



EEP

SOUTHERN AND EASTERN AFRICA

Project Final Report

01.08.2011 to 15.05.2013

MOZ202: Enabling 2.400 people to access sustainable small scale solar power in Changanane, Namaacha District, Maputo Province, Mozambique

Prepared by: Bente Jepsen

Company: ISET/OWU

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Executive Summary

This solar energy project was designed to train 2,400 people (approx. 400 families), from Changalane in the District of Namaacha, to get solar energy from sustainable small-scale energy power stations in Changalane. The project objective was the introduction of an innovative energy solution to rural communities in Mozambique through the provision on affordable, decentralised, clean and sustainable energy.

The invocative component of the project for the rural people of Changalane was the introduction of 6 solar energy systems that could enable them to charge lamps for lightning in a business perspective. The project structure consisted of:

- Installation of 6 LaBL recharging systems
- Sale of 100 affordable solar lanterns
- Capacity training for the 12 LaBL entrepreneurs, 50 local business people, and 200 community leaders and members

The project has addressed the problem of illumination for many families that today has access to better education, possibility of realisation of more domestic and income generating activities and possibilities to develop local businesses. At least 800 children gained access to light in order to study after dusk which contributed to their better learning performance. A total of 12 LaBL entrepreneurs are now running their sustainable solar energy business and 50 local business people received training on how to use the new technology to develop their businesses, 200 leaders and members of the community received capacity training on how to use the new technology to improve their economy and life standard in general. Regarding the environment perspective, with the project the consumption of kerosene and wood for lighting purposes has decreased considerably.

The great experience and lessons learned has to do with the construction of small houses for the establishment of the solar stations (instead of the previously planned installation of solar panels in the roofs of the LaBL entrepreneurs) and this contributed to make people see and understand that solar energy stations were a common good. However it was also necessary to use burglar bars to avoid equipment theft and continuously mobilize the people about the importance of their participation in the project.

In general, the target group or beneficiaries are happy and willing to continue using the solar lamps and expect to see this initiative being scaled up, to reach other surrounding areas that did not benefited from the project in this phase.

1 Achievement in Implementation of Project Activities [as per project original plan]

The project main mission was fully accomplished, with the active participation of the target communities, installation of the 6 solar charging stations, trainings of the project beneficiaries and team, which enable the different target groups with small business management skills, as well as on solar charging stations installation, operation and maintenance and use and importance of solar energy for lightning purposes.

The beneficiaries of this initiative have presented testimonies on the benefits from this innovative approach of solar charging stations. This promotion of the initiative can be witnessed on the promotional video, booklets and conferences.

The project team and office were properly established and the coordination with TERI, the supplier of the LaBL stations was also a success. The only or main change registered on the project is related to the construction of small houses for the solar charging station with burglar bars to prevent burglaries.

The project monitoring was made through supervision visits to the site of implementation and follow up of activities when analysing the project progress reports. The management of the project consisted in coordinating the activities in the site of project implementation, as well as dealing regularly with the donor and with the cooperating institutions (such as TERI, FUNAE and local authorities). The Management proposed actions to promptly identify and implement alternatives for emerging problem solving. During the project term were also produced a baselines study, an internal review, one external evaluation and an audit.

1.1 Activity 1 Achievement

- The location for the installation of the solar energy stations have been selected, namely Mafavuca 2, Alto Enchiza and Mussuquelane, Ndividuane, Xigubuta A and Mafavuca 1/Mundayene. The LaBL entrepreneurs were identified and selected in coordination with the beneficiary communities;
- The selected LaBL entrepreneurs signed the agreements with the project ;
- The 6 solar charging stations were installed and are operational, have “metallic base for the panels support” and are protected with grid bars to prevent thefts;
- The LaBL entrepreneurs were trained and retrained on maintenance of the stations, timely distribution and collection of solar lanterns from users, maintenance of the daily logbook and product knowledge;
- The project staff received trainings on the advantages of the solar energy, use of affordable lanterns and technology use promotion. These training were conducted by 2 TERI technicians and FUNAE. All the project staff visited 1 solar charging station and is aware of how it operates.

The provision of quality illumination to 2400 was successfully undertaken, the installation of the solar charging stations, trainings of the project beneficiaries and staff.

1.2 Activity 2 Achievement

- The target groups were trained to maximize the impact of the added hours of clean, safe and improved lightning. A total of 370 community members were reached with these 6 training sessions;
- The entrepreneurs have received a training on small business skills (including topics such as business planning, opening a bank account, access to micro credit schemes, using the solar energy technology to develop businesses);
- The local business owners were assisted by the project team with trainings on business, they are now aware of business planning and have completed their own plans;
- The LaBL entrepreneurs are now planning the reinvestment of the profits from their panels and are able to calculate the maintenance costs, pricing tariffs, administration charges, among other relevant administrative and business issues;
- The local leaders, headmasters, women groups and other community groups have received training on the importance of the solar lanterns. The immediate result of this is the great demand on the solar lanterns and many people were interested in renting the solar lamps and buying the solar panels.

The sustainability of the solar panels was supported by the different kinds of training to address the interests of the target group.

1.3 Activity 3 Achievement

- The promotional video was produced with the desired quality, including scenes of the daily life LaBL entrepreneurs as well as the small business owners working in their small shops, the beneficiary families that are using the solar lamps in their houses and the conferences held under the project;
- A pamphlet to promote the solar technology was produced and 1.000 copies were distributed among the main stakeholders. This booklet explained the main idea of the project and illustrated the installation of the solar charging stations and beneficiaries;
- The 2 conferences to promote the project among the main stakeholders were held, and counted with the participation of community members, representatives from FUNAE

The project succeeded in demonstrating that affordable solar energy is possible in rural Mozambican areas and this initiative of solar charging stations can easily be replicated. Many of the beneficiaries were proud of presenting their experiences with this new and innovative sustainable energy solution for lightning and charging mobile telephones. The promotional video, booklets and conferences have passed a positive message of the project.

1.4 Activity 4 Achievement

- The project team was established following the initial plan and contributed for a good management of the project activities;
- The project team was in charge of the administration of the project and did not had any significant problems;
- The purchase of the project equipment was made in partnership with TERI (the supplier of the LaBL stations), although this was a long process, mainly due to imports issues. The establishment of the project office was also undertaken without problems

The project management and administration was held with no major issues. The project team and office were also established.

1.5 Activity 5 Achievement

- A baselines study, an internal review and one external final evaluation were successfully performed;
- The audit report was produced

The monitoring and evaluation of the project has been done regularly, through regular meetings, to discuss issues regarding the project implementation and were also produced progress reports on the activities undertaken in the project as well as an audit report of the project.

Changes and Variations

Activities	Achievement Status	Deviation if any	Reasons for Deviation	Monitoring and management measures implemented
Activity 1: Providing quality illumination for 2.400 people by establishing 6 solar stations	100%	Construction of small houses for solar charging stations with metallic bases to support the panels and grid bars	The roofs of the community members are made of straw and would not support the panels; grids to avoid panels and equipment burglaries	Progress reports and supervision visits; assistance from TERI technical team
Sub-activity 1: Identify the candidates who will be LaBL entrepreneurs and select locations.	100%			Progress reports and supervision visits;
Sub-activity 2: Sign agreement with the LaBL entrepreneurs (including reinvestment plan).	100%			Progress reports and supervision visits;
Sub-activity 3: Installation of the solar charging stations.	100%	Construction of small houses for solar charging stations with metallic bases to support the panels and grid bars	The roofs of the community members are made of straw and would not support the panels; grids to avoid panels and equipment burglaries	Progress reports and supervision visits; assistance from TERI technical team
Sub-activity 4: Training to the LaBL entrepreneurs (maintenance of charging station, timely distribution and collection of lanterns from users, maintenance of daily logbook, and product knowledge)	100%			Progress reports and supervision visits; assistance from TERI technical team
Sub-activity 5: Training the project staff on the advantages of solar energy, use of affordable lanterns and to promote them so that 100 families purchase such lanterns.	100%			Progress reports and supervision visits; assistance from TERI technical team

Activities	Achievement Status	Deviation if any	Reasons for Deviation	Monitoring and management measures implemented
Activity 2: Educate the entrepreneurs and the community to support the sustainability of the solar panel entrepreneurs	100%			Progress reports and supervision visits; assistance from TERI technical team
Sub-activity 1: Provide training to the target groups to maximise the impact of the added hours of clean, safe and improved lighting.	100%			Progress reports and supervision visits; assistance from TERI technical team
Sub-activity 2: Train small business skills to entrepreneurs (how to plan a business, how to get a bank account and possibilities to enter into a micro credit scheme, learn about market potential and availability of raw materials).	100%			Progress reports and supervision visits;
Sub-activity 3: Support to local business owners.	100%			Progress reports and supervision visits;
Sub-activity 4: Plan the re-investment of their profits and calculate maintenance costs, pricing tariffs, administration charges etc	100%			Progress reports and supervision visits;
Sub-activity 5: Train local leaders, headmasters, women's groups and other community groups on the importance of the lanterns in terms of increasing productivity and reduction of respiratory diseases.	100%			Progress reports and supervision visits;
Sub-activity 6: 50 small-scale business owners and the entrepreneurs as role models for the community, demonstrating the positive impact the lantern use can have on a family	100%			Progress reports and supervision visits;
Activity 3: Demonstration model promoted widely	100%			
Sub-activity 1: Produce a	100%			Progress reports

Activities	Achievement Status	Deviation if any	Reasons for Deviation	Monitoring and management measures implemented
small video film to promote the affordable solar energy model				and supervision visits;
Sub-activity 2: Produce a similar booklet	100%			Progress reports and supervision visits;
Sub-activity 3: Hold a conference at ISET/OWU to promote the model	100%			Progress reports and supervision visits;

2 Achievement towards project Outputs, Results and Impact

[Using specific indicators in the table below, please describe each of the project outputs as a result of and extent of achieving to date].

Project Objective	Intervention	Output/Deliverable	Extent of Achievement: Indicator
Provide quality illumination to 300 families	<input type="checkbox"/> Set up solar charging stations <input type="checkbox"/> Selling lanterns	<input type="checkbox"/> Solar charging stations <input type="checkbox"/> Renting solar lamps	<input type="checkbox"/> 6 stations <input type="checkbox"/> 100 lamps sold <input type="checkbox"/> 360 lamps rented per day
To support the sustainability of the solar panels.	<input type="checkbox"/> Trainings	<input type="checkbox"/> Training of LaBL entrepreneurs <input type="checkbox"/> Training of small business owners <input type="checkbox"/> Training of community members	<input type="checkbox"/> 12 LaBL entrepreneurs trained <input type="checkbox"/> 50 small businessmen trained <input type="checkbox"/> 200 community members trained
To demonstrate that it is possible to provide affordable solar energy to rural Mozambicans through a system that can easily be replicated	<input type="checkbox"/> Promotional material	<input type="checkbox"/> Video <input type="checkbox"/> Booklet <input type="checkbox"/> Conferences	<input type="checkbox"/> 1 video <input type="checkbox"/> 1000 booklets <input type="checkbox"/> 2 conferences for 50 stakeholders

3 Lessons learnt and Experiences

3.1 Implementation challenges

The project has fairly well followed the plan, but started late, because it was the first time that ADPP should import solar equipment, and the process took time to get started. The equipment was bought via the Indian Institute TERI, which is running a campaign – Lighting a Billion Lives. The communication with TERI was not very efficient. Finally a link was established between ADPP and the producer of the equipment, and after this, things went well. The equipment arrived in January, which meant a delay of 4 months.

Another deviation from plan was how the 6 solar charging stations were installed. In the project proposal it was assumed that the panels would be mounted on the roof of the house of the solar energy entrepreneur. But since roofs in Changalane are made of straw and security is an issue in this district, the project team decided to build small houses for the solar charging stations. This would also facilitate to make the community understand that the stations belong to the community, and they must take good care of them, to ensure continuation. Burglar bars have been added to the small houses, after an incident of theft from one of the stations. The equipment which was stolen was later replaced, and no further theft has been reported.

A challenge and lesson learned is how to secure the maintenance of the equipment.

The entrepreneurs have signed an agreement that they should pay 30% + 20% of their income to a fund for maintenance. This has however not been very efficient, as the entrepreneurs only contributed the first months of the project period, and later stopped paying. The entrepreneurs are also not very open about their income, since the less they report, the less they would have to pay.

The new plan for this challenge is to form an association of the 12 entrepreneurs, the local community leaders and One World University. The community leaders have more influence on the entrepreneurs, and will be part of solving questions arising.

Instead of paying 30% of the income, the entrepreneurs will pay a fixed fee which is considered hire of the equipment. The fee will be decided by the association, and the purpose of the fee is to secure future replacement of batteries in the lanterns and other maintenance issues.

3.2 Project environment and effects

The expected results from the project were positively reached. It was possible to complete the installation of all the 6 solar energy stations, the project staff and the LaBLs entrepreneurs were trained, with a special focus on solar lamps and equipment maintenance. The local small businessmen/women were trained on the topic of business planning and micro finances.

In terms of impacts, many people are benefiting from the installation of the solar charging stations, a total of 320 families are directly benefiting from this affordable initiative. Some of them rent more than one solar lamp, because they use the solar lamps for their houses illumination in the evening and other for their small business (such as market stalls or tailor's workshop), where they sell products. Others lanterns are being used in the local church and in the school, enabling adults education in the evenings.

From an economic perspective, the project is contributing to the increase of income generation activities, because there are people using the solar lamps to work in the evenings, and in the future the results from this change of behaviour will be massive, as there are many people that are thinking of running a small business activity in the evenings. 50 small businessmen/women – owners of small shops have been trained by the project on the topics of business planning and micro finances.

In terms of health and safety, the beneficiaries are confirming that they are feeling better when they don't need to inhale the smoke from the kerosene lamps. Another advantage of the solar lamps is the safety as kerosene lamps can cause fire accidents.

The Solar Charging Stations are showing sustainability. All lanterns are hired out, because the fee is affordable for the rural poor families and the light is important for them. This small fee is generating enough income for the entrepreneur to have a monthly salary, and also to set money aside for maintenance of the lanterns. The battery life is around 3 years, and the money for changing batteries has been calculated into the business plan of the solar charging stations. The solar charging station entrepreneurs are able to maintain the equipment, and ISET/OWU is providing a technical back-up.

In terms of environmental impact, the use of 360 solar lamps available in the project means that there are at least more than 300 families not using kerosene for illumination. During the trainings provided to the beneficiary communities the project team always emphasizes messages related to the reduction of Greenhouse Gases and the people awareness on this issue is increasing, therefore the demand for these solar energy lamps is increasing and the available supply of 360 solar lamps is not enough.

With the realization of the conferences this initiative is being promoted in the region, many people are contacting the project team asking for explanation about the project logic and how they can promote similar initiatives in their own areas.

During the implementation of the project the engineers of FUNAE (Fundo Nacional de Energia) Mr Tiago Benesse and Mr Nelson Bila besides being very helpful with different technical aspects, always praised the project as a pilot project that needed to be spread out many more places in Mozambique. They attended our conferences and got to know the project in the communities very well.

The video about the project was shared with the project team stakeholders, mainly other organizations as well as in the meetings with the community, so that many people have knowledge about this affordable and sustainable initiative.

3.3 Success factors

The importance of mobilizing the community, involving local leadership, and training not only the entrepreneurs, but as many as possible from the community was also an experience for the project leaders. People adhered to the training sessions offered at times at the stations and at times at ISET/OWU. The students at the ISET/OWU course needed to understand the project as a learning process about community work, from which they would gain important knowledge. After this became evident, they were eager participants in the project implementation.

3.4 Dissemination activities

[Describe activities related to dissemination of knowledge/results/lessons of the project, means of dissemination and how many people were reached]

5 Conclusions and future work

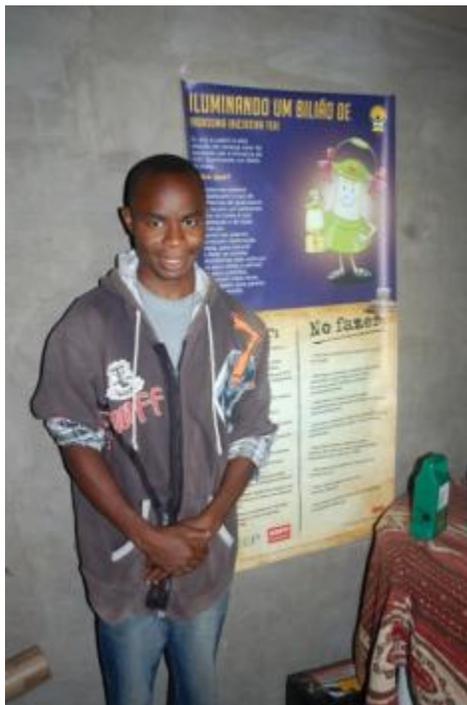
Considering that this is a pilot project the main finding is that it is possible to get renewable energy out to the people. The experiences can be improved with smaller units either for e.g. 10 families together or simply as an individual basis. The financial control of the solar charging stations can be improved by organizing the entrepreneurs in associations, which will be responsible for the sustainability of the stations.

In general, the target group or beneficiaries are happy and willing to continue using the solar lamps and expect to see this initiative being scaled up, to reach other surrounding areas that did not benefited from the project in this phase.

PHOTO PAGES FOR MOZ202 MILESTONE 4



This is the entrepreneur for the solar charging station in Mafavuca 1, João Bila. He has his own Small shop, from where he is selling products, benefitting from the evening hours.



The entrepreneur from the solar charging station, Mafavuca 2, in front of the poster which explains the daily maintenance of the equipment.



The solar charging station of Mussuquelane. The 2 entrepreneurs are presenting the station.



The entrepreneur is registering the daily activities in his logbook.



Training August 2012, in repair and maintenance of the lanterns.

The entrepreneurs from Mafavuca 1, Chigubuta A and Ndivuane participated in the training, and the primary school headmasters and local leaders were also present.



Beneficiaries were trained in the correct use and benefits of the lanterns

Above at the solar charging station in Mussuquelane, and underneath from the training at Ndividuane



The equipment and the system of solar charging stations were first introduced to the project by Mr. M. K. Somashekara, an engineer from the supplying company, Global Telelinks, India.



A Technician from TERI - India, Mr. Arvind Sharma, arrived to the project, after the first house for the solar charging station had been built, and trained the beneficiaries in how to use and maintain the equipment, and assisted in the installation of the first station in Mafavuca Village.



The Pedagogical Director of the primary school Chigubuta. The school has received a system for ceiling light, which enables them to organize literacy studies in the evening. The school also received 2 small study lamps, with which the headmaster and pedagogical director can prepare themselves for next day's school work.



Children can do their homework in the evening



A woman from Mussuquelane village explains:

With the solar lamps, we have better light. We can see what we are doing in the house. If we hear noise from outside the house we can see what is happening, and if there are animals, we can scare them away.

This light is safe to leave in the house with our children, we don't have to be afraid of fires.

If we need to go somewhere in the evening, this light can be taken outside, it does not blow out as the kerosene lamp easily does.

The solar lanterns are an important improvement for us.