



El Guaylo, Estelí

SOLAR SCHOOL AND HEALTH CLINIC CASE STUDY

El Guaylo is a rural community of 261 people located in San Juan de Limay, Estelí, Nicaragua. The department of Estelí is located north of Managua, the nation's capital, and known for its mild climate, forested mountains and tobacco crops. Its largest city, Estelí, was greatly affected by heavy fighting during the country's civil war in the 1980s. The national electric grid does not reach many of the department's rural communities, including El Guaylo.

GRID Alternatives learned of the community through Casa Baltimore/Limay, a friendship-city project connecting the people in the municipality of San Juan de Limay, Nicaragua with people in the Baltimore, Maryland region. Agriculture is the primary source of income in El Guaylo. Community members cultivate wheat, corn and beans and raise livestock, which they use locally or take to San Juan de Limay, the nearest town, to sell. Most homes use kerosene lamps to see at night which emit harmful gases, are flammable, and are

expensive to use. Some families use flashlights or lamps with batteries that must be replaced every two weeks.

GRID Alternatives started meeting with the community in 2014 to assess its electricity needs. The community identified the school and the health post as the highest impact locations for solar installations, and formed an energy committee to plan, oversee and maintain the project.

El Guaylo has one small school with three classrooms for all ages. There are three teachers who work at the school from Monday through Friday and teach 48 students from first to sixth grades. The school also offers weekend high school classes to 33 students from El Guaylo and neighboring communities. In the afternoon, the school is used to teach adult literacy through a government-supported distance-learning program called *Yo Si Puedo*. The program is designed to use videos to support the curriculum, but the school was not able to use the videos since it had no electricity. The school



is also used for community meetings. Lack of electricity restricted the school to daytime activities, limiting both its educational and community uses.

The community's health post is a small, one-room building used by volunteer health workers and attendants sent periodically by the Ministry of Health to provide vaccinations, general health check-ups and gynecological exams. With no permanent staff and no electricity to power devices or refrigerate medicines, people needing more care had to walk or be carried for more than one hour to the nearest hospital.

The project started in January, 2015 when GRID Alternatives led a group of volunteers to install a 920W

battery-based PV system on the school. Volunteers included both community members and nine Nicaraguan women volunteers from outside of El Guaylo. While formal education programs and interest in renewable energy are growing in Nicaragua, there are very few opportunities to gain hands-on experience installing solar. Women interested in working in the renewable energy industry were invited to apply for the volunteer opportunity as part of GRID's Women in Solar Initiative, a program to bring more women into the solar industry and support them in their professional advancement. Selected participants included women from the Ministry of Energy and Mines (MEM), Universidad Nacional Autónoma de Nicaragua (UNAN), American College University, IDEAS, and Fundacion Proyecto Solar para Mujeres Nicaraguenses (FUPROSOMUNIC).

The system was installed over three days with support from a local solar installation company, and energy committee members received training in basic maintenance. In addition to electricity for learning aids like videos, projectors and computers, the system is providing night time lighting and access to power to charge cell phones and other small electronics used by community members.

One year later, in January, 2016 GRID Alternatives led another all-women volunteer team to install a 490W battery-based PV system on the health post. The system brought lights and AC power to help improve the frequency and quality of services the health post can offer the residents through access to nighttime lighting, fans, nebulizers, vaccine refrigerators and more. Now that the health center has electricity, the community is also eligible to receive a permanent health care worker in the community paid for by the Ministry of Health.

Although the community energy committee is charged with basic maintenance on both systems, GRID will continue to visit El Guaylo at least twice a year to maintain and monitor the PV system, stay in touch with the community and gather ongoing feedback about the project to inform future project.



SPRING 2016 - Community Impacts Reported

- Before having the PV system installed in the school, community members had to walk five miles or take a one-hour bus ride into San Juan de Limay to charge their cell phones. In-community cell phone charging has saved them time and money, helped them stay in better touch with family and friends outside the community, and provided radio and internet access.
- Revenue from cell phone charging is supporting the system's maintenance and battery replacement fund. An average of seven people charge their cell phone each day, or 50 per week. The energy committee charges 2 córdobas per charge, generating approximately 100 córdobas (almost 4 dollars) weekly.
- One young man purchased an electric razor to start a community hair cutting business, providing a small income for his family and saving people the travel time and expenses of getting haircuts in town.
- Adult basic education class can start later in the afternoon and go into the evening, allowing more adults

who work full days in the field or in the home the opportunity to study. There are currently nine adults taking evening classes.

- Six members of the community have become community leaders through their participation in the energy committee, charged with system maintenance, fundraising for battery replacement and communication with GRID Alternatives.
- The community as a whole has increased knowledge of solar and renewable energy, and some members now have direct installation and maintenance experience.
- Two representatives from El Guaylo, one man and one woman, participated in GRID's annual Solar Conference. The conference provides PV workshops and trainings to community members from GRID installation sites all over the country. It is a rare opportunity for people from rural villages to travel outside their region and meet other community leaders, sharing ideas about fundraising and bringing new projects to their community.



SOLAR SCHOOL SYSTEM SPECS:

Modules: Four SunPerfect CRM230S 156P-60 230W PV modules

Inverter: One Outback GFX 1424, 24V inverter
Charge Controller: One Midnite Solar Classic 200

Batteries: Four Trojan T-605 deep-cycle lead-acid batteries

Other DC components: Breakers, DC wires, connectors, flashings, etc.

AC components: All AC wiring, breakers, switches, outlets, light sockets, etc.

SOLAR HEALTH CLINIC SYSTEM SPECS:

Modules: Two 245W Solar World Modules

Inverter: One Morningstar 300W SureSine inverter

Charge Controller: Two Morningstar SunSaver 15A controllers

Batteries: Two Trojan 27TMX 12V, 105Ah, deep-cycle lead-acid batteries

Other DC components: Breakers, DC wires, connectors, flashings, etc.

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