

Creating Conditions for Gender Equity in Rural Energy Projects

Experience in Productive Uses of Renewable Energy
in Guatemala



Case Study
Guatemala, 2014



ENERGIA
INTERNATIONAL NETWORK ON
GENDER AND SUSTAINABLE ENERGY



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Preface

The International Network on Gender and Sustainable Energy (ENERGIA) and the International Union for the Conservation of Nature (IUCN) signed a collaboration agreement in 2008, to integrate the complex linkages between energy, gender and the environment. Implementation of the initiative entitled "Women as Leaders and Change Agents in the Energy Sector" began in 2013 in four countries of Central America, coordinated by the IUCN Global Gender Office, with support from ENERGIA. This initiative was made possible thanks to financial support from Hivos, the Humanist Institute for Development Cooperation.

The objectives included producing written and visual materials to capture and express the way in which gender can be mainstreamed within energy projects. This way, the initiative seeks to document and share experiences, lessons learned, best practices, and recommendations, as a way to support and build the capacity of decision-makers, project implementing organizations, grassroots groups, energy and sustainable development experts, and government representatives, increasing the number of energy projects with gender equality.

This study is the first of a series of four case studies that will be conducted in Central America under this initiative. "Creating Conditions for Gender Equity in Rural Energy Projects: Experience in Productive Uses of Renewable Energy in Guatemala" has been undertaken by Fundación Solar (Solar Foundation), a private development organization established in Guatemala in 1993. This case study documents the ways in which an energy project, in this case for climate change mitigation, can integrate gender considerations in its implementation phase, even if these considerations were not made explicit in project design. Additionally, this study demonstrates the way in which including a gender perspective can increase the benefits generated by raising the quality of and access to renewable energy. This can be done by: (i) Supporting effective women's participation in community decision-making fora, (ii) increasing productive activities for women and men through energy interventions, and (iii) enabling women to participate in non-traditional roles.

1. Introduction

The Productive Uses of Renewable Energy (PURE) project in Guatemala promotes the adoption of renewable energy by removing obstacles and reducing implementation costs. PURE encourages the adoption of renewable energy technologies, particularly micro and small scale hydroelectric production, as well as demonstration initiatives with photovoltaic systems, biodigestors, and efficient cook stoves.

The objectives of the PURE project are focused on community development processes. In its implementation phase, the project recognized the participation gap for women, and moved to include a social approach, affirmative actions, participation quotas, and technical training to help create conditions for women's empowerment.

PURE was implemented in rural areas in the Departments of Alta Verapaz, Baja Verapaz, Quiché, Huehuetenango, and San Marcos, in Guatemala. The project was coordinated by Fundación Solar, a private development organization established in Guatemala in 1993.

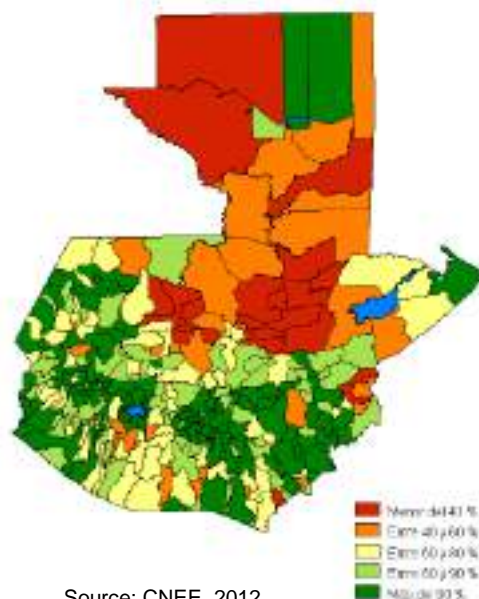
2. Background and Geographic Context

Guatemala is a country in Central America with 14 million inhabitants, 52% of whom are women. The population density is 129 inhabitants/km², making Guatemala the country in Latin America with the second-highest density, after El Salvador (327 inhabitants/km²).

The country's Gross Domestic Product (GDP) is USD 64.32 million, that is: UDS 4,800 dollars per capita. This amount is not an adequate reflection of how the wealth generated each year is distributed; 51% of the population lives below the poverty line, and 15.2% in extreme poverty. Women and indigenous groups in rural and marginalized urban areas account for the majority of the people living in poverty.¹

In Guatemala, electric coverage has hovered around 85% over the last two decades. Little by little, the energy grid has migrated toward generation from renewable sources in an attempt to reduce dependence on fossil fuels. Nonetheless, the reality behind the numbers in a country such as Guatemala continues to reveal a need to improve access and coverage for the most vulnerable populations, those that lie outside the reach of the interconnected system.

Map of Electricity Coverage
2010



Source: CNEE, 2012

¹ República de Guatemala: Informe nacional sobre desarrollo sostenible. 2009.

The situation of marginalization, subordination, and unequal opportunities for women, especially in the rural areas, is a result of historic conditions tilted against women, indigenous people, and people living in poverty, as part of a predominantly patriarchal and exclusive system. On top of this, the internal armed conflict that raged in Guatemala from the 1960s through the mid-1990s left severe repercussions, including ruptures in the country's social fabric, migration, and internally displaced groups.

In this context, the value and volume of women's work continues to be hidden, and poverty is a determining factor in the energy source options for rural households, which are often limited to consuming firewood and biomass. Collecting firewood, cooking and processing food, and carrying water are responsibilities that fall nearly exclusively on women, and which take a large part of their time and bear no economic compensation.

Inhabitants in the areas where the PURE project was implemented, Alta Verapaz, Quiché, Huehuetenango, and San Marcos, are mainly of Mayan origin, including the following ethnic groups: Q'anjob'al, Jakalteko, Chuj, Mam, Ixil, Q'eqchi', Poqomam, K'iche', and Kaqchikel; these groups speak their own Mayan languages first and foremost, followed by Spanish. In most of the communities, the illiteracy rate among women ranges from 60% to 80%, while this rate for men hovers from 40% to 60%. Access to education is clearly limited, especially for girls, who are often restricted by cultural habits to staying at home to take care of younger siblings.

In this difficult reality, Fundación Solar² has worked to promote integral management of natural resources and services, especially renewable energy and water, by providing accompaniment and facilitation for local development processes. As part of this work, from 2000 to 2004, the foundation led several participatory consultation processes to explore the needs of 92 communities from the North-eastern and North-western regions of the country (Departments of Alta Verapaz, Baja Verapaz, Quiché, Huehuetenango, and San Marcos). These consultations revealed an average daily household income of USD 1 per day.³

3. Project Description

Although renewable energy outside the supply grid has the potential to satisfy the energy needs of the rural population (the majority of these needs are for agricultural activities), widespread application of these technologies is blocked by a series of obstacles around technical, social/institutional, and financial aspects, as well as gaps in public policy.

² Fundación Solar: Private development organization established in Guatemala since 1993.

³ Cited in: UNDP, 2006, PRODOC.

These obstacles combine to enforce a situation of "business as usual", in which rural communities lack the financial capacity to gain access to energy and other basic services, while the lack of energy and infrastructure severely limits opportunities to conduct new production and income-generating activities.

In this context, the project "Productive Uses of Renewable Energy in Guatemala" (PURE) was designed based on two relevant prior experiences led by Fundación Solar: a study entitled "Gap Analysis in Communities in Extreme Poverty in Guatemala", produced for Global Villages Energy Partnership (GVEP), and a UNDP-GEF Medium-Size Project entitled "Development of Small Businesses based on Renewable Energy in El Quiché", with the intention of generating pilot actions that could be replicated on a larger scale.

PURE is a Full Size project⁴ that comes within the Global Environment Facility (GEF) focus area on climate change, in particular on Operational Program 6, which promotes the adoption of renewable energy through removing obstacles and reducing implementation costs.

In Guatemala, 45.5% of electricity is generated through hydropower, followed by bunker fuels at 23.6%, coal at 12.5%, biomass at 10.8%, and geothermal energy at 3.1%. 4.4% of the energy is imported*.

* National Electric Energy Commission (CNEE), 2012. "Electricity Production for the Year 2010".

(GG) emissions and integrated watershed catchment area management. The project was implemented from August, 2007 to March, 2013.

Sustainable energy is a fundamental medium for use in community development processes. Alongside this process, the PURE process hopes to contribute to an indirect reduction of 5.25 million tons of CO2 equivalent for a period of more than 20 years, by substituting current and projected fossil fuels for renewable energies.

One of the central objectives of PURE was to promote sustainable energy as a fundamental means for community development, through integral management of renewable energy sources and their productive uses. In this sense, PURE focused on the introduction of Renewable Energy Technologies (RET) for production processes, to help improve the living conditions for the population in the rural areas of Alta Verapaz, Baja Verapaz, Quiché, Huehuetenango, and San Marcos.

In environmental terms, the PURE project sought to contribute to climate change mitigation and adaptation, through reduction of greenhouse gas

⁴ Projects with funding over 2.5 million dollars, implemented over four or more years. Guide to the Global Environment Facility for NGOs.

In all, the project budget implemented was nearly USD 22 million, distributed as follows:

FUNDER	AMOUNT IN USD
Global Environment Facility -GEF-	\$2,500,000.00
Government of Guatemala	\$2,266,924.00
Government of Japan, through JICA	\$15,175,000.00
Other Donor Agencies	\$1,921,785.00
Solar Foundation (in kind)	\$175,000.00

PURE Project Targets/Outcomes

- Develop and promote 1.5 MW from technology outside the supply grid for productive energy uses.
- Develop 13.5 MW and promote renewable energy technologies from the private sector connected to the national energy supply grid (small-scale hydropower).
- Sustainably manage natural and energy resources in watershed catchment areas.
- Establish conditions to replicate the project, including proposals.

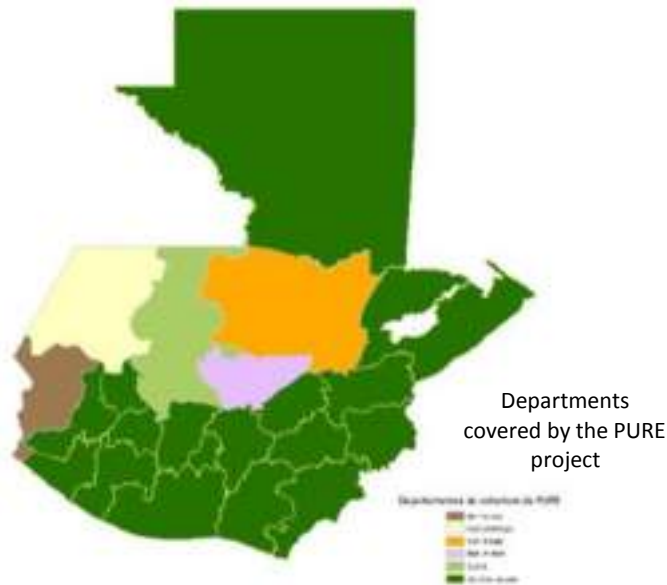
PNUD, 2006 PRODOC

4. Project Implementation

The PURE project included eight stages⁵: (i) Identification and selection of communities participating in the project; (ii) Awareness-raising among stakeholders and preparing social conditions; (iii) Determination of the technical viability of the project and formalizing cooperation relationships; (iv) Knowledge of the social and institutional surroundings (stakeholder mapping, technical survey, socio-economic census); (v) Training and education; (vi) Technical studies; (vii) Management of RET projects; Implementation of RET.

⁵ Fundación Solar-UNDP-GEF. 2013b

PURE Project Geographic Coverage



Source: Solar Foundation

While the project did not establish specific gender objectives, it did recognize the participation gap for women, and moved to include a social approach, affirmative actions, participation quotas, and technical training to help create conditions for women's empowerment, promoting the adoption of RET, particularly micro and small-scale hydropower, as well as demonstration initiatives with photovoltaic systems, biodigestors, and efficient stoves. During the implementation phase, the project undertook a series of activities to ensure the effective participation of women in decision-making processes as well as access to the benefits generated by the project:

- Inclusion of a gender lens and cultural diversity as an element in the criteria for identification and selection of the communities participating in the project.
- Identification of training needs for men and women in terms of the productive use of renewable energy and good watershed management, emphasizing a cross-cutting social approach in all project phases. The methodology included diverse dynamics such as tours for inter-community or inter-municipality experience exchanges, or learn-by-doing workshops.
- In the specific case of hydroelectric projects implemented with support from Japan, the project worked with women from the 23 selected communities, sharing the *Seikatsu Kaizen* life improvement philosophy. This philosophy allowed women to discover their own capacity to create, develop, and maintain work opportunities over time using local resources and promoting small collective entrepreneurial initiatives. This experience demonstrated that having electric energy access had generated opportunities to start other production activities to benefit their families.
- Establishment of steps to ensure women's participation in decision-making fora.

As was mentioned, PURE also conducted pilot projects with other renewable energy technologies, including solar panels. These pilots were used as an entrepreneurial capacity-building tool and to

manage small businesses such as community movie theatres and mobile phone charging stations. Some women did participate in these activities, learning how to use and maintain photovoltaic systems, and the basics of administration and accounting; these skills are useful for the future management of energy generation plants in their communities. One of these women applied and was offered a position as an accountant at the Energy Administration office for the Micro Hydropower Plant built in Chahal, Alta Verapaz.

In San Marcos, an irrigation system using solar energy was installed as a pilot project for an association of women tomato farmers. All of the members of the organization received training for the use and maintenance of this equipment, which is also able to inject the energy produced by the panel back into the national grid when the electricity is not in use for the irrigation pump.

Eight biodigestors were installed in strategic areas to allow the users to show the technology to others interested in obtaining more information and sharing in the experience. The installed systems facilitate and provide value added for the production processes in certain existing entrepreneurial initiatives. They also have facilitated work and comfort in people's homes.

Women have shown significant acceptance of this technology, and in the majority of cases they are responsible for feeding the biodigestors; these women tend to feel that the benefit of eliminating the wood smoke from their kitchens by cooking with biogas outweighs the work it takes to maintain the biodigestor.

A total of 430 firewood-saving cook stoves were distributed in the intervention area. Prior to installing this equipment, an awareness-raising and capacity-building process was conducted in the communities interested in this technology, allowing the inhabitants to understand and take ownership of the importance of using energy efficient equipment, to the extent that they were willing to cover the cost of the stoves (at market prices). A high percentage of women continue to use the stoves, as the elimination of smoke in their kitchens and reduction in the consumption of firewood has been an incentive for them. "Now I can use perfume, because I no longer smell like wood smoke", announced one of the users in Alta Verapaz.



Members of the association of women tomato farmers receive training on the use of irrigation systems with photovoltaic energy.



The PURE project conducted 30 technical studies for hydroelectric power, 14 of which reached the pre-investment stage, and four were built with support of other institutions.

Each community in which opportunities were identified to implement a RET hydroelectric project had different gender entry points in terms of the forms of community organizing and institutional participation. Nonetheless, certain actions were similar across the board and are described below:

- a) *Community organizing:* The communities from each region defined the organizing structure that would allow them to be legally established and represented, and thus take control of the administration, operation, and maintenance of Micro-Hydroelectric Plants (MHP). These community associations were composed as follows:
 - o General Assembly: All of the members of the association
 - o Board of Directors: Seven representatives from the communities elected by the General Assembly
 - o Energy Administration Unit: An administrative and technical operations coordinator, an accountant, a line worker, a meter reader, and two machine operators
 - o Micro-Watershed Committee: Made up of representatives from different community groups

One requirement that was set in establishing these community structures was that both spouses —heads of household—should be registered as members of the community association in order to promote gender equity and create the conditions to involve women in the project. Women's participation was promoted in positions on the Board of Directors, and some women accepted posts as the board secretaries and at-large members.

According to the perception of the consultants from Fundación Solar⁶ that worked in the social component and monitoring activities for the PURE project, reactions from men have been favourable, though gradual, as information has spread regarding affirmative actions for women's inclusion.

- b) *Institutional organizing:* Preparatory activities included legal registration of the community associations, a base line of business capacities, a socio-economic census of the member families in the community association, and establishment and registration of the micro-watershed committees in each region. Capacity-building processes were led on the roles and responsibilities of the positions on the board of directors, interpersonal relationships, communication, and leadership.



Learning to load the biogas digester with grandpa



Efficient wood-burning cookstoves

⁶ Pérez, M. J.; Altamirano, H; Estrada, M.; mayo 2013; reference in sources

5. Main Challenges Encountered

One of the challenges that the project faced was the search for funds to cover the lack of matching funds from the government sector; these contributions represented 66.37% of the projected budget. This situation was partially resolved with support from the Government of Japan to the Guatemala Government, for the construction of the MHPs in Alta Verapaz.

The administration of the Government of Guatemala changed three times over the course of the PURE project, and the priorities and interests for public expenditure changed as a result, thus complicating project implementation. Political instability in general, unsatisfied social demands in the regions involved in the project, divided leadership, social fragmentation, and a weak business climate around energy initiatives in the country all posed obstacles to attracting investors and/or loans for the construction of RETs in the different project regions.

The project also encountered challenges in achieving gender equity through its activities. The analysis performed in prior studies conducted by Fundación Solar identified that the main obstacles for rural women include⁷:

- Women's work is under-valued in all areas
- Limited access to participation outside the home
- Few options for capacity-building on business activities
- Lack of information and design of indicators on gender and energy

Men and women discuss...

Disqualification on the basis of gender affects women, even within local development associations. Their male colleagues don't make them feel part of the process, leading to negative consequences for women's self-esteem and truncating their participation as true representatives. Paulina Ruiz, Vice-President of ASDICHI, shares:

“I sit on the Board of Directors but they don't invite me to the meetings, some don't respect me, they throw bad words my way, and because of that sometimes I don't want to come. Some women tell me that I go and meet with the men because they must be my lovers. Doña Martina participates in the meetings and they say the same thing about her too (...) No organizations here work on women's rights, women only work at home but we want to work to earn money (...) Sometimes we go out to the fields to work for ourselves.”

Focus group with women from Chimachó, July, 2011.

The few women who participate in the leadership structures in the associations or within any of the committees are criticized in the community by both men and women.

“So far it has been tough for women to participate in community activities, because their husbands don't give them permission.”

Domingo Camajá Rosales, Interview on September 26, 2011

⁷ Fundación Solar, 2001.

6. Impacts and outcomes⁸

The PURE project was able to achieve a series of economic, social, and cultural impacts described below:

Economic impacts

The economic dynamics generated in the micro-regions with the introduction of energy, produced better income for families and households in the medium term. Through a gender lens, further monitoring and management is needed for initiatives or projects to support capacity-building for women's business ventures, and to strengthen knowledge and skills to seek other sources of employment related to renewable energy.

Social impacts

The synergy built with local authorities and community leaders to undertake this project is an important step forward in the development of the population. Additionally, the long management process conducted by the communities (over seven years in the case of the Alta Verapaz MHP) has helped build advocacy, communications skills, and perseverance in the communities. These capacities have been useful in undertaking other types of efforts, such as housing and potable water projects.

Cultural impacts

Cultural, educational, and religious activities have increased, especially at night. Previously, these activities were limited due to cost (difficulty in obtaining gas generators or buying fuel). Some life habits are changing, for example, bedtimes have been pushed back. With available electric lights and recreation or information such as television, people have made use of night-time hours for recreational activities, academics, or work. One of the women in the community shared: "Now not even my chickens go to sleep because there is light at my house, they keep eating as I do laundry into the night."

Comments on the virtues and risks of technology have also emerged. One of the schoolteachers remarked: "Now my children are better informed, because they watch programs that help them learn". Mr. Noel Contreras, the President of ASOCALCO, expressed: "I'm concerned that some parents don't supervise what their children watch on television, or the time that they spend watching" (Fundación Solar-UNDP-GEF). 2013c).

Impacts for gender equity

Seen through a gender lens, the project has enabled initial steps toward removing barriers by promoting spaces for expression and strengthening women's self-esteem. Participating in capacity-building workshops with novel approaches such as Kaizen, or gaining skills generally reserved for men, such as learning to install and maintain equipment, has allowed women to consider how they can develop personally in the future, and to believe in their capacity to contribute in the community and bring about better living conditions.

⁸ Based on information from Fundación Solar-UNDP-GEF. 2013c.

In the MHPs implemented with JICA support for the Government of Guatemala, 53 groups were formed of 25 women each, among the three regions (23 communities in all). These women participated in a two-year training process that generated group production ventures such as raising pigs, operating a bakery, raising chickens, or other entrepreneurial initiatives in which women have built new capacities and skills. (Fundación Solar-UNDP-GEF. 2013c).

Women's participation, although still in its initial stages, in the project (as members of boards of directors, staff at the Energy Administration Units, or leaders of their own production initiatives) has demonstrated that women are capable of making important contributions for the development of their communities. At the same time, they have motivated others to join in this kind of activity.

The participation of women community leaders in management and implementation actions was a key factor in the awareness-raising and readiness processes for community hydroelectric initiatives. This does not mean that sexism and the limitations that women have faced over decades have simply vanished, but it is a gateway to build more equitable conditions in the relations between men and women.

Monitoring actions within the PURE project

Five new project initiatives were drafted and presented to the Green Business Fund for Women (under development), supported by the UN Women office in Guatemala.

1. Green financing: An alternative for the productive use of renewable energies in poor communities.
2. Establishing community nurseries of high-value forest timber species to empower women by including them in the local economy and in forest conservation in the watershed of the Piyac River in Jolomijix, Panzós, Guatemala.
3. Generation of renewable energy using biomass from community coffee processing plants in Guatemala.
4. Dialogue and Communications Platform around hydroelectric projects, between the indigenous population and public and private stakeholders in the Guatemalan highlands.
5. Building Synergy with Equity: Institutional strengthening of GENES, the Meso-American Gender Network on Sustainable Energy, Green Business Program, UN Women.

Fundación Solar, 2012.



Kaizen Activities



WOMEN BENEFICIARIES IN THE PURE PROJECT RET AND ASSOCIATED INITIATIVES*

ACTIVITY	PARTICIPATION		
	Total systems	% Women	% Men
Renewable energy technologies			
Biodigestors	8 ^a	50 (28)	50 (28)
Efficient wood-burning cook stoves	430 ^b	100	0
Photovoltaic systems for irrigation	2	100 ^c (24)	100 ^d (8)
Micro-Hydro Power (MHP)	4 MHP	49 (2482)	51 (2537)
- Positions at the Energy Administration Unit (average percentage)	7 positions	14	86
- 53 Groups of women at MHPs established with support from JICA (25 women per group)	53 groups	100 (1,325 ^e)	0
- Population with access to electricity generated by the MHPs with a pre-feasibility study or built over the course of the project.	10 projects	51 (66,906)	49 (64,328)
Watershed management			
Soil and water conservation, timber/fruit nurseries, and organic fertilizers	7 committees	42 (63)	58 (86)

a. Data for Alta Verapaz, Baja Verapaz, and San Marcos
b. Data for Alta Verapaz, Baja Verapaz, San Marcos, and Izabal
c. Esquipulas Palo Gordo, San Marcos
d. Purulhá, Baja Verapaz
e. Micro-regions: Las Conchas, Jolomijix, Seasir, all in Alta Verapaz

Source: Internally produced, with data from Fundación Solar-UNDP-GEF, 2013c; personal interviews with Ms. Marta Estrada and Ms. Heidy Altamirano; DIGI-Fundación Solar, 2012, based on PURE-SESAN census from October, 2010 to January, 2011; INE, 2002.

6.1. Energy services and benefits for women

- The use of efficient firewood stoves and/or biogas cook stoves instead of open stoves or open flames has helped to improve working conditions for women, reducing exposure to fire and the risk of severe burns for them and their young children. Ventilating smoke out of their homes has helped to reduce respiratory and vision problems in the medium term, and cut medical expenses.
- The households involved in this project reported consumption of approximately 1.2 m³ of firewood per month when using open cook fires. After one month of using the new methods, women reported that their consumption had dropped to 0.4 m³ of firewood per month, a savings of nearly 66%. This savings has had a positive impact on household economies, freeing the resources invested in firewood for use in other family needs, including the time that women and their children spent collecting the wood fuel for their homes.
- The biogas plants installed are capable of generating 4.5 m³/day, while the higher capacity plants can produce up to 20 m³/day. The biogas plants together produce a daily total of 50.5 m³/day, equal to 24 pounds of LPG. Some of the systems installed are also being used to provide gas for the stoves of the homeowners, substituting firewood consumption for food preparation and avoiding smoke exposure and inhalation.
- The photovoltaic pump system in tomato greenhouses has substituted the consumption of electricity from the national grid, allowing the owners to bring down production costs and improve the profit margin.
- In terms of the development of productive energy uses, three market studies were performed (for coffee, cardamom, and tourism), and two business plans were developed (certified timber and tourism). Business trainings were given for users' associations to facilitate opportunities in the future for value added in their projects, and a corresponding increase in quality of life for their families.
- Business production or "business incubator" projects were implemented, including community cinemas or mobile phone charging stations. For the latter, there is a high level of community development and the operations of the community association are well-established. In one of the experiences, three of the members were women who, along with their male partners, applied for the administrative positions that opened with the formation of the Energy Administration Unit. One of the women was selected to serve as the accountant. The production potential in the project area includes different activities such as ecotourism, cardamom, timber products, coffee, tomatoes and other vegetables, tilapia, commercial services, auto mechanics, restaurants, butchers, stores, TV/cinema, etc.

PRODUCTIVE USES IDENTIFIED FOR RENEWABLE ENERGY AND PROJECTED BENEFITS FOR WOMEN

Business/activity	Energy services	Baseline for energy use	Main RET approach in PURE	Projected benefits for women
<p>Agriculture, horticulture, and livestock</p> <p>Value-added productive energy uses Coffee, cardamom, certified timber, dairy</p> <p>Indirect productive energy uses Corn, dairy products, surplus of traditional and non-traditional crops (tomatoes, pineapple, vanilla, honey)</p> <p>Small businesses and services</p> <p>Ecotourism (ecological hotels)</p> <p>Indirect productive energy uses <i>Products (baskets, ceramics, wooden crafts, weaving, embroidery)</i> <i>Workshops (ironworks and carpentry)</i></p> <p>Social uses for energy <i>Services (restaurants and stores)</i> <i>Non-productive uses (homes)</i> <i>Public services (education, community centres, health clinics, communications)</i></p>	<p>Milling and processing</p> <p>Irrigation and water supply</p> <p>Lumber milling and packaging</p> <p>Drying</p> <p>Lighting</p> <p>Lighting</p> <p>Equipment and tools for workshops (saw, drill)</p> <p>Cooking and heating</p> <p>Refrigeration</p> <p>Potable water</p>	<p>Diesel engines (fuel, electricity)</p> <p>Diesel pump</p> <p>Saw (diesel engine)</p> <p>Heat from timber</p> <p>Dry batteries</p> <p>Electricity</p> <p>Electricity (diesel/grid-based generator, batteries)</p> <p>Power/supply manual; Candles</p> <p>Firewood, LPG</p> <p>- -</p> <p>Manual pump</p>	<p>Electricity - micro and mini hydroelectric plants</p> <p>Electricity - micro and mini hydroelectric plants</p> <p>Electricity - micro and mini hydroelectric plants</p> <p>Solar thermal energy - solar dryers</p> <p>Electricity - micro and mini hydroelectric plants, solar photovoltaic</p> <p>Electricity - micro and mini hydroelectric plants, solar photovoltaic (with high-efficiency light bulbs and energy-saving devices)</p> <p>Biomass waste</p> <p>Efficiency improvements</p> <p>Biodigestors</p> <p>Electricity - micro and mini hydroelectric plants</p> <p>Solar photovoltaic</p> <p>Manual pump or electricity</p> <p>Micro and mini hydroelectric plants</p> <p>Solar photovoltaic</p> <p>Rainwater collection</p>	<ul style="list-style-type: none"> • Reduction in time and physical demands for domestic activities • Freedom from tiring activities • Reduction of health risks • Familiarity with alternative energy sources • New learning for additional income-generating entrepreneurial initiatives • Opportunities to eliminate cultural barriers to participation in community spaces • Time savings that can be dedicated to training activities or additional income-generating activities • Improved hygiene conditions • Reduction in disease and risk of accidents • Reduction in risks to physical safety

Source: Internally produced, with data from UNDP, 2006, PRODOC.

7. Non-Traditional Economic Activities

The PURE project provided opportunities for rural women to participate in non-traditional economic activities. Through new contributions from JICA funding to the Government of Guatemala to build three MHPs in Alta Verapaz, a basic course was organized and funded for electricians. This course was provided for 45 individuals chosen from the associations (15 from each). It is important to note that a young woman participated in this activity. Traditionally and culturally, these trades have been the domain of men; nonetheless this young woman was interested in the electricians' course and was able to complete the course satisfactorily.

In addition to the "learn-by-doing" experience in the small business for mobile phone charging, women participated in *Kaizen*, or life improvement activities, and developed new skills and knowledge for entrepreneurship, including the foundation to design and plan new projects using energy.

8. Participation in decision-making

Although the PURE project did not include a gender lens in its design, the experiences mentioned here have opened windows of opportunity for women's participation in activities that are not traditionally assigned for their gender roles. These experiences are contributing to overcome barriers to gender equity in rural energy projects by creating favourable conditions such as capacity-building for entrepreneurship, greater access to participation and decision-making outside the home, and valuing work performed by women.

Some numbers:

- Nearly 40% of the women in the project were involved in community organizations (community associations, religious groups, COCODEs (Community Development Councils), school committees, etc.)
- In five Boards of Directors and PURE Watershed Committees women hold the posts of:
 - 1 President
 - 1 Vice-President
 - 2 Secretaries
 - 14 At-large members
- Five women are members of CORETARN (Commission for Economic Promotion, Tourism, Environment, Natural Resources, and Renewable Energy) within the COMUDE (Municipal Development Council) in San Marcos, actively participating and advocating in the creation of:
 - Municipal water policy
 - Municipal management plan for comprehensive solid waste management
 - Proposed community forest nursery plans, including construction of tool storage areas with eco-brick walls.

In this sense, follow-up actions to the PURE project should consider a broader study to understand the dimensions of the context, and the social, cultural, and economic impacts from a gender lens. This exploration may highlight the importance of women's participation as change agents and effective administrators of resources, particularly in alternative energy systems.

Perceptions of women's participation

“Increased women's participation in organizing activities also represents progress, as women share views and ideas that are not always considered by men.”

“We have grown in our ideas and knowledge on things we didn't know about before. We know now (...) We have had so many meetings and discussed so many things, we don't want to stay in the dark, now, we want to succeed.”

¹ Canchel focus group, July 27, 2011; cited in: DIGI-Fundación Solar, 2012.

9. Relevance of the experience and lessons learned

9.1. Relevance of the PURE project

This project has made significant contributions to:

- Promoting the use of simple, efficient, and technically, environmentally, and economically-sustainable technologies (efficient cook stoves and biogas) to reduce GG emissions
- Positioning RETs in the discussions on rural energy in Guatemala
- Developing the PURE methodology to include it in proposed energy policy
- Creating conditions to empower women from rural sectors and facilitate their participation in different stages
- Providing incentives for women participants to build skills and knowledge for their own personal and family benefit, expanding their options for income generation
- Opening spaces for women in the social dynamics of the communities in order to increase their participation and advocacy in decision-making
- Empowering communities through their organizing structures and training on the management of production projects, conservation of natural resources, and use of RETs
- Producing materials to identify, evaluate, and monitor projects for productive use of RETs

- Developing and implementing climate change adaptation mechanisms such as watershed conservation

This project has:

- Promoted and implemented MHPs not connected to the grid
- Promoted MHPs connected to the grid
- Promoted the use of different RETs in rural communities

9.2. Lessons learned

Climate change is a reality; energy consumption patterns depending on fossil fuels such as oil, coal, and gas have caused greater greenhouse gas emissions that directly contribute to increasing the impacts of climate change. The causes and effects of climate change are closely linked to development models and the usage of natural goods and services, particularly water and energy.

Given that the impacts of climate change are different for women and men, by virtue of their different conditions of vulnerability, the implications of addressing gender – energy relations in this context are translated into: effectiveness for development, growth, social justice, and promotion of equality and equity. This is feasible if the project design incorporates tools in the training and education stage that link gender and energy in a culturally appropriate way and in accordance with the age groups in the participating community. These tools must also consider the adverse impacts of climate change, and the needed adaptation and mitigation actions.

The economic dynamics generated in the PURE project areas suggest that with the introduction of energy, men and women may obtain greater income in the medium term. These improvements may be linked to value added for important crops in the area such as coffee and cardamom, as well as other sources of employment directly linked to energy and the new knowledge and skills developed through the project.

No documentation was found on increased income or equitable distribution of income between men and women; nonetheless there is a certain level of ownership of the RETs by the project beneficiaries in watershed conservation and microenterprise projects. The project users have also experienced the virtues of RETs first-hand, and these initial experiences serve as demonstration cases for these technologies with a multiplier effect.

In this sense, follow-up actions to the PURE project should consider a broader study to understand the dimensions of the context, and the social, cultural, and economic impacts from a gender perspective. This exploration may highlight the importance of women's participation as change agents and effective administrators of resources, particularly in alternative energy systems.

The initial design of the PURE project did not incorporate gender objectives. Nonetheless, important efforts have been made to create the conditions to allow local associations and organizations to see the potential of RETs for income generation, improving health conditions for women and children, improving community and household economies, and building capacity for small-scale business ventures, as well as their linkage to climate change mitigation and adaptation actions.

The decision and willingness of each social stakeholder to contribute from their particular scope of action allows organizations such as Fundación Solar to unify efforts and bring together initiatives to generate management models with rural communities that share the dream of having energy. In this sense, in this scope of action it is important to continue to accompany the multi-sector dialogue strategy to support the MHPs and the Network of Small Renewable Energy Projects (REDPPER). It is also important to maintain a focal point organization in Guatemala for the Latin American Platform for Energy Sustainability and Equity (PLESE), and the Latin American Sustainability Watch network (Suswatch).

In this context, tools with a gender lens must be designed or enhanced in collaboration with grassroots organizations, including specific awareness-raising processes for men and women. Collaboration is also needed among government institutions responsible for statistics, academia, and research groups, to ensure that the territorial approach is comprehensive and respectful of local dynamics. These lessons promote greater participation and investment in women's empowerment and promotion of gender equity as a key factor in building new paradigms that underpin inclusive, equitable, and fair societies.

Community identification and selection: Viability of the gender perspective and diversity. During the implementation of the PURE project, this criterion examined only the quantitative aspects of participation and affirmative actions for women in very general terms. Specific gender indicators should be defined for the different stages of future projects, including at least one interview tool.

Knowledge of the social and institutional environment (stakeholder mapping, technical study, socioeconomic study): Following this stage, in addition to the stakeholder map and socioeconomic census, indicators should be designed with a gender lens, to establish the baseline in the community.

Training and education: This stage should incorporate tools to link gender and energy in a culturally appropriate way and in accordance with the age groups in the participating community. These tools must also consider the adverse impacts of climate change, and the needed adaptation and mitigation actions.

Technical studies: The diagnostic study and micro-watershed management plan should incorporate gender tools in their methodology to determine the practical and strategic interests of men and women, as well as their expectations for change in domestic, productive, and community spheres.

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10.2. Interviews

Josefina Ax Can. Accountant, 27 years old. Asociación Sepemech Las Conchas, Alta Verapaz. Tel. (502) 4611 7040

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11. Acronyms and abbreviations

CNEE	National Electric Energy Commission (Comisión Nacional de Energía Eléctrica)
COCODE	Community Development Council (Consejo Comunitario de Desarrollo)
COFETARN	Commission for Economic Promotion, Tourism, Environment, and Natural Resources (Comisión de Fomento Económico, Turismo, Ambiente, Recursos Naturales)
COMUDE	Municipal Development Council (Consejo Municipal de Desarrollo)
GEF	Global Environment Facility
GG	Greenhouse Gases
LPG	Liquefied Propane Gas
GVEP	Global Villages Energy Partnership
JICA	Japanese International Cooperation Agency
MARN	Ministry of the Environment and Natural Resources (Ministerio de Ambiente y Recursos Naturales)
MHP	Micro-Hydroelectric Plants
MEM	Ministry of Energy and Mines (Ministerio de Energía y Minas)
UNDP	United Nations Development Program
PURE	Productive Uses of Renewable Energy
PV	Photovoltaic
REDPPER	Network of Small Renewable Energy Projects (Red de Pequeños Proyectos de Energía Renovable)
SEPTEM	Presidential Secretariat for Women (Secretaría Presidencial de la Mujer)
RET	Renewable energy technologies
UAE	Energy Administration Units (Unidades Administrativas de Energía)
PUE	Productive Uses for Energy

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