

ENERGY FOR LIFE - BEST PRACTICE AWARD 2011

System / Location

Shared-pico hydropower pilot project in the village of Angsang, Huaphan province, Lao PDR



The shared pico-hydropower project aims to demonstrate how a rural community can use pico-hydro in a collective environment, sharing the financial costs and workload, in order to provide a safer and more reliable service. The system is operated as a community based service, with village technicians responsible for maintenance as well as collecting fees, and a village community to manage and coordinate the service. Local authorities and LIRE providing guidance support and capacity building until independency are achieved. The households are divided into two different tariffs reflecting the different energy needs; a low tariff provides only lighting (30W limit) and a higher tariff is introduced for those users who require power for TV's and stereos (100W). This best practice demonstration site has already been a success viable model for one year and half.

Planning/Installation

Lao Institute For Renewable Energy
www.lao-ire.org

Donation/Support

Embassy of Federal Republic of Germany, Vientiane, Lao PDR.
<http://www.vientiane.diplo.de/>
BORDA Bremen Overseas Development Association, Germany.
www.borda.de

Operator

Chief village technician:
Mr Lae Phone,
Tel. : +856 30 51 60 370

PROJECT DATA SHEET

| | |
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| Year the installation started operating | January 2010 |
| Type of system | Pico-hydropower |
| Type of energy produced | Electricity |
| Location | Angsang Village, Viengxai District, Huaphan Province, Lao PDR |
| Geographical position | North East of Laos |
| Size of installation | Two x 1 kW turbines installed in an area of 4m ² |
| Thermal Power of installation | 2 Kilowatt (two turbines of 1kW each) |
| Use of energy produced | Lighting, working |
| Quantity of energy produced per day | 1540watt x 24hour x 0.35LoadFactor= 12 kWh (10hh x 100w + 18hh x 30w = 1540 watt of Peak load) |
| Type of financing | grant |
| Source of financing | Embassy of Federal Republic of Germany, Lao PDR representation office |
| system investment cost | 21,906 US\$ |
| System cost per watt | 10.95 US\$ |
| Income generated from installation | 33 US\$/month (10hh x 18,000kip + 14hh x 6,000kip) Households (hh) |
| Maintenance cost per year | 108 \$/year (salary of 4 village technicians 18,000kip/month) |
| Fossil fuel savings per year | 0.8 lit x 24hh = 19.2 lit/month high is equal to 230.4 litre/yr of kerosene |
| CO2 reduction per year | 1. 19.2lit x 2.3kgCO2/lit x 12month= 529.9 kg of CO2 2. CO2 produced by diesel system of same capacity 0.975 kg/kWh x 12kWh x 350days = 4.1 ton of CO2/yr (Note:15 days of production is excluded for downtime losses) |
| Number of beneficiaries | 24 families, 125 people (Total Lao PDR population 6,128 000) |
| Presence of renewable energy country programme | Yes. A draft RE strategy (Dec. 2010) but not yet approved |



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LEGAL FRAMEWORK

About 40% of the total population in Laos has no access to electricity. The Government of Lao [GOL] has set the ambitious development goal to achieve an electrification rate of 90% by the year 2020. Nevertheless, connecting remote rural areas by the national grid is in most cases not feasible and comes along with negative impacts on Lao environment. Small-scale village grids could have the potential to change this. The shared picohydropower (pico-hydro) project is one solution for Laos where there are numerous waterways. It is estimated that low-head pico-hydro units provide electricity for about 90,000 households, making it the most important renewable energy technology in the country. Unfortunately, quality, safety and maintenance are low. Alternatives need to be carried-on to improve and sustain this source of renewable energy. The best practice demonstration site was supported by the Embassy of Federal Republic of Germany as part of a local programme funds.

FEASIBILITY, SUSTAINABILITY AND REPLICABILITY

The target group is off-grid villagers. The project has a direct impact on 25 families and aims to:

- Improve security: 3 cases of death due to electrocution from the use of inappropriate pico-hydro systems have been reported in the village
- Improve living conditions
- Provide continuous electricity to the community
- Provide new income for the community

The main goal of the shared pico-hydro system: Provide electricity to isolated communities.

Positive sides' effects: Provide a safer and better quality pico-hydro system, and empower members of the community through capacity building and improved living conditions. The project is sustainable, thanks to the creation of a village entrepreneur who is responsible for (maintenance and fee collection). The project has proven to be successful and a viable model for already one year and a half.

SOCIAL IMPACTS

The shared pico-hydro system brings several benefits They are:

Community benefits:

- Continuous flow of electricity which allows children to do homework after the sun.
- Enhance community gatherings (NB: in rural areas, usually life stops at nightfall).
- Greater access to information via TV and radio
- Generate new income:
 - Direct income - 2 technicians and one entrepreneur have been trained
 - Indirect income - women can work (weaving) more at night after the daylight field work (NB: nightfall in Laos is between 5 pm and 6.45 pm).

Ecological benefits:

- To face power cuts, families had to buy gasoline to use in lamps.
- Increase fish protection, the reduction of low head pico-hydro systems along the river, reduces the risk of harming river life.

FINANCING AND FINANCIAL IMPACT

1. It was decided that two different tariffs reflecting the electricity need of the villagers was needed. After starting one and a half years ago, only the highest tariff had to be re-evaluated. Fortunately, the system flexibility allows adaptation. The project scheme required the village committee to take care of internal problems.
2. Surveys were conducted prior to the site choice as to evaluate support and willingness of the people to be involved in the project. The community prepared the building site (cut and carve electricity poles, wood channels). During the installation, teams worked together to clean the river, dig and carry necessary raw materials. Furthermore, villagers provided food and accommodation to LIRE staff.
3. The beneficiaries pay a direct monthly fee. The fund serves as a social fund for the villagers, and also as a maintenance fund for pico-hydro system parts that need to be changed. Villagers can also ask for credit at a low interest rate to make an initial purchase which will generate income.
4. The cost benefit has not been evaluated. However, we can assume that USD 21,906 is a relatively low cost to provide renewable energy electricity to 24 households plus training.

ADDED VALUE

The specific added-value of the project are:

Promotion of gender equality

Through the creation of the village committee, women have the power to make decisions. Indeed LIRE works with the Women Union Association to empower women's role within the community.

Right of minorities

The community is composed of two minorities: the Thai Deng and the Khamou.

Environmental impacts

The community is no longer dependent on fuel for lightening. Before they had to travel for 10 km to get gasoline.

