Green Empowerment

Knightsbridge International

BORDER GREEN ENERGY TEAM

Palang Thai

Kawthoolei Department of Health and Welfare

Burmese Mobile Solar Clinics

2007 Final Report

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Medics have completed the wiring for a new system.

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I. Introduction:

Green Empowerment, along with the Border Green Energy Team (BGET) and the Karen Department of Health and Welfare (KDHW), two local non-governmental organizations (NGOs) in Thailand, work with Burmese medical clinics and their staff to provide solar power systems and the necessary expertise to operate and maintain them so that the medics can better treat victims of the civil war. Through the Burma Clinic Trainings Program BGET also provides training on system operation and maintenance for medics and their staff. The trained medics carry solar power equipment back from the trainings held in Mae Sot, Thailand to their remote clinics deep within Burma. The trainings, held annually since 2004, have brought the total number of clinics using solar powered systems to 35. Each clinic serves 3,000-5,000 people and the solar power systems have a major impact on the quality of health care provided at these remote bamboo clinics. Solar power provides light for operations and electricity for computers (which they use to search CD-ROMs of medical information), battery chargers, two-way radios, and small medical devices.

This report will outline the project to date in Thailand and Burma, future plans for the expansion of the project, the history of the conflict, and a description of the technical training received during these workshops.

These projects were supported by Border Green Energy Team (BGET), Palang Thai, Green Empowerment, the Karen Department of Health and Welfare (KDHW), Knightsbridge International, the Burmese Medical Association of North America, and the McCargar Foundation.

II.

A. Problem Statement:

The eastern area of Burma, often referred to as Myanmar, along the border with Thailand is a zone that has been under siege for the past several decades. The Burmese military have oppressed the indigenous peoples of this area, burning villages and crops, forcing men and women into slavery, raping, and killing. And, because of the relative inexpensiveness of mortars and mines this area has been saturated with these devices that kill and maim thousands.

In the past, it was possible to escape to refugee camps within the Thai border however political developments between Burma and Thailand have made it increasingly difficult for those seeking freedom from oppression to come to Thailand. Consequently, about one million internally displaced persons (IDPs) live in hiding surrounded by land mines without health care and permanent shelter.

One of the largest of the indigenous groups in this area is the Karen people, with over 200,000 of them living on the Burmese side of the border. Due to the nature of their oppression, medical assistance is not supported by any governmental agency, and NGOs are not permitted to operate in this zone. In 2003, the Karen Department of Health and Welfare (KDHW), a NGO that manages clinics within Burma, approached BGET with a request for the electrification of their medical clinics. The medics and surgeons in these clinics previously worked into the night without electricity, a nearly impossible task. Because of the unique situation an inventive solution has evolved for providing aid to this population supported by KDHW on the Thai side of the border. The KDHW has, over the years, built up a network of medics and clinics operating inside Burma. They support 35 clinics scattered over 600 miles (925 km) with a roster of approximately 75 surgeons, medics, and nurses. The medics serve an estimated 200,000 "internally displaced people" and treat land mine victims and other casualties of the conflict and grinding oppression.

B. Background of Green Empowerment's work with BGET

BGET was formed in 2005 with funding from Green Empowerment and is run by Salinee Tavaranan who holds a Master's degree in applied Photovoltaic Engineering from University of Massachusetts. BGET works with the help of local technicians, international volunteers, and Karen refugees in Mae

Sot, Thailand. Green Empowerment continues to contribute technical expertise, training experience, strategic organizational planning, and fundraising assistance. BGET partners locally in Mae Sot with the Taipei Overseas Peace Service and the Karen Department of Health and Welfare (KDHW).

Objectives

Objective One: To provide solar power lighting systems for the 35 clinics in the eastern part of Burma so that the medics can work without flashlights at nights.

Outcomes:
All 35 of the medical clinics in Burma now have electricity for the first time thanks to solar electric systems. Mobile clinic electrification systems power clinic area lighting, directed operation lighting, lighting for medical training, microscope lighting for examining blood samples, small medical equipment, AA/AAA battery charging, and community information systems. Before medics were forced to place an IV in their patient with a flashlight in their own mouth while working in the dark, they are now able to commit their full attention to the task at hand. In addition, they are now able to hold trainings for community members to teach more about health, basic hygiene, nutrition, and general wellbeing.

Objective Two: To train clinic medics in photo voltaic design, system construction, operation, and maintenance**.**

Outcomes: With funding from Green Empowerment, BGET provided seven days of intense hands-on solar power electrification and management training. The trainees learned to understand design and usage, assemble, disassemble, position their systems plus test and maintain components and how to make a solar water distiller to make clean water for battery maintenance. The most recent training focused on new equipment provisions and usage training for seven KDHW mobile medical clinics. In all, 32 medics and one radio mechanic from 28 sites attended the training, including two women. These solar electrification trainings have occurred annually since 2004.

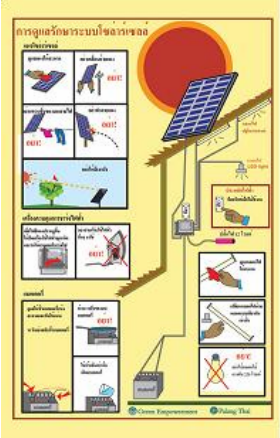
Unintended Outcomes:

- By using local trainers and by hiring translators to communicate with the Karen BGET was able to create technical manuals in Karen and Burmese that the medics could take back to their clinics and share with other medics who were unable to attend the training.

The KDHW learned a lot about leadership and collaboration and are now better able to enact a positive change in Burma

.C. Project Sustainability

Financial Sustainability



Although the Karen medical clinics will perhaps never be able to buy their own solar equipment or medicines each clinic has international sponsors who supply them with funds for these necessities. In addition, the KDHW has funding from international donors for personnel work and operating the systems and are dependent on outside fund raising from Green Empowerment and private donors for all equipment purchases.

Technical Sustainability

While attending the trainings in Mae Sot, Thailand the medics are trained to maintain their clinics' solar system. These annual trainings give medics the opportunity to replace and repair malfunctioning equipment. BGET has now hired two local technicians, making them less reliant on outside volunteers.

D. Challenges and Lessons Learned

- Unfortunately for the project, frequently those trained to teach about the solar power systems end up leaving the refugee camp for better opportunities within Thailand or relocation to other countries around the world. The brain drain hurts the development efforts of the local NGOs.
- Because of the nature of Burma and the restrictions placed on movement in and out of the country the solar power systems must be carried from Thailand into Burma by hand and adapted to the environment. The solar systems are now packaged for transport in a way that protects them from the unavoidable movement associated with walking and from the humidity in the jungle. In addition, this “plug and play” design can be quickly disassembled and hidden within minutes. This is necessary for the clinics when they suffer a surprise attack from the Burmese military. When this has happened the solar electric systems were successfully hidden and reassembled after the attack.
- The logistics of training the Karen proved to be complicated because of language barriers. The trainers were Thai and English speakers; however the Karen people speak Burmese and Karen. Because of this, translators were necessary to communicate with those attending the solar trainings and to translate the documents into a form understandable by the Karen.
- A little bit of solar powered light goes a long way in making clinics more effective. The LED lights are great for providing a small amount of light all night long to allow patients and caregivers to move around more easily.
- The Karen medics are very smart and competent, not to mention extremely brave, but ongoing follow up training and assistance is still essential for sustainability.

E. Conclusion

We are pleased to report that we have met all of the objectives we set out to accomplish: all 35 clinics in eastern Burma are now set up with a solar power system and are trained in operating and maintaining them. Although we accomplished our goals BGET will continue to work to provide sustainable electricity to Burmese refugees along the border.

III. New and Future Projects

Green Empowerment and BGET are looking to deepen our impact in Burma. While some clinic training goals are attainable during a week-long training, others take more time, additional resources and further training. Now that we have been able to furnish systems and training to 35 clinics in the area, we need to expand our efforts to concentrate on how to help assure system sustainability. Our partners' work to visit clinics on site last year to determine how the systems were being used and to provide additional on-site training to medics was the first step. This effort was followed up in this year's training by providing re-supply equipment to the clinics whose systems needed to be upgraded. Additional items we will be concentrating on as we move forward include: more attention to providing instructions and trainings in the native language; and identifying supporting area technicians within the KDHW framework to provide the first line of maintenance and repair service.

In addition to project sustainability, at the conclusion of our April 2007 trainings, the leadership of the KDHW expressed the urgent need for more electricity at two very important medical centers. These two referral clinics were part of the original group of clinics to receive systems in 2004. Their location in a stable area of the border region has allowed them to grow and become referral clinics for serious medical problems within the region. As a result they have outgrown the small one-panel solar systems they received in 2004.

As next phase of the collaborative project, we helped increase the power provided to these two large referral clinics and provide for vaccine refrigeration. To do this we increased the number of solar panels from one to eight, bringing the electrical supply up to approximately 2000watt/hours per day.

With an increase in available electricity the clinics will be able to:

- Refrigerate critically needed vaccines that are currently unavailable in the remote border area due to a lack of storage facilities.
- Increase the physical capacity of the clinics to house and treat more severely injured patients.
- Use the lights that are built into the microscopes--making diagnosis easier.
- Set up an eye lab and surgical unit, particularly for cataract surgery.
- Provide a training center with expanded nighttime lighting for after hours medical staff trainings on topics such as malaria prevention, infant development, and family planning.

These two referral clinic systems have been installed in December 2007. Details and photos will be available early 2008 in a special report.

IV. History of the Conflict

The Karen are an ethnic group native to the eastern region of Burma (now known as Myanmar) and northwestern part of Thailand. Burma won its independence from the British Empire on January 4,

1948. In the years after independence there was much fighting among the different communist organizations within the country and by 1958 it was recovering economically but falling apart politically Because of distrust among the factions Army Chief of Staff General Ne Win was invited to take over. The General arrested over 400 communist sympathizers and stabilized the situation allowing for general elections. On March 2, 1962 General Ne Win staged a military coup to overthrow the elected government and declared a socialist state run by a Revolutionary Council of senior military officers.

After seizing power he crushed political protests and arrested hundreds from political and insurgent groups. In 1964 all opposition parties were banned. General Ne Win made Burma into a socialist state and isolated it from contact with the rest of the world. The Burma Socialist Program Party (BSPP) was in complete control and nationalized commerce and industry. General Ne Win created policies to wipe out the ethnic opposition groups that were in conflict with his government and were struggling to assert their own identities and cultures. During the 1970s Ne Win introduced the "Four Cuts" program to cut off food, information, recruits, and financial support to the armed ethnic opposition groups, the Karen being the largest of these groups. These policies mostly affected the villagers living in the ethnic border areas close to Thailand.

In the 1980s the government began to relax restrictions on foreign aid but the naming of Burma as the Least Developed Country by the UN made its economic instability hard to cover up. In 1988 widespread protests and demonstrations broke out and the military responded by attacking the protesters. The government seemed powerless and by September the country was on the verge of a revolution. The military killed thousands during the 8888 Uprising and set up a system of martial law with Saw Maung at the head of the newly named Myanmar.

In May 1990 multi-party elections were held with the National League for Democracy (NLD) winning by a landslide in the Constituent Assembly. The military refused to let the assembly meet and continued to oppress the people of Burma, resulting in economic sanctions by several countries. In 1992 General Than Shwe became the new leader and relaxed some of the restrictions placed on the Burmese people. *Unfortunately the military was unable to reach a cease-fire with some of the hill tribes, including the Karen. In 1995 the main Karen base was captured, but without a final peace agreement.*

In 1997 the United States increased sanctions against Burma because of their human rights violations, with accusations of ethnic cleansing and the suppression of religious freedoms (40% of the Karen are Christians). In 2000 the European Union imposed similar sanctions. In 2003 the government announced a seven step "road-map to democracy" but there is no timetable or goals associated with this plan and many people are skeptical of any change happening.

In 2006 the Burmese Army began their largest offensive against the Karen since 1997. Burmese troops

have looted and burned homes and planted land-mines in civilian areas to further terrorize them and prevent their escape into Thailand. Some Karen have even been subjected to slavery at the hand of the army.

The Karen have fought for their independence from the oppressive regime in Myanmar since January 31, 1949. They are currently the largest of twenty minority groups participating in the insurgency against the military dictatorship. It is estimated that up to 200,000 Karen have been driven from their homes since 1949, forced to hide in the jungle with little food or basic necessities. Another 120,000 refugees, many of which are Karen, from Burma are living in refugee camps in Thailand.

Photos

The students pictured here have all devoted their lives to providing medical care to their communities in Eastern Burma. Most received between 6 months and 2 years of intensive practical medical training at the Mae Tao Clinic. They then receive assignments assisting physicians at the remote medical clinics scattered throughout the border region. In some areas there is no physician present, and these young men and women are the sole provider of medical care in their communities. In order to attend this weeklong training in Thailand, the medics had to cross the border illegally and risk prosecution, fines, and deportation by both the Thai and Burmese authorities. After attending the training, they must again cross the border, this time carrying all of the solar equipment provided to them by generous donors. Together the community of medics represented in this photo serves roughly 150,000 internally displaced Burmese people.

Burmese refugee children gather around a table during a break in the training at the Mae Tao Clinic. The Mae Tao Clinic, founded and directed by Dr. Cynthia Maung, provides free health care for refugees, migrant workers, and other individuals who cross the border from Burma to Thailand. People of all ethnicities and religions are welcome at the Clinic. Its origins go back to the student pro-democracy movement in Burma in 1988 and the brutal repression by the Burmese regime of that movement. The fleeing students who needed medical attention were attended in a small house in Mae Sot. The Mae Tao clinic hosted the week-long training in April.

Green Empowerment projects train medics working in Burma to provide solar powered electricity for remote health clinics. These clinics are vital to ensure the health of Burma's future generations. (OR) Future generations depend on the remote clinics for their health.

V. Technical Report


Day 1) Mr. Eh Kalu of the KDHW gives introductions to the students and trainers. The 30+ students receive class materials which include: Karen language manuals and copies of all the slides used in the slideshow, Karen language versions of technical specs, notebooks, pens/paper. All prepared by the Border Green Energy Team staff and volunteers.


Students receive and identify all the solar equipment. They also receive a toolkit with all the necessary tools to install and repair their systems. Once they are in Burma, no tools are available for purchase, so they must leave the training sight equipped for many scenarios.


Local trainers give instruction in electricity, the solar resource, charge controllers, panels, batteries, and tools such as the multimeter, as well as maintenance, and installation.


The training soon gets hands-on. An important part of the training is getting the tools and equipment in the student's hands starting on day 1.


Day 2) Students begin building the weather tight enclosure that protects the electronics from the harsh and humid climate in the Burmese mountains. This adaptive component of the system was created specifically for these clinics and has become known as the “Burma box.”


Students assemble various system components.

Students from previous trainings attended this year’s training and they were able to assist the students who were receiving systems for the first time.


Students with a finished “Burma box”


Technical instruction and hands on training continues every day of the week long training.

Once the systems are built and the student's have learned how they operate, each system is tested.

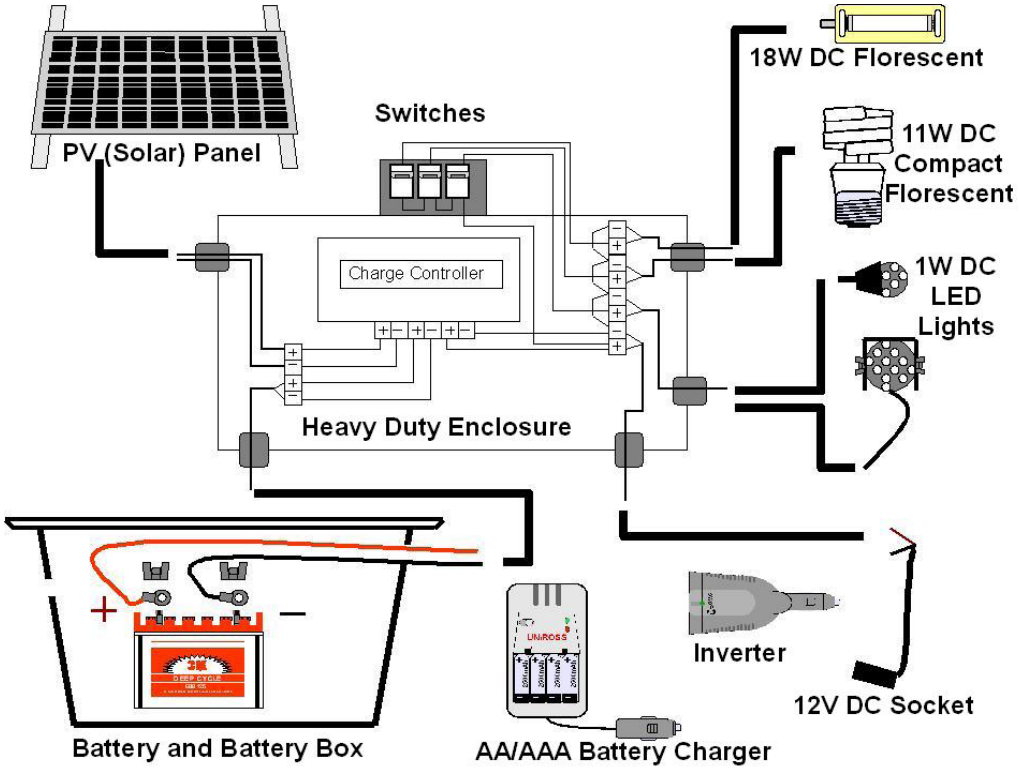
Every system component is checked and double-checked to make sure there are no problems once they arrive at their clinics.

Students are taught how to produce their own distilled water for refilling the batteries. Students are provided with necessary safety equipment to fill the batteries with acid. It is necessary to transport the acid and batteries separately into Burma due to the weight of each and safety concerns about the acid

Students review proper system siting and installation before their return.

Students are also able to relax and network during the training. It is not often that the medics get to see each other during their hectic lives inside Burma

A 2007 Mobile Clinic Photovoltaic System



These are the components included in the solar medical clinic kits.

Small Clinic Photovoltaic System Costs – April 2007

System Equipment	Costs (US$)
120W Solar Panels	$879
Deep Cycle battery, 125 AH, 12V	$81
Battery charge controller	$109
Fluorescent & LED lights, 12V	$94
DC/AC Inverter	$108
Cabling, Boxes, Switches, Hardware, Tools	$289
Total Equipment Costs	**$1,559**

Costs vary from training to training due to price inflation, currency exchange rate, and difficulties associated with importing technical equipment. This chart only represents equipment costs and does not represent total clinic system costs which include training, travel, transport, etc.