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A Bright Idea

Photovoltaics in the Dominican Republic

Photovoltaics projects in the Dominican countryside provide financing and jobs as well as much needed power.

About 70 percent of the rural population of the Dominican Republic does not have electric lighting in their homes. And they're better off than most of Central America. The Central American Rural Electrification Study, completed in 1986 by the National Rural Electric Cooperative Association and the U.S. Agency for International Development (USAID), shows that only 15 percent of the rural population in Central America has electricity.

Although total rural electrification by grid extension is an impossible mission, photovoltaic power provides new and economical possibilities for electricity in the Dominican countryside. In most areas, kerosene lamps and batteries provide light and power. Some people carry lead-acid batteries every week, often by mule, to be recharged in an electrified village.

An Innovative Approach

To address this need for clean dependable power sources, a nonprofit group called Enersol Associates was created in 1984. This organization offers technical assistance and training to Dominican businesses and nonprofit organizations, in order to complete the commercial chain for photovoltaic technology.

The organization also makes credit available to rural families for pho-

tovoltaic system purchases. The collaboration of trained technicians, rural credit associations, and local solar service enterprises comprises what Enersol describes as SO-BASEC — the SOLar BASEd Electrification Concept.

SO-BASEC employs the private commercial network because it is a suitable means of equipment distribution. It is now evident that many Dominicans would use photovoltaics if they knew

that option existed and they had a convenient way of acquiring it. However, there were no established importers or manufacturers of solar electric equipment in the country, and no mechanism existed to make the equipment available to rural Dominicans. Ignoring the conventional wisdom that photovoltaic technology's time had not yet come, Enersol Director Richard Hansen set out to make photovoltaics as accessible to

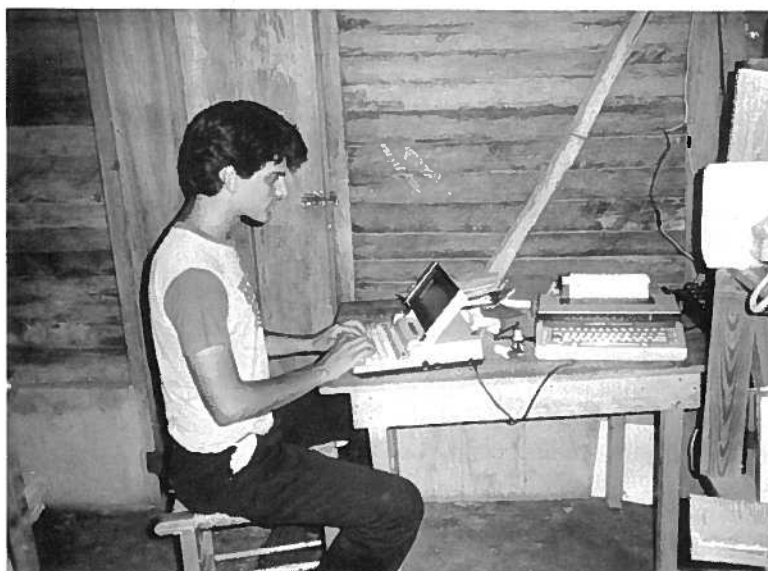


Photo courtesy of Enersol Associates

The Information Age comes to rural Dominican Republic. Phil Covell uses a PV powered laptop to write sections of the Department of Energy Report "Photovoltaics for Rural Electrification in the Dominican Republic" (Enersol Associates and University of Lowell Foundation, 1987).

rural Dominicans as kerosene and batteries.

Enterprising residents of rural areas now make a living by offering electric power to people for whom it was previously unattainable unless they moved to more densely populated areas serviced by the (undependable) electric grid. These villagers assemble, sell, install, repair and guarantee their products and workmanship. Job creation is a significant outcome of the project, for in the countryside unemployment often reaches 50 percent.

Although the photovoltaic systems usually pay for themselves in less than five years, financing is often needed to spread the \$200-to-\$500 cost of the system over many monthly payments. In SO-BASEC projects, rural credit associations manage the revolving funds that service the small farmer's financing needs.

Electrifying Puerto Plata

The idea first took hold in the northern province of Puerto Plata. With financing from a community credit association and service from a solar energy equipment dealer, 105 systems were installed in rural areas of Puerto Plata in 1989 alone. Over the past five years nearly 1000 systems have been installed around the country.

The project began after American engineer Richard Hansen visited the country and saw that rural people paid a lot to buy kerosene and dry cell batteries, and to take automobile batteries up to 6 miles or more to the nearest gasoline station for recharging with grid electricity. Mr. Hansen had an interest in electric energy, and had worked for six years for the Westinghouse Corporation, one of the largest electrical equipment producers globally.

After living a while in the rural setting, it occurred to Mr. Hansen to establish a community development project using solar energy. He spoke with officials from the Dominican Electric Corporation, the national Energy Policy Commission and various other development organizations, while founding a small



Ydalia Alcantara sews by PV-powered light.

Total rural electrification by grid extension is an impossible mission.

non-profit organization called Enersol Associates to attract international development funding for the project.

After seeing Mr. Hansen's demonstration system, Felipe Martinez bought the first solar electric system for his family and country store. "We're very pleased," says Martinez, "because it's economical and has not had any kind of failure whatsoever." The Martinez family has entirely repaid their 4-year loan, making that money available for others who wish to purchase systems.

Economics and Financing

In rural locations where the utility lines do not reach, solar electricity is economical because it displaces, for 20 years or more, expenses for kerosene, dry cells and car battery recharging. It thereby reduces energy costs for lighting, radio and television. Plus, solar energy sys-

tems do not require much maintenance.

Juan Hiraldo, treasurer of ADES, or the Solar Energy Development Association explained: "If I buy a system, from then on I pay nothing (no electric bills) because the rest God gives for free via the sun."

Since most campesinos have few economic resources, not many can pay cash for their systems. Because of this, some families organized themselves to form the association "Families Dominicanas para Energia Solar" in November of 1984.

According to Mr. Hiraldo, "At first there were five families who were members (of the Association) when the U.S. Agency for International Development gave us a little over seven thousand pesos (US\$2000)." This donation started a revolving fund so that families could pay for their sys-

tems in monthly installments roughly equal to what they already paid for kerosene and batteries.

Mr. Hiraldo continued: "Soon there was more recognition of the product and people became interested in it when they saw lights in the other houses and noticed that the system was effective. But we didn't have enough financing available for them. So then came another donation of 10,000 pesos from AID." This second donation came in March of 1986 and augmented the revolving fund to finance three-year loans to families that were awaiting systems.

Although various community associations around the country now offer loans for PV systems, demand for solar system financing continues to exceed the capacity of the fund. People have to await payments to the fund by other members to finance their systems.

As a result, most of the systems were purchased with financing direct from the solar service and equipment dealer in Bella Vista, Sosua, a village of about 250 people where the project began.

Photovoltaics in the Dominican Republic

Solar Advantages

The advantages of solar energy are not just economical. Mrs. Ydalia Alcantara, a seamstress in Bella Vista, was very bothered by the smoke issued by the kerosene lamp that she kept close to her as she sewed at night. Now she has electric light that is four times as bright as her kerosene lamp, gives off no smoke to sully the fabric or her walls and presents no health threat.

Country stores (which are social centers in rural Dominican society) also make good use of solar electricity. Their clients can chat and play dominos under electric lightbulbs while listening to music played with energy generated by the sun.

It is possible to see quality solar electric light used productively in each step of the production and consumption of dairy products. Many villagers have cows that they milk before sunrise, and cheese from the milk is made evenings under electric light. The cheese is sold in stores, cooked in the kitchen and served and enjoyed under electric light.

Furthermore, the village of Bella Vista has experienced a growth in its economic activity because of the local enterprise which sells the systems and employs the technicians which install and maintain the systems.

Young Dominicans from several communities have been trained as technicians, and others are waiting for the next training workshop sponsored by Enersol Associates. "The technicians are guys who sincerely want to learn as much as they can about solar energy," according to Juan Hiraldo, who proudly added that together with the credit association and the local solar equipment dealership, "the technicians make our team complete."

Community Participation Critical

This team was organized by Richard Hansen and Enersol Associates, who from the beginning of the project have



Enersol Director Rich Hansen demonstrates PV to youth in Montecristi, D.R. before installation in the community center. Milo Martinez, lead technician at the Industria Electrica Bella Vista, holds module.

Photo courtesy of Enersol Associates

Richard Hansen set out to make photovoltaics as accessible to rural Dominicans as kerosene and batteries.

worked with a philosophy of community participation. "If the people are going to use this technology, the same people have to be developing it. We have to start with community participation right from the word 'go'."

Hansen added that in other areas of the country as well, Enersol can "plant the technology, beginning a process with the community that involves showing demonstrations and teaching technicians as well as educating the people who will actually use the systems.

"Enersol is seeking relationships with institutions that have roots in other communities, that can build projects more or less similar to ours in Puerto Plata."

The promotion of solar energy is consistent with the goal of rural development. Families, small businesses and

other institutions can benefit from high quality electric systems, and the entire community benefits from new activities generated by solar energy systems.

A Case in Point

Gregorio Medrano lives with his family in Bella Vista, which is located four kilometers from the nearest connection to the national electric grid. Until 1986, when he purchased a solar electric system for his home and general store, Medrano depended on kerosene lamps, dry cell batteries and a noisy generator mounted on his roof for light and power.

Medrano bought his system from "Ferreteria Bella Vista" with financing from the Solar Energy Development Association (ADES). Peace Corps volunteers installed the system during a training course given by Enersol Associates.

Medrano paid 45 pesos (\$15 US at that time) monthly against his three year loan, and his system should last at least 20 years. He and his family are now independent of the national electric grid, its bills and its frequent blackouts.

"My family is pleased with solar energy," says Medrano. "I have not had any problems with the system.

"This countryside used to be a little dark," he continues. "We used a small

kerosene lamp to light the house, and the smoke that it gives off can irritate the children."

Medrano now has three electric lightbulbs in his house and he saves the seven pesos that he used to spend monthly for kerosene. His system is also an investment for his business.

"If the store is dark, the business is slow," he explains. "But with a lot of light, everybody gathers and spends money."

Medrano spent less on the monthly payments for his photovoltaic system than he previously had for dry cells for the radio that he plays for his customers as they play dominoes.

He is enthusiastic about the benefits of solar energy. "Solar energy is a very important development for the country," says Medrano. "There are places where we know that the electric grid will not reach. But in La Monteada, Rio Arriba, Las Espinas, Loma Blanca and La Pelota (villages near Bella Vista), where quite a few families have solar electric systems, people live a little more comfortably now."

The entire community benefits from new activities generated by solar energy systems.

Expansion on the Horizon

The SO-BASEC project is at an exciting point in its development. In Puerto Plata, the solar service enterprise and the credit association have matured, and similar projects have begun to germinate in six other regions of the country. Dominicans, moreover, are beginning to use photovoltaics in their clinics, schools, churches and community centers.

Doctors at the clinic in the village of Madre Vieja, Sosua, had routinely worked by kerosene lamps and flashlights. The local health committee decided to solicit funds from the community and the Sosua Town Hall for an electric lighting system. Matching funds were provided by a Connecticut

Rotary Club, and the photovoltaic system was installed. The total cost of this community system was minimal, because a local service enterprise and trained technicians were already in place to supply parts and perform the installation.

Enersol estimates that at least 60,000 rural families in the Dominican Republic would purchase solar electric systems for their homes if three-to-five year financing were made readily available. For these people, to have small daily amounts of energy (less than a 60-watt bulb burns in one to three hours) would

represent a vast improvement over kerosene and batteries.

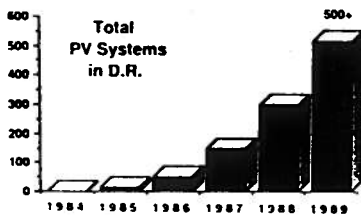
Based on the success of the program in the Dominican Republic, Enersol is preparing to play a more significant role in energy and community development internationally, outside the Dominican Republic and even outside of Latin America. It seems clear that Enersol's style of photovoltaic development is replicable in other countries.

To that end, Enersol is broadening its international scope by collaborating with "Associates" who have developed innovative and successful PV projects of their own in other countries. For example, they have been working closely with Dr. Sajed Kamal of the International Consortium for Energy Development, which recently began an ongoing PV program in Bangladesh. Gary Klein, who established an entrepreneurial PV project in Lesotho, southern Africa, is also now an Associate.

This kind of development will inevitably come to countries like the Dominican Republic. Dominicans are determined to pursue their vision of modernization, which seems to include rural electrification. This being the case, it is gratifying to participate in efforts like Enersol's SO-BASEC project, which allows people greater control of their living environment without leading them into an ecological dilemma. ☉

ENERSOL ASSOCIATES, INC.

- Non-profit Int'l development organization
- 1984 - first PV system, near Puerto Plata
- Assists with start-up of Ferreteria Bella Vista and other small PV businesses in rural D.R.
- 1989 - Over 500 PV systems in D.R.



Growth of the PV program in the Dominican Republic in terms of the number of systems installed.

Photo courtesy of Enersol Associates

Philip Covell, a native of Ithaca, New York, began his association with Enersol in 1986 as a student intern from the School for International Training of Brattleboro, Vermont. He served as Program Coordinator before returning to the United States in April 1988, where he now manages the Enersol U.S. office.

Groups interested in Enersol's work may sponsor a project or slide presentation and discussion led by Philip Covell or another person on Enersol's volunteer staff. Direct inquiries to Enersol Associates at 1 Summer Street, Somerville, Massachusetts 02143, or c/o Covell, 127 Milford Drive East, Syracuse, New York 13206.