



Solar Electric Light Fund and  
SunEnergy Power International  
Supporting Partners in Health

# Lesotho

## Health Center Electrification

### Solar / Diesel Hybrid

## Training and Implementation

**Training locations**  
Lesotho, Africa  
(Inside South Africa)

**Village Locations**  
Nohana,, Bobette,  
Tlhanyaku, N’Kau

**Project dates**  
Phase 1: Mar 2008

**Areas Covered**  
4 Health Centers  
Remote Mountain  
Highlands

**Capacity of each installed PV System**  
Phase 1:  
1,400 Wp  
Phase 2:  
Up to 6,000 Wp

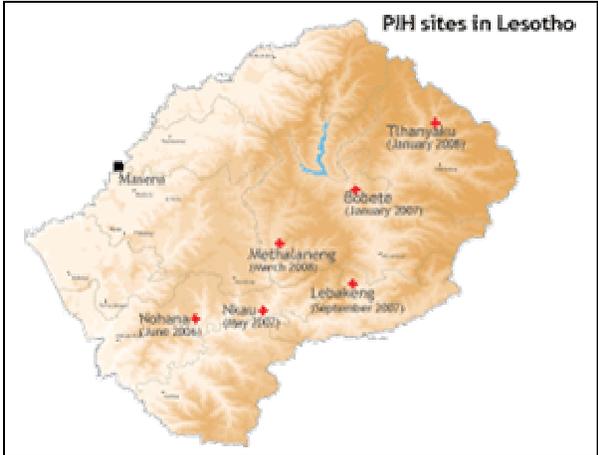
**Equipment for each Solar System**  
Solar Array  
9,000 Watt Inverters  
Battery Banks

Under the leadership of Dr. Paul Farmer, Partners in Health (PIH) has embarked on a project to operate at least 10 clinics in the remote rural reaches of mountainous Lesotho.

As in Rwanda, Solar Electric Light Fund (SELF) has committed to working with PIH to help provide the energy systems that are needed for their medical equipment, communication systems, and critical lighting needs.

This work just completed is the first part of a multi-phase project to electrify all 10 clinics.

Most of Lesotho is quite mountainous, and reminds you of parts of Arizona and Utah. Access to the clinic sites is generally via small Cessna flights, although the four installations we did on this phase were at least somewhat accessible by 4WD truck, (and boat crossings, and horseback.....)



## Lesotho

## Implementation and Training

Feb / March 2008

**Background and Medical Situation:**

Mountains of Lesotho

Lesotho is a mountainous nation, home to 2 million people and completely surrounded by South Africa. About one third of Lesotho's adult population is infected with HIV (the third highest seroprevalence of the disease in the world). This statistic by itself is cause for great alarm, but there are additional points of concern. One is that even though access to antiretroviral therapy (ART) has improved significantly in Lesotho, it is estimated that fewer than 20% of those in need of treatment actually have access to such services. Most of those that do have access live in the lowland areas that are easily accessible from Maseru.

The remote mountain regions are largely inaccessible, and are home to a significant population of persons with HIV infection. Unlike the lowland areas, many of the mountain regions lack access to even the most basic health services and do not offer ART.

PIH is working hard, in conjunction with Brigham and Women's Hospital, the Clinton HIV/AIDS initiative and the Ministry of Health to address this emergency situation in the rural areas of Lesotho.



The Road Into Bobete



The "Road" to N'Kau

The four clinics that are now open, and are the sites for this initial phase of work, and are: Nohana, Bobete, Tlhanyaku, and N'Kau.

## Lesotho

## Implementation and Training

Feb / March 2008

**Phasing of Projects:**

One of the most important, initial, needs of the clinics is for good internet access and communications, and some basic, limited energy for other critical lighting and procedure needs. The internet / communications systems are especially required due to the difficulty of access to the clinics, and the lack of cell phone coverage. PIH systems are based on efficient data gathering and reporting to allow efficient tracking of patients, and communications to schedule the appropriate supplies into the sites.



With this in mind, the Phase 1 systems for each site include all of the basics of a solar / diesel hybrid system, including the inverter equipment, charge controllers, batteries, solar panels, and a connection to the generators being delivered to the sites under other programs. The quantity of the solar panels and batteries are designed, in this initial phase for the needs of the VSAT and communications equipment along with other limited loads.

The expansion on Phase 2 will increase both the solar array and battery bank to accommodate the full energy needs of the clinics.

This project we just completed provides the Phase 1 level of energy supply at the four open clinics. This includes 1,400 Watts peak of solar panels, a three phase, Outback Power Management system, and appropriate batteries.

**Training and Implementation:**

SELF made a visit to all of the sites in August, 2007 to assess the needs and plan for the site installation. The systems were then designed, and the equipment shipped, arriving in Maseru, Lesotho by February of 2008.

The PIH staff then took care of arranging logistics to get the equipment delivered to the four sites, and to begin the construction of the electrical buildings that would be required to house the energy equipment being installed under this and subsequent phases.

We arrived in Maseru in mid – February to assist with the final logistics and construction details and begin the installation of the systems.

As in other projects, the solar panels are installed on pole-mount racks adjacent to the equipment buildings. This keeps the DC wire short, and more efficient. The inverter equipment is designed to accommodate the full loads on the final build-out, and will not have to be augmented on the future phases.



Once we arrived at a given site, our work was to (a) oversee the completion of the electrical buildings with special attention to the details needed to accommodate the energy equipment, (b) help with the installation of the galvanized steel poles for the mounting of the solar arrays, and (c) proceeding with the installation of the solar panels, inverters, batteries and all of the auxiliary equipment.

These systems are all solar / diesel hybrid installations, meaning that the solar panels work in conjunction with the diesel generators to keep the batteries charged. Where the generators were installed, we completed the in and out wiring connections and tested the combined solar / diesel system. In the sites where the generators have not yet been delivered, we trained the PIH staff and local electricians how to make these connections so this interconnection will be completed as soon as the generators arrive and are commissioned.

The heart of all of these systems is the battery bank, and special programming and training is required to assure that the battery voltages do not fall to dangerous levels. These systems require the operator to complete twice-daily logs, and to monitor the energy use during the day. There are also alarms to alert personnel when the system may require more attention than it is getting. To put these practices into action, we trained operators at each site. The PIH team will be managing these systems from their central location in Maseru, and on their periodic site visits.



## What's Next?

Now that Phase 1 is complete at 4 of the 10 sites, the remaining work includes the Phase 1 work at the remaining 6 sites, and the Phase 2 work at all 10 sites. We are hopeful that this work will be able to proceed to keep up with the opening and expanding of the medical work at each of the facilities, to provide the maximum support to the PIH efforts to diagnose and treat HIV and TB.

SELF and PIH are actively raising funds to be able to keep up with the PIH schedule to commission and expand the remaining sites.

This project was conceived, financed, and designed by Solar Electric Light Fund. All of us at SunEnergy Power International are proud to be part of the implementation team.

Report by: Walt Ratterman, Chief Executive Officer, SunEnergy Power International  
[www.sunepi.org](http://www.sunepi.org)

## Contact Information:

Walt Ratterman  
Jeff Lahl  
Robert Freling

[watterman@sunenergypower.com](mailto:watterman@sunenergypower.com)  
[jefflahl@yahoo.com](mailto:jefflahl@yahoo.com)  
[rfreling@self.org](mailto:rfreling@self.org)

SunEnergy Power International  
Solar Electric Light Fund  
Solar Electric Light Fund

More Pictures Follow.....





Sometimes the buildings are not quite Ready when we get there.



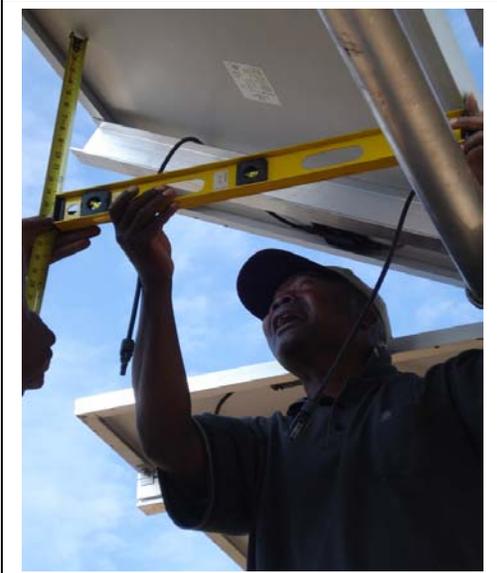
But, everyone chips in To complete the work



Installing panels on the poles.



Wiring up the Inverters.



Getting the Angle Right!



Always time for Class



We're Almost done  
(Who needs a roof?)



Plenty of Mountains