

Solar-Powered Outdoor Lighting, Bolivia

Themes

- ★ Renewable energy
- * Innovative technology applications
- ❖ Technical capacity development
- ❖ Institutional capacity development
- * Health (MDGs 4-6)

PROJECT DATA

Name: Solar Energy Application in Arampampa
Implementing Organization: Agrobioenergy Assistance Program for Small Farmers (NGO)
Location: inter-Andean valleys north of Potosi, Bolivia
SGP Contribution: \$23,351.54
Start Date: November 1997

ENERGY OVERVIEW

Energy Resource: solar
Technology: communal PV systems
Application: outdoor and indoor lighting
Sector: public and residential lighting
Total power provided: 4.8 kW
Households Served: public lighting for entire village, residential lighting for 30% of homes in the village

BACKGROUND

In the high regions of the Andes Mountains, there are numerous poor and remote villages. Many do not have access to electricity, and depend upon candles, batteries and diesel for their energy. Due to their remoteness, it is unlikely the grid will reach these villages any time in the near future.

PROJECT DESCRIPTION

Overview

This project sought to remove technical and institutional barriers to the use of solar electricity in this region of high solar radiation. To this end, the project established an Energy Services Committee in the community, which managed the installation of outdoor lighting, as well as indoor lighting for 30% of the community. In turn, this community has shared its newly-gained technical expertise with 54 neighboring communities also interested in installing this type of system.

Implementation

The project was carried out in three stages. First, the community was organized and motivated for the project. Next, the equipment was installed. Then community members were trained in system management. All of these activities were conducted via participatory workshops, including the design and definition of the network, establishment of administration and management systems, cost calculations and the setting of rates for public and domestic lighting.

Technology

The system used twelve 80Wp panels, 4 batteries, 1 charge regulator and 2,500 meters of aluminum cable.

Environmental Benefits

Global: The project achieved a 70% reduction in the use of candles, batteries and diesel, thereby reducing carbon dioxide emissions.

Local Livelihood Benefits

Health: Due to outdoor lighting, the project has reduced the risk of accidents when people are moving around at night in the town. In addition, for those individual households receiving solar electricity, there are health benefits associated with reduced use of candles and diesel sources of energy.

Education: Nighttime activities are now more possible in the village. This has opened up new educational and cultural opportunities for community members.

Regional/national benefits:

There is great potential for the use of solar energy in this region near the Andes. The region has benefited from the example set by this pilot project, which opens up a new option for meeting energy needs. The community of Arampampa has distributed technical information about their system to 54 neighboring communities who wish to set up similar systems. In addition, it appears that there are plans in the medium term for the electric grid to extend to this region north of Potosi. The community of Arampampa plans to maintain its solar electricity generating system, but in anticipation of the grid's extension, the Energy Services Committee has switched from a direct to an alternating current for compatibility.

Capacity Development

The community learned how to organize itself to manage a communal electricity system through an Energy Services Committee. In particular, four community leaders, four local government members and two members of the Community Supervisory Committee were trained in energy use applications and the maintenance of photovoltaic systems.

Beneficiaries

The entire community of Arampampa has benefited from the new outdoor lighting, and 30% of the households now have indoor electricity as well. In addition, 54 neighboring communities now have technical information about how to build systems of their own.

Partners

The community itself was the most critical partner in this project. Local people participated, through workshops, in many aspects of the design and implementation of the project. In addition, local government was integrally involved. This has helped the project in that the new electric system can be well integrated into the overall plan for the development of the village, and the new solar mini-grid can be integrated into regional plans for electrification.

LESSONS LEARNED

Environmental Management

The community seems to have been very successful at reducing the use of candles, batteries and diesel fuel. Outdoor lighting seems to be a good application for a communal PV system because there is little opportunity for some families to take greater advantage of it than others. It also seems that the community has established tariffs for public and domestic electricity use, which also helps ensure proper management of energy use. Finally, communal PV systems have the advantage that they can be more easily integrated into conventional electricity networks, should those be developed at a future time.

Barrier Removal

Institutional: Adequate participation in the decision-making about the design of a mini-grid and the setting of rates are essential. An Energy Services Committee with clear responsibilities and community support made this project possible. It was very helpful that members of the community's existing government were part of this committee. This lent legitimacy to its efforts and also helped facilitate the community's awareness of regional electrification plans so that steps could be taken

ahead of time to ensure the integration of the new solar mini-grid instead of allowing it to become obsolete when the new conventionally powered grid was extended.

Scaling Up

The choice of location for this project is one element that can facilitate scaling it up. Arampampa is one among many villages in this Andean region with great solar power potential and a great need for electricity. Thus, Arampampa can serve as an excellent local demonstration project with wide application in the immediate surroundings. The integration of local government officials is also helpful in facilitating the replication or scaling up of projects. These officials lend legitimacy to the community's efforts when promoting them in other communities. In addition, these officials can help the community access government information more readily, which can be very helpful in project planning.

SOURCES CONSULTED

Project Record, SGP Project Database, <http://www.undp.org/sgp>
GEF Small Grants Programme, Bolivia. "De Hombres, Bosques y Montanas: Memoria de 25 proyectos apoyados por el PPD/PNUD-LIDEMA." Bolivia, 1999.