The Solar Women of Totogalpa

A group of rural Nicaraguan women cook up a winning recipe for a solar-powered restaurant.

A group of women in rural northern Nicaragua, where 20 years ago a war raged, are empowering their community with renewable energy. The Mujeres Solares de Totogalpa (Solar Women of Totogalpa; SWT) is a cooperative that offers solar products and serves as a model of economic, ecological, and social sustainability.

The story of the solar women of Totogalpa begins in 1999, when Grupo Fenix—a group founded by university students from Managua, Nicaragua, led by engineering professor Susan Kinne—received a grant to reintegrate land mine victims into society. Their approach? Training them to build PV modules (see "Solar Electricity in the Nicaragua Hills" in *HP97*).

The group focused their efforts on Sabana Grande, an agricultural community of 200 families in the mountains of Totogalpa, about 20 miles from the Honduran border. Land mines scattered throughout the region had left many civilians disabled.

Grupo Fenix hosted workshops, training land mine survivors to assemble their own PV modules using discarded PV cells. The group also donated a few solar cookers to the community. This low-tech tool immediately interested the women in the community—in Nicaragua, where at least 90% of the rural population cooks over an open fire, respiratory diseases are the leading cause of death for women.

Before long, the women began building their own solar cookers and adapting them for specific uses. The cookers do not replace wood entirely but reduce the amount of wood needed for cooking—and the women's smoke exposure.

The Key Ingredients

In 2003, with the support of Grupo Fenix, the women organized into the *Mujeres Solares de Totogalpa*. In 2010, they became an official Nicaraguan cooperative. The SWT had been selling and building solar ovens out of members' houses, but they needed more room to work. They dreamed of having a solar restaurant where they could showcase their solar-cooked food and teach the public about solar ovens. But they were missing the key ingredients: funding and a piece of land.

The women turned to Grupo Fenix for guidance, securing a grant from the Oklahoma-based Noble Foundation in 2005, and acquiring three acres of donated land along the Pan-American highway to Honduras. A local architect helped them develop a plan for a solar campus that could grow one building at a time.

The first Solar Center building—constructed with adobe blocks that the women made—got underway in 2005, with the women doing all of the heavy lifting. More than 6,000 adobe blocks were made for the building, all on volunteer time. In fact, in one year alone, the women contributed more than 8,000 volunteer hours to the building's construction.

In December 2007, the women inaugurated their first building, housing an office and warehouse, as well as workshop and meeting spaces. One of the products the women are most proud

The SWT solar cooker is based on one originally developed by the Central American Solar Energy Project (www.solaroven.org). A box cooker, with one reflector and a door in the front, sits on a wheeled stand so it can be moved easily.

Courtesy Laurie Stone

of, and that visitors most often request, is their solar-roasted coffee. Coffee is Nicaragua's biggest export crop, and the best coffee beans are sent to the United States and Canada, leaving Nicaraguans with a bitter cup of coffee from the green beans that remain. However, the women figured out that if they roast the coffee beans in the solar oven, instead of over an open fire (the traditional method), the bitterness mellows, leaving a rich and delicious flavor.

The women also produce jams canned in the solar ovens, solar-dried fruits, medicinal herbs, and solar-baked cookies and cakes. However, the women really desired a venue to sell their products and to showcase their solar ovens, and their dream of having a solar restaurant continued.

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Green Hours & Nano-Loans

The SWT faced many challenges during the two years it took to build the center—weather, lack of construction skills, tight finances, and internal struggles. Some women put in more volunteer hours than others, and this caused some discord. To alleviate some of the tension, the group decided they would keep track of the volunteer hours. With the help of volunteer Charlotte Ross, a student of economics, the women went a step further and devised a system of "green hours."

Each woman earns one credit for every hour worked. The women can redeem their credits to purchase items in their "green store," open once a month, where donated items—ranging from solar cookers and PV systems to bed linens and clothes—are sold. Members have the option to purchase items with hours or with cash, and the income generated is used to buy items that the group needs.

As more visitors came to the Solar Center, the women decided they needed better guest accommodations—a separate room with a bed, mosquito net, and lockable door. But creating this addition to their homes required cash for materials, which the women didn't have.

Under Ross's guidance, a nano-loan program was established, providing $150 home-improvement loans. Participants use income from renting the rooms to repay their loans, while income from meals served to guests goes directly to the women and their families.

The loan program has been wildly successful: 19 of the 20 families represented in the SWT now have guest rooms in their homes, and there has been a 100% loan payback rate.

Recipe for Success

In 2009, the women secured international grants to begin work on their solar restaurant. The restaurant will offer meals prepared with produce from their organic gardens, using innovative cooking methods—solar cookers, parabolic cookers, solar dryers, and, perhaps, a range fueled by methane gas produced in a biodigester.

The restaurant will run entirely on solar power. The first PV array was installed in December 2010 during a Solar Energy International workshop. Four 220-watt modules will power DC lights and AC appliances, such as a blender and microwave. Eventually, another PV system will be added to run a refrigerator.

—Laurie Guevara-Stone, International Program Manager at Solar Energy International

Courtesy Laurie Stone

Solar as the Main Course

One of the SWT's biggest accomplishments has been the electrification of all of its members' households. In Nicaragua, only 55% of the population has access to electricity and less than 1% of that comes from solar electricity—though that percentage is increasing rapidly in rural areas. In Totogalpa, only 15% of the population has access to electricity and less than 1% comes from solar power. But within the SWT, 100% of members have access to electricity and 54% of their households are powered with solar energy.