biogas centre
- vi. Need to develop a clear community based monitoring programme of all activities and interventions.

OTHER PROJECT MILESTONES

- i. The frequent highlighted visits to the project site by UNIDO Expert and exchange of information on both plans and ongoing works have led to increased featuring of the project in relation to the ongoing debate on energy and development in Kigoma including in high circles of the district administration.
- ii. Information sharing among partner agencies and foreign linkages has offered the project the necessary platform

HANDOVER NOTES FOR THE BIOGAS AND PALM OIL PROCESSING CENTRE AT ILANGALA-KIGOMA

Prepared by Mr Munyaneza Michael UNIDO ENERGY CONSULTANT and the UNIDO technical team for submission to YATAKAMOYO and KIGOMA DISTRICT.

On this 23-09-2011 following the successful testing of the systems especially the generators compatibility to the Biogas, installations and test running the Palm oil machines and discussions held with local community leaders at Ilangala-Kigoma. It has been observed that the construction and installation works have been duly completed. The construction or installed equipment on the project premises yard include,

BIOGAS PLANT

- 2 Plastic tank for hydrolysis
- Containerized digester fully fitted, and connected solar panels for the heating system, with solar battery all operational.
- Gasbag shelter galvanized fitted with a gas bag.
- Temperature control system.
- Generator and house with all fittings and operational on gas.
- Installed plastic tank for overflow sludge and water storage.
- Electricity distribution board installed in the power house
- A well maintained and landscaped site.

PALM OIL PROCESSING CENTRE

Complete set of oil processing machine all fitted in-house with mortars and connected to the generators, while others are displayed in open space for easy operation. All machines are fully serviced. The oil processing machines include

- Fruit removal machine
- Palm Boiler machines
- Red oil processing machine

- Nut cracker machine
- Oil cannel machine
- Palm oil dryers
- 2 Duo fuel SVO, 10 KVA Generators fully serviced and housed.

It is our conclusion that the project is operational. Additionally 2 local technicians have been trained as full time plant operators and 2 supervisors to oversee plant ongoing works.

We have discussed in detail the current status and proposed actions for each area of concern during the immediate post- period, also as possible guide to the Management Committee (MC) which may assume these tasks previously discharged by the project team, in addition to the 2 trained local operators and supervisors. The issue of community connectivity to the mini grid is ongoing in full consultation.

Done on 23-09-2011, at ILANGALA-KIGOMA