

Community-Scale Solar Water Pumping, Thailand

Themes

- ★ Renewable energy
- ❖ Technical capacity development
- ❖ Institutional capacity development

PROJECT DATA

Name: Community-scale solar water pumping
Implementing Organization: Hin-Ngome Tambol Administrative Organization (CBO)
Location: Thailand, Sangkhorm District, Udonthani Province
SGP contribution: \$12,857
Start Date: February 2000

ENERGY OVERVIEW

Energy Resource: solar
Technology: photovoltaic panels
Application: pumping water
Sector: domestic
Total capacity: two solar-powered pumps; capacity unknown
Number of People Served: 80 families in three villages

BACKGROUND

Ban Hin Hgome and two other villages in northeast Thailand rely upon rain and the Mekong River system for irrigating their rice plots, but drinking water must be pumped out of deep wells. This village is connected to the grid, and the water pumps are powered by electricity. The local administrative organization is responsible for paying the electricity bill and distributing the cost among the villagers via the water bill. Other energy needs in the village, such as streetlights, have not been met by electricity distributors.

PROJECT DESCRIPTION

Overview

This project has demonstrated the use of solar water pumps to reduce grid-connected electricity use in pumping water for domestic consumption, thereby decreasing carbon dioxide emissions and allowing the villagers to reduce their electricity costs.

Implementation

The project idea was conceived when the secretary of the Tambol Administrative Organization (TAO) heard about the possibilities of solar water pumping during a talk by the SGP National Coordinator. After TAO had applied and received a grant from GEF to try the idea, TAO invited two solar water pump companies to submit bids, and selected one of them for the project. New wells had to be dug in order to use the solar pumps, and this funding was provided by government agencies. Training about solar energy uses and technologies was provided to ten community leaders by a university in Thailand that



Solar photovoltaic panels providing power for water pumping (Thailand, Sangkhorm District, Udonthani Province).

specializes in renewable energy. The solar energy company, Solartron, Ltd, then came to install the pumps, with the assistance of the newly trained community leaders. School children were made aware of the project, and of the importance of not playing football near the panels. In December 2000, the pumps began working, and by January, the first cost savings were realized. A decision was made by the TAO to continue to collect the same amount for electricity at least for the first year; but to use the savings in electricity costs to establish a community development fund. Community leaders have decided to begin by investing the savings in photovoltaic panels for outdoor lighting at night. The TAO now plans to install five additional solar water pumps to serve the other villages under its jurisdiction. In July 2003, the community decided not to use electricity from the grid to pump water for one of the pumping stations, and instead rely completely on solar energy for pumping water.

Technology

Two solar water pumps were installed by Solartron, Ltd. The pumps are submersible, and are attached to elevated water storage tanks. The systems are also designed to catch rainwater as well. When there is not sufficient sunlight to operate the solar pumps, electricity from the grid connection is used.

Environmental Benefits

When there is sufficient sunlight, the community uses water pumped using solar energy instead of grid-connected electricity. During the first month, the community used about a third less electricity for water pumping. According to one report, this translates into a reduction of 374 kg of carbon dioxide emissions per month. Most recently, in July 2003, the community decided to switch off the electricity for one of the pumps, and just rely on solar energy, which should result in close to a 50% reduction in the use of grid-connected electricity.

Livelihood Benefits

Savings: By using solar energy, the cost of electricity for water pumping has decreased. During the first month (December 2000),the electricity bill for the whole community was reduced from 2,400 Baht to 1,600 Baht. The Tambol Administrative Organization (TAO) has continued to collect the same amount for water use as before, but puts these savings aside for a community development fund.This fund is being used for purchasing outdoor solar lighting, a long-time community priority.The community has agreed to continue accumulating these savings in the community development fund for at least one year, after which time they may consider reducing water rates. However, one concern about doing this is the possible incentive to waste water.

Income Generation:The new pumps have also been more effective in providing a steady supply of water.This has led community members to embark upon other income-generating activities, such as growing medicinal plants and then making medicines, shampoos and drinks with them.With TAO's help, community members are exploring the use of solar energy for processing these items.

Capacity Development

This project has been led by TAO, whose members are elected by the local community. Ten community members have received education and training in renewable energy.This training has greatly improved their ability to manage village energy use effectively. For example, during a two-day training in May 2000 at the Naruesuan University, ten community members learned about how solar technology works, how to maintain the equipment, and how much the equipment costs. This awareness has helped them understand other possible applications of solar energy, as well as its limitations, given its relatively high cost.

Beneficiaries

The beneficiaries of this project are the 80 community members in the three villages that are now being served by solar water pumps.Future beneficiaries are those living in nearby villages over which TAO has jurisdiction;TAO plans to install solar water pumps in these communities as well.

Partners

This project involves several beneficial partnerships in addition to SGP.

Universities:This project made use of connections at Naruesuan University to provide training to community members on renewable energy and maintenance of the solar water pumps.

Private companies: The community contracted with a private company, Solartron, Ltd., to install the water pumps.This company was one of two that placed bids on the project.Solartron trained community members selected for maintaining and operating the pumps.

Government agencies: Upon the advice of Solartron, the com-

munity dug two new wells for these pumps.The community contacted and received financial assistance from office of Accelerated Rural Development in the Ministry of Interior; as well as from the Department of Mineral Resources in the Ministry of Industry. In addition, the Sangkhorm District Office has designated TAO as the central organization for energy conservation and the environment among the four other organizations under its jurisdiction.This means that TAO's experience with solar energy can easily be disseminated throughout the District.

LESSONS LEARNED

Environmental Management

This project illustrates the potential for solar energy to reduce the use of grid-connected electricity. However, it should be noted that solar energy is still relatively expensive compared to grid electricity, so this will not make sense in many situations.In this case, the SGP grant helped cover the initial costs of purchasing the solar equipment, which enabled the community to realize the savings so quickly after installing the solar water pumps.In addition,care should be taken that the installation of solar water pumps does not increase the use of groundwater so that supplies are depleted.

Barrier Removal

Information/awareness: This project has greatly improved this community's awareness and understanding of solar energy and its applications. This has opened many possibilities for other applications besides water pumping.The community's success has gained the attention of other communities, who are now also interested in using solar energy.

Financial: This project lowered financial barriers for accessing solar energy, but only with respect to this community.The SGP grant helped cover some of the initial equipment costs so that the community could quickly realize savings, which they are now using to cover the costs of other solar energy applications, in particular, outdoor lighting. However, it is unclear how other communities outside of TAO's jurisdiction will be able to access solar energy without another SGP grant.

Policy: Due to TAO's success with the solar pumps, the Sangkhorm District Office has designated TAO from among the four organizations under its jurisdiction as the central organization for environment and energy conservation.This will allow TAO to share its knowledge about renewable energy projects and energy conservation efforts throughout the District.

Scaling Up

This project has potential for scaling up via several avenues. First,TAO plans to install five more solar water pumps to meet the needs of all the villages in its jurisdiction. Second, this demonstration of the use of solar energy has caught the interest of village residents in using solar energy for other applications, such as drying and processing of medicinal plants.Third, other communities outside of TAO's jurisdiction are learning about solar energy applications. One community 15km away

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has applied for and received a grant from SGP to combine solar energy with biomass burning for drying and boiling agro-products.

Jenny Yamamoto, UNESCAP Staff Member,Thailand."Sunny days ahead:The multiplier effect of solar energy in North East Thailand." August 2001.

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