Beacon Solar Energy Project for Sierra Leone
Sierra Leone
Princeton University
Henry Rounds

The Beacon Solar Energy Project in Sierra Leone was designed to help improve the care at an amputee clinic run by Dr. Bailor Barrie and the National Organization for Welbody (NOW) in the eastern Kono region. By installing solar panels, which eliminate the unsustainable costs of using a diesel generator, the clinic will be able to run more advanced medical equipment including an X-ray machine and an ultrasound machine, as well as provide care well into the night.

The NOW clinic serves a population of approximately 300,000 individuals, offering free healthcare to amputees, HIV positive individuals, children under five, and pregnant women. It has also become a popular source of fee-based healthcare for other segments of the population, acting as an alternative to the nearby government hospital, which is sometimes accused of providing substandard and unequal care to the population. Our project was generously supported by Projects for Peace as well as the Princeton University Grand Challenges Initiative, the Princeton University Class of 1978 Fund, and the Princeton University Fred Fox Fund.

The trip successfully accomplished our dual goal of providing renewable energy for the clinic as well as inspiring dialogue and excitement over future uses of solar energy in Sierra Leone. For this project, we collaborated with the Sierra Leone-based NGO Energy For Opportunity (EFO). EFO was critical in helping with in-country logistics and providing significant technical insight into our designs. We also worked with three students from the Government Technical Institute who were enrolled in one of the country's first renewable energy engineering programs and were able to gain hands-on experience through our project. EFO has volunteered to be the on-the-ground contact for future technical assistance with regard to the energy system. We left a fully functioning system, and will receive weekly reports on the system's generation and the clinic's consumption of energy. The system contains twelve 175W panels, eight 12V 225a/h batteries, an inverter, and a charge controller.

Neal Yuan '10, Henry Rounds '11, GTI students, and clinic staff help hoist solar panels onto the clinic roof.

As with almost all development projects, this project was not without its hiccups. Fortunately, with advanced planning we were able to obviate most potential difficulties such as the many problems associated with the purchasing of supplies, as well as the importation and transportation of materials from the US to Kono. One problem that we

did encounter was a shortage of cash due to the prices of various electrical materials which had changed significantly since the time we procured our initial price quotes. Through careful management of funds, however, we were able to maintain our budget.

Looking to the future, our goal is to help continue building and improving the basic infrastructure which contributes to health in the Kono region. We hope to maintain relations with the NOW clinic and to ensure the full functioning of the photovoltaic (PV) system. We would also like to branch out into the surrounding community and are considering a number of different projects including: (1) helping to provide a library in Koidu town with computers and internet access to allow students access to school textbooks online, and (2) developing machinery for a palm kernel farm that would sustain and be managed by a community of amputees.

Sierra Leone's brutal ten-year civil war ended in 2002. A merely literal application of the dictionary definition of *peace* as the absence of war and violence might lead one to conclude that the nation was now at peace, and, by many measures, Sierra Leone has taken great strides forward. A report in February 2009 by the UN Integrated Peacebuilding Office in Sierra Leone (UNIPSIL) noted the near-absence of violent disputes throughout the country, including during the several successful democratic elections. Nevertheless, while the report claims that poverty levels have declined and that government institutions are developing, it seems that for most Sierra Leoneans, there is still a long road ahead. In conversations in the marketplace or at a local lunch stand, people expressed their lack of optimism about progress and a longing for times like those before the war. The fighting had ended, yet it became clear to us that peace is more than the absence of war. For true peace, there is a need for stability, security, and basic necessities such as shelter, food, and healthcare. NOW saw an opening to promote this kind of peace, by serving one of the groups most affected by the war, the amputees. The provision of free quality health care to amputees, and later to children under 5 and HIV/AIDS patients, as well as the offer of fee-based quality health care to their families and community members, helps to remove a source of anxiety and unease from these

Meghan McNulty '10, Henry Rounds '11, Zoe Li '12, Nizette Edwards '11 put together light fixtures for new compact fluorescent lightbulbs that will cut down on the clinic's electricity consumption

people's lives. As the patient load at the clinic has grown, so too has the need for medical services and procedures, some with modern equipment requiring far more electricity than the clinic's diesel generator could provide. That is where we saw an opening to promote a kind of "true peace" through providing a sustainable source of electricity to facilitate NOW's work.

Beyond the immediate health benefits that may be derived from the electricity produced by the solar panels, our project, we feel, has helped promote peace through a broader commitment to the development of a sustainable energy source. Reducing pollution (both noise and diesel exhaust) will contribute to the preservation of a clean healthy environment by removing the operating expenses of a fuel generator allowing the clinic to spend more resources on providing better healthcare; and partnering with Sierra Leonean GTI students and patronizing local businesses, thus encouraging an investment in Sierra Leone's future. All of these impacts work to mitigate the structural conditions that have conspired to delay the return of a full comprehensive peace to the daily lives of Sierra Leoneans.

We hope that these effects will spread beyond the local region by creating excitement about the potential of solar power as a source of renewable energy in all of Sierra Leone. During our brief time in the country, the project aroused noticeable dialogue about solar energy, and some locals are now considering installing solar panels for themselves. While the price of the average solar panel system is still out of range of most households and businesses, cheaper solar technologies are rapidly becoming available. We hope that, as the largest solar panel installation in the country to date, our project is just the beginning of the growth of sustainable energy systems in Sierra Leone.

We were very excited, happy, and relieved to see this project to the end. Last year, Dr. Barrie mentioned that many foreigners come to Sierra Leone, take pictures, make promises, and never return. That was always in the back of our minds through the year as we applied for grants and made plans for this year's trip. Indeed, it is often easy to be overwhelmed by the poverty of the region and feel incapable of having any significant impact on existing conditions. Thus, seeing the tangible effects of our projects, such as the lights of the clinic at night and the powering of the region's first ultrasound, has been especially moving for us.

It was truly humbling to see how Sierra Leoneans, while often having little in terms of material wealth, are some of the most generous in spirit. We felt that in the end, it is we who have received much more than we have contributed. Indeed, we learned so

much from completing this project. Perhaps most importantly, it became clear that nothing exists in a vacuum and an engineering project such as ours cannot help but be placed within a specific context and subject to its influences. Humanitarian groups such as EWB abound in Sierra Leone, and we learned that while all of them may have good intentions, some are much better than others at effecting positive changes. We've realized that effective aid depends not only on how much one spends, but also in what ways one spends: successful projects must be appropriate for the needs of the community, must be locally sustainable, and must have ensured accountability.

Though we may be tempted to throw money at problems to provide fast help, especially due to the daunting pervasiveness of infrastructural shortcomings when it comes to health and education, forethought and societal understanding are the keys to any aid project. Only thanks to extended time in the field and among the locals are we able to design projects, sustainable both by their nature and through local support, that will gradually make headway in helping current and future generations access the opportunities we take for granted.