DEVELOPING RENEWABLES
Renewable Energy that benefits all

Recipes for the implementation of renewable energy sources in emerging and developing countries and the European industry that benefit the local and global environment, the socio-economic situation

Brussels, 09-02-2006

Ghanaian country study: Part D – DENG Solar Training Center

Final and approved version

SIXTH FRAMEWORK PROGRAMME PRIORITY 3
Underpinning the economic potential and cohesion of a larger and more integrated EU

SPECIFIC SUPPORT ACTION

RECIPES
Renewable Energy in emerging and developing countries: Current sItuation, market Potential and recommendations for a win-win-win for EU industry, the Environment and local Socio-economic development
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1. Introduction

In RECIPES project, the data collection phase is realised by local experts in 15 Emerging and Developing countries. **Ghana** is one of the 5 countries selected in Africa.

Experts are asked to provide 5 parts, describing the Renewable Energy present and future situation in their country:

- Part A: Questionnaire providing data on RE situation.
- Part B: Energy and Policy
- Part C: Country Maps
- Part D: Description of RE projects
- Part E: Interviews with stakeholders

This document (Part B – Energy and Policy) aims at providing highlights of the current policy concerning energy and renewable energy. It provides answers from the local experts to questions asked by the RECIPES team.

RECIPES Ghanaian local expert is Sven Dernedde from Ghana Energy Foundation. The Foundation is a non-profit, public-private partnership institution, devoted to the promotion of energy efficiency and renewable energy, as a key strategy to Ghana's growing energy needs.

2. Deng PV Solar Training Centre

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Description of the project

Deng PV Solar Training Centre, was commissioned on 5th April, 2005 by a representative of the Minister of Energy. It will organize Technical Training Courses on Stand Alone Solar Power Systems on a quartely basis, each course lasting 11 days, combining theoretical and practical training.-Each course is limited to 12 students.

The Centre is being co-financed by a German Government Institution DEG during the first two years, when 1-2 local trainers are being specially trained to continue the training after this period and thus ensure the sustainability of the facility.

The Training is being carried out in close co-operation with Global Sustainable Energy Solutions of Australia and KNUST.

Training is open to all stakeholders in the solar industry.- About 50 students will be trained per year but the number can be increased if required.

The project also provides for a number of Solar Awareness workshops which are being organised mostly in the rural districts.

Main risks and constraints for realisation and maintenance

So far there has been no constrains.

Which organisation was the main stimulator to realise this project?

Mr. F.B.Bosteen, Chairman, Deng Ltd.

Mention some side effects of this project (education, programme for the poor, employment etc.)

Through the training of students and the Solar Workshops more people in both urban and rural districts will be made aware of the benefits of using solar in place of kerosene lamps, candles, open fires etc. – Solar energy can facilitate: Education for both Adults and children in the evenings; improve social life by the use of TV and Radio; create jobs

in the catering and tourist industry with solar fridges; provide pumping of drinking water and irrigation facilities for the farmers; power for health clinics, midwives, hospitals.

What was the reaction and attitude from persons and organisations who can replicate this project?

The Training Centre has been welcomed by the industry including the training institutions in the country such as KNUST and the Polytechnics. – Under the DENG – KNUST co-operation agreement KNUST has been given an advance allocation of 5 students per training course on scholarship basis during the first 2 years.

And is it likely to be replicated? Please explain.

Replication of the DENG Solar Training Facility is un-likely to happen for some time.- The solar industry in Ghana is still relatively small and we think that until such time that we may see a considerable growth in the solar business then the DENG Solar PV Training Centre will suffice.

3. Renewable Energy Service Project (RESPRO)

Description of the project

The Ministry of Energy MoE instituted RESPRO in February 1999 without utility participation. The project installed some 1,400 PV systems.
RESPRO was the single largest PV electrification project implemented in Ghana. It was undertaken in the East Mamprussi District in the Northern Region. It promoted electrification in 13 communities based on a fee-for-service model. As a project RESPRO came to an end in 2002.

Subsequent to this RESPRO became an NGO which operates independently.

Financing:

Global Environmental Facility GEF: 2,500,000 USD
Government of Ghana: 500,000 USD
National Renewable Energy Laboratory (US Department of Energy): 1 million dollars.

RESPRO owns the PV systems and collects fees for performance and maintenance service.

In the case of a 50 Wp system it received a initial installation fee of 10,000 Cedis (~$1.00) and a monthly fee of 15,000 Cedis or $1.50.

As a project in this form RESPRO came to an end in 2002 and was established an an NGO.

Main risks and constraints for realisation and maintenance

- RESPRO cannot cover the cost of battery replacement with this fee. Consequently there are plans to transfer this burden assumed by the customer.
- RESPRO has a high overhead.
- RESPRO had a high operating cost, because it was undertaken in a remote area.
- There was no composite strategy or policy framework

What has been done to overcome the constraints?

As this project has come to an end, the batteries have not been replaced, and there are no fees collected anymore.

It was realized that a second look needs to be taken to a maintenance scheme prior to start such projects.

MoE has asked for the assistance of JICA to establish a master plan for the rural electrification in the north prior to undertake similar projects.

Who or which organisation was the main stimulator to realise this project?

MoE, GEF

Mention some side effects of this project (education, programme for the poor, employment etc.)

Few street lights, some improvement of health sector, no impact on employment

What was the reaction and attitude from persons and organisations who can replicate this project?

It was learned that a project should not be replicated in that form.

And is it likely to be replicated? Please explain.

It has to planned well with a life cycle cost analysis which reflect items like maintenance and replacement cost

4. Solar water heating for Shangri-La Hotel

Description of the project

The 100 bed-capacity hotel with kitchen and laundry has installed a micro chip controlled solar water heating system that grants 100 % hot water supply throughout the year even during cloudy and rainy days. The system guarantees a 7,500 litre-water capacity with a temperature of up to 85°C. The substitution of the 100 kW conventional electrical heater allows the hotel to cut down its electricity bills by 40-45 % a year. The thermal solar pilot and reference project was undertaken by UFE solar (GH) Limited, a German-Ghanaian Solar Developer in collaboration with their German partners MP-TEC GmbH & Co KG and DEG / KFW Banking Group.

Financing

- DEG / KfW Banking Group 39 % (subsidy)
- MP-TEC GmbH & Co KG 35 % (investment / donation)
- UFE SOLAR (GH) Ltd 20 % (investment / subsidy)
- Shangri-La Hotel 6 % (users contribution)

Total Project Cost: 333,226.00 €, incl. marketing, project publishing, workshops and demonstration events, installation training for local subcontractors (electrical and plumbing)

Technical Development and Installation

UFE Solar GH Ltd; Mr. Bernd Schmidt; solar@africaonline.com.gh

Main risks and constraints for realisation and maintenance

So far there has been no constrains.

Who or which organisation was the main stimulator to realise this project?

UFE Solar (GH) Ltd.

Mention some side effects of this project (education, programme for the poor, employment etc.)

- demonstration of the new technical opportunities (100 % coverage rates without electrical preheating, highest reliability)

- economical results (40 % reduced energy cost, pay back period less than 4 years)

Is it likely to be replicated? Please explain.

Yes. This project has shown that there are no technical problems. Especially in branches like:

- Tourism and accommodation branch (hotels, restaurants, laundries etc.)
- Health sector (public hospitals)
- Food and beverage industries as hot steam generation (canneries, food preservation, breweries etc.)

UFE Solar Ghana Ltd. offers a full financial package to interested hotels through an AREEED loan. The AREED program is organised by KITE in Ghana.
(www.kiteonline.net; www.areed.org)

5. Biogas plant at Accra Mental Hospital

Description of the project

In 2003, the 700 bed-capacity hospital has installed a biogas plant to manage sewage and kitchen organic waste. All toilets and waste disposals are connected to an anaerobic sanitation system that cleans the sewage and produces three main products:

- Water, which is used to flush the hospital's toilets
- Slurry, which goes into the drains
- Biogas (Methane), which is used at the hospital for cooking 3 times a day

The dome plant has a capacity of 120 m^3 and produces around 5-8 m^3 biogas per day.
Before the installation of the biogas plant, the sewage used to be collected in septic tanks and the cooking was based on LPG gas, firewood and charcoal.

Financing

- Total Project Cost: 420 million Cedi, financed by the Ministry of Health.

Project Development and Construction of the plant

Biogas Technologies Company Ltd., Tema; Mr. John Idan, biotech@wwwplus.com

Main risks and constraints for realisation and maintenance

So far there has been no constrains.

Who or which organisation was the main stimulator to realise this project?

Ghana Health Service on behalf of the Ministry of Health

Mention some side effects of this project (education, programme for the poor, employment etc.)

- Water saving
- Sanitation practices on a high standard

- Utilization of by-products, namely methane, for cooking
- Reduction of burning fossil fuels and wood/charcoal
- Education about biogas technology for the staff via brochures and regular training programmes

What was the reaction and attitude from persons and organisations who can replicate this project?

This project has been a replication of the project at Tamale Regional Hospital (in 2002) and had been replicated again at Koforidua Regional Hospital (in 2005). Moreover, the Ministry of Health plans to make all hospitals in the country set up their own sewage and waste management.

And is it likely to be replicated? Please explain.

Yes. This project has shown that it is possible to have other similar projects, that there are no technical problems. Especially in branches like public toilet facilities, schools, churches, market places, slaughter houses and recreational areas.