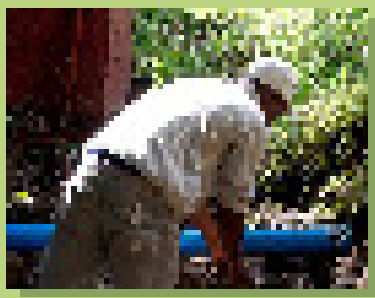
ENERGY FOR LIFE - BEST PRACTICE AWARD 2011

System / Location

Pico hydro system local made / Tanzania



The pico hydro system of 750W implemented in Makumira village (north Tanzania) is a demonstration site which gives an example of 100% locally made renewable energy technology suitable for isolated areas. The local realization of the device was possible through the contribution of 3 institutions: Dar es Salaam University for the design, Arusha Technical College for the workshops and the construction of the device and Oikos East Africa for the coordination, logistic and community aspects. This collaboration brought to the local technical college the skills to replicate such a system and to spread this knowledge to future students. These skills were completely absent in this area, where there are many isolated places that could be exploited to replicated the plant. This system provides electricity to 20 households, which is now managed as a community owned service. The site was already a demonstration site for biogas, wind, stoves, agriculture technologies and mechanical workshop that was started by a local skilled technician.

Planning/Installation
Istituto Oikos, Oikos East Africa
www.istituto-oikos.org
www.best-ray.com

Donation/Support
European Union

Operator
Istituto Oikos, Oikos East Africa
www.istituto-oikos.org
www.best-ray.com

PROJECT DATA SHEET

Year the installation started operating	2011
Type of system	Hydro
Type of energy produced	Electricity
Location	Tanzania, Arusha region, Arumeru district, Usa River, Makumira Village
Geographical position	3°21'36.26"S 36°48'44.78'E
Size of installation	13 m3 (Power house, penstock & channel)
Power of installation	0.75kW
Use of energy produced	Lighting, battery charging
Quantity of energy produced per day	18 kWh per day
Type of financing	Grant
Source of financing	European Union, 9th European Development Fund
system investment cost	6000 USD
System cost per watt	8 USD per W
Income generated from installation	15 USD/day (savings on diesel for generator)
Maintenance cost per year	200 USD
Fossil fuel savings per year	Approx. 3500L (diesel)
CO2 reduction per year	Approx. 9.4t of CO2 per year
Number of beneficiaries	20 families
Presence of renewable energy country programme	No

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LEGAL FRAMEWORK

The hydro system is part of the BEST RAY (Bringing Energy Services to Tanzanian Rural Areas) project which aims to provide energy services through renewable/efficient technologies (solar, biogas, improved stoves, etc.) in an isolated rural area of north Tanzania. Best Ray objectives are: to implement renewable energy systems in local institutions (schools, hospitals, dispensaries, community centres) rural household, but mostly to create local capacity (technicians), awareness and access to the community to the use of these alternative technologies. In this framework, the implementation of a locally made hydro system as a demonstration site, gave access to energy to an isolated area, created capacity through the strengthening of the local technical college and the training of community technicians during the construction; finally it improved the awareness as it is set in a demonstration site.

FEASIBILITY, SUSTAINABILITY AND REPLICABILITY

Tangible project impacts are: 20 isolated households now have electricity for lighting and charging batteries; the community has a demonstration site where they can go, see and learn practically about hydro technology. The project is likely to be replicated in nearby areas since now the local technical college has the capacity to build hydro turbines and because there are many potential sites for their implementation (isolated areas with low water flow). To be replicated somewhere else, it just needs to find the appropriate technical expertise and workshop for the turbine construction, then it is a suitable technology to be implemented in any isolated area with water flows nearby. The financial support can be found trough private individuals, organizations, projects or by the same benefiting community. The beneficiaries of this system are managing the plant in as a community owned facility both for its use (the electricity is equally shared) and for the financial aspects (they organize a fund for maintenance needs). One of the beneficiaries has been trained on maintenance and technical issue. These aspects contribute to the sustainability of the project.

SOCIAL IMPACTS

The isolated beneficiary community is now electrically served. The families can use clean light even in the evening thus increasing the number of hours used for different activities (e.g. working, studying, and housework) per day. This service can also be exploited to create small business activities (e.g. battery charging service, etc.). There will also be other communities touched by the project as the location is very popular as a demonstration site, so it will give high visibility to the project. The ability of sizing, designing, constructing and implementing a hydro turbine developed at the technical college can be used again as a business activity to produce other turbines at suitable locations. Technicians from the rural community have also been trained for feasibility studies, sizing and maintenance of hydro plants; thus they can use these skills for future work opportunities.

FINANCING AND FINANCIAL IMPACT

The financial support for the realization of the project was a collaboration between: Oikos East Africa (Best Ray project), that financed the material for the construction of the plant and the logistic aspects; the Arusha Technical College gives the technical expertise and the workshop where the turbine was constructed; and the Dar es Salaam University that gave the design and the engineering expertise. The benefiting community is in charge of the financial management of the plant (they organize a fund for maintenance needs).

ADDED VALUE

The project has been implemented on a site owned by a skilled local technician (part of the beneficiary community). He is very manually skilled with a solid educational background, and already experimenting and promoting renewable energy and environmental systems by himself for biogas, organic agriculture, forestation, wind energy, etc.), at his home. Choosing this location for the implementation of the project has also supported his activities and visibility. Moreover he is now collaborating with the technical college combining his technical skills with proper knowledge to improve his products while realizing new project ideas.