

CELAPEH PROJECTS EXECUTIVE SUMMARIES

1. LATIN AMERICAN TRAINING CENTER ON SMALL HYDROPOWER

INTRODUCTION

Two of the most important specific objectives of CELAPEH are:

1. Theoretical and practical training and capacity building on all working areas related to small hydro power
2. Execution of joint programs with: Latin American government institutions, international organizations, research and technology development centers, SHP equipment manufacturers, and CELAPEH members, in the areas of: Capacity building, research, technology transfer and technology development on SHP

In order to fulfill these two objectives, CELAPEH has included as priority line within his strategic development plan the constitution and operation of a Latin American Training Center on SHP (TC).

This document constitutes an executive summary CELAPEH's SHP Training Center project.

A. MAIN OBJECTIVE

Provide theoretical knowledge and practical training on areas related to SHP, like: Sites identification, feasibility, design, construction, operation and management.

B. TARGET PUBLIC

Training services will be mainly focused on:

- Local, municipal and regional electric utilities
- Engineering services companies
- Public institutions responsible for, or interested in SHP based rural electrification projects

Community level organizations interested in or active in the execution of SHP projects or productive projects using SHP generated electricity

C. JUSTIFICATION

SHP development has been growing at a fast pace during the last years in Latin America. There is already a strong demand for qualified manpower to carry out design, construction, maintenance, operation and management of SHP projects. Adequate, SHP specific training and learning facilities are required at local, national and regional level to capacitate a large and wide spectrum of people, from non qualified manpower up to engineers.

D. PROBLEM DESCRIPTION

SHP development was neglected in Latin America during a long time period, when many existing SHP installations were abandoned. A significant loss of know how at all levels (basic, technological, academic) was the result.

People living in rural communities, who are expected to play an active role on construction, operation and maintenance of their own SHP projects, generally have a low level of education and no experience at all on this kind of activities.

At technological level, there is scarcity of qualified technicians to carry out activities like supervision and coordination of civil works, as well as installation and maintenance of electro mechanical equipment.

At higher level there is also a severe scarcity of engineers with knowledge and experience in SHP related areas like: feasibility studies, design, project management and utility management.

E. PROPOSED SOLUTION

Even before formal constitution, CELAPEH defined creation and operation of a Latin American SHP Training Center (SHP TC) as a strategic project to achieve its main objective.

SHP TC shall include physical, equipment and personnel resources as required to provide SHP specific training on all activity areas and at three levels: Basic, intermediate (technicians) and academic (engineers).

Facilities shall include: Classical and internet based lecture rooms, laboratories and two micro power stations to allow trainees to get real, hands on experience on SHP issues.

Instructors will be recruited out from local universities and technology education institutions, and will receive special formation from CELAPEH's founder members and supporting institutions (train the trainers program)

F. IMPLEMENTATION

Implementing CELAPEH's SHP TC includes following activities or procedures:

- Prepare, define and approve TC basic concept
- Identify and engage strategic partners
- Find out a suitable location for TC headquarters
- Search for and obtain financial resources for construction and furnishing.
- Define scope and extension of training programs
- Select TC instructors and give them SHP specific training

G. PROGRESS REPORT

Per end of October 2009, implementing procedures had advanced as follows:

1. Basic concept: Defined and approved
2. Strategic partners: Following have been identified and engaged:
 - International Center on Small Hydropower (CELAPEH founder member)
 - European Association on SHP (CELAPEH founder member)
 - Colombian National Basic Training Service
 - Envigado City Government
3. Headquarters site: Will be facilitated by Envigado Government
4. Instructor's specific capacity building: IC SHP offered train the trainers course.

H. OUTSTANDING ISSUES

1. Find and engage supporting institutions
2. Obtain financial resources for TC construction and furnishing
3. Define training programs
4. Recruit and train instructors

I. US TRADE OPPORTUNITIES AND USTDA SUPPORT

Project Execution opens direct export opportunities to US businesses in the areas of:

- Training and testing equipment
- Training and educational services

On a broader basis, TC operation will certainly foster SHP development and open significant business opportunities to US suppliers of SHP related equipment and services.

While providing grant assistance for acquisition of training and testing equipment, as well as specific SHP training services, USTDA would significantly contribute to achieve both trade and development goals

2. OPTIMAL RENEWABLE ENERGIES POTENTIAL ASSESSMENT PROJECT

A. OBJECTIVE

Basic goal of this CELAPEH strategic project is to develop a standard model as a practical tool to carry out RE potential assessment on a country wide basis and define optimal RE mix for a given country and, by extension, for the Latin American and other world regions.

B. JUSTIFICATION

Climate change is the first global problem whose solution, or at least mitigation, requires participation of all, developed and developing countries.

Therefore, it is necessary to optimize world wide the use of clean and technically feasible renewable energy sources to achieve a significant reduction of green house gases emissions.

For such purpose, each (developed or developing) country needs to find out which is his optimal potential on each relevant renewable energy source available, as well as the combined optimal potential of all his RE sources, to define which is the country's optimal RE share of his energy basket.

C. PROBLEM STATEMENT

Whereas a large majority of developed countries has carried out RE potential assessment and defined potential development strategies, lack of knowledge and financial resources have prevented most developing countries from assessing their RE potential.

Even though developed countries have provided important financial and technical resources to help developing countries to execute RE projects, cooperation measures have proved to be not enough and in many cases inefficient, face to the challenge of optimizing RE potential in these countries.

Main reason for such poor results is the fact that, since (as already mentioned) in developing countries an optimal RE potential assessment is not available, projects are selected for execution on the basis of other criteria. Moreover, in many cases project selection and execution is influenced by a RE industry branch lobby of donor country, more interested in developing and selling his particular RE technology. As a consequence, many RE projects executed in developing countries do not bring optimal benefits and do not contribute in an effective way to climate change mitigation.

D. PROPOSED SOLUTION

CELAPEH's proposal to cope with above described problem is to carry out a research and application work leading to development and implementation of a standard model for RE potential assessment which can be used by a large number of developing countries to find out and define each country's optimal RE potential and optimal RE share of his energy basket. The model is intended to be tested on a selected Latin American country and adapted for use in other LA countries. Later on, model shall be used as basis for similar work in other regions.

E. SCOPE OF WORK

Model development and implementation includes following steps:

1. Create a working group including specialists on at least following RE sources: Wind, solar, hydraulic and biomass.
2. Find out and define best suited technology or procedure to assess maximum technically and economically feasible potential for each RE source.
3. Identify and engage a pilot country for practical application of selected RE potential assessment procedures.
4. Carry out field work, collect and process information and present results for each RE source
5. Combine results to obtain overall RE potential.
6. Set up criteria and procedure to obtain optimal RE potential of pilot country.
7. Carry out adjustment work to apply model in other countries as a standard

F. ROLE OF CELAPEH

CELAPEH intends to play a leading role in the project and take over following responsibilities:

1. Search for and identify members of project working group
2. General coordination of working group
3. Active participation on all work steps
4. Direct execution of project work specifically related to hydropower.

G. CURRENT STATUS

As project promoter, CELAPEH is now introducing the project to interested stakeholders and searching for financial support required for project execution

H. US TRADE OPPORTUNITIES AND USTDA SUPPORT

Project execution requires intensive use of hardware and software tools for field survey, data collection, data processing and data evaluation. US leadership in these areas will open wide export opportunities to US businesses, as model is implemented in a large number of countries.

Much larger export opportunities will be open to US suppliers of RE equipment and services, benefiting from fast growing execution of RE projects resulting from optimal RE potential assessment.

CELAPEH requires financial resources for standard model development and implementation in a pilot country, and is fully convinced that USTDA grant assistance would be a big step toward:

- Achieving Agency's development goal in Latin America
- Fostering commercial trade among US and Latin American business
- Contributing to climate change mitigation

3. REFURBISHMENT / UPGRADE OF ABANDONED SMALL HYDRO POWER STATIONS

A. OBJECTIVE

Basic goal of this CELAPEH project is to put again into service and productive use thousands of small hydropower stations shot down and abandoned in many Latin American countries, mainly in their rural areas

B. JUSTIFICATION

Millions of families, living in small communities at remote and isolated rural areas, still do not have access to electricity. Quite frequently, they burn wood as their single energy source.

At the same time, thousands of small hydropower stations, built during the first half of 20th century in such rural areas, where forced to shut down (and in many cases dismantled and abandoned), due to:

- Obsolete technology
- Lack of financial resources for technological update
- High costs and poor quality of operation and maintenance
- Lack of knowledge and poor management

Rehabilitating, refurbishing and upgrading as much as possible such power stations, using modern technologies and avoiding above mentioned constraints, will bring following benefits:

- Allow rural communities to get access to a clean and useful energy source, thus alleviating poverty and at the same time preventing forest degradation
- Create job and investment opportunities for local communities and suppliers of SHP equipment and services
- Contribute to mitigate climate change effects.

C. PROBLEM STATEMENT

Climate change is the first global problem whose solution, or at least mitigation, requires significant reduction of green house gases emissions at both, developed and developing countries. For such purpose, optimal and world wide the use of clean and technically feasible renewable energy sources is required.

New RES like wind, solar and biomass still have a long way to become mature, cost affordable solutions to increase RES share of energy basket, specially in developing countries.

On the other side, small hydro power is a mature, simple and reliable RES which can be quickly applied to achieve significant increase of RES in the short term.

Refurbishing and upgrading thousands of already existing, yet abandoned SHP installations is the easiest, fastest and cheapest way to achieve significant growth of RES use in Latin America.

However, most project owners of such abandoned SHP stations do not have technical and financial resources required to refurbish, upgrade, operate and manage those stations

D. PROPOSED SOLUTION

In order to solve above mentioned problem, CELAPEH is undertaking efforts to:

- Carry out a country wide and region wide survey of abandoned SHP stations
- Carry out feasibility studies and work plans on selected SHP stations for refurbishing and upgrading
- Search for local and foreign investors looking for business opportunities in the SHP area
- Coordinate purchase or cooperation agreements between project owners and investor to carry out refurbishing and upgrading works

E. IMPLEMENTATION

First steps of CELAPEH's project, consistently with proposed solution, include:

- Carry out historical research and field work to identify and classify abandoned SHP stations, first in Colombia and later on in other Latin American countries.
- Carry out refurbishing feasibility studies on the 100 most promising stations
- Prepare and present refurbishing proposals to interested investors

F. US TRADE OPPORTUNITIES AND USTDA SUPPORT

CELAPEH's project clearly opens interesting business opportunities to US companies, as follows:

- Consulting companies in the survey and feasibility studies phases
- Investors, project developers and SHP equipment suppliers in the execution phase

Grant assistance from USTDA in the survey and feasibility studies phases is deemed as a valuable tool to achieve regional development, contribute to mitigate climate change effects and create interesting business opportunities for US stakeholders in the SHP area.

4. MICRO HYDROPOWER STATIONS UMBRELLA PROJECT FOR ISOLATED RURAL COMMUNITIES

A. OBJECTIVE

Basic goal of this CELAPEH strategic project is to help at least 10 communities living in non grid zones of Colombian rural areas where enough hydraulic resources are available to get access to electricity through construction of their own micro power stations.

B. JUSTIFICATION

There are over 500.000 Colombian families, living in the most isolated rural areas, still without access to electricity, in spite of abundant hydraulic resources easily available. Moreover, Colombian government created a fond (FAZNI) to provide financial resources for construction of electricity supply solutions to such communities. Besides, CELAPEH's first strategic line of activity is explicitly oriented toward fostering development of micro and nano hydropower stations as an economic and efficient tool to provide electricity access to the most poor and isolated communities in the Latin American rural areas. For such purpose, CELAPEH developed a socio economic model carefully adapted to social and local conditions of such communities. Finally, assembling a set of at least 10 similar community projects for execution as an umbrella project brings important scale economies in the purchase of equipment and better possibilities to apply for carbon certificates.

C. PROBLEM STATEMENT

In spite of plentiful hydraulic and significant financial resources, interested communities face several barriers which do not allow them to benefit from such resources, among them:

1. Lack of economic resources and know how to carry out preliminary work required to obtain government financing.
2. Very low economic income and electricity consumption which, in many cases, do not even reach to cover Operation, Maintenance and Reposition costs. Therefore, such projects are in many cases not sustainable.
3. Remote location and in many cases no access roads render very difficult to local utilities electricity service billing and money collecting.
4. Poor quality of operation and maintenance due to lack of knowhow and low educational level, which leads to inefficient energy use, frequent shut downs and very short useful life cycle of the installations.

D. PROPOSED SOLUTION

In the search of an adequate solution, CELAPEH defined a comprehensive approach leading to overcome above mentioned barriers. Basis of CELAPEH approach are as follows:

1. CELAPEH undertakes directly preliminary work, including: Site identification and evaluation, load and capacity analysis, plant size and characteristics definition, feasibility study, preliminary design and project formulation, in the way required by authorities to approve construction grant or loan. CELAPEH also search for required financial resources to carry out such preliminary work.
2. In the (frequent) case that energy consumption level does not allow for optimal use of micro station capacity and project sustainability, CELAPEH evaluates community agro industrial possibilities which can be integrated into the project, in order to use idle electricity capacity and, at same time, generate productive jobs and income to pay for electricity consumption.
3. To overcome poor operation and maintenance quality, CELAPEH provides a comprehensive capacity building package, including a community organization program to insure, besides adequate operation and maintenance, active participation during construction phase and sound management of the installation.

E. CELAPEH'S ROLE AND PRE INVESTMENT REQUIREMENTS

Expenses associated to above described preliminary work are normally quite different for each specific micro station project, since community and local conditions are also different. However, for a set of 10 micro stations, an average cost of USD 12.000 per micro station has been estimated. Therefore, total estimated cost for the whole umbrella project amounts to USD 120.000.

Such low cost can be achieved because:

1. CELAPEH is a not for profit organization, with very low O&A costs.

2. Work procedures are based on a proven model and carried out in a standard and simplified way.
3. Active participation of Communities is encouraged.

F. US TRADE OPPORTUNITIES AND USTDA SUPPORT

Given that scope of work only includes pre investment work to be carried out by CELAPEH, no direct opportunities for US business are likely to arise. However, during execution phase quite interesting opportunities for US suppliers of SHP related equipment and services will certainly come up, specially if US government support is granted for pre investment works.

For such reason, CELAPEH kindly requests USTDA to look for assistance possibilities, either directly or through other US Agencies like USAID.

5. LOCAL SHP EQUIPMENT MANUFACTURING PROJECT

A. OBJECTIVE

This CELAPEH strategic project has as main goal facilitate local manufacturing of SHP equipment and components through technology transfer agreements and technology adapting procedures.

B. JUSTIFICATION

A strong revival of SHP is taking place all over Latin America, as a result of increasing demand for renewable energies and availability of significant hydraulic resources in a large number of countries.

Consequently, a large and fast growing market for SHP equipment and components is taking shape. Foreign manufacturers are getting more and more orders and, since the large majority of them are small sized companies, can not cope with such demand. Delivery schedules are becoming too long.

For such reason, local industry managers are now starting to look for alternatives to create local manufacturing capabilities on a partnership basis with foreign manufacturers.

CELAPEH strongly support such efforts and regards local manufacturing as a quite feasible possibility, for following reasons:

1. SHP is an old, mature and rather simple technology. In the past, several Latin American countries had their own manufacturing capacities. Even though manufacturing capacity almost disappear, theoretical knowledge still remains.
2. High qualified technicians and engineers with solid experience in similar branches are scarce, yet available.
3. Financial resources to build a manufacturing plant are not very high and, in any case, affordable to local investors.

C. PROBLEM STATEMENT

In the first half of 20th century, thousands of small hydro stations were built and operated all over Latin America. Unfortunately, many of them were abandoned during the second half of the century, due to construction of large power stations and interconnection grids. With them, local SHP industrial basis disappeared.

Fortunately, since the beginning of 21st century, SHP is experiencing a strong come back. Abandoned SHP stations are being rebuilt and many new ones are planned or under execution.

However, lack of local manufacturing capacity has been slowing down SHP growth pace, specially in the mini hydro and micro hydro sectors, due to following reasons:

- SHP stations on these sizes have normally higher unit costs for installed capacity, and are therefore less attractive to public and private investors.
- The need to import main equipment and components leads to even higher costs and lower attractivity
- Current worldwide demand for SHP equipment exceeds installed manufacturing capacities. Therefore, manufacturers give priority to larger orders and skip smaller ones or punish them with higher quotation prices and longer delivery periods. This, again, renders mini hydro and micro hydro projects even more expensive and less attractive. Many of them turn out to be economically unfeasible and must be discarded.

D. PROPOSED SOLUTION

CELAPEH is fully convinced that the only way to solve above described problem and regain mini and micro hydro growth pace is building up local manufacturing capability. For such purpose, CELAPEH joined efforts with a group of 4 engineering companies (regular members of CELAPEH) which entered into a temporary union agreement (named UT4) to search for and implement a procedure to build an equipment manufacturing facility in Colombia.

Parties agreed that the fastest and easiest way is through a technological and commercial agreement with a suitable foreign manufacturer.

Two types of technological agreements have been considered: Business cooperation and technological transfer. They are briefly described below:

1. Business Cooperation

Under this approach, foreign manufacturer and local companies or investors create a local subsidiary of the foreign manufacturer and become shareholder partners of the local subsidiary. Parties contribution to the new facility is basically as follows:

Foreign investor: Provides technological know how required for local manufacturing

Local partners: Provide physical facilities (manufacturing building and administration offices), workshop machinery and tools, and start up capital.

A neutral party evaluates each partner's contribution and determines his equity share in the new facility.

As alternative, foreign manufacturer can make additional contributions to increase his equity share and become majority owner. Contribution can be in form of workshop machinery, or cash.

Operative duties are basically distributed as follows: foreign partner takes over production and engineering division, whereas local partners become responsible for sales and marketing.

2. Technology Transfer

Under this schema, usually called license agreement, foreign partner provides technical know how and support during construction and start up of manufacturing facility, but does not become facility's shareholder. Local partners are entitled to manufacture equipment using foreign manufacturer brand names.

Foreign manufacturer compensation for his know how transfer (license) usually includes a lump sum (license fee) and a equipment fee for each piece of equipment sold by local manufacturer under his brand name.

E. KEY PARTICIPANTS

- Foreign manufacturer(s) as technology providers
- Local partners as technology purchasers
- Local and foreign investors
- CELAPEH, as project promoter, coordinator and as equity partner
- Other project promoters or supporters

F. IMPLEMENTING PROCESS

Project execution process includes following steps or activities

1. Find out suitable manufacturer(s) interested in local manufacturing of his products, directly through a joint venture with local partners or through license agreement.
2. Set up local partners group and define their scope of participation
3. Carry out a market assessment study and prepare business plan
4. Create local manufacturing company
5. Carry out technology transfer procedure
6. Start up local manufacturing

US TRADE OPPORTUNITIES AND USTDA SUPPORT

Local manufacturing capabilities will no doubt significantly speed up construction of SHP stations all over Latin America and, therefore, will open quite interesting business opportunities to:

- SHP equipment manufacturers willing to go joint ventures to insure a large share of fast growing Latin American market
- SHP related services suppliers
- Investors looking for investment opportunities in environmentally friendly business areas.

USTDA support to CELAPEH's project would certainly give US businesses a leading edge to benefit from above mentioned opportunities. Therefore, CELAPEH would like USTDA to consider grant assistance to:

- Search for, contact and select potential US manufacturers, investors and service providers interested in the project
- Bring interested US stakeholders together with local partners
- Carry out feasibility studies and business plan for a pilot manufacturing facility