

Micro Hydro Power for Agro-Processing in Rural Areas, Bolivia

Themes

- ★ Renewable energy
- ❖ Technical capacity development
- ❖ Institutional capacity development
- * Poverty alleviation (MDG 1)

PROJECT DATA

Name: Micro Hydro Power and Processing Plant for Coffee and Chili Powder

Implementing Organization: Camata Community Organization (CBO)

Location: Camata, Department of La Paz, Bolivia

SGP contribution: \$32,761.91

Start Date: December 2001

ENERGY OVERVIEW

Energy Resource: water

Technology: micro hydro

Application: lighting, radio, television (domestic and public buildings), coffee roasting, chili dehydrator, grinding mill, chili cutting machine, bag sealer, scale

Sector: domestic, public and commercial

Capacity: 27 kW

Number Served: 70 households, school, police station, public space, agro-processing plant

BACKGROUND

In Bolivia, only about 25% of the rural population has access to electricity. Due to the mountainous terrain and remote locations of many villages, it is unlikely that the grid will be extended to them anytime soon. Micro hydro power, in locations where it is feasible in Bolivia, is the least costly per kW of all the renewable alternatives. However, one common problem is that while hydropower is being generated all day, domestic uses mostly occur in the evenings and at night, and the power generated during the day may not be fully used. Due to this, greater attempts are being made to link micro hydro power installations to productive applications that can make fuller use of this power and generate income for community members.

Camata is a village in the Muñecas Province of the Department of La Paz, 20 km away from Charazani. Its inhabitants make their living through agriculture, primarily growing chilies, coffee, and corn. However, without power people there live only at a subsistence level.

PROJECT DESCRIPTION

Overview

This project built a micro hydro power plant in the village of Camata. The system provides electricity for domestic and public needs, and boosts the local economy by powering an agro-

processing unit that enables people in the community to process their own agricultural products and sell them directly to the market. Both the power plant and the agro-processing unit are managed by a community cooperative.

Implementation

The Hydro-electric Program of the Hydraulic and Hydrology Institute determined through an assessment of the region that Camata was a feasible site for a micro hydro plant. In discussions with the community and local authorities, the community expressed willingness to participate. The idea of starting an agro-processing plant to dehydrate local chilies and make chili powder, as well as roast coffee beans, emerged through discussions with the community. The community organized a Committee for Electrification, which took the lead in constructing the micro hydro system and the agro-processing plant. This organization is now responsible for running and maintaining both efforts, and sets the regulations for the use of power and the operation of the plant. The community contributed the labor for the project, while the local municipality contributed materials and transformers for the high-voltage distribution line, and the Prefecture of the Department of La Paz contributed the posts for stringing the distribution lines and outdoor lights in the central square of Camata.

Technology

The infrastructure constructed through this project relates to both micro hydro power generation and agro-processing, including chili powder making and coffee roasting. The micro hydro power system is of 27kW capacity, and uses a Pelton turbine and a tri-phase generator. High-voltage distribution lines are a total of 1km in length. In the agro-processing plant, there is an oven using re-circulating hot water to dry chilies, a grain mill, a chili cutting machine, a coffee roaster and dryer, and a package sealer.

Environmental Benefits

Global: Previously, the community had no electricity and made use of kerosene for lighting. Decreased use of kerosene significantly reduces greenhouse gas emissions.

Local Livelihood Benefits

Health: Since kerosene use is reduced, indoor air pollution should also be reduced, thereby relieving some respiratory and eye problems.

Income generation: The introduction of agro-processing, along with electricity access, greatly improves the community's opportunity to generate income. Whereas previously farmers could only grow and sell enough chilies or coffee beans to meet subsistence needs, now they are planning to sell processed and packaged agricultural goods directly in the city of La Paz. The income from this operation will return to the community via the committee that runs both the micro hydro plant and the processing plant. In addition to the 70 households of Camata, 238 households in the surrounding 12 communities benefit from the ability to sell their produce to the plant.

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Beneficiaries

Direct project beneficiaries include the 70 households of Camata, who live in a relatively remote region. These community members now have access to electricity in their homes and in public spaces, as well as access to the agro-processing plant to process their agricultural produce. Secondary project beneficiaries include the 12 communities (238 families) in the surrounding area who will now also be able to bring their produce to the agro-processing plant and receive payment. Previously, they had greater difficulty selling their agricultural products.

Capacity Development

The capacity of community members involved in the committee is increased, since they have learned how to manage a micro hydro system and an agro-processing plant. IHH has provided technical assistance in all aspects of this project.

Partners

Partners in this project include:

Institute of Hydraulics and Hydrology: The idea for the project first came from an IHH feasibility study identifying Camata as a possible location for micro hydro power. IHH has provided technical assistance and guidance in building and managing the micro hydro plant and the agro-processing plant.

Committee for Electrification: This community committee has played a key role in all decisions regarding the micro hydro and agro-processing plants. Partnership with the committee made the construction of the plants possible through the donation of community labor.

Local government: Both the municipality and the department in which Camata is located have contributed to the construction of the micro hydro plant, both donating equipment that serves to distribute electricity. This connection is important, since these government officials may learn through the process how micro hydro plants work and how they can work in certain locations.

LESSONS LEARNED

Environmental Management

This project illustrates one possibility for making use of the power generated by micro-hydro plant during the day. The

project created a very targeted economic activity so that the community's raw agricultural materials could be processed and therefore sold at higher prices, improving the community's income generation potential. Indeed, it is not only Camata's prospects that are improved, but those of the surrounding community as well. This option should be considered along with the other options available for making full use of hydropower in rural communities, such as using the running water for irrigation purposes, as illustrated by another SGP project in Bolivia, or selling excess power to the grid, as illustrated by an SGP project in Indonesia. One aspect to bear in mind with respect to this alternative is that actually beginning to sell the finished products on the market may take some time. As of May 2003, the plant was producing the products, but sales had not yet begun in the city of La Paz, since transportation still needed to be arranged. There are a lot of factors to address in ensuring that such operations are sustainable businesses and managed such that they bring the greatest possible benefits to the community. Targeted technical assistance in this area is probably needed.

Barrier Removal

Information/Knowledge: The project raised awareness among government officials about the possibilities offered by micro hydro power. Government officials contributed to the success of the project, so it will be interesting to track whether this might result in their willingness to support or initiate other micro hydro projects.

Financial: The project does not appear to reduce financial barriers relating to this technology on a broader scale than this community, unless the government is motivated to contribute to the distribution of micro hydro systems as result of this project.

SOURCES CONSULTED

Project Record 012/2001, SGP Project Database,
<http://www.undp.org/sgp>
GEF Small Grants Programme, Bolivia. "Proyecto: Microcentral Hidroeléctrica y Planta Procesadora de Café y Locoto Camata." May 2003.