Solar Household Energy, Inc.

Solar cooking for economic development and environmental relief

FY 2007 Annual Report
June 2006-May 2007

Solar Household Energy completed its 2007 fiscal year closer than ever to fulfilling its mission to "promote solar cooking technology, primarily the HotPot, in appropriate areas of need and opportunity around the world." The year was marked by a series of noteworthy accomplishments, a few disappointments, new insights and strong faith in the future of our endeavors.

In this succinct report, we highlight the most significant events of Solar Household Energy's 2007 fiscal year, and encourage you to contact us to learn more about our activities and share your own interests and ideas about the dissemination of solar cooking technology.

Program operations

The heart of Solar Household Energy's efforts is to deliver the promise of solar cooking to our "preferred customers" – low-income families in developing countries with climates suitable for solar cooking. In Latin America and Africa, we are employing a variety of tactics to train people to use solar cooking, and to facilitate the sustainable distribution of inexpensive solar ovens, particularly the "HotPot." Our small field program staff works both with local non-profit NGOs (non-governmental organizations) and entrepreneurs to achieve our goals.

HotPot demonstration, Oaxaca, Mexico

In **Mexico**, we completed our hand-over of all program operations to our long-time partner there, the Mexican Fund for the Conservation of Nature (MFCN), following the successful completion of our two-year Partnership for Clean Indoor Air (PCIA) project there. The PCIA project, partially funded by a $149,400 U.S. Environmental Protection Agency grant, demonstrated solar cooking's capacity to reduce human exposure to smoke caused by cooking with wood-fueled fires. Solar Household Energy's project was notable in that all other nine PCIA-funded pilot projects involved the use of fuel-efficient wood-burning

HotPot demonstration with ACUA, El Salvador

stoves, a complementary technology to solar cooking. Solar Household Energy personnel attended conferences with other PCIA-funded project managers, gaining useful insights and opening the door to possible future collaboration with organizations that focus on fuel-efficient stoves.

That PCIA project was built from the ground laid in a two-year World Bank "Development Marketplace" grant, also involving a close partnership with the MFCN. That effort and the HotPot in particular were singled out by the Bank's president last year as an example of a product that "helps poor people seize the opportunities they need to transform their lives and to create better futures for their children." Ultimately, some 5,000 HotPot solar ovens were manufactured and distributed in Mexico through those projects. MFCN is moving forward through local implementing partners, with grant support from other sources. Solar Household Energy intends to support a comprehensive follow-up research effort by MFCN to document and analyze the history and progress of the program to date.

Elsewhere in Latin America, a modest pilot project in **El Salvador** with the Asociation Comunitaria Unida por el Aqua y la Agricultura (ACUA) involving the distribution of 50 HotPots to women in the rural communities of Santa Marta, Nueva Amanecer, San Juan Buenavista, Nazareth, and Ojos de Agua, was greeted so enthusiastically that the project is now being followed by a much larger effort. Although the HotPot is generally purchased by individuals for purposes of cooking personal meals, one resident of that community uses her HotPot to cook snacks that she sells at local soccer games. The prospect of the HotPot's utility as an income-generating vehicle opens the door to microcredit as a financing tool, as lenders generally decline to finance the purchase of consumer goods.

HotPot demonstration with Fundación para la Conservación de los Recursos Naturales y Ambiente en Guatemala, La Estancia, Guatemala

Meanwhile, another project in El Salvador, involving the international NGO Feed the Children, has fallen short of

program goals. Solar Household Energy financed one-half the cost of a 250-HotPot order by the San Salvador office of that organization, and underwrote the salary of a trainer/distributor. Disappointing results stemmed from inappropriate community selection and product pricing strategy, among other factors. Those lessons are being applied to other projects. Unsold HotPots purchased by Solar Household Energy for that project are being redeployed elsewhere in El Salvador.

In **Guatemala**, two pilot projects – one rural, one urban in Guatemala City -- are in preliminary stages. Both were delayed due to difficulties in importation logistics and organizational changes within partner NGOs.

Efforts to identify additional partners, both NGOs and commercial distributors, in those countries and **Peru**, are ongoing. For example, Solar Household Energy engaged the services of Intrix Corporation, an international sales development consultancy based in Greenwich, Connecticut, to identify potential commercial distributors in Peru.

Mme. Sissoko promoting the HotPot on ORTM television, Bamako, Mali

This project, if successful, may be the beginning of a new approach to identifying local business partners which would facilitate the importation of HotPots in sufficient quantities (generally a full 40-foot shipping container, which can hold over 2,000 units) to achieve essential economies of scale. Such commercial entities could concentrate their sales efforts on middle class urban customers, but offer volume discounts to NGOs serving Solar Household Energy's "preferred customers" with purchases in the 50-250-unit range. In addition to the economic considerations, NGOs and small enterprises lacking import experience often encounter significant difficulties and delays in securing HotPot inventories.

That was the experience in **Mali**, where Solar Household Energy was, after considerable effort and expense, able to facilitate the shipment of 1,048 HotPot units to SYST-COM & Energie, a small energy services company based in the country's capital of Bamako. The company's co-owner, Ms. Aissata Sissoko, has engaged in a tireless crusade to promote solar cooking in Mali. With support from Solar Household Energy, Sissoko has organized conferences, training sessions, attracted national television media attention and secured a grant from the national government to facilitate the discounted sale of HotPots to rural and urban consumers. SYST-COM's original hope of selling HotPots, even to urban consumers, for as much as $80 per unit proved unrealistic. With a recent grant from the government of Mali, the company will cut the price in half. (A

discussion of HotPot manufacturing costs and pricing strategies appears elsewhere in this report.)

Solar Household Energy maintained ownership of nearly half of the HotPots shipped to Mali, using SYST-COM's storage facility as a depot from which to dispatch units to neighboring Senegal**,** Burkina Faso, and soon, to Cameroon, for pilot projects there. In **Senegal**, a successful 120-HotPot pilot project with a small NGO, L'Association des Femmes pour la Promotion des Sciences et de la Technologie au Senegal (AFSTech) in four rural communities as well as a neighborhood in Dakar and a community in Thies, led to the prospect of a relationship with a larger NGO, Tostan.

Tostan, an organization whose international headquarters are in Thies, Senegal, was founded in 1991 to "empower African communities to take charge of their own development," a philosophy compatible with Solar Household Energy's. Tostan works primarily with women in 400 communities in Senegal, and also has projects in five other countries. We anticipate formalizing a relationship with Tostan this year to resume and amplify where the pilot project with AFSTech left off. In addition, in our constant effort to identify ways to minimize the cost of producing and delivering appropriate solar cooking technology to targeted communities, Solar Household Energy Executive Director Marie-Ange Binagwaho, during a trip to Senegal, arranged for a local trial production of the aluminum reflector component of the HotPot.

In **Burkina Faso**, Solar Household Energy collaborated with the Centre Ecologique Albert Schweitzer (CEAS) in a solar cooking dissemination project involving 100 HotPots. That group is also exploring the viability of local production of the HotPot reflector. (Technical requirements for the manufacture of the HotPot's tempered glass and enamel-coated steel components so far have precluded local sourcing, but efforts to identify new manufacturing sources are ongoing.) Burkina, like several other countries Solar Household Energy has targeted, has enacted legislation exempting certain alternative energy products from the punitively high import tariffs -- 50%, in Burkina's case -- applied to other goods. But the inconsistent application of that law by government officials at the border has hampered our efforts in that country. The "hit-or-miss" nature of obtaining relief under these laws demands persistence and patience.

Pilot program participant selling a solar baked cake to children, Mekhe, Senegal

Securing the benefit of such import duty relief in **Cameroon** is one of the tasks being performed by Solar Household Energy's NGO partner there, APELD (the Association for Environmental Protection and the Fight against Desertification). The severe over-harvesting of trees in northern Cameroon has contributed to desertification. APELD has generated preliminary interest in the HotPot as a means to help reverse that devastating process. Solar Household Energy anticipates delivering HotPots for a pilot project managed from the northern regional capital of Maroua, in 2008. The geographic remoteness of that region will add, however, to the inherent logistical and financial challenges involved.

Solar Household Energy also has explored opportunities for partnerships with suitable NGOs in Eastern Africa, particularly **Tanzania** and **Kenya**. Promising discussions have taken place with Pact Kenya, following a trip to the region by Camille McCarthy, Solar Household Energy's Director of Latin America and East African Programs. As with all NGO relationships, Solar Household Energy's ability to advance its relationship with Pact Kenya will depend upon its success in securing essential grant support (Solar Household Energy's finances are discussed elsewhere in this report).

Solar Household Energy's operational experiences to date, most extensive in Mexico, have highlighted critical factors in effective solar cooking technology dissemination that guide our evolving efforts elsewhere. Those include:

- **Implementing partner selection:** Whether commercial or nonprofit in nature, finding a local partner with a "good fit" requires extensive research, face-to-face discussion, financial realism, clear delineation of responsibilities and patience.
- **Community receptivity to change:** Some communities are more open to new ideas and technology than others. This can be gauged, at least to some extent, prior to choosing a pilot project site. Our reliance on our NGO partners without seeking additional evidence on this important issue may have limited our success in some villages in El Salvador and Mexico.
- **Financial responsibility:** As with receptivity to change, communities vary according to their willingness to pay for "helpful" goods (such as the HotPot), than others. A community that has historically been the beneficiary of "hand-outs" of various kinds by NGOs or the government is not a good prospect for a self-sustaining HotPot distribution effort.
- **Product pricing:** Even when families are genuinely eager to purchase a solar oven, price sensitivity must be evaluated carefully. Arguments that an investment in solar cooking will be rewarded with savings on cooking fuel over a period of months generally cannot overcome the "sticker shock" of a HotPot if it is priced beyond immediate reach. (Retail prices above $30-40 are problematic in most rural areas.) Periodic payment financing mechanisms, employed in Senegal, El Salvador and Mexico, can help, but the total price must remain low.

Metal worker constructing HotPot reflector, Mekhe, Senegal

HotPot Developments

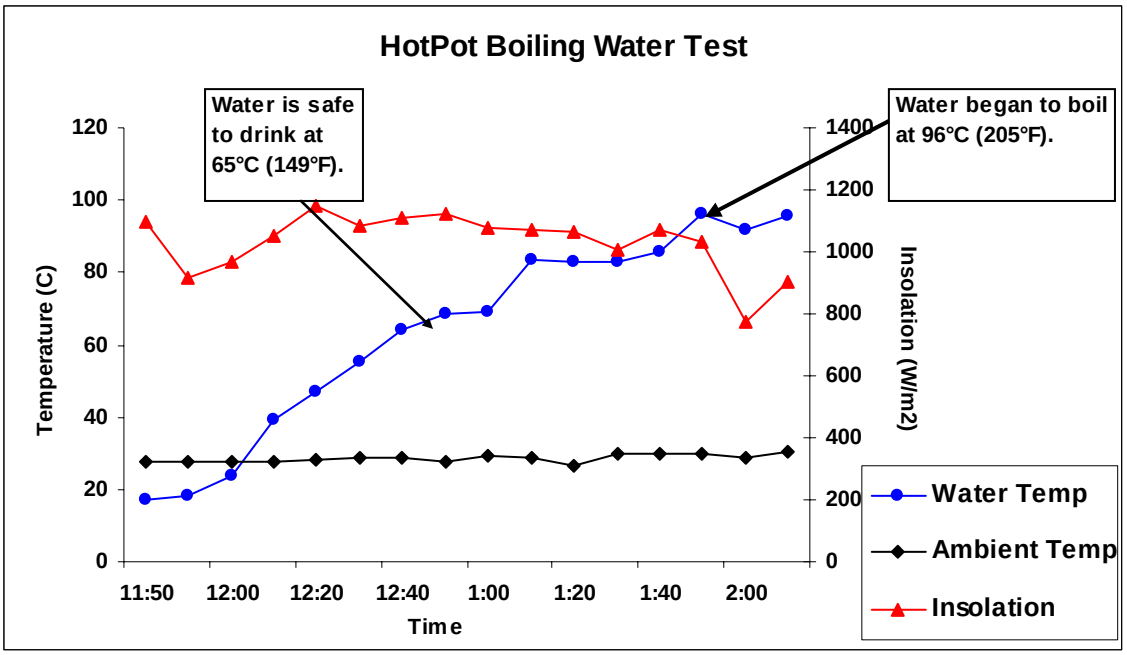
Given the critical importance (as noted above) of making the HotPot available to buyers at the lowest possible price, Solar Household Energy explored several approaches to accomplish that goal. One, as noted earlier in this report, was to explore the possibility of local manufacturing of the "Morningstar" aluminum reflector, both in Senegal and Burkina Faso, seeking savings in labor, shipping and importation costs. (Those countries were targeted based on the prospect that current pilot projects there will be scaled up in the future.) Small metalworking workshops have been tasked with producing reflector prototypes. In Senegal, a prototype of acceptable quality was built, and cost projections for regular production runs are forthcoming.

However, the labor cost inherent in the existing aluminum reflector model produced in Mexico represents a small proportion of the total; the principal raw ingredient, aluminum sheet, is a global commodity, with no anticipated cost advantage in Africa. Meanwhile, ILS Inc., the Monterrey, Mexico-based supplier of the HotPot (which assembles components manufactured at separate factories in Mexico, packages and ships the finished product), was in the final stages of producing a more durable version of the low-cost "Tharco" foil-faced cardboard reflector. (The original maker of the product has discontinued production.) It is hoped that the new reflector, with an anticipated manufacturing cost in the $5-$6 range, will offer a reasonable alternative to the more expensive aluminum model, whose manufacturing cost is in the $25 range.

Another cost reduction strategy to minimize the retail price of the HotPot is to ship the product unassembled, reducing packaging costs and making it possible to more than double the number of units that can fit into a shipping container, thereby reducing unit shipping costs proportionately.

Meanwhile, scientific performance measurement of the HotPot was conducted this year (and continues) under the direction of Solar Household Energy's scientific advisor, Melanie Szulczewski, Ph.D., to respond to any questions about its capacity to cook. An example appears on the following page.

Solar cooked rice with carrots, potatoes and sausage, El Salvador



The graph above displays data collected from a boiling test of one liter of water conducted in Washington, D.C. Solar insolation, measured as watts per square meter, measures the strength of the sun's radiation. Note that even when the amount of solar insolation, represented by the red triangles, fell at 2:00 p.m. due to passing clouds, the water temperature, represented by blue circles, continued to rise. This is an effect of the "greenhouse" nature of the HotPot. The design of the HotPot allows it to reach and maintain an internal temperature far in excess of the outside temperature. Here, the outside temperature, represented by black diamonds, only fluctuated between 81 and 86 ° F during the three-hour test. The graph also shows that the water reached pasteurization temperature of 149° F after approximately 50 minutes and achieved a maximum temperature of 204° F after 2 hours 20 minutes. These results clearly present the capability of this simple, affordable solar cooker. Note: The HotPot reaches higher temperatures more quickly in tropical latitudes.

Spreading the word

In keeping with Solar Household Energy's overarching mandate to promote the dissemination of solar cooking technology, this year our staff participated in numerous outreach activities, including exhibiting and demonstrating the HotPot, and giving presentations at a variety of venues in the U.S. and abroad. They include:

- The annual Engineers in Technical and Humanitarian Opportunities of Service (ETHOS) meeting in Kirkland, Washington
- A Partnership for Clean Indoor Air international conference in Bangalore, India
- 25th Black Family Reunion on the National Mall
- Indoor Air Pollution - Healthy Kitchens Conference, Peru
- Technology and Development Staff, U.S. Peace Corps

- Office of Policy Planning (Energy Issues), and the Bureau of Population, Refugees and Migration, U.S. Department of State
- U.S. Agency for International Development (Global Development Alliance)
- Demonstration for U.S. Congressional staff on the National Mall

In addition, under the direction Solar Household Energy's Bridget Huttenlocher, we initiated a quarterly electronic e-mail newsletter, distributed to several hundred people who have expressed an interest in solar cooking in general and Solar Household Energy in particular. Solar Household Energy's website, www.she-inc.org, has also been substantially overhauled, including the addition of a Spanish edition of the site.

Building capacity

Marie-Ange Binagwaho (second from left) visits the HotPot Pilot Project in Mekhe, Senegal

Solar Household Energy took a significant step forward in October when Marie-Ange Binagwaho joined the organization as Executive Director. She has nearly two decades of high-level NGO management and consulting experience, and holds a Masters in Public and International Affairs with a concentration in Economical and Social Development. A native of Kenya, Marie-Ange has worked for such prominent international NGOs as CARE and Plan International and has managed or played a role in development projects in some twenty countries. Richard Stolz, who preceded Marie-Ange in the role, continues to serve Solar Household Energy on a part-time basis focusing on financial matters. Meanwhile, Bridget Huttenlocher, who joined Solar Household Energy as a program associate in 2006, has been promoted to assume operational responsibility for Solar Household Energy's activities in West Africa.

Solar Household Energy's ongoing efforts to expand its financial base bore some fruit with a grant from the International Foundation, to support projects in El Salvador. Concurrently, Solar Household Energy has been devoting energy to generating statistically robust project performance data to buttress fundraising efforts. To that end, solar cooking user survey methods and instruments have been modified, relying less on self-reporting, and more on professional researchers. Fund-raising remains, as always, an urgent priority for Solar Household Energy.

Our FY 2007 financial statement follows.

FY 2007 Solar Household Energy Income Statement

June 1, 2006-May 31, 2007 (*unaudited)*

INCOME	
Foundation grants	330,000.00
Individual contributions	4,945.00
HotPot sales and misc. income	5,343.61
TOTAL INCOME	**340,288.61**
EXPENSES	
Project operations & implementation partner support	108,989.45
Project personnel	150,848.78
Project contractors	6,000.00
HotPot Solar ovens	48,533.11
Travel & field expenses	32,966.54
Technical evaluation	4,053.14
Fund development	37,958.23
Professional services	12,719.60
Management & administration	116,448.24
TOTAL EXPENSES	**518,517.09**
NET INCOME	**(178,228.48)**

FY 2007 Solar Household Energy Balance Sheet

As of May 31, 2007 (*unaudited*)

ASSETS	
Operating funds	72,818.53
Accounts receivable	1,152.40
TOTAL ASSETS	**73,970.93**
LIABILITIES & EQUITY	
Accounts payable	7,087.43
Payroll liabilities	4,635.54
Deferred contribution	50,000.00
TOTAL CURRENT LIABILITIES	**61,722.97**
EQUITY	
Opening Balance	(0.08)
Unrestricted funds	190,476.52
Net Income	(178,228.48)
TOTAL EQUITY	**12,247.96**
TOTAL LIABILITIES & EQUITY	**73,970.93**

Looking ahead

We have significantly advanced the methodology for introducing solar cooking to communities and of ensuring, through training and follow-up, cultural acceptance and consistent use of solar cooking devices. Our efforts have raised the demand for solar ovens and solar cooking training. This occurs as families realize financial savings on cooking fuel or, in communities where women and girls must forage for wood, savings in time.

Building on our achievements, next year we will launch a scale-up project engaging 400 families in El Salvador, where an initial effort was so successful that our local partner, with our enthusiastic approval, has shifted the project design from a work exchange payment mechanism, to having families pay for the HotPot with cash. We anticipate a 1,000-family project in Senegal over a two-year period working with Tostan. For Senegal we plan to obtain reflectors from local metal workers, and import the glass and enamel steel components of the HotPot. In Kenya, we are preparing to launch a pilot project in the coastal community of Kilifi, working with Pact Kenya. Kenya already has a very small cottage industry which manufactures the cardboard version of the HotPot reflector, due to ongoing efforts to distribute other solar cooking devices in that country, we will take full advantage of that resource.

Both Senegal and Kenya are offering an opportunity to lower the cost of the HotPot, making it more affordable to our target populations, as well as to foster local income-generating projects.

The future is not without challenges. Our experience has shown that resistance to change in this arena -- as in virtually all other realms of human behavior – can be strong. But our experience also shows that the combination of sound, simple and affordable technology, strong local implementation partners and collaborative project design, can, overcome that barrier. We invite you to join and support us in this critical endeavor.

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