

EDU-TOURISM MODEL OF GRUPO FENIX: LESSONS LEARNED

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INTRODUCTION

In the mid-1990s, Grupo Fenix originated out of a group of Nicaraguan students at Managua's National Engineering University (UNI) who wanted to learn about and work with Renewable Energy. After having been institutionalized as a university program, The Program for Alternative Energy Sources (PFAE), the first cohorts of Grupo Fenix played a significant role in the promotion of small-scale renewables across Nicaragua, participating in the government, business and nonprofit sectors. Ten years later, one of the later generation cohorts focused its efforts on collaborating with an indigenous rural community in creating its own model for sustainable development.

Thus, with its base in UNI, Grupo Fenix became a consortium of groups working to promote renewable energy in Nicaragua through the PFAE. As the academic and administrative arm of Grupo Fenix, PFAE began working in Northern Nicaragua in 1999 with a project to create jobs in solar energy for landmine victims. When the project ended PFAE made a commitment to continue working with the indigenous community of Sabana Grande in the municipality of Totogalpa based on its proactive response to the concept of sustainable technologies. What began as learning to make and sell solar devices evolved into teaching others to make them. In a collaborative process characterized by the sense of reciprocity among the stakeholders, PFAE, the persons affected by the land mines and eventually groups of women, developed what we now call "Edutourism" as a way to share their learning with people from the developed world who were hungry for hands on experience with appropriate technology development. In what has

become an instructive case study, Edutourism also became a way for the community to initiate technical exchanges with people from other parts of the world. The community members have become co-creators of sustainable alternatives for cooking and farming, as well as for income generation. While limited resources are still a reality, many community members now look into the future with more confidence and pride. For them the development of their community has become a process of their own making - a process recognized, valued and supported by Grupo Fenix and its international partners.

HISTORY

The area around Totogalpa has long suffered from severe land degradation, resulting in water shortages, low agricultural yields, and food shortages. Climate change is likely to increase such problems. Grupo Fenix began by facilitating efforts to design and implement environmentally-friendly energy systems and cooking methods. Increased involvement led to construction of water and soil retention systems, reforestation projects, and sustainable farming techniques. As a result, some areas have already begun to recover, making the community less prone to floods, landslides, and fires; crop yields have slowly begun to rise; and local farmers have learned the benefits of sustainable farming methods by adapting them to their situation in innovative ways. For several years the community had been aware of climate change and related hazards but did not know how to address them. Many of its members now feel that they are in a position to address these issues in a proactive and resourceful way.

At its inception the work that Grupo Fenix has facilitated in Totogalpa represented an entirely new focus and consisted of many innovative activities within the community that have transformed life there. Prior to the establishment of the Solar Women, women rarely had the opportunity to work outside of their dark, smoky kitchens, and the primary source of work and income for men in the community was working long, difficult hours for poor pay in the mountains harvesting coffee during the dry season in order to be able to purchase seeds to plant crops on their own land during the rainy season.

The people in Totogalpa associated with Grupo Fenix have undertaken an impressive number of initiatives to address vulnerabilities to climate change. These include planting over 22,000 trees--many of them grown from local seeds--on degraded land; constructing over 70 water and soil retention systems; modeling improved basic grain production through organic methods which restore degraded soil; setting up organic compost systems, a nursery for fruit and forest trees, and a collectively managed organic fruit orchard; and producing organic insect repellent.

Building on the initial work that PFAE undertook in the area, community members have also installed solar-powered drip irrigation systems. They have constructed and operated solar distillers to produce demineralized water for PV and vehicle batteries. Additionally, they have assembled over 400 PV panels in Totogalpa, approximately a third of which have been installed locally, which has dramatically increased access to clean, reliable energy for the community.

The Edutourism model Grupo Fenix developed in Totogalpa focuses on technical and cultural exchanges between university professors and students, engineering, agronomical, and veterinary professionals, and female-led rural Nicaraguan groups. These exchanges have resulted in Nicaraguan groups that are over 75% female engaging in a range of economic activities that both directly benefit local communities and embody the best practices of sustainable development. The Solar Women (Las Mujeres Solares), specifically, have focused their efforts on changing traditional cooking practices to be more environmentally friendly and sustainable. Through the collaborative process of the Edutourism model the Solar Women developed a simple, functional solar oven made from locally sourced materials. The Edutourism model emphasizes a family-like creative environment sustained by continual communication. This dynamic led to the Solar Women winning a United Nations sponsored SEED Initiative Prize in 2008, allowing them to become a legally recognized cooperative and win a grant from the United Nations Development Program (UNDP) to build a solar-powered restaurant. The restaurant was constructed largely by the women themselves and is made of the traditional adobe of the region. It makes use of solar cookers and high-efficiency wood-burning stoves and is supplemented by a biogas system

running on human and cow manure. The restaurant has been fully functional and open to the public since 2011.

OVERVIEW OF GRUPO FENIX

As an umbrella organization, Grupo Fenix is built on strong partnerships between Nicaraguan groups including four formal entities and several associations within the Totogalpa communities, as well as strong relationships with external partners, such as international organizations and universities. Together these partnerships implement the knowledge cycle in the communities of Totogalpa via Edutourism and as a result develop appropriate technologies and sustainable practices which can help others seeking solutions for similar situations.

Nicaraguan Partners are:

- **The Program for Alternative Energy Sources (PFAE)** at the National Engineering University is the organizational center for Grupo Fenix and formed the legal base of operation within Nicaragua. PFAE has acted as an incubator for the other Nicaraguan organizations that form Grupo Fenix.
- **Suni Solar, SA** is the legal autonomous Nicaraguan business, formed out of PFAE, which has a branch near Totogalpa developed and run by one of the original land mine victims involved in Grupo Fénix's early work.
- **The Solar Women of Totogalpa** is the cooperative of 19 women and one man who began organizing around solar cookers and have since won national and international prizes including the 2008 SEED Initiative.
- **The Solar AgroEcológicos Promoters** is the agricultural group of community members organized to respond to draught crisis. They work in reforestation, soil and water conservation, organic farming practices and have begun to participate in the Edutourism model.

- Other groups made up of members of communities of Totogalpa which are active as a part of this process are: the staff at the **Solar Center**; the photovoltaic construction workshop “**AceSol**”; a group of local students with community development internships that permit them to attend universities, **Los Pasantes**; a technically oriented young people’s group, **Jovenes Pedaleando Hacia el Futuro** (JPHF, Youth Pedaling Toward the Future); and an agriculturally oriented young people’s group “**Los Sansun**” (name incorporates Spanish Nutritional and Food Security and English “sun”) . Another focal point of activities is in the three room primary school, **San Miguel Arcangel**. The growth of all of these groups has led to using the name “Solar Community” for the conjuncture of groups in Totogalpa.

Some of the main international partners are:

- **Skyheat**, an NGO run by Dr. Richard Komp along with his business Sunwatt Associates started working with Grupo Fenix in 1996. Dr. Komp was the original source of information for constructing PV panels and the inspiration for learning the science of solar energy. Skyheat has been the legal entity to receive several grants for Grupo Fenix charging little or no overhead.
- Since 2004, the **University of Dayton’s Engineers in Technical Humanitarian Opportunities of Service Learning (ETHOS)** program annually brings a group of 12 to 15 students to receive an intensive 10-day introductory, hands-on course in solar energy taught by community members, followed by 10-week internships for 2 to 5 students who become involved in one or more projects working alongside members of the community on sustainable solutions to local problems.
- Since 2006, **Cornell University’s Engineers for a Sustainable World** group has been working to continually improve the solar cooker, culminating each year with a technical exchange with the Solar Women Construction team.
- Since 2006, **Solar Energy International** has been co-teaching their course “Renewable Energy in the Developing World” with members of the community. It also sends

volunteers, usually young adults making career changes into the renewable energy field and wanting to gain hands on experience.

- Since 2007 the **Center for Ecological Living and Learning** annually co designs an experience for from three to five weeks in the Solar Community as a part of their College Semester Abroad Programs in Environmental and Community Sustainability.
- Since 2010 **University of California, Davis** D-Lab and their Medical School's "One Health" Program have been sending students and professors and communicating via email throughout the year as part of the exchange.

THE PRINCIPLES AND PRACTICES OF EDUTOURISM

Edutourism is both scalable and replicable as a diverse array of collaborations with educational institutions and NGOs creates an ever-widening feedback loop. Visitors take lessons learned to their own communities and refine and scale the projects so they are suitable for their local environment. Grupo Fénix's strategy focuses on capacity building and on the co-creation, development, and exchange of knowledge and practices for sustainable development. It pursues this strategy in five ways.

First, it engages with local, national and international partners in joint initiatives in Totogalpa and across the region (workshops on the construction of solar cookers or panels in Haiti, Honduras, Peru, Costa Rica, the Dominican Republic and Colombia).

Second, it facilitates networking and knowledge exchange by co-organizing and participating in fairs (about six per year); attending international conferences; hosting and collaborating with local and international students in courses and thesis and dissertation projects; organizing workshops and seminars in Totogalpa and Managua; and helping develop the Renewable Energy

coalition RENEWABLES. A strong example of the fruitfulness of this networking and knowledge exchange is Cornell University's eight-year relationship with Grupo Fenix, which has focused on improving the solar cookers. Cornell students spend the year experimenting in their laboratory on agreed upon technological challenges and culminate with a week-long technical exchange with the Solar Women in Totogalpa. On the first day of the exchange, both the local and visiting teams present and share ideas and together design an improved solar cooker based on the lessons learned through the year long dialog. Together they spend the rest of the week building this design. This long-term relationship and ethos of reciprocity gives the students hands-on-experience working outside a laboratory setting using only locally available tools and materials. They come to realize that women with no formal, or only basic academic education can understand and discuss high-level engineering ideas. Simultaneously the women are empowered by teaching and working alongside university students to improve their product.

Third, the first cohorts of Grupo Fénix's students now hold leadership roles in the governmental and non-governmental organizations which shape policy making.

Fourth, Grupo Fenix creates and openly shares resources such as manuals for the construction of solar devices. The manual for the construction of the improved solar box cooker and the Solar Cooker recipes book gleaned from the Solar Women is on the ISES Website.

Fifth, through its Edutourism program Grupo Fenix develops innovative learning models that show students and practitioners from all over the world how they can learn from the communities they work with, thereby contributing to a better understanding of co-learning as a fundamental process in sustainable development. We have created an alternative to the more common model of outside expertise being applied to local problems without reciprocal stakeholder participation, a model that can beget more problems than it was intended to solve.

LEARNING FROM EXPERIENCE

Adaptation: A lesson learned in development is that no program can be replicated exactly, but must be adapted to the local reality. The guiding principles of Grupo Fenix are being replicated in numerous situations in a variety of settings across the world as people come from institutions from all over to participate in courses with Grupo Fenix and diffuse the methods and technological knowledge they've learned once they return home or become involved in other parts of the world. For example, Solar Culture Courses have been offered yearly since 1998, and Grupo Fenix co-taught the course "Renewable Energy in the Developing World" with Solar Energy International from 2005 to 2012. A significant number of the students from those courses write back for continued guidance and advice, and some also share their growing experiences creating a positive feedback loop.

Cooperation and Reciprocity: Over time the work that Grupo Fenix does in the community has flourished into a cooperative endeavor with universities throughout the world joining the mix. Grupo Fenix and the community of Totogalpa have built standing relationships with the University of Dayton, Cornell University, Massachusetts Institute of Technology, and the University of California--Davis. These relationships represent a unique structure from which mutually beneficial technical exchanges take place in which the community and the universities share best practices with each other. Technical exchanges have allowed the members of the community to develop the skills, abilities, and confidence to adapt, innovate, and execute ideas, while at the same time allowing the university volunteers to learn things from the community that they can use in various other applications around the world over time.

The Power of Concrete Artifacts from the Exchange: As tangible examples of these technical exchanges, the community of Totogalpa has been able to (among many other things):

- make improvements to a locally built permanent solar cooker to bettering costs, durability, and efficiency and teach a minimum of seven international groups each year how to construct solar box cookers

- conduct research into developing a solar-powered autoclave to sterilize surgical equipment for clinics that don't have access to or the ability to pay for electricity
- build and promote a US\$10 version of an efficient charcoal burning stove,
- improve the process for creating charcoal out of agricultural wastes
- develop a direct solar dryer for fruits
- co-design and build a bicycle-powered blender which is modeled alongside several other clean, sustainable cooking methods in the Solar Restaurant.
- co-design and build a bicycle generator, a bicycle pump and a bicycle transportation cart.
- Construct 7 earthen buildings, three with improved traditional adobe techniques and four with combinations of traditional and mixed earthen techniques.

Facilitating Knowledge Transfer: These technical exchanges and cooperative relationships with universities are a natural and sustainable mode of replicating the guiding principles of Grupo Fenix. The activities being done in the Solar Center originated around the use of solar energy, but the fundamental ideas of cooperation with universities, technical exchanges, and a self-sustaining community can be applied to communities in many locations. All places have their own specific natural resources or skills that can be used as the basis for a unique self-sustaining community that has the ability to teach others. The fact that requests for members of the local community to teach both nationally and internationally have been increasing is evidence that the activities being done in Totogalpa have merit and are sought after in various parts of the world.

Innovation as Business Model: The idea of financially self-sustaining local groups focused on international technology exchanges and the construction, use, and improvement of solar technologies is, in and of itself, an innovative business model. Starting with the women, many of whom had minimal formal education, the other groups have found their sustainable technologies

and developed income generating activities. Although Grupo Fenix has donors for certain projects, such as the building of the Solar Restaurant and the current UNDP project for the construction of 120 improved firewood stoves (US\$20,000.00), over the last 10 years, an average of around 70% of its operating budget has been earned via services offered, primarily in Edutourism. For example, in 2012, 86% of the program budget was earned through Edutourism.

Growing Customers through Quality Experience: Though Grupo Fenix has no advertising budget for its courses and volunteer program, numbers grow annually based on the enthusiasm people feel for the empowerment that they experience when they participate in the Edutourism activities. In 2005, David Oakes, was one of three University professors to attend the August “Solar Culture Course”. Two years later he returned with a group of students in the first semester of the Center for Experiential Living and Learning’s (CELL) Semester Abroad Program. CELL has brought a new group each year, and students have returned on Fullbright type scholarships. A parent of a CELL student, Lynn Schlager, chose to do his sabbatical at the Solar Center working on the Portable Solar Cooker design and two years later brought back a group of his students from University of Wisconsin, Platteville. Another example is from November 2005, when the family of Deborah Bruns, a public school science teacher advocate participated in a adobe building brigade. Her enthusiasm has succeeded in a growing annual involvement with institutions in Davis, California including Peregrine Elementary school, Da Vinci High School, and University of California Davis’ D-Lab and Medical School’s “One Health” Program.

TRANSFORMATION THROUGH BUILDING SOCIAL CAPITAL:

Grupo Fénix’s work is based on the firm belief that enduring change can best be achieved by supporting the development efforts of all local people. Grupo Fenix and its various initiatives evolved due to regular meetings that helped to share ideas and to organize efforts, thereby enhancing social capital. Additionally, collaborative engagement with external partners from other countries, social backgrounds, and worldviews has opened up new development choices. Through participatory decision-making community members have enhanced their organizational skills, empowering them to make their own choices about development and to act upon them.

In addition to the social, cultural, and economic impacts that Grupo Fénix's various initiatives have had on the community of Totogalpa, specific technologies developed and implemented in the community have also had significant effects of their own on life in this rural region. The installation of PV systems in homes in the community has provided a reliable source of electricity for families unable to connect to the conventional energy grid and for times when the conventional grid is unreliable or down. The ability to perform chores easier and faster after dark and to study, read, and write at night is a significant benefit to having a PV system for families. The long life of solar cells amplifies the worth of investing in a PV system. Additionally, the installation of improved wood-burning stoves into homes in the community has produced financial, health, and quality of life benefits. Finally, the solar cookers have provided many of the women with a source of work and income, as well as with a completely clean and sustainable way of preparing food or roasting coffee. In Nicaragua, the sun's energy is both free and abundant, making the solar cookers, which also help to stem deforestation, an attractive alternative to wood-burning stoves for both the women in the community to use in their own homes and for people outside of the community to purchase from the Solar Women.

Not only has the community incorporated these technologies that stemmed from the technical exchanges into their daily lives, but they have also been able to design and improve some of the technologies themselves. They have gained the experience necessary to build and install the technologies in their own homes and in the homes of others outside of the community. The ability to make design changes and to install their products is new to the community and has given them an independence that has contributed to their ability to resist the consumerist society.

One example of this development can be seen in the innovative and internationally acknowledged research accomplished by a number of older people, including two women who are illiterate. This emphasis on exchange and empowerment of women has led to national and international recognition, and the Edutourism model has been replicated both inside and outside

of Nicaragua. The women's team has visited Peru, Colombia, and the Dominican Republic, as well as various locations within Nicaragua to teach solar cooker construction to other locally formed groups.

The women's cooperative, which has built its own adobe workshop for the construction of solar cookers and actively runs a solar restaurant and a home-stay program for visiting interns and course participants, has grown to become a model of a financially self-sustaining business for the community. The Solar Women are now able to provide jobs for others in the community – including men. Inspired by the model of a self-sustaining cooperative exhibited by the Solar Women, an agro-ecological association began in Totogalpa with just a few men, but has since grown into a group of 13 women and four men.

As Grupo Fenix continues to grow and take on more activities in Totogalpa, women (including single mothers) are seeing the need for higher levels of education and take advantage of opportunities to go back to school. International exchanges have also opened up new perspectives on gender roles and life choices for both men and women.

CONCLUSION: EDUTOURISM IS BOTH WIN-WIN AND TRIPLE BOTTOM LINE SUSTAINABLE

These long term cross-cultural partnerships have built relationships based on trust, mutual respect, and commitment to the goals of ecological, economic and social sustainability. This sense of partnership and common cause leads to the development, implementation and acceptance of alternative methods for not only a sustainable life, but one that restores and enriches both the land and the people involved. Additionally, the partnerships and technical exchanges with universities have allowed members of the community to develop the skills, abilities, and confidence to adapt, innovate, and execute ideas, while at the same time allowing

university volunteers to learn things from the community that they can use in various other applications around the world. These technical exchanges and cooperative partnerships are a natural and sustainable mode of replicating the guiding principles of Grupo Fenix.

The work Grupo Fenix has helped to facilitate in Totogalpa via the Edutourism model has provided the community with new relationships around the world and a new focus on the use of solar power, which has paved the way for the development of the many innovative technologies for the community that make use of the local resources. While much has already been accomplished in the community, there is still much to be done and both volunteers and community members are developing innovative ideas and opportunities for new projects almost daily. The community is rich in enthusiasm and knowledge of the local resources, a combination which strongly supports future developments.

Overall, the successes that the Solar Women have experienced have demonstrated sustainable alternatives for cooking, farming, and income generation that have allowed the community to resist the external social pressure to copy the consumerist society and have improved the community's adaptability and resilience to environmental pressures.

As recognition grows for the work associated with Grupo Fenix and the Solar Women that is being done in Totogalpa, more and more requests are being received for members of the local community to teach in both other parts of Nicaragua and other parts of the world. Consequently, a growing number of women and young people desire to learn more in order to have the opportunities to teach others and to travel. While limited resources are still a reality, the community remains enthusiastic as they now have sources of great pride.

TO LEARN MORE

The following videos, photo montage, and blog highlight the work that has been done in Totogalpa via Grupo Fenix and the Solar Women of Totogalpa:

<http://www.povertycure.org/library/product/adelante-con-el-sol-the-solar-women-of-totogalpa-nicaragua/>

<http://vimeo.com/40697553>

<http://www.oprah.com/own-own-shorts/OWN-Original-Shorts-Susan-Kinne-Solar-Pioneer>

<http://www.lowcountrynaturalbuilding.com/2012/05/19/natural-building-in-nicaragua-a-photo-montage/>

http://blog.rmi.org/blog_2014_03_18_solar_empowerment_in_a_rural_nicaraguan_community