



United Nations Development Programme
GLOBAL ENVIRONMENT FACILITY



Date: June 7, 1999

To: Mr. Kenneth King
Assistant CEO

Attention: Program Coordination

From: Rafael Asenjo
GEF Executive Coordinator

Subject: **Submission of Project Brief: "Renewable Energy Based Small Enterprise Development in the Quiche Region of Guatemala"**

Enclosed is a project brief for "**Renewable Energy Based Small Enterprise Development in the Quiche Region of Guatemala**" submitted to UNDP by The National Commission of the Environment, CONAMA, Guatemala. Please note that the project has been endorsed by the GEF national operational focal point in Guatemala.

In accordance with the operational guidance for the preparation and approval of medium-sized projects, we are submitting this to the GEF Secretariat for action by the Chief Executive Office (CEO). We understand that the Secretariat will recommend to the CEO that the project be submitted to the Council for approval, that it be returned for revision or that it not be developed further.

We are simultaneously circulating copies to UNEP/GEF, World Bank/GEF, STAP and the UNFCCC Secretariat for comments to the GEF Secretariat. We expect to receive these comments within 15 working days. Therefore, we look forward to receiving the CEO's decision on or before July 13, 1999. But understand that the project will not be formally approved, even if the CEO has endorsed it, until the Council has reviewed it within the following 15-day period, namely by August 3, 1999.

Thank you and best regards.

cc: Ahmed Djoghlaif, UNEP
Lars Vidaeus, World Bank
Madhav Gadgil, STAP
Rohit Khanna, UNEP/GEF
Mark Griffith, UNEP/STAP
Lita Paparoni, Regional GEF Coordinator
Michael Zammit Cutajar UNFCCC Secretariat

**UNITED NATIONS DEVELOPMENT PROGRAMME
GLOBAL ENVIRONMENTAL FACILITY
MEDIUM-SIZED PROJECT BRIEF
GUATEMALA**

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PROJECT SUMMARY

PROJECT IDENTIFIERS	
1. Project Name: <i>Renewable Energy Based Small Enterprise Development in the Quiché Region of Guatemala.</i>	2. GEF Implementing Agency: <i>United Nations Development Programme (UNDP)</i>
3. Country or countries in which the Project is being implemented: <i>Guatemala, Department of El Quiché.</i>	4. Country eligibility: <i>Guatemala ratified the UNFCCC on the 15th of Dec. of 1995.</i>
5. GEF focal area (s): <i>Climate change</i>	6. Operational program/Short term measure: <i>OP6 - Promoting the adoption of renewable energy by removing barriers and reducing implementation costs.</i>
<p>7. Project linkage to national priorities, action plans, and programmes:</p> <p><i>In compliance with the recently signed (1996) peace accords and in preparation of the first communication of the UNFCCC convention, energy-related NGO's and the Government of Guatemala are seeking strategies to increase rural electrification of marginal communities and reduce CO₂ emissions through the adoption of renewable energies in former areas of conflict (ZONAPAZ). The Government of Guatemala has prepared a national programme for rural electrification, including the development of a rural electrification fund. This project will benefit the implementation of the national rural electrification programme through the design and field-testing of sustainable financial mechanisms for renewable energy. The project aims at assisting in removing financial, institutional and project development barriers that hamper the adoption of renewable energy in rural areas, and will promote local empowerment and self-sufficiency through the formation of small energy service enterprises. This project will also benefit the local and global environments through avoidance of CO₂ emissions and the use of renewable energy sources</i></p>	
<p>8. GEF national operational focal point and date of country endorsement:</p> <p><i>National Commission for Environment (CONAMA) – 7a Avenida 7-00 Zone 13, Guatemala; 20, May '99.</i></p> <p><i>Contact Person: Dr. Adrian Juárez, Coordinator.</i></p>	
PROJECT OBJECTIVES AND ACTIVITIES	
<p>9. Project objectives:</p> <ul style="list-style-type: none"> (1) <i>Promote innovative financing and social organisation schemes for renewable energy based enterprises.</i> (2) <i>Strengthen knowledge about renewable energy through local and institutional training and technical assistance for renewable energy business development.</i> (3) <i>Assist in the formation of local Pre-investment Assessment capacity through support for technical, organisational and financial evaluations required by local developers as well as financial institutions.</i> (4) <i>Displace CO₂ emissions generated by current traditional energy uses like candles, kerosene lamps, biomass fuel uses.</i> 	<p>Indicators:</p> <ul style="list-style-type: none"> (1) <i>Investment in renewable energy technologies takes place.</i> (2) <i>Local stakeholders are active in renewable energy activities.</i> (3) <i>More pre investment activities in renewable energy are carried out.</i> (4) <i>Less candles, kerosene and fuel wood are being used both by households.</i> (5) <i>Renewable energy fuels productive activities in the area.</i>

<p>10. Project Outcomes:</p> <ol style="list-style-type: none"> (1) <i>At least 2 financial entities buy-in and financing mechanisms are established in support of renewable energy.</i> (2) <i>US\$ 300,000 over 24 months is committed to renewable energy projects in support for RE equipment.</i> (3) <i>At least 4 Renewable energy service enterprises established and significantly strengthened.</i> (4) <i>At least 6 new renewable energy driven micro-enterprise activities operational within 24 months.</i> (5) <i>Feasibility and financial packages developed for 8 renewable energy projects.</i> (6) <i>At least 4 systems fully operational within 24 months and all requirements fulfilled for making the other 4 operational directly after the project period has ended.</i> (7) <i>System design and project management documents have been prepared.</i> (8) <i>Construction guidelines and codes of practice have been prepared and support for commissioning of renewable energy systems has been provided.</i> (9) <i>Awareness created and information shared with at least 3 other regions in the country.</i> (10) <i>Rural-renewable energy issues included in the national policy dialogue in the energy sector.</i> 	<p>Indicators:</p> <ol style="list-style-type: none"> (1) <i>Increased financial commitments and financial inter mediation for renewable energy.</i> (2) <i>Business entities mobilised for renewable energy.</i> (3) <i>Increased use of renewable energy technologies.</i> (4) <i>Renewable energy being used at household and productive levels.</i> (5) <i>Renewable energy investment pipeline exists.</i> (6) <i>4 newly installed systems (off-grid).</i> (7) <i>Improved documentation for project contractors and-or investors.</i> (8) <i>Improved project-cycle management.</i> (9) <i>Project implementation plans exist.</i> (10) <i>Interest in other regions exists for replication of the project concept in El Quiche.</i> (11) <i>A first draft of a policy document reflecting renewable energy in the context of rural electrification.</i>
<p>11. Project activities to achieve outcomes:</p> <ol style="list-style-type: none"> (1) <i>Development of financial mechanisms both for financial availability as well as for financial delivery for renewable energy in the Quiche.</i> (2) <i>Setting-up of energy micro enterprises fueled by renewable energy aimed at productive energy uses for development.</i> (3) <i>Facilitate energy system design through reducing technology entry conditions in the form of support for feasibility studies for Renewable Energy Technologies.</i> (4) <i>Facilitate selected project implementation through technical assistance and construction management.</i> (5) <i>Replicate the model for energy enterprise development in other rural areas of Guatemala through renewable energy service delivery mechanisms and support for institutional developments amongst stakeholders involved in rural energy in these areas.</i> (6) <i>Facilitate a policy dialogue in the context of emergence and consolidation of rural-renewable energy at the national level.</i> 	<p>Indicators:</p> <ol style="list-style-type: none"> (1) <i>Investment capital for renewable energy technologies at the local level is available.</i> (2) <i>Renewable energy services are available, reliable and cost effective.</i> (3) <i>Properly sized renewable energy systems and investment plans exist.</i> (4) <i>Renewable energy projects are operational.</i> (5) <i>Similar processes initiated in other parts of the country.</i> (6) <i>Renewable energy services included in the political agenda.</i>

<p>12. Estimated budget (in US\$ or local currency) Total GEF Contribution: US\$ 408,000 PDF-A: US\$ 25,000.00 Medium Size Project: US\$ 383,000.00 Co-financing (European Union/Quiché Project+other sources identified): US\$ 373,000.00 (over a 2-year period). Total: US\$ 781,000.00</p>
<p>INFORMATION ON INSTITUTION SUBMITTING PROJECT BRIEF</p>
<p>13. Information on project proposer: <i>Fundación Solar - 15 Ave. 18-78 Zona 13, Guatemala City, Guatemala, C.A. 01013. Fundación Solar is a Private Development Organisation (PDO) dedicated to helping communities improve their quality of life through the use of renewable energy sources by fostering human and economic growth whilst minimising the negative impacts on the local and global environment. Fundación Solar focuses on 3 programmatic areas, which include: (1) energy (renewable and conventional); (2) environmental services (protected area management, eco-tourism project planning, pre-investment studies and joint implementation/carbon sequestration projects (3) Energy and Environmental policy. Contact person: Ing. Iván Azurdia.</i></p>
<p>14. Information on proposed executing agency: <i>PNLD</i></p>
<p>15. Date of initial submission of project concept: <i>12 February 1998</i></p>
<p>INFORMATION TO BE COMPLETED BY IMPLEMENTING AGENCY</p>
<p>16. Project Identification number: <i>GUA/98/G41/A/1G/99</i></p>
<p>17. Implementing Agency contact persons: <i>Ing. Edgar Pineda, Project Officer- UNDP, Guatemala. Fax: (502)3370304</i> <i>Ms. Lita Paparoni, Regional UNDP-GEF Coordinator, New York, Fax: 1 (212) 906 6688.</i></p>
<p>18. Project linkage to Implementing Agency program(s): <i>National inventory on Greenhouse Gas and Risk Assessments of sectors vulnerable to climate change and the Small Grants Programme, especially related to the operational areas i) emissions control and ii) reforestation (carbon sequestration). The project also links to the efforts of the Guatemalan First National Communication for the UNFCCC as it relates to the implementation of the energy chapters.</i></p>

1. CURRENT SITUATION

The department of El Quiché lies in Guatemala's northwestern region, bordering with Mexico in the north, the departments of Sololá and Chimaltenango to the south, Alta and Baja Verapaz to the east and with Sololá and Huehuetenango to the west. It covers a surface area of 8,378 km² and is divided into 18 municipalities. Its local population although composed almost entirely of Maya-Quiche and Maya-Ixil, with a small percentage of local non-indigenous *ladinos*, is by no means homogenous and after armed conflict numerous repatriated people from Mexico and internally displaced groups of various other ethnic origins have settled in this department.

Subsistence agriculture and livestock activities represent the principal economic activity, though infrastructure for the development of this industry and the consolidation of commercial chains is extremely weak. The repercussions, which a recently ended 36-year civil war has had on Guatemala as a whole, and on the department of El Quiché in particular, are significant. Physical infrastructure in the form of buildings and roads were destroyed and social infrastructure in the form of social organisation and a solid cooperative movement were broken down. Counterinsurgency strategies during the 1980's also affected the natural environment leading to high levels of deforestation and consequently of soil erosion and agricultural productivity losses.

Besides counting with the highest social development exclusion rates, El Quiché is currently the least electrified department in the country and its inhabitants receive some of the lowest wages in the formal sector. The links that exist between the availability of energy (in this case renewable) and the potential for increasing wages through agriculturally-related micro-enterprise, improving peoples' health through cleaner technologies and extending night-time study hours through illumination, are undeniable.

Owing to the fact that the department of El Quiché is located at the end of the national interconnected system (national electrification grid), it suffers from the costs of upgrading sub-stations to feed primary transmission lines and the cost of extending the secondary transmission line to more remote and scattered settlements. Although, the Government through funds made available from the privatization of the electricity sector is starting a rural electrification program in Guatemala that has increased the overall electrification index to about 60%, the Quiché, continues to be one of the departments with lowest electrification indexes quoted at about 40% in early 1999 (lower than national average).

For many urban dwellers and most rural dwellers in the department, the use of candlesticks, torch pines and dry-cell batteries for illumination purposes is still very common amounting to over \$6 a month for illumination loads. Well over 50% of the rural populations in the department does not have access to energy services and more over, agricultural processing in the area does not have access to energy services currently needed to achieve crop and produce value added through appropriate drying and water pumping services.

The selected target portfolio of projects for the development of this initiative has taken into account the projected areas of rural electrification development over the next several years, and brings into the project localities that are not anticipated to have other type of energy services available in the near future.

2. RATIONALE AND OBJECTIVES

Rural areas in Guatemala currently face considerable challenges in the provision of modern energy services to their populations. On average, less than 50% of the rural inhabitants in the country have adequate access to modern energy services.

Although the Guatemalan government is actively pursuing a plan for rural electrification it is anticipated that several clusters of isolated communities will remain with no access to energy services.

Small scale renewable energy technologies like micro hydro plants, solar photovoltaic home systems, water pumping and solar drying; stand as feasible options for supplying energy services to these isolated areas in the country, which are endowed with significant local renewable energy sources. Renewable energy is a solution for the provision of energy services in rural areas, especially the target region of this project since:

- i. **Small-scale renewable energy (RE) projects are the most cost effective option** (although still expensive) for energy supply in the context of energy services in rural populations in the Quiché Region.
- ii. Small-scale renewable energy is suited to the size and scale of investments that can be promoted to assist the deployment of rural energy services in the area.

Funding for renewable energy projects is hardly available in the region, and more widely, funding for entrepreneurial development in the context of socio-economic development of the region is under utilised.

The proposed initiative aims to assist in overcoming the barriers that prevent the development of small scale RE projects in the Quiché Region of Guatemala and reduce the implementation costs. At the same time promoting energy services based on clean fuels, reducing the amounts of carbon emissions associated with current energy sources used in the rural areas. The Initiative is designed to catalyse financial resources coming from existing Government of Guatemala (GoG) and European Union (EU) projects that operate in the Quiché Region and have the mandate to support socio economic and micro enterprise development.

The proposed activity is consistent with GEF operational program 6, "Promoting the adoption of renewable energy by removing barriers and reducing implementation costs". It will promote small energy enterprise development and formation of financial mechanisms aimed at reducing availability and delivery barriers identified in the chain of project development for Renewable Energy. GEF support is required to remove the identified barriers to the sustainable financing, and management required for the implementation of these type of technologies in applications such as micro hydro installations, solar photovoltaic home systems, photovoltaic water pumps and solar drying systems which will promote income generation and employment in economically productive micro-enterprises in the department of El Quiché.

The main **OBJECTIVE** of the Initiative is :

To create and strengthen the capacity for renewable energy service development based on cooperation with existing rural development programs currently operating in the Quiché Region.

Specific objectives are to assist in removing technical, financial, informational and institutional barriers to renewable energy in order to:

- i. Increase access to basic energy services to a greater number of inhabitants in the region.
- ii. Increase the development of renewable energy service enterprises aimed at productive uses of electricity in the area and with relevance to agro industrial processing.
- iii. Promote innovative financing and social organisational schemes for renewable energy based enterprises.
- iv. Assist in the formation of pre investment capacity development both for local developers as well as financial institutions.
- v. Displace CO₂ emissions from current energy services based on fuel wood, candles, torch pines, etc.
- vi. Activate a national policy dialogue on rural energy services.

It has been estimated that through the implementation of the initial set of 8 projects proposed under this initiative, CO₂ emissions could be reduced by at least 6,149 tonnes of carbon in 20 years (see annex 1). The specific displacement of carbon emissions from the targeted technologies is about 88% from micro hydro electric facilities, and the remaining from solar technologies providing energy services for micro enterprises located in the project area.

Taken into account the activities under this Initiative which aim at extending and replicating them elsewhere in El Quiché and Guatemala as a whole, a total of at least 42,149 tC will be potentially displaced over a period of 20 years (see annex 3).

As a result of this initiative an estimated total of at least 42,149 tC will be displaced over 20 years, with a GEF financial contribution of US\$ 384,500; i.e. US\$ 8.27 per tC displaced. In the most positive estimate a total of 56,148 tC will be displaced over 20 years; i.e. US\$ 6.21 per tC displaced.

3. IDENTIFICATION OF BARRIERS PREVENTING RENEWABLE ENERGY DEVELOPMENT IN THE QUICHE REGION OF GUATEMALA

During the implementation of the Project Development Facility (PDF-A), Fundación Solar carried out an assessment through local and in-region meetings and workshops in the area of Quiché, in order to identify the barriers that prevent the development of small-scale RE projects in the region. Findings showed that there have been positive changes at the institutional and legal levels. However, in spite of this, barriers to increase the use of renewable energy throughout the region still remain and can be classified as follows:

Institutional Barriers:

- i. With the change from a state owned electricity sector to a privatised market, there is no guarantee of improved energy access for rural communities. Ongoing privatisation of the energy sector make investments in rural energy schemes highly doubtful because of their poor investment returns.
- ii. For off-grid rural communities seeking electrification and access to energy services through small renewable energy technologies, the organisational structure needed to guarantee access to financing, and to ensure the adequate maintenance throughout project life cycles is either not clear or non existent.
- iii. Entrepreneurial and business development attitudes are relatively new to the target rural area stakeholders most likely to participate in the development of rural energy services.
- iv. At the decision making level, there is limited interest in small scale renewable energy projects, and these sort of projects are not integrated into a more wider and comprehensive rural development programme.
- v. The rural area characteristics and relative remoteness of most communities coupled to the relative lack of local engineering services and construction companies does not facilitate broad access to small-scale renewable energy technologies in the region.

Informational Barriers:

- vi. There is limited access to information on small scale renewable energy technologies and project cycle development activities.
- vii. There is limited knowledge on the potential markets for renewable energy services, such as the capacity to pay and the potential productive uses of renewable services.

Technical Barriers:

- viii. The supply of renewable energy technologies is still a nascent business in the Quiché Region resulting in poor pre-sales and after-sales services at high costs.
- ix. There is a lack of qualified human capacity to design, install, operate and manage aspects of project cycles for renewable energy technologies.

Financial Barriers:

- x. There is limited payment capacity in the rural areas because of the high poverty level. Small-scale RE technology investments require high initial costs, which are not feasible for low-income

sectors. Credit alone would not assure the access to energy services to the people in the region. Funding from national subsidy schemes (e.g. national rural electrification funds) needs to be organised/targeted.

- xi. The investment costs of grid extension by conventional means are unlikely to take place because of their poor investment returns as a result of low demand and dispersed rural populations.
- xii. There has been a trend among foreign donors and government related programs to support community groups and NGO's on a project basis, creating dependence that limits the ability of these stakeholders to undertake fund raising in the long term. This in turn reduces the sustainability of the institutional set up required to implement renewable energy projects in the region.
- xiii. Credit facilities for rural energy services are either non-existent or with a relatively high intermediation cost.
- xiv. The capacity of commercial financial institutions or local development banks to evaluate small-scale RE projects is limited or non-existent. To date very little funding, apart from traditional government funds, have been earmarked for off-grid electrification and renewable energy based rural energy service provision in the area.

4. EXPECTED PROJECT OUTCOMES

The project expects to increase the use of renewable energy technologies, which benefit the local Quiché Maya population and the global environment, and incorporate them into the development of small-scale energy service enterprises. Without an energy input, or access to training and financial delivery mechanisms, small business units are at a significant disadvantage in terms of productivity on a national scale. Moreover, in the context of the New World Order and globalisation, where market competition and access to market chains is all important, indigenous rural groups shall not be excluded from "know-why" or "know-how" in these areas.

After two years it is expected that the initiative will have produced at minimum the following outcomes¹:

- i. Innovative financing mechanisms supporting renewable energy development with at least 2 financial entities in the Quiche Region will have been established.
- ii. Financial resources up to a total of \$ 300,000 are committed to the development of the project portfolio.
- iii. Replicable experiences created through the establishment and strengthening of 4 renewable energy service enterprises (RESCO's).
- iv. Replicable experiences created in support of productive uses of energy by at least 6 new renewable energy driven micro-enterprises.
- v. At minimum 4 and maximum 8 renewable energy systems are fully operational within the project period of 2 years. In case only 4 projects will be operational within the project period, all necessary requirements for making the other 4 operational as well, will have been carried out during the project period itself, thereby ensuring that all 8 projects included in the project portfolio will eventually be implemented.
- vi. Local organisations strengthened and potential new enterprises fostered through linkages created between actors involved in financing, engineering services, technology suppliers; through facilitation of Feasibility and Financial packaging for the 8 projects included in the portfolio.

¹ In this section renewable energy service enterprises (also called RESCO's) and renewable energy-driven microenterprises. To avoid confusion, the following definitions have been used for these components:

Renewable energy service enterprises are companies that generate electricity and/or heat making use of renewable energy source, they transport it (if necessary) and sell it to end-users.

Renewable energy-driven micro enterprises are an (important) part of these end-users and are normal enterprises for which energy is an input for their (agricultural) production process. The energy 'happens' to be coming from renewable sources, but could have come from anywhere.

- vii. Renewable Energy Construction Management strengthened through provision of appropriate system design capacity, project management documents and construction codes applicable to small-scale renewable energy projects and 4 projects operational in the period.
- viii. Project and Energy Service Micro enterprise Management documents prepared in support of the portfolio and useful for further dissemination in the country.
- ix. Construction Guidelines and general codes of practice appropriate for small RE projects prepared and tested during the construction phase of the initiative.
- x. Awareness created and information shared with at least 3 other regions/programmes in Guatemala, similar to the one developed in Quiché in Guatemala aiming at strengthening rural energy service schemes.
- xi. Rural Renewable Energy issues included and promoted in the national policy dialogue in the energy sector.

5. ACTIVITIES AND FINANCIAL INPUTS NEEDED TO ENABLE CHANGES

The aforementioned outcomes will be achieved through the implementation of the following activities:

Activity 1: Development of Financial Mechanisms in Support of Renewable Energy

Development of financial mechanisms both for capital availability and financial delivery is critical to the project and its replication. The activity starts early in the project to maximise the potential contribution of financial resources for equipment to be provided by the GoG/EU Proyecto El Quiché. Initial financial mechanisms will address critical aspects such as working capital needed for enterprise development as well as developing loan packages for renewable energy in the area. The cost of this activity is \$100,000 and GEF financial resources amount to \$90,000 that will support \$10,000 from local stakeholders developing the financial mechanisms required for the project as well as putting in place conditions for replication of the project activities in El Quiché and beyond.

Specific activities include amongst others, training of local bank staff, development of lending procedures, assistance in channelling EU/Quiché Project financial resources, development of repayment schemes and administrative procedures related to metering, billing and collecting of electricity charges.

Activity 2: Strengthening Renewable Energy Service Micro-enterprises

The strengthening of the micro enterprises for energy services in the Quiché Region is necessary in order to overcome the identified barriers. The initiative will undertake several workshops on enterprise development for energy services as well as one to one training with stakeholders involved in actual setting of energy micro-enterprises. Solicited GEF resources amount to \$38,000 that will support the \$350,000 from the GoG/EU Proyecto El Quiché and other stakeholders (available to strengthen enterprises by making equipment capital available).

Activity 3: Feasibility and Engineering Studies of Projects

This activity will focus on the development of feasibility and engineering studies for the selected 8 projects in the renewable energy portfolio in the El Quiché Region. Simultaneously through the development of feasibility studies, and development of business plans, the lack of capacity of local stakeholders for these activities will be developed. GEF resources for a total of \$125,000 will be instrumental for developing feasibility studies that were not to take place under the baseline scenario.

Specific activities include preparation of detailed feasibility studies and packaging of projects for financial consideration of the project portfolio. Detailed engineering studies are also considered for civil and power house development of the projects.

Activity 4: *Construction Management Support for Renewable Energy Projects*

Due to the fact that the project aims at assisting project development in the energy services in the region, and that the project portfolio includes sufficient leverage for the equipment component of each of the small scale RE projects, GEF resources will be used to assist in developing a framework of support for construction management as it relates to small scale rural projects, including supervision, cost centre management, construction protocols. The total cost of the activity is \$75,000 to be supplied fully by GEF, since such activities were not to take place under the baseline scenario.

Activity 5: *Coordination for Project Replicability*

The different activities aforementioned need to be closely monitored and evaluated in order to assure adequate operation and to provide feedback in the different stages of the project development cycle. The activity will be providing networking and coordinate meetings and facilitate management and exchange of information. An important component of the activity will be to disseminate results within rural stakeholders in the El Quiche Region as well as in at least three other regions of Guatemala where the same kind of developments can take place. Total resources required for this activity are \$38,000 for which \$13,000 is available from national stakeholders. The remaining \$25,000 is requested from GEF. Resources are to be used for providing networking and stakeholder facilitation, development of initial programme concepts for the other 3 targeted regions initially selected in the country and for exchange visits for validation of lessons learned during the development of the Initiative.

Activity 6: *Policy Dialogues for Renewable Energy and Rural Energy Issues in Guatemala*

The Rural Energy focus of the Initiative requires appropriation of concepts related to the policy making environment in Guatemala. The design of the activity includes the participation and strengthening of the policy making environment at different levels, from central government offices, local municipalities, communities and participation of different other stakeholders. Taking a sustainable development perspective, social economic and environmental issues of rural energy policy making will be taken into account in the activity. Several consultation meetings and discussions on rural energy policy development will be developed, and at the local level it is anticipated to support the capacity of local municipalities and groups for participation in rural energy issues. Current baselines do not include activities for policy dialogue development.

Specific activities to be undertaken include development of draft "policy papers" on rural and renewable energy policies for sustainable development in Guatemala, facilitation of policy sessions and stakeholder empowerment related to the policy initiatives. An important aspect relates to the assistance to the country discussion on a financial policy for the formation of a rural energy/electrification fund. GEF resources in the amount of \$30,000 will be used to undertake these policy-related activities.

6. SUSTAINABILITY OF THE INITIATIVE

The long-term sustainability of the project in favour of renewable energy technologies will be enhanced through:

- i. The activities related to changes in the public policy environment and financial availability and delivery of rural energy services, resulting in a more enabling context for small-scale renewable energy project development in Guatemala.
- ii. The setting up of a financial infrastructure and mechanism to be used for future RE projects and programs in Guatemala.
- iii. Increased human and institutional capacity for design, development, implementation, monitoring and evaluation of renewable energy projects.
- iv. Dissemination of the hands-on experience and the know-how for project development

- v. Local linkages-networks for replicability of concepts for rural energy services to other areas of Guatemala
- vi. Reductions on project cycle investment costs of future projects as both economies of scale and learning curve for project development are achieved in the region.

RISKS

There are two main categories of risks present in a project of the nature of the Quiche Initiative for RE, where the project deals with under served populations and enterprises mostly in formation and with low capacity for payment for energy services.

Institutional risks

To be successful the project needs inputs and cooperation from several actors from different administrative levels within the public as well as private sector. Proper incentives need to be developed and put in place to secure full cooperation on the short as well as long term. In addition the management of a programme where two multilateral institutions are involved in tends to be more difficult, especially when the success of the proposed UNDP/GEF activity is closely related to the timely inputs of the EU/GoG programme in El Quiche.

The proposed initiative has the possibility to create incentives for local stakeholders by means of offering low interest or donated capital - to be used for hardware investments - as a result of the grant donation of the EU/GoG programme. Furthermore capacity building efforts and the fact that renewable energy based electricity contributes to income generating activities and/or welfare improvement is a direct and significant incentive for a majority of the stakeholders involved. Through a management relationship between this initiative and the EU/GoG programme and the setting up of a project steering committee the proposed initiative addresses the described management risk.

Financial risks

The greatest concern for this project is the ability to pay the full cost for an energy service delivered to a rural household and/or a rural micro-entreprise. The level of income in the El Quiche region is low and - although economic development opportunities have been identified - is expected to grow at a fairly slow pace. In addition access to capital for rural infrastructure development is very limited, what will have it's impact on extending/replicating this initiative.

The proposed initiative addresses these risks by supporting the set-up of income generating activities; e.g. the renewable energy service enterprises and through micro-entreprises (under the EU/GoG programme), that will contribute to the economic development and as such the level of income available for increasing welfare. The donations under the EU/GoG programme for renewable energy hardware facilitates the initial investments for 8 projects. In using these financial resources a financial mechanisms will be designed (as much as possible in line with normal lending operations of local/rural banks; e.g. Banco Rural) that could also be used for future investments. Thus, the financing mechanisms to be developed under activity I address the accessibility of investment capital for extending and/or replicating the proposed activities.

8. STAKEHOLDER INVOLVEMENT AND SOCIAL ASSESSMENT

Stakeholder Identification

Fundación Solar identified a series of key participants; i.e. the GEF focal point in Guatemala, UNDP country office, government agencies (at national and municipal levels), the EU-GoG Quiché Program, local microenterprise groups, financial institutions, NGOs, technology suppliers, engineering service companies, and end-users during the implementation of the PDF-A. The stakeholders identified are interested and to a certain extent already involved in the development of small scale off-grid rural energy service projects, and out of the process conducted in the region the initial portfolio of projects that comprise this initiative have been prioritised. The appropriate networking process, ensuring the effective involvement of the different stakeholders has thus been already initiated and will continue during the implementation of the proposed initiative.

Information, Dissemination and Consultation

The structure of the initiative addresses the dissemination of lessons learned, information and experience gained. The above will be implemented through the training of energy service enterprises, publication of codes and standards of practice, handouts on small scale renewable energy project management aspects. Three in region workshops are to be conducted to support exchange on the Initiative with other areas of Guatemala that have the potential to develop clusters of renewable energy services.

Social and Participatory Issues

By ensuring empowerment, and addressing training and strengthening of the commercial chain, there will be incentives to promote cash savings and investment in the region, which will have an impact in the region through the replicability that the projects are expected to have in the Quiché Region and beyond.

9. INCREMENTAL COST MATRIX AND COST ANALYSIS

The main objective of this initiative relates to the process of strengthening the local capacity in the Quiché region of Guatemala to foster the development of small scale renewable energy based rural energy services, through removing informational, institutional, technical and financial barriers.

The lack of an integrated approach to overcome these barriers impedes the sustainable development of local energy sources, and limits the access to sources of financing at the local, and national level; sources that are very important as a condition for economic development.

The business - as - usual scenario considered for the Initiative will be the lack of regional and institutional capacity. Due to the high transaction costs associated with the development of rural energy services, no single organisation or government has taken the initiative of establishing an integral strategy to promote small-scale renewable energy resources. Therefore the baseline is defined as the lack of effective links between actors and stakeholders (developers, end-users, engineering services, technology suppliers, financial institutions, etc) participating in rural energy service provision in the Quiche Region.

The project costs to GEF include enhancing a financial environment, costing associated with technical and management assistance to projects in the field, training and construction protocol development, and funding the incremental costs associated with management, and engineering service provision for emerging sustainable energy ventures.

Six activities have been designed to remove the identified barriers to increased and sustained development of small-scale renewable energy applications. All of the incremental costs requested are related to the costs of removing the barriers identified. The incremental costs of each activity are briefly summarised in the following matrix.

INCREMENTAL COST MATRIX

Activity	Baseline (B)	Alternative (A)	Increment (A-B)
1. Development of Financial Mechanisms	Lack of technical knowledge to appraise energy projects in the finance sector	FI able to analyse RE projects	Increased availability and delivery capacity of RE
Global Environmental Benefits	RE projects do not have adequate loans	Loan conditions improve access to credit	financing available to stakeholders
Domestic Benefits	Business opportunities not known or wasted	Linkages established in the financial chain	
Costs	\$10,000	\$100,000	\$90,000
2. Strengthening Energy Service Micro-enterprises	Lack of capacity for RE project development	Capacity implemented for RE project development	Capacity strengthen for development of RE based energy service companies
Global Environmental Benefits	Ignorance of RE advantages at micro-enterprise level for productive uses	Enterprise developers aware of RE potential in energy services	
Domestic Benefits	Local energy service resources not utilised fully	Utilisation of locally available sustainable RE energy sources	Capacity created for developing local enterprises and projects
Costs	\$350,000	\$388,000	\$38,000
3. Feasibility Studies of Projects	Lack of successful small scale RE projects	Substitution of traditional rural energy services for clean RE sources and improved quality of service	Validation of new project approaches to transform traditional rural energy paradigm
Global Environmental Benefits			
Domestic Benefits	RE services seem unaffordable	Feasibility of RE based energy services verified and validated	New projects in investment cycle responding to local demand for energy services
Costs	-0-	\$125,000	\$125,000
4. Construction Management Support	Lack of capacity for project development	Increased know-how on project development and construction management in rural energy	Better understanding and use of cost and management tools for small scale RE projects
Global Environmental Benefits			
Domestic Benefits	Lack of capacity for project development	Local engineering and construction service companies able to develop RE projects	Increased availability of project related services at the local levels in support of the commercial chain of RE
Costs	-0-	\$75,000	\$75,000
5. Coordination for Replicability	Lack of effective links in the energy service chain for renewable energy	New stakeholders interested in Renewable Energy	Increased learning on roles for RE in rural areas
Global Environmental Benefits		Links established for project replicability	
Domestic Benefits	Rural populations unable to develop energy service solutions for local needs	Links strengthen for local project and small scale rural RE service developments	New initiatives emerge in the context of local needs in rural Guatemala
Costs	\$-3,000	\$38,000	\$25,000
6. Policy Dialogues for Rural Energy	Issues on energy sustainability and rural areas not integrated in policy making	Improved policy environment in support of Renewable Energy	Renewable Energy promotion integrated in the policy environment of Guatemala
Global Environmental Benefits			
Domestic Benefits	Slow penetration and substitution of clean sustainable energy services in rural areas	Improved energy services in rural areas for productive applications	Increase number of energy services based on RE available in the rural areas of Guatemala
Costs	-0-	\$30,000	\$30,000

	Rates of consumption of fuelwood and traditional energy sources continue to grow causing climate change impact	Decreased rates of climate change and vulnerability due to RE energy services	Decreasing trend of climate change and vulnerability effects in Guatemala
	Barriers exist to the dissemination of clean energy sources	Gradual substitution of traditional energy sources in rural areas	Barriers removed in support of Renewable energy in the Quiche region of Guatemala
	Large percentage of the rural population without access to energy services and not integrated to economic development	Potential market growth for RE based energy services in rural areas	Greater access to Renewable Energy based energy service in rural areas of Guatemala
	\$373,000	\$756,000	\$383,000

THE FOLLOWING BUDGET PRESENTS THE PROPOSED BUDGET FOR THE COMPLETION OF THE PROPOSED INITIATIVE OVER A PERIOD OF 2 YEARS.

The following table presents the proposed budget for the completion of the proposed Initiative over a period of 2 years.

Item	2000	2001	2002	Total
PDF-A	25,000			25,000
Personnel		109,000		109,000
Subcontracts		148,300	10,000	158,300
Training		48,200	8,000	56,200
Equipment			350,000	350,000
Travel		20,000	5,000	25,000
Evaluation mission(s)		20,000		20,000
Miscellaneous		26,000		26,000
Project Support Services (3%)		11,500		11,500
Project Total	25,000	383,000	373,000	781,000

(*) These are committed in-cash (US\$ 300K) and in-kind (US\$ 73K) funds from stakeholders engaged during PDF-A activities.

THE PROJECT WILL BE NATIONALLY EXECUTED (NEX) AND THE GEF FOCAL POINT IN GUATEMALA, THE COMUSIÓN NACIONAL DEL MEDIO AMBIENTE (CONAMA) HAS ENDORSED THE PROJECT. THE EXECUTING AGENCY WILL BE CONAMA, WHEREAS FUNDACIÓN SOLAR WILL BE THE IMPLEMENTING AGENCY.

The project will be nationally executed (NEX) and the GEF focal point in Guatemala, The Comisión Nacional del Medio Ambiente (CONAMA) has endorsed the project. The executing agency will be CONAMA, whereas Fundación Solar will be the implementing agency.

A programme management unit (PMU) will be set up to manage the implementation process and provide technical inputs related to the implementation of the proposed activities. The PMU will be located in Guatemala and will work closely with the local UNDP office for the implementation of the work plan, including the 8 projects in the portfolio. An appropriate management relationship will be implemented amongst the different organisations participating in the project, so that the project components like subcontracting, purchasing, etc.; could occur smoothly. A project steering committee will be set up and will be put in charge of providing adequate monitoring and steering of the activities to be developed.

At the same time Terms of Reference will be developed and agreed upon for the timely availability of resources and inputs from the GoG/EU Quiche Programme. This includes disbursement schedules for

equipment purchase, flow of financial resources for leveraging investment and activities related to micro-enterprise capacity building including end-users.

As part of the Project Document Phase, the project's detailed implementation plan, work plan and terms of References will be prepared. The following table presents the first draft of the proposed implementation work plan.

PROJECT IMPLEMENTATION PLAN

DURATION OF PROJECT (IN MONTHS): 24	
ACTIVITIES	PROJECT-MONTHS
	0 3 6 9 12 15 18 21 24
1. Development of Financial Mechanisms	-----
2. Strengthening Energy Service Micro-enterprises	-----
3. Feasibility Studies of Projects	-----
4. Construction Management Support	-----
5. Coordination for Replicability	-----
6. Policy Dialogues for Rural Energy	-----

12. MONITORING AND EVALUATION PLAN

The project will be closely monitored in accordance with UNDP established monitoring procedures. Consequently the UNDP office in Guatemala will provide ongoing performance monitoring with backstopping from UNDP technical staff from the GEF unit in New York. In addition, Tri-Partite Reviews (TPR's) will also be held with the participation of project counterparts and partners. During the development of the TPR's, the project performance will be measured against established work-plans, and expenditures will be reviewed, and overall technical performance will be evaluated. At the end of the first year of implementation, a mid term evaluation will be carried out. Full details on procedures for overall project review will be detailed as part of the Project Document Preparation.

13. PROJECT CHECKLIST

The following Table includes a reference checklist to evaluate areas of activities and technical categories involved in the development of the Initiative.

PROJECT ACTIVITY CATEGORIES			
Biodiversity	Climate Change: ✓	International Waters	Ozone Depletion
Prot. Area zoning/mgmt:	Efficient prod.-distribution	Water body	Monitoring
Buffer zone dept:	Efficient consumption:	Integrated land & water	Country programme:
Inventory/monitoring:	Solar: ✓	Contaminant:	ODS phase-out:
Ecotourism:	Biomass:	Other:	Production:
Agro-biodiversity:	Wind:		Other:
Trust fund(s):	Hydro: ✓		
Benefit-sharing:	Geothermal:		
Other:	Fuel cells:		
TECHNICAL CATEGORIES:			
Institution building: ✓	Targeted research:	Awareness / Information / Training: ✓	

Investments:	Technical/management advice: ✓	
Policy advice: ✓	Technology transfer: ✓	Other:

(14) TECHNICAL REVIEW

No Technical Review needed (project under \$750,000)

ANNEX 1. RENEWABLE ENERGY PROJECT PORTFOLIO

PROJECT	TECHNOLOGY	CAPACITY (kW)	Min. CARBON DISPLACED (tC/20 years)	Max. CARBON DISPLACED (tC/20 years)
<i>Chajul Water Pumping</i>	Solar p.v. pumping	0.2 kW _p	0.1	0.125
<i>Yisigulchum Village Illumination</i>	Solar p.v. home systems	3.0 kW _p	567	700
<i>Cunén Garlic Micro-enterprise</i>	Solar thermal drying	12.0 kW _{th}	9	11
<i>Chel Village Micro Hydro</i>	Micro-hydro	56.0 kW	1,175	1,500
<i>Las Hortensias Micro-Hydro</i>	Micro-hydro	200.0 kW	4,212	5,250
<i>Sumalito Village Illumination</i>	Solar p.v. home systems	0.9 kW _p	167	200
<i>Sacapulas water Pumping</i>	Solar p.v. pumping	5.4 kW _p	17.67	22
<i>Chichicastenango Apple Micro-enterprise</i>	Solar thermal drying	3.0 kW _{th}	0.8	1
TOTAL		280.5	6,149	7,684

The numbers calculated for displaced carbon emissions for the different projects in the project portfolio are based on the methodologies presented in Annex 3. In the calculations itself the 'power factor' of the installed capacity is one of the main parameters that determines the actual carbon emission displacement. Especially in cases where the electricity demand is only a few hours per day, or in cases where there is a seasonal demand (drying and agro-processing) this plays an important role.

ANNEX 2. GOVERNMENT OF GUATEMALA/EU QUICHE PROJECT

The Proyecto Quiché is a programme supported by the Guatemalan Government aimed at improving socio-economic and cultural conditions of a target population of over 425,000 people living in extreme poverty conditions and social exclusion in 14 municipalities of El Quiché Department of Guatemala. The majority of the beneficiaries of the programme are Maya descendants of the Ixil, Quiché and Mam ethnicities.

The Programme has the objective of promoting a model for regional development, that in the short term shall permit the populations to improve their living conditions; and that on the mid to long term should integrate and consolidate development processes with the aim of establishing a socio economic web based on rooted cultural identities.

The programme has a duration anticipated to the end of the year 2002, with the objective of reaching over 2,700 families in food security programs, 10,000 families in the agro diversification and processing sector, 900 families through development of micro enterprise schemes, and over 14,000 families through credit programs.

The principal actions of the program are related to:

- Development of small agro-industrial enterprises (subsistence level)
- Small and medium marginal enterprises (pre commercial level)
- Small and medium commercial enterprises (commercial level)
- Artisan industry development

The programme has several lines of activities:

- Support for Sustainable Production
- Food Security
- Agricultural Base Diversification
- Natural Resource Conservation and Management
- Support for Micro-enterprise Development
- Institutional and Communal Strengthening
- Credit and Financial Mechanism Development
- Infrastructure Development and Financing: Social, Socio-Productive (roads and **energy**), and **productive uses of energy** (processing centre development, micro irrigation and irrigation systems).

The GoG/EU Quiche Project links with the GEF supported project in providing capital resources to be used in creating incentives availability of initial hardware for the development of projects, and also by facilitating a well developed network for socio-economic development in the targeted communities where the project will operate and also by supporting and catalising resources for the leverage of interest from existing credit and financing agencies operating in the region, in order to assist in the creation of improved conditions for energy service development in the target area of the project.

ANNEX 3. CARBON DISPLACEMENT CALCULATIONS

The baseline for calculations of carbon displaced emissions for the portfolio of projects identified in the PDF-A activities relates to the use of traditional energy sources in rural areas.

Four different methodologies were used in the analysis used in the formulation of the Initiative:

- Carbon estimates for substitution of traditional energy sources in solar PV home systems were taken from data available from calculations and estimates used in Uganda - where energy consumption patterns are similar to those of El Quiche. These show that Renewable Energy Services per household can displace up to 9.3 tC/household (ref. UNDP/GEF approved Solar Project in Uganda in 1998) for an entire life for the project of 20 years. The estimate is for substitution of a traditional use of a mix of sources based on candles, torches, and batteries.
Carbon estimates for micro-hydro systems were evaluated based on the replacement of grid-connected electricity. The carbon intensity of grid-connected electricity based on coal is 0.24 tC/MWh (Centre for Sustainable Development of the Americas; USDOE [CSDA/DOE] Manual).
- Carbon estimates for agricultural drying operations were evaluated by performing a representative test of combustion emissions for typical dryers operating on fuel wood obtaining an average biomass use of about 9 kg of biomass per 100 lb of agricultural product processed. Stechiometry equations were used for a 150% excess air found in the combustion gases and therefore CO₂ estimates were carried out to a value of about 1 kg CO₂/ kg fuelwood (1:1) used. Drying capacity of the systems was used to determine total biomass usage, and by using the conversion ratio of 1:1, an estimation was performed over the period of 20 years (lifetime of the dryers).
- Water Pumping carbon estimates were determined by calculating energy consumption of the irrigation schemes based on average capacity factors per year. These were referenced with carbon emissions from small-scale diesel driven water pumps at a rate of 20tC per TJ of energy consumed (ref. Centre for Sustainable Development in the Americas, 1997).

Specific project carbon displacement numbers appear in the table including in Annex 1, as part of the characteristics of the Renewable Energy Portfolio identified during the development of the PDF-A Activities in the Quiché Region of Guatemala.

Taken into account the activities under this Initiative which aim at extending and replicating them elsewhere in El Quiche and Guatemala as a whole, it is estimated that a total ranging from 42,149 tC to 56,148 tC will be potentially displaced over a period of 20 years. The institutional involvement of Fundación Solar in the proposed activities 'guarantee' cross-fertilisation.

Estimated Carbon Emissions Displacement Replication Potential in Rural Renewable Energy Projects in Guatemala as a Result of the Proposed Initiative

Target Area	Capacity (kW)	Estimated Emissions Displaced (tC)
El Quiche	281	6,149 - 7,648
Verapaces (EU/GoG progr.)	300	7,000 - 9,000
Sierra de las Minas (micro-grid)	650	15,000 - 20,000
Anacafe/Funrural (coffee project)	620	14,000 - 19,500
TOTAL	1,851	42,149 - 56,148

MINISTERIO DEL AMBIENTE Y ENERGIA

**DESARROLLO SOSTENIBLE**
*Bienestar para siempre*206 APCRI
17 de junio, 1999.SEÑORES DIRECTIVOS DEL FONDO CENTROAMERICANO DE DESARROLLO
SOSTENIBLE (F O C A D E S):

	# FAX	LUGAR
JOHN BRICEÑO	00501 822333	BELMOPAN, BELICE ✓
ANTONIO VILLACORTA,	00503 2264339	EL SALVADOR, SAN SALVADOR
NESTOR VILLEGAS,	005062258039	SAN JOSE, COSTA RICA
ELBA Mª DE LA CRUZ MALAVASSI	00506 2773583	SAN JOSE, COSTA RICA
HUMBERTO PAREDES	00501 823759	BELMOPAN, BELICE
JULIO BERMUDEZ	00507 2283745	PANAMA, PANAMA ✓
MARIO RAMOS	001202 5223240	WASHINGTON, USA

DE: **Ing. Manfred Peters Seevers**
DIRECTOR EJECUTIVO A.I. FOCADESASUNTO: **CANCELACION REUNION FOCADES**

Estimados señores (a):

Reciban ustedes un cordial saludo.

Me permito hacer del estimable conocimiento de ustedes que, en reunión celebrada en Guatemala, el día jueves 3 de junio, 1999 y por Resolución del Consejo de Ministros de la Comisión Centroamericana de Ambiente y Desarrollo (CCAD), se tomó la decisión de cancelar la reunión de FOCADES, convocada por el suscrito para el viernes 9 de julio 1999, en El Salvador.

Oportunamente, se les dará a conocer más detalles sobre dicha cancelación.

Atentamente,

Copias Sr. Ernesto Leal,
Sr. Mauricio Castro,
Ing. José Luis Salas,
Sra. Cristiana Figueres,
Sr. Edgar Plineda,SECRETARIO GENERAL SICA, EL SALVADOR
DIRECTOR AMBIENTAL, SICA, EL SALVADOR
DIRECTOR DE DESPACHO MINISTRA MINAE
CSDA-WASHINGTON-USA
PNUD, GUATEMALA

MPS/sp.-

ASESORIA PRINCIPAL DE COOPERACION Y RELACIONES INTERNACIONALES
TELEFONOS (00506) 234 8935 - 253 8249 - 234 0973, FAX (00508) 234 0651
APARTADO 1338-1002 PASEO LOS ESTUDIANTES, SAN JOSE - COSTA RICA



COMISION NACIONAL DEL MEDIO AMBIENTE
PRESIDENCIA DE LA REPUBLICA

GUATEMALA, C. A.

Of. No. 459-99/AJP/mdch

DIRECCION

7a. Avenida 7-09, zona 13
Teléfono: (502) 4407916/17/17/18
Fax: (502) 4407938
E-mail: conama@urds.org.gt

Guatemala, 20 mayo de 1999

Señor

Lars Frandlin

Representante Residente del Programa de
Naciones Unidas Para el Desarrollo -PNUD-

Señor Representante:

De la manera más atenta me dirijo a usted, en relación el proyecto denominado **"Desarrollo de Microempresa por Medio de Energía Renovable en la Región de Quiché, Guatemala"**, presentado a la consideración del PNUD y al GEF, por parte de Fundación Solar.

Sobre el particular, esta Coordinación, en consulta con las instancias técnicas, considera que el proyecto busca diseñar y validar en el campo la adopción de energías renovables y el desarrollo de mecanismos financieros que le den el soporte económico necesario (lo que lo constituye como una gran innovación tecnológica); asimismo, constituye una acción específica para la reducción de emisiones de carbono (CO₂), el uso de fuentes renovables de energía y, lo que se considera más importante, promueve el desarrollo humano integral, a través de la autogestión comunitaria y la autosuficiencia por medio de la formación de pequeñas empresas de servicios energéticos.

El proyecto se encuentra enmarcado dentro de las actividades prioritarias que favorecen el cumplimiento de los Acuerdos de Paz y es consistente con los compromisos en materia política, social y económica contenidos en el Programa de Gobierno 1996-2000; en ese mismo orden, las actividades en las que se divide el proyecto, coinciden con los objetivos y metas planteados.

En tal virtud, nos permitimos recomendar la elegibilidad del Proyecto.

Me suscribo con altas muestras de consideración

20 5 99 16 11 11

A. JUÁREZ
Dr.-Ing. Adrián Juárez Pinola
Coordinador Nacional

