



## SunEPI Project Profile: Southern Sudan, October 2010

### Project Overview:



SunEPI project engineers Christopher Freitas and Bill Hoffer traveled to South Sudan in October to coordinate the installation of two solar electric power systems in South Sudan which power a medical clinic and a primary school and staff housing. The installations were used to train students from the local university who will be operating and maintaining the system as well as completing future installations of solar electric systems in South Sudan.



The medical clinic and school is staffed by members of the Lost Boy community with many returning from refugee camps in Kenya in order to help rebuild their country. The facility is supported by a USA based NGO and church organization who provided the funding to purchase the solar equipment and provided the transportation to the site in South Sudan from the Nairobi, Kenya based equipment supplier.

South Sudan is a semi-autonomous state formed 5 years ago through a peace agreement with the Northern Sudanese

*Clinic and school installation with hands-on training*

government which ended Africa's longest civil war. An upcoming referendum in January 2011 will offer South Sudan independence. South Sudan is bordered by Ethiopia to the east, Kenya, Uganda, and the Democratic Republic of the Congo to the south, and the Central African Republic to the west.

During the Second Sudanese Civil War (1983–2005, about 2 million killed) more than 27,000 boys of the Nuer and Dinka ethnic groups who were separated, displaced and/or orphaned from their families when government troops systematically attacked villages in southern Sudan killing many of the inhabitants, most of whom were civilians. The younger boys survived in large numbers because they were away tending herds or were able to escape into the nearby jungles. Orphaned and with no support, they would make epic journeys lasting years across the borders to international relief camps in Ethiopia and Kenya evading thirst, starvation, wild animals, insects, disease, and one of the most bloody wars of the 20th century.



*SunEPI's solar installation assistants!*

When the villages were attacked, girls were raped, killed, taken as slaves to the north, or became servants or adopted children for other Sudanese families. As a result, relatively few girls made it to the refugee camps. In 1992 UNICEF reunited almost 1200 "Lost Boys" with their families. However, about 17,000 are still in camps in the area.

### Project Information:

**Location:** Southern Sudan

**Scope of Project:** Two identical solar electric systems were installed – one to power the medical clinic and the second system to power the school, office, library, staff housing, a dormitory, and the kitchen facility.

The medical clinic system includes a super efficient refrigerator to store medical supplies and vaccines. Both systems incorporate an automatic load shedding system which disables most of the AC electrical outlets to limit the AC loads being operated when the power consumption exceeds what is produced by the system. A display panel provides the system users with operational information including a battery state of charge bar graph. A very bright red LED warning light is located in a highly visible location to indicate that the system has reached a critical low condition. This red LED automatically turns off once the system has recharged sufficiently and the load management system is reset.

**System description:** Each system consists of the following equipment:

**Solar Electric Array:** (16) 175 Watt Suntech monocrystalline photovoltaic modules - 2.8 kWDC rated

**Battery:** (6) Deka brand sealed lead acid batteries, 12V-210AH each wired into a 24VDC- 630AH bank with a total usable capacity of 7 KWH at 50% depth of discharge level.

**Power Inverter:** (1) OutBack Power FX2024E inverter/charger rated at 2000 watts AC 230VAC 50Hz

**Charge Controller:** (2) OutBack Power FM60 charge controllers rated at 60 amps continuous / 1440 watts maximum per controller.

**System Monitoring:** OutBack Power MATE2 display with FNDC system monitor / data logger.

**System Loads:** Primary loads are AC powered high efficiency compact fluorescent lighting for both the interior of the buildings, outdoor security lighting, recharging of cellular phones, simple medical diagnostic equipment, and a vaccine refrigerator. When excess power is available electric fans will be used during the hottest periods of the year. Several computers are expected to be powered in the future along with a communication link to provide an internet connection for both the school and clinic use