PILOTING SOLAR ENERGY PROJECTS IN COMMUNITIES OF TIMOR LESTE

PROJECT'S AIM: TO PROVIDE SCHOOLS, HEALTH CLINICS AND COMMUNTITY CENTRES WITH CONTINUES LIGHT THROUGH COMMUNITY-LED PV SOLAR SYSTEMS

Location:
Timor Leste

Technology:
Solar PV System

Energy-related need:
Lighting

Costs:
Total: €1,200,000
WISIONS financial support: € 39,805

CO2 Reduction:
none

Partners Involved:
Mercy Corps
(www.Mercycorps.org)

Duration:
01/2011 – 10/2012

Picture: Mercy Corps

Timor Leste is one of the poorest countries in Asia. Over 70% of households rely on kerosene as their main energy source for lighting and, in rural districts, this figure may be as high as 90%. However, burning kerosene to produce light is extremely inefficient and, in addition, its indoor use can have severe negative effects on the health of users.

This project, implemented by Mercy Corps, aimed to address these issues by replacing kerosene with solar PV systems to provide a clean and efficient source of household lighting, as well as power for key community institutions such as schools, health clinics and community centres.

The WISIONS funded project was part of a 36 month 'energy for all' programme (E4A) funded by the European Commission and implemented by Mercy Corps. The programme as a whole provided lighting solutions for 23 community institutions and 3,000 households. The WISIONS funding was used to implement 16 systems at community level.

The first stage of the implementation was to form and train Energy Management Groups (EMG) at community level. The EMGs developed 'Community Energy Plans' by identifying the fundamental energy needs in consultation with the community. The EMGs collected socioeconomic data concerning the number of lamps used daily in facilities, the demand for electricity for other uses and the total number of individuals using the installations weekly and monthly.

The second step was to inform the villages about the new energy systems and their functionality. About 65% had not previously heard of solar technology; therefore, an awareness campaign was launched and a number of solar systems were installed for demonstration purposes.

TECHNOLOGY, OPERATIONS AND MAINTENANCE

The analysis showed that basic lighting and certain other power requirements, such as for mobile phone charging, were most needed in community buildings such as schools, youth centres and religious buildings. Small solar PV systems are a proven technology for meeting these types of energy needs. Accordingly, 12 PV systems with a capacity of 48W each, three PV systems each with an 85W capacity and one system with a capacity of 170W were installed. The key technical components in addition to the PV panel were a sealed gel battery, a regulator, an inverter and between 4 and 7 LED lamps. The local EMGs were trained to install the systems themselves, which also provided them with the technical capacity to operate and maintain the equipment.

At community level - in contrast to household level - PV systems only replaced

kerosene and candles to a limited extent. To a much larger extent, the systems have provided the opportunity for additional lighting and power for other new activities in the hours of darkness that were not possible before.

FINANCIAL ISSUES AND MANAGEMENT:

The PV system hardware cost about €450 for each 48W system, €750 for the 85W systems and €1500 for the 170W system. The community contributed about 25% of the total cost in the form of labour. In addition, each community developed a maintenance plan indicating how they would raise the funds to replace parts over time. Schools and religious buildings are able to use their maintenance budgets to replace spare parts, while youth centres and sacred houses required a different approach: communities agreed to charge a fixed rate for using the facilities and solar power for private events, such as weddings, parties, cultural occasions etc.

ENVIRONMENTAL ISSUES

The use of kerosene for lighting results in relatively high levels of CO_2 emissions because the process is very inefficient – more than 99% of the fuel is converted into unused heat instead of into light. Therefore, the project aimed to reduce CO_2 emissions by reducing the use of kerosene for lightning. However, although the project provided 23 communities with PV systems, no kerosene was actually replaced because the energy from the PV systems was used to provide additional energy rather than to replace the current source of energy. As a result, the direct environmental benefits of the project are limited and, in addition, further negative side effects could occur in the future because the proper recycling of batteries in the solar systems cannot always be assured at local level.

SOCIAL ISSUES

Timor Leste is one of the poorest countries in Asia with 77% of the population living on less than $2 per day. The community PV systems do not generate income but they do provide the opportunity for additional social, educational or wellbeing activities after dark in community institutions such as schools, clinics or community centres.

RESULTS & IMPACT

The results in relation to the two major components of this project - community training and installation of community systems - exceeded the set targets. Instead of the 4 community energy systems that were planned, 23 were implemented in 16 communities.

REPLICABILITY

Mercy Corps explored the possibility of selling community systems through local businesses. However, they concluded that ensuring the availability of the various system components and providing appropriate installation and after-sale service would not be feasible, given the limited demand and wide geographical spread of potential customers. Conversely, the prospective market potential for compact solar products such as solar lanterns and all-in-one systems is anticipated to be much better.

The replication potential for community systems was, however, improved by the involvement of government agencies in the implementation process. This raised awareness of the technologies among decision-makers who facilitated the implementation of solar community systems in six additional locations.

LESSONS LEARNED

The substantial increase in the number of systems was due to three factors. Firstly, the capacity that was needed for lighting was much lower than initially anticipated. In many locations 40W to 50W systems were sufficient to meet lighting needs. Secondly, money was saved on installation by training community members to install the systems themselves. Thirdly, solar panels could be purchased more economically than expected due to a reduction in the cost of PV technology over time.

Although the overall outcome of this project was positive, the experience does demonstrate the need for assessments to be undertaken before project implementation because meeting the needs of users is one of the most significant factors for the sustainability of a project.

The awareness-raising campaigns and the active involvement of government agencies were also key to the success of the project.

Source: Final Report submitted to WISIONS by Mercy CorpsCorps (11/2012)

Picture: Mercy Corps