

Global Environment Facility

MOHAMED T. EL-ASHRY
CHIEF EXECUTIVE OFFICER
AND CHAIRMAN

July 5, 2000

Dear Council Member:

I am writing to notify you that we have today posted in the GEF's website at www.gefweb.org, a medium-sized project proposal entitled *Peru: Renewable Energy Systems in the Peruvian Amazon Region (RESPAR)*. The GEF will contribute \$747,500 towards a total cost of \$2.67 million.

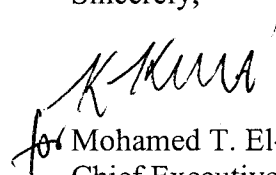
The proposed innovative project will contribute to the implementation of the national rural electrification plan through the design and field-testing of off-grid diesel-PV hybrid systems and state-of-the-art energy storage batteries in those rural communities with operating diesel generators. Specifically, the project will

- Help reduce significantly the GHG emissions generated by fossil fuels;
- Introduce the Remote Area Power Supply (RAPS) system as an appropriate renewable energy technology in the amazon region of Peru;
- Promote the participation of the private sector in rural electrification projects;
- Strengthen the knowledge about rural electrification and specially RAPS systems through a participatory approach among all stakeholders; and
- Demonstrate RAPS systems sustainability and replicability.

The project proposal is being posted for your information. We would welcome any comments you may wish to provide by July 25, 2000, in accordance with the procedures approved by the Council.

If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to down load the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,


for Mohamed T. El-Ashry
Chief Executive Officer
and Chairman

cc: Alternates, Implementing Agencies, STAP



United Nations Development Programme
GLOBAL ENVIRONMENT FACILITY



Date: May 17th, 2000.

To: Mr. Kenneth King
Assistant CEO

Attention: Program Coordination

From: Emma Torres
Deputy GEF Executive Coordinator and Officer-in-Charge

Subject: Submission of Medium Size Project Brief for GEF contribution of less than \$750,000: Renewable Energy Systems in the Peruvian Amazon Region (RESPAR)

Enclosed is a project brief for **Renewable Energy Systems in the Peruvian Amazon Region** submitted to UNDP by LZRO RAPS Peru. Please note that the project has been endorsed by the GEF national operational focal point in Peru.

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 Climate Change Convention 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 June 21st 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 July 12th as part of the next work programme.

Thank you and best regards.

cc: Ahmed Djoghlaif, UNEP
Lars Vidaeus, World Bank
Madhav Gadgil, STAP
Rohit Khanna, UNEP/GEF
Mark Griffith, UNEP/STAP
Claire N. Parker, CC Secretariat
Martha Perdomo, CC Secretariat

**UNITED NATIONS DEVELOPMENT PROGRAMME
GLOBAL ENVIRONMENT FACILITY
MEDIUM-SIZED PROJECT BRIEF
PERU**

L:\LAC_GEF\GEF\MEDIUM\PERU\RESPAR\RESPAR PROJECT BRIEF.DOC

PROJECT SUMMARY

PROJECT IDENTIFIERS	
<p>1. Project name: Renewable Energy Systems in the Peruvian Amazon Region (RESPAR)</p>	<p>2. GEF Implementing Agency: United Nations Development Programme (UNDP)</p>
<p>3. Country or countries in which the project is being implemented: Perú, Region Loreto</p>	<p>4. Country eligibility: Perú ratified the Climate Change Convention on June 7, 1993.</p>
<p>5. GEF focal area(s): Climate Change.</p>	<p>6. Operational program/Short-term measure: Promoting the adoption of renewable energy by removing barriers and reducing implementation costs.</p>
<p>7. Project linkage to national priorities, action plans, and programs: Perú registers one of the lowest average consumption rates of energy in Latin America even though the country has a wide range of non-conventional energy sources not yet sufficiently assessed and exploited. Nevertheless, the <i>Government of Perú (GOP)</i> has made tremendous progress in increasing the national electrification coverage from 49% to 73% between 1990 and 1999, an increase that benefits more than two million people. The GOP's <i>National Electrification Plan (NEP)</i> has been implemented using two approaches: the expansion of the grid; and the use of non-conventional energy in areas where expansion is not feasible due to high cost. The proposed RESPAR project will be executed by the private sector following the NEP dictated by the GOP in an effort to demonstrate sustainability and replicability of renewable energy technologies (RETs) in rural settings. Based on centralized <i>Remote Area Power Supply (RAPS)</i> systems, the proposed innovative project will contribute the implementation of the national rural electrification plan through the design and field-testing of off-grid diesel-PV hybrid systems and state-of-the-art energy storage batteries in those rural communities with operating diesel generators. The project aims to substantially increase service quality, provide 24-hour basic electricity, and expand opportunities for productive, economic, and educational activities in higher populated areas. Thus, the RESPAR project will have an impact on climate change, reducing greenhouse gas (GHG) emissions and preserving the ecosystem of the target area, the Peruvian Amazon region. In addition, the proposed project expects to contribute to the development of rural areas by providing electricity and the potential to develop income generation activities with the available energy for the inhabitants of these remote communities. It is critical to demonstrate that RAPS systems will be sustainable with the tariffs paid by the consumers. The signing of a final peace agreement in October 1998, which resolved a fifty-year dispute between Ecuador and Perú, has sparked significant international interest in developing the border region. Therefore this project intends to embrace these objectives while preserving the current habitat of the region. This project will benefit the local and global environments through the savings of CO₂ emissions and the use of RE sources. A momentum is in place for a successful implementation and replication of RAPS systems in the Amazon region.</p>	
<p>8. GEF national operational focal point and date of country endorsement: National Commission for Environment (CONAM) - Avenida San Borja Norte 226, San Borja, Lima, Perú. Contact Person: Dr. Paul Remy, Executive Secretary. Endorsement date: September 3, 1999</p>	
PROJECT OBJECTIVES AND ACTIVITIES	
<p>9. Project rationale and objectives:</p> <ol style="list-style-type: none"> (1) <u>Significant reduction</u> of GHG emissions generated by fossil fuels. (2) Introduction of RAPS systems as an appropriate RET in the Amazon region of Perú. (3) Promote the participation of the <u>private sector</u> in RE projects (rural electrification). (4) Strengthen knowledge about RE and specifically RAPS systems through a participatory approach among all stakeholders. (5) Demonstrate RAPS systems sustainability and replicability. 	<p>Indicators:</p> <ol style="list-style-type: none"> (1) Investment in RET takes place. (2) Local stakeholders are active in RE activities. (3) More pre-investment activities in RE are carried out. (4) Less fossil fuels are used. (5) RE fuels productive activities in target communities.

<p>10. Project outcomes:</p> <ol style="list-style-type: none"> (1) One RAPS system working in Padre Cocha and another one in Indiana. (2) System design and project management documents have been prepared. (3) Establishment of framework--financial, technical, and institutional--for replicability of the system in other rural areas. (4) Awareness created and information shared with other regions. (5) Replicability of experiences in support of productive uses. 	<p>Indicators:</p> <ol style="list-style-type: none"> (1) 2 newly installed systems (off-grid). (2) Business entities mobilized for renewable energy. (3) Increased use of RET. (4) Renewable energy being used at household and productive levels. (5) Improved documentation for project administrators and/or investors. (6) Improved project-cycle management. (7) Project implementation plan exists. (8) Interest in other communities and regions exists for replication of the project concept.
<p>11. Project activities to achieve outcomes:</p> <ol style="list-style-type: none"> (1) Installation of RAPS units in Indiana and Padre Cocha. (2) Identification and training of private RAPS system administrators. (3) Energy efficiency program. (4) Identification and promotion of income generating activities. (5) Coordination, monitoring and evaluation. (6) Facilitate policy dialogue for RE and rural electrification in concordance with the international climate change policy. 	<p>Indicators:</p> <ol style="list-style-type: none"> (1) RE services are available, reliable, and cost effective. (2) Properly sized RAPS systems exist. (3) Private RAPS administrators operating each hybrid system (4) Workshops, policy dialogues, and roundtables held in Iquitos and Lima on international climate change policy.
<p>12. Estimated budget (in US\$ or local currency):</p> <p>MSP GEF: US\$ 747,500 Co-financing: US\$1,922,199 TOTAL: US\$2,669,699</p>	
<p>INFORMATION ON INSTITUTION SUBMITTING PROJECT BRIEF</p>	
<p>13. Information on project proposer: ILZRO RAPS Perú is the project proposer. ILZRO RAPS Perú is a not-for-profit association based in Iquitos, that was created in 1999. The members of ILZRO RAPS Perú are ILZRO RAPS LLC and Doe Run of Perú. ILZRO RAPS LLC is a single member, limited liability company formed in North Carolina, USA. The single member of ILZRO RAPS LLC is the International Lead Zinc Research Organization, Inc. a not-for-profit organization which conducts research and implements projects on behalf of lead and zinc users and producers throughout the world. Formed in 1958, ILZRO works in such areas as electrochemistry, coatings, diecasting, chemicals, environment, and health. Doe Run Perú is a Peruvian corporation engaged in the mining, smelting, and refining of lead and other metals.</p>	
<p>14. Information on proposed executing agency (if different from above): Same as project proposer.</p>	
<p>15. Date of initial submission of project concept: August 1999</p>	
<p>INFORMATION TO BE COMPLETED BY IMPLEMENTING AGENCY:</p>	
<p>16. Project identification number: PER/00/G35</p>	
<p>17. Implementing Agency contact person: Mr. Nick Remple, UNDP/RBLAC, phone: (212) 906-5426; fax (212) 906-6688</p>	
<p>18. Project linkage to Implementing Agency program(s): This project links to other initiatives directed to utilization of renewable and alternative energy in the country, namely two PDF-A and a FS directed to the utilization of barter of coffee and cassava foliage meal to solar energy financing, obtaining biofuels and non-wood cellulose fiber from agricultural</p>	

waste and the establishment of Photovoltaic-based Rural Electrification.

1. BACKGROUND

Perú covers 1,285,220 square kilometers and is the third largest country in South America. Its population is over 26.4 million (July 1999 estimates). Three well-defined geographical areas divide the country: (1) a narrow western coastal plain characterized by 2,414 kilometers; (2) high and rugged Andes in the middle; and (3) eastern lowland jungle of Amazon Basin.

The proposed RESPAR project will be implemented in Region Loreto, which is located in the northeastern part of Perú, in the heart of the Peruvian Amazon Basin. Region Loreto borders with Colombia and Ecuador in the north; Brazil in the east; Amazonas and San Martín regions in the west; and Ucayali region in the south. Loreto covers a surface area of 339,918.55 square kilometers, and is divided into ten provinces. Such extensive area makes Loreto an important region geopolitically, not only because of its oil production that contributes to the Peruvian economy, but for its environmental and ecodiversity features that call for clean, cost-effective, and sustainable strategies for rural development.

Region Loreto, has a total population of 859,960 (INEI 1999) of which 26% are of indigenous descent. Iquitos, a land-locked capital city of Region Loreto, is the fifth largest city in Perú with 324,000 inhabitants (INEI 1999). The city is the major center of economic activity and development in the Amazon Basin of Perú. Commercial ties with Brazil, Colombia, and other countries are possible through its international airport and fluvial ways along the Amazon River and its tributaries.

Region Loreto has approximately 3,000 communities with access to electricity. Statistical data from the Ministry of Energy and Mines (MEM) shows that 147 of these communities have functioning diesel generators operating in a range of 30 to 500 kilowatts, which provide electricity for limited periods of time.

The Peruvian Amazon basin includes the regions of Loreto, Madre de Dios, Ucayali, Amazonas, and San Martín. It covers an area of over 650,000 square kilometers, and includes 8,500 communities in a rainforest region largely inaccessible except by boat or seaplane, of which only 10% have access to electricity using diesel generators and minigrids.

For most rural dwellers in the Loreto region, the use of candlesticks, torch pines, and dry-cell batteries for illumination purposes is still very common amounting to approximately \$10 a month for illumination loads. Well over 80% of the rural population in the region does not have access to energy services and needed to generate income and foster development.

After a comprehensive survey requested by MEM and conducted by project proposers for the selection of target communities, five communities were chosen in the Amazon Region, two of which were selected due to their geographical location, financial, technical, and social issues: Padre Cocha (250 families; 1,785 pop., 1999) and Indiana (2,300 families; 16,536 pop. - 1999) mostly rural.

The RESPAR project will be executed by ILZRO RAPS PERU (IRP), a private not-for-profit association based in Iquitos. The initiative started with the signing of a MOU in 1997 (see Annex 1) between project proposer and DEP/MEM which clearly stated its support to enhance its off-grid electrification expansion in rural settings by introducing RAPS technology. Later on, the initiative obtained the institutional support from the Regional Government of Loreto (CTAR

Loreto), the private solar industry (Solarex/Ferreyros), and local NGOs. On September 3, 1999, the project was endorsed by CONAM, the GEF national focal point (see Annex 2). The concept paper was cleared by UNDP-NY on March 17, 2000 (see Annex 3).

2. RATIONALE AND OBJECTIVES

GOP's National Electrification Plan has been implemented using two approaches: expansion of the national grid and RE in remote rural areas. The expansion of the grid is accomplished through governmental and private companies, and is limited to highly populated areas. Small rural areas are not attractive to private investors since the investment is not sustainable due to low income per capita of villagers. The Government of Perú (GOP) has opted to use RE in the Amazon basin, including Loreto region, and has implemented a program to provide SHS to single dispersed households that do not have any form of electricity. For larger areas with small independent grids powered by diesel generators, the most viable RE solution is the use of hybrid RAPS systems. The proposed RAPS systems are included into the NEP and complement the GOP's RE initiatives by taking an innovative approach through the use of modern technological advancements in off-grid diesel-PV hybrid systems. Each RAPS system uses the existing diesel generator and a centralized solar panel system to generate energy along with extended-life gel batteries to storage the energy and supply a 24-hour electricity service. This service will foster income generating activities that allow current users to increase per capita income, thus making private investments on RAPS sustainable with the payments of the tariffs for their consumes of electricity.

Given the geography of Region Loreto, an extensive plateau with no waterfalls or aeolic sources, DEP/MEM determined that solar energy is the natural RE to develop in the region. The RESPAR project will install off-grid Diesel-PV hybrid with state-of-the-art storage batteries that will store the energy. The systems will deliver a total of 900 kWh per day (300 kWh per day in Padre Cocha and 600 kWh per day in Indiana). The systems will include six 150 kWh per day RPS-150 power modules (two in Padre Cocha and four in Indiana) into the diesel generators in Padre Cocha and Indiana. Each RPS-150 module consists of a large battery bank, power electronics and controls package housed into a 6-meter (20ft) ISO shipping container. Each unit is connected to a PV central system. The batteries--the real innovation of the RESPAR project--are gelled electrolyte batteries specifically designed for heavy cycling RE applications, with an average life span of 7-8 years under tropical weather of about 40 degrees Celsius and free maintenance. The spent batteries will be properly removed from the communities and sent to a recycling center out of the Amazon basin.

The proposed RESPAR project is consistent with the GEF operational program No. 6, "Promoting the adoption of renewable energy by removing barriers and reducing implementing costs." The project will promote small RAPS operators with strong technical, financial, and managerial background in order to overcome barriers and foster the sustainability and replicability of the system. GEF support is required to remove the identified barriers to reduce the GHG emissions through the demonstration of the sustainability of RAPS systems, and management required for their implementation, which will provide 24-hour electricity for income generating activities.

The following table shows a comparison of current options for energy services in remote areas of Region Loreto versus the RAPS systems option.

	Prime Diesel	SHS	RAPS Systems
Energy Generation	<u>Diesel</u> Limited energy output	<u>Single panel</u> Very limited energy output	<u>Hybrid Diesel-PV</u> Higher energy output
Energy Storage capacity	<u>None</u> Excess energy wasted Limited operation	<u>Limited</u> Excess energy wasted Limited operation	<u>Gel-lead batteries</u> Energy stored 24 hour service
Economic Empowerment	Domestic Educational Institutional (Public Lighting)	Domestic Educational Institutional (Public Lighting)	Domestic Educational Institutional (Public Lighting) Productive and Commercial uses
GHG Emissions	High GHG emissions	None GHG emissions	Low GHG emissions

* Power is limited by the high fuel cost and its delivery, and the economic constraints of users.

Main Objective: To build and strengthen the capacity of public and private sectors for development of renewable energies in the Amazon Region specifically using off-grid Diesel-PV systems, and with the purpose to demonstrate the sustainability and replicability of RAPS systems. The proposed project is aimed to demonstrate that the innovative approach and technology of RAPS systems coupled with the extended life of gel batteries can be replicated in Perú and elsewhere.

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

- i. Reduce GHG emissions generated by current fossil fuel uses.
- ii. Provide access to electricity service to remote localities of Loreto Region.
- iii. Promote the development of renewable energy applications aimed at productive uses of electricity in the area and with relevance to income generating activities that use local available resources.
- iv. Promote institutional organizational schemes for RE-based private operators.
- v. Activate a national policy dialogue on RE and rural energy services.
- vi. Promote the private sector participation to supply energy to remote areas with RAPS systems.

It is expected that the proposed RESPAR project will reduce approximately 16,412 tons of carbon dioxide throughout the 20-year life cycle period. In addition, the potential for a large-scale implementation in 150 communities with existing gensets already identified in the Loreto Region could reduce up to 932,243 tons of CO₂.

3. IDENTIFICATION OF BARRIERS

Throughout project preparation and development, the project proposer has identified a variety of barriers that constitute and remain an obstacle for preparation and development of RE projects to be implemented in Perú. For the case of the RESPAR project, these barriers can be classified as follows:

Institutional Barriers:

- i. There is no integral plan nor a national strategy that involves public and private sector in order to implement RE systems in rural electrification.

- ii. Lack of legal framework to promote the private sector investments in electrical infrastructure to supply energy to rural and remote areas. Lack of well-trained private operators to manage rural electrical systems.
- iii. RE are not integrated into a more wider and comprehensive rural development programme.

Technical Barriers:

- iv. Lack of capacity and knowledge of the know-how for building, operating, and maintenance of RAPS systems.
- v. Perceived technology performance uncertainty and risk.
- vi. Limited qualified human capacity in the region.
- vii. The rural area largely inaccessible and the relative remoteness of most communities coupled to the relative lack of local engineering services does not facilitate broad access to RAPS in the region.
- viii. Lack of technical RAPS standards and norms.

Financial Barriers:

- ix. RAPS Systems and other RET investments imply high initial costs.
- x. There is limited payment capacity because of the high poverty level in the target areas.
- xi. The Government does not have a strategy for climate change mitigation.
- xii. The capacity of local development banks to finance RE systems like RAPS systems is non-existent.

Informational Barriers:

- xiii. Lack of information. Consumers, managers, engineers or planners may lack information on RAPS characteristics, economic and financial costs, and benefits.
- xiv. Lack of information on RAPS project cycle development activities.
- xv. There is limited knowledge on the potential markets for RAPS services, such as the capacity to pay and the potential productive uses of renewable services

4. EXPECTED PROJECT OUTCOMES

The project expects to increase the use of RETs, which benefits the global environment and the local communities, and incorporate them into the development of energy services.

After three years of implementation, it is expected that the RESPAR project will produce the following outcomes:

- i. One RAPS unit working in Padre Cocha and another unit in Indiana.
- ii. Financial framework for replicability of RAPS system in other rural and remote areas including (a) the establishment of tariff structure and (b) lessons learned on how productive activities guarantee sustainability.
- iii. Technical framework for replicability of RAPS system in other rural and remote areas: (a) manuals of assembling, installation, operation and maintenance for replica RAPS systems (b) engineers and local technicians qualified, (c) local population with reasonable qualification.
- iv. Institutional framework for replicability of RAPS system in other rural and remote areas: (a) guidelines for selecting private operators, (b) guidelines for qualifying, modules of training established, (c) determination of the knowledge that the private operators should

- have: administration, tariff models, collection and sanctions, supplies, general accounting, budgets, cash flow, operation and maintenance.
- v. A framework to generate productive uses of energy to guarantee the sustainability of projects based on RAPS systems.
 - vi. Awareness created and information shared regarding the expansion of RAPS systems into other areas with similar circumstances as the target areas.
 - vii. Local organizations strengthened and potential new enterprises fostered through linkages created among actors involved in financing, engineering services, and technology suppliers.
 - viii. Awareness created and dissemination of information and best practices at the regional level.
 - ix. Rural RE issues included and promoted in the national policy dialogue in the energy sector.

5. PROJECT ACTIVITIES

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

Activity 1: Installation and operation of RAPS systems in Indiana and Padre Cocha

From the onset of the initiative, IRP in collaboration with the Central Government (MEM/DEP) and the Regional Government (CTAR Loreto) conducted in-depth field studies to identify adequate target communities. Indiana and Padre Cocha were selected based on social economic, technical and geographical aspects combined with strong support to the project by community leaders and local governments.

On the basis of the studies, *Preliminary Design Analysis: Engineering Feasibility Study (January 1998)* and *Project Implementation Plan (June 1998)*, six 150 KWh/day power modules will be installed at Padre Cocha (300 kWh/day) and Indiana (600 kWh/day). The modular community power RAPS systems will be integrated to the existing diesel generators and grids. These modules will be shipped from abroad and assembled locally, under the direct supervision of a prime contractor, using local labor and parts where possible. Local contractors for site preparation, transportation, construction, operation and maintenance will also be used in order to transfer the RAPS technology and involve the community. The activity is schedule for completion within eleven months after obtaining financing.

The components of this activity are designed to facilitate the installation of RAPS replica systems. The following table shows in detail the eight different components for this activity:

Component	Total Cost US\$	GEF financing US\$	Other Sources US\$
1. Materials/Equipment: batteries, power electronics, control electronics, shelters, array structure, satellite monitoring equipment, wires and misc. hardware, 90kW PV modules. Subsystem manufacture and testing in the U.S.	977,000	0	977,000
2. International Shipping: from the U.S. to Iquitos-Peru, custom house duties.	48,000	0	48,000
3. Project Engineering: project manager (PM), project engineers, programming support.	185,600	185,600	0

Component	Total Cost US\$	GEF financing US\$	Other Sources US\$
4. Travel and Other Direct Costs: travel, assembly (first module), testing, PM Perú expenses.	51,200	51,200	0
5. Perú Costs: local assembly in Perú, shipping to sites, foundations (array and shelter), installation labor, via local subcontractors with the general supervision from the project manager.	168,000	168,000	0
6. Technical framework for replicability of RAPS system: training to local engineers, technicians and inhabitants; manuals for assembling, installation, operation and maintenance for replica RAPS systems.	120,000	120,000	0
7. Project Design Fee: RAPS technical standards and norms, transfer of RAPS technology.	125,200	125,200	0
8. Fuel, maintenance service – travels to the sites, and Non-Recurring	432,768	50,000	382,768
TOTALS (in US\$)	2,107,768	700,000	1,407,768

This activity accounts for nearly 90% of project funds. Total cost of this activity amounts to \$2,107,768 of which \$700,000 will be solicited from GEF.

Activity 2: Identification and training of private RAPS system operators

From the onset of the project, IRP will identify and train RAPS operators that will operate and maintain RAPS systems once they are installed, tested and fully operative. Private operators will be attracted if the RAPS systems are sustainable with revenues from the tariffs and the systems are profitable. RAPS operators will be trained in all the activities referred to operate RAPS systems efficiently, including all the necessary matters for their administration, tariff models, collection and sanctions, supplies, general accounting, budgets, cash flow, operation and maintenance. RAPS private operators will be identified locally in order to be culturally sensitive to clients. The results will be useful for replica systems supplying the directives to select RAPS private operators and the training modules. Total cost of this activity amounts to \$35,000 of which \$7,500 will be solicited from GEF

Activity 3: Energy efficiency program and establishment of tariff structure

The proposed initiative will design the tariff structure and will inform the same to the community for its complete understanding. It is expected to have the following tariff structure: domestic (three levels), commercial (two) productive (two) and institutional (one). In addition, this activity will inform the community about the energy limitations for each level, as well as the controls and sanctions established for a suitable and efficient energy supply.

As critical component of this activity, ILZRO RAPS PERU will promote a strong energy efficiency program among all the community households and other commercial, productive and institutional customers that will be served by the RAPS systems. Due to past experiences where

end users tend to waste newly available energy, the RESPAR project will conduct an awareness campaign and disseminate information on energy savings and the efficient use of energy in order to minimize waste or misuse. In addition, the project will coordinate closely with the Energy Saving Program (PAE) of the Ministry of Energy and Mines to share lessons learned and successful approaches in rural settings. Finally, this energy efficiency program will include the design of an innovative financial mechanism to supply electrical components such as meters, fuses, and lamps. Total cost of this activity amounts to \$31,800 of which \$5,000 will be solicited from GEF.

Activity 4: Identification and promotion of income generating activities

The identification and promotion of income generating activities for the inhabitants of the target communities will be crucial for the sustainability of the RAPS systems with the payment of tariffs. The productive activities to be promoted will be compatible with the ancestral habits of the inhabitants, with a rational use of the natural resources and with small energy consumption. The project aims to empower the inhabitants of both communities with sufficient knowledge that will allow them to start and manage their own small businesses. Fishery, crafting, pottery, agriculture, carpentries, sewing shops, restaurants, mini-markets and others are all economic activities that will be greatly benefited with the advent of electricity.

Fishery: One of the most viable productive activities. Even though the local fish resource is abundant and of good quality, fishing is currently limited to the auto-consumption due to the lack of preservation systems. Electricity will make it possible to run ice makers and refrigerating systems that will extend the life cycle of goods to be marketed and distributed in nearby places, thus increasing the production.

Crafting: Tourist-oriented activities such as handcrafted souvenirs, mostly made by women. Electricity will extend the number of hours of lighting thus increasing productivity.

Pottery: Traditionally, Padre Cocha has been known for producing pottery items made of natural colored clays. The material is abundant and available at no cost. Lighting will allow an increased production of these items. These activities will be promoted with marketing strategies devised to introduce such items in the tourist segment of the region.

Agriculture: Electricity supply will allow the process of products such as vegetables, medicinal plants and fruits. Potential activities include drying, milling, packing, and others resulting in a reduction of transportation costs and the risk that these perishable products may expire before arriving to the consumers. The final products can be flours, meals, soaps, dry juices, marmalades, medicinal products, among others.

The project will carry out a number of workshops and training sessions prepared to create and foster business attitude among local stakeholders and market knowledge. It is planned to joint efforts with other NGOs and the private sector into the joint venture schemes that represents financial, technical and/or marketing advantages for the productive activities of the inhabitants. Lesson learned from this activity will be disseminated in order to facilitate the replication and guarantee the financial sustainability of the RAPS systems. Total cost of this activity amounts to \$44,500 of which \$10,000 will be solicited from GEF.

Activity 5: Coordination, monitoring and evaluation

ILZRO RAPS PERU as executing agency will perform this activity bringing all the parties involved in the RESPAR project a concerted way to coordinate efforts and monitor and evaluate the progress of the project in agreement with its objectives and plans. In this way this activity will be performed in agreement with the inhabitants of the communities, the GOP, the Regional

Government of Loreto, the MEM's National Electrification Plan, the private sector, and NGOs. This activity will specifically carry out periodic round tables, discussions, and field visits in order to have a smooth implementation. Also midterm and final evaluations will be implemented to assess the compliance of technical specifications as well as achievement the engineering and socio-economic objectives.

In addition, a strong technical monitoring and evaluation component will be in place. This effort will include sophisticated satellite equipment to monitor the operation of the RAPS systems and each of their electrical components. This technical monitoring is suitable considering that the RAPS systems, pilot and replica, will be installed in remote areas. The satellite will make possible a permanent control and will capture technical data to improve the design of the RAPS replica systems.

The purpose of the RESPAR project is to monitor the RAPS systems performance under specific conditions to be encountered in the Amazon jungle. The electrical components, battery bank, energy conversion system, PV panels and the control systems will be monitored separately and as an integral system. Particular challenges include the hot, humid weather and the difficult supply of fuels and technical parts. Finally this activity will establish the monitoring of the GHG emissions reduction. The cost of this activity amounts to \$70,000 of which \$20,000 will be solicited from GEF.

Activity 6: Policy dialogues for renewable energy and rural electrification

MEM/DEP has strongly endorsed the RESPAR project. The proposed RAPS systems are included into the National Electrification Plan for rural and remote areas of the Amazon Basin. Given the potential for replicability in at least 150 rural communities in Region Loreto with similar settings like in the proposed target communities, a constant dialogue in the form of forums and workshops are planned with the participation of the GOP and key national and local public and private organizations to progress in policy dialogues for renewable and rural electrification in the basis of the experience. The workshops planned will be jointly coordinated and sponsored with the mentioned institutions. Complementary, the proposed RESPAR project has been recognized by CONAM and FONAM officials as a RE model project to introduce the concept of GHG mitigation in Perú. A capacity building program will be developed to progress these matters. Solicited GEF resources amount to \$5,000 that will support the 25,000 from other sources targeted for this Activity 6.

See Annex 4 for the relationships between identified barriers and project activities.

6. SUSTAINABILITY OF THE INITIATIVE

The long-term sustainability of the project in favor of RAPS systems will be enhanced through:

- i. Further RE investment encouraged by improved living standards of the community.
- ii. A financing structure whereby private and public investments cover the initial investment; and the user fees, through the tariff structure, cover the O&M costs.
- iii. Dissemination of the hands-on experience and the know-how for project development.
- iv. Increased human and institutional capacity for design, development, implementation, monitoring and evaluation of RAPS systems.
- v. Local linkages-networks for replicability of concepts for RE services for other communities in the Amazon region of Peru.

- vi. Cost reductions on implementation and operation of RAPS systems as familiarity is achieved in the region.
- vii. Possibility to leverage international finance through climate change related mechanisms.

7. RISKS

The proposed initiative presents two main types of risks due to the institutions in the region and the characteristics of the target area and its population.

Institutional Risks

To be successful, the project needs inputs and cooperation from several actors from different administrative levels within the public and private sector. Proper incentives need to be developed and put in place to secure full cooperation in the short and long term. The project addresses this risk by establishing an advisory council where representatives of the project funding contributors will provide advice and assistance to IRP.

Financial risks

The greatest concern for this project is the ability of the community to pay for the energy service delivered. The level of income in Indiana and Padre Cocha is low and the proposed initiative addresses this risk by promoting income-generating activities.

8. STAKEHOLDER INVOLVEMENT AND SOCIAL ASSESSMENT

Stakeholder Identification

Since 1997, the project proposer has identified and worked with key participants that include the following agencies: GEF focal point in Peru (CONAM); UNDP-Peru; MEM and DEP in charge of the National Electrification Plan; Solar Energy Industries Association (SEREF/SEIA); the Regional Government of Loreto (CTAR Loreto); the National Fund for Social Programs (FONCODES); Solarex/Ferreyros; Doe Run of Perú; Indiana and Padre Cocha communities; and local NGOs.

Most of the stakeholders identified are already involved in the development of small scale off-grid rural energy service projects at different levels. All of them have already been involved with the proposed RESPAR project and have given it strong support.

Social and Participatory Issues

From the onset of the initiative, the inhabitants of Indiana and Padre Cocha have expressed strong support for the implementation of this project. See Annex 5 for letters of support. By ensuring empowerment, and addressing training and strengthening of income generating activities, major emphasis will be placed on demonstrating the sustainability and replicability of the project along the Amazon region of Perú

9. INCREMENTAL COSTS AND PROJECT FINANCING

The main objective of the RESPAR project relates to the process of strengthening the local capacity of public and private sectors for development of RAPS systems in the Amazon Region, and to complement GOP's efforts on its National Electrification Plan in rural areas through removing institutional, technical, financial, and informational barriers.

The proposed RESPAR project aims to remove these barriers and to create the required conditions for a clean economic development in rural areas.

Six activities have been designed to remove the identified barriers to increase and sustain development of RAPS systems. All of the incremental costs requested are related to the costs of removing the barriers identified. The incremental costs of each activity are briefly summarized in the following matrix.

INCREMENTAL COST MATRIX - RESPAR PROJECT

Activity	Cost Category	Cost (US\$)	Domestic Benefit	Global Environmental Benefits
1. Installation and operation of RAPS systems	Baseline	934,200	People of Indiana and Padre Cocha receive electricity service 5 hours per day.	None
	Alternative	2,107,768	People of Indiana and Padre Cocha receive electricity service 24 hours per day.	16,412 tons of CO2 reduced directly in 20 years. Elimination of barriers to RAPS related to technical capacity, standards and perceived risks.
	Increment (Alternative - Base)	1,173,568	Increase in the electricity service by 19 daily hours. Valued at US\$ 473,568 (equipment, fleet, etc.)	16,412 tons of CO2 reduced directly in 20 years. Capacity and technical barriers and perceived risks removed. Valued at US\$ 700,000
2. Identification and training of private RAPS system operators	Baseline	27,500	Training related to rural electrification through conventional diesel systems and traditional administrative models.	None
	Alternative	35,000	Training of RAPS private operators using innovative administrative models.	Elimination of institutional and capacity barriers. Development of replicable models for RAPS administration, operation and maintenance.
	Increment	7,500	None	Institutional and capacity barriers removed. Replicable administration and O&M models developed. Valued at US\$7,500

INCREMENTAL COST MATRIX - RESPAR PROJECT (Cont.)

Activity	Cost Category	Cost (US\$)	Domestic Benefit	Global Environmental Benefits
3. Energy efficiency program and establishment of tariff structure	Baseline	0	Energy service is provided with traditional fixed tariffs and with low efficiency.	None
	Alternative	31,800	Energy service is provided using innovative tariff structures and with high efficiency.	Elimination of financial barriers. Improvement of sustainability.
	Increment	31,800	Improved availability of electricity due increased efficiency. Valued at US\$ 26,800.	Financial barriers removed and sustainability guaranteed. Valued at US\$5,000.
4. Identification and promotion of income generating activities	Baseline	34,500	Standard of living of the people improved through various income generation activities.	None
	Alternative	44,500	Standard of living of the people improved through income generation activities related to energy use and RAPS program.	Improvement of RAPS financial sustainability through development of productive income generating activities.
	Increment	10,000	None	Financial sustainability of RAPS improved through development of productive income generating activities. Valued at US\$10,000
5. Coordination, monitoring, and evaluation	Baseline	0	None	None
	Alternative	70,000	Coordination and monitoring of activities producing domestic benefits	Monitoring of global benefits. Coordination of activities related to global benefits
	Increment	70,000	Activities producing domestic benefits coordinated and monitored. Valued at US\$ 50,000.	Global benefits monitored. Project coordination related to global benefits guaranteed. Valued at US\$ 20,000.

INCREMENTAL COST MATRIX - RESPAR PROJECT (Cont.)

Activity	Cost Category	Cost (US\$)	Domestic Benefit	Global Environmental Benefits
6. Policy dialogues for RE and rural electrification	Baseline	25,000	Rural electrification based mainly on diesel generators, grid extensions and SHS.	Issues on RE and rural areas partially integrated in policy making.
	Alternative	30,000	Rural electrification based mainly on RAPS, grid extensions and SHS.	Strong policy environment in support of RAPS. Elimination of institutional barriers.
	Increment	5,000	None	Improved policy environment in support of RAPS. Institutional barriers removed. Valued at US\$5,000
TOTAL	Baseline	1,021,200	Rural electrification based mainly on diesel generators, grid extensions and SHS. Rural villages using diesel generators receive electricity some 5 hours per day. Income generating activities not related to electrification by RAPS systems.	None
	Alternative	2,319,068	Rural electrification based mainly on RAPS grid extensions and SHS. Villages receive 24 hours of electricity. Improved efficiency in electricity use.	Barriers for RAPS replication removed. Potential to mitigate GHG emissions in 150 already identified communities by 932,243 tons of CO2 in 20 years unleashed.
	Increment	1,297,868	Increased availability of electricity. Improved efficiency. Valued at US\$ 550,368	Barriers for RAPS replication removed. Potential to mitigate GHG emissions in 150 already identified communities by 932,243 tons of CO2 in 20 years unleashed. Additional global benefits from replication outside of Perú. Valued at US\$ 747,500.

The baseline is defined as the cost of both generators, fuel consumption for 5 hrs/day and maintenance. The alternative costs include gensets operating 2.75 hrs./day plus RAPS installation, operation, and replacement of batteries in years 8 and 16. Calculations are considering a 20-year project life.

10. PROJECT BUDGET

The following table presents the budget for the completion of the proposed initiative over a period of three years.

Component	GEF	Other Sources	Totals
Personnel	\$185,600	\$227,852	\$413,452
Subcontracts	\$344,400	\$61,899	\$406,299
Workshops and Training	\$147,500	\$113,800	\$261,300
Equipment	0	\$977,000	\$977,000
International Shipping	0	\$48,000	\$48,000
Travel	\$50,000	\$48,292	\$98,292
Coordination, Monitoring & Evaluation	\$20,000	\$50,000	\$70,000
Miscellaneous	0	\$44,738	\$44,738
SUBTOTAL	\$747,500	\$1,571,581	\$2,319,081
Project Development* (<i>as of March 2000</i>)		\$350,618	\$350,618
TOTAL	\$747,500	\$1,922,199	\$2,669,699

* Includes preliminary engineering, local management in Perú, legal fees, and travel expenses.

11. PROJECT IMPLEMENTATION PLAN

The project will be executed by IRP (see Annex 6 for Agreement between IRP and MEM/DEP and Annex 7 for MEM Ministry Resolution). IRP staff will directly manage the implementation process and will provide technical input from the advisory council and consultants related to the implementation of the proposed activities.

As part of project preparation, the proposers have already produced a Project Implementation Plan on June 1998, which will be updated accordingly due to minor changes on cost estimates. The following table shows the detailed activities to be performed during the first 11 months as part of materials, installation, and engineering activities.

ACTIVITY 1: Installation of RAPS Systems

	Month										
	1	2	3	4	5	6	7	8	9	10	11
Phase I – Final Engineering Design											
Prepare final engineering design.											
Prepare final software specifications (control and host/monitoring).											
Prepare draft operations / billing plan.											
Finalize satellite data link design.											
Get firm commitments from all vendors, including cost and delivery.											
Set up subcontracting arrangements and tasks for Peru.											
Major Components design review.			x								
Identify any long-lead items and order.											
Do final site surveys and draw up detailed site plans.											
Do formal energy survey at each site.											
Hold village seminars to raise awareness and set rules											
Finish with design review in Peru.				x							
Coordinate with other agencies as necessary.											
Ship Peruvian materials to US for first two units.											
Prepare Energy Management Plan.											
Phase II - Production – Unit 1											
Order materials, specifying shipment to either Peru or USA.											
Fabricate Unit 1, test, complete "as-builts" and ship to Peru.											
Develop quality control plan for Peruvian-built system.											
Develop commissioning tests and procedures.											
Get shop in Peru ready to build units.											
Begin site preparation at all sites.											
Begin testing of satellite data link.											
Phase III - Production – Units 2 - 6											
Build units 2-6, and test per QC plan.											
Continue site preparation at all sites.											
Begin implementing energy management plan.											
Begin training for maintenance contractor.											
Phase IV - Installation – Sites 1-2											
Install PV array at site 1.											
Install 2 units at first site.											
Connect to diesel generator and perform commissioning test.											
Install satellite monitoring system and begin commissioning.											
Install PV array at site 2.											
Install system at site 2.											
Connect to diesel generator and perform commissioning test.											

At the end of month 11, two RAPS systems--one in Padre Cocha and one in Indiana--will be installed and ready for operation. The following table shows the work-plan for the rest of project activities.

PROJECT ACTIVITIES: Months: 6 - 36											
ACTIVITIES	6	9	12	15	18	21	24	27	30	33	36
2. Identification and Training of RAPS System Administrators	[Bar from 6 to 24]										
3. Energy Efficiency Program	[Bar from 9 to 36]										
4. Identification and Promotion of IG Activities	[Bar from 9 to 36]										
5. Coordination, Monitoring and Evaluation	[Bar from 6 to 36]										
6. Policy Dialogues for RE and Rural Electrification	[Bar from 12 to 36]										

12. PUBLIC INVOLVEMENT

From the onset of project preparation, regional authorities, local elected officials, and inhabitants of Padre Cocha and Indiana have shown and expressed their support to the RESPAR project. A strong participatory approach including all stakeholders will be followed for both project target sites.

The proposed initiative will conduct community consultations as well as regional and national workshops. In general IRP staff will conduct a variety of consultations such as meetings with

private operators and municipality representatives to obtain feedback on an ongoing basis. A permanent discussion forum will be set up in Iquitos as a venue for continued feedback from community members. Community committees will be organized with the participation of local leaders.

13. MONITORING, EVALUATION AND DISSEMINATION

The project will be closely monitored in accordance with UNDP established monitoring procedures. Consequently, UNDP-Perú will provide ongoing performance monitoring with backstopping from UNDP technical staff from GEF unit in New York. In addition, the project will have a satellite-based monitoring system that will allow 24-hour monitoring of the whole RAPS system, including battery operation and discharge rates.

A mid-term evaluation is scheduled after 18 months of implementation; and a final evaluation is planned two months prior GEF grant termination. External evaluators will be brought to the field to conduct a participatory evaluation with input from IRP staff, local governments, regional government, and other project stakeholders accordingly.

In addition, IRP will monitor and verify greenhouse gas emission reductions to quantify savings for CDM and/or AIJ purposes. A comprehensive description of evaluation procedures with full compliance with UNFCCC will be detailed in the final Project Document Preparation.

14. PROJECT TECHNICAL REVIEW

Not applicable (requested GEF support under \$750,000)

ANNEX 1

Memorandum of Understanding with DEP/MEM

ANNEX 2

Endorsement from CONAM (GEF Focal Point in Perú)

ANNEX 3

Letter of Concept Paper Clearance from UNDP-NY

ANNEX 4

Relationships between Identified Barriers and Project Activities

Relationships between Identified Barriers and Project Activities

	<i>Activity 1</i> Installation and operation of RAPS systems	<i>Activity 2</i> Identification and training of private RAPS system operators	<i>Activity 3</i> Energy efficiency program and establishment of tariff structure	<i>Activity 4</i> Identification and promotion of income generating activities	<i>Activity 5</i> Coordination, monitoring and evaluation	<i>Activity 6</i> Policy dialogues for renewable energy and rural electrification
<i>Institutional Barriers:</i>						
xvi. There is no integral plan nor a national strategy that involves public and private sector in order to implement RE systems in rural electrification	X	X	X		X	X
xvii. Lack of legal framework to promote the private sector investments in electrical infrastructure to supply energy to rural and remotes areas.		X	X		X	X
xviii. RE are not integrated into a more wider and comprehensive rural development programme		X	X	X	X	
<i>Technical Barriers:</i>						
xix. Lack of capacity and knowledge of the know-how for building, operating, and maintenance of RAPS systems.	X	X	X		X	
xx. Perceived technology performance uncertainty and risk.	X	X	X		X	
xxi. Limited qualified human capacity in the region.	X	X	X		X	
xxii. The rural area largely inaccessible and the relative remoteness of most communities coupled to the relative lack of local engineering services does not facilitate broad access to RAPS in the region.	X	X	X		X	
xxiii. Lack of technical RAPS standards and norms.	X	X				

Relationships between Identified Barriers and Project Activities (Cont.)

	<i>Activity 1</i> Installation and operation of RAPS systems	<i>Activity 2</i> Identification and training of private RAPS system operators	<i>Activity 3</i> Energy efficiency program and establishment of tariff structure	<i>Activity 4</i> Identification and promotion of income generating activities	<i>Activity 5</i> Coordination, monitoring and evaluation	<i>Activity 6</i> Policy dialogues for renewable energy and rural electrification
<i>Financial Barriers:</i>						
xxiv. RAPS Systems and other RET investments imply high initial costs.			X	X	X	X
xxv. There is limited payment capacity in the target areas because of the high poverty level			X	X	X	X
xxvi. The government does not have a strategy for climate change mitigation.					X	X
xxvii. The capacity of local development banks to finance RE systems like RAPS systems is non-existent.				X	X	X
<i>Informational Barriers:</i>						
xxviii. Lack of information. Consumers, managers, engineers or planners may lack information RAPS characteristics, economic and financial costs and benefits.	X	X	X	X	X	
xxix. Lack of information on RAPS project cycle development activities.	X	X	X	X	X	
xxx. There is limited knowledge on the potential markets for RAPS services, such as the capacity to pay and the potential productive uses of renewable services.		X	X	X	X	

ANNEX 5

Letters of Support

ANNEX 6

Agreement between IRP and DEP/MEM

ANNEX 7

MEM Ministry Resolution

ACRONYMS

CTAR Loreto	Regional Government of Loreto
CONAM	National Environmental Commission (Focal Point) in Perú
DEP/MEM	Directorate Executive of Projects/Ministry of Energy and Mines
FONAM	National Environmental Fund in Perú
GHG	Greenhouse Gases
GEF	Global Environmental Facility
GOP	Government of Peru
ILZRO	International Lead-Zinc Research Organization
INEI	National Institute of Statistics and Informatics
IRP	ILZRO RAPS Peru
MOU	Memorandum of Understanding
NEP	National Electrification Plan
PAE	Energy Saving Program
RE	Renewable Energies
RESPAR	Renewable Energy Systems in the Peruvian Amazon Region
RET	Renewable Energy Technologies
SEIA	Solar Energy Industries Associations
SHS	Solar Home Systems
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

ANNEX 1

Memorandum of Understanding with DEP/MEM

MEM/DEP

ILZRO

SEIA

2/14

CARTA DE INTENCIÓN

En concordancia con la primera prioridad que tiene el Gobierno del Perú, el Programa de Lucha contra la Pobreza, las Organizaciones que suscriben el presente Documento, reconociendo el sustancial rol de la electrificación rural en el desarrollo de los pueblos, expresan su mutuo interés en desarrollar la promoción de Sistemas de Energía para Areas Rurales y Remotas (RAPS), reconociendo que esta Tecnología provee beneficios socioeconómicos y ambientales a las zonas aisladas del Perú, específicamente en la Región Loreto. (CTAR Loreto)

En tal sentido el Ministerio de Energía y Minas (MEM) y la Dirección Ejecutiva de Proyectos (DEP) del MEM vienen desarrollando el Plan de Electrificación Nacional, para extender la frontera eléctrica principalmente en las Areas Rurales y Remotas, dotando de energía a los habitantes de las comunidades alejadas del interior del país.

En este contexto de los planes de la DEP/MEM para la ampliación de la frontera eléctrica y de acuerdo a la importancia que asignan al empleo de Energías Renovables para el Desarrollo Sostenible, suscribió con la International Lead Zinc Research Organización Inc. (ILZRO) y la Solar Energy Industries Association (SEIA) el Memorándum de Entendimiento (MDE) de fecha 15 de julio de 1997 para la investigación y evaluación de proyectos RAPS.

En cumplimiento del mencionado MDE, ILZRO y SEIA han desarrollado el "Análisis de Diseño Preliminar - Estudio de Ingeniería y Factibilidad para la implementación de Sistemas RAPS en la Región Amazónica del Perú".

Este Análisis de Diseño Preliminar presentado a la DEP/MEM y a CTAR Loreto, incorpora última tecnología en los sistemas RAPS, que asegura una reducción sustancial del consumo de combustible diesel y considerables menores emisiones, mediante el desarrollo de RAPS híbridos con la utilización eficiente de los generadores diesel existentes, paneles solares, partes electrónicas y baterías especiales para el almacenaje de la energía. Asimismo menores costos de operación y mantenimiento y provisión de energía limitada por 24 horas de mayor calidad y garantía.

El "Análisis de Diseño Preliminar" incluye tres fases, el Estudio de Ingeniería y Factibilidad, la implementación de 2 a 4 sistemas demostrativos/pilotos y la replica de sistemas RAPS Híbridos en localidades de la Región Loreto y de la Amazonia del Perú.

En el Estudio de Ingeniería y Factibilidad es muy importante la selección de las localidades para la implementación de los sistemas demostrativos/pilotos, tanto para la reducción de los costos como para los asuntos relacionados al desarrollo socioeconómico de los pobladores de las localidades y su capacitación para administrar y mantener los sistemas RAPS.

Commercial in Confidence

MEM/DEP

ILZRO

SEIA

3/14

CTAR Loreto reconociendo que esta tecnología de los sistemas RAPS y la participación de DEP/MEM, ILZRO y SEIA son muy importantes para dar pasos acertados y seguros para proveer de energía a las localidades remotas de su Región, se compromete inicialmente a apoyar este Proyecto RAPS tanto financieramente como con los medios y gestiones que estén a su alcance para la mas pronta terminación del estudio e implementacion de los sistemas demostrativos.

En tal CTAR Loreto queda a la espera del Estudio de Ingeniería y Factibilidad para confirmar su apoyo financiero y se compromete desde ya en colaborar ampliamente con DEP/MEM, ILZRO y SEIA en el proceso de selección de localidades y en el trabajo socioeconómico correspondiente.

Estando a los 06 dias del mes de Febrero de 1998, las Organizaciones mencionadas firman este documento en señal de conformidad



Juan de Pawlikowski
Ing. Juan de Pawlikowski
CTAR Loreto - Presidente

Jerome Cole

Dr. Jerome Cole
International Lead Zinc Research
Organization - President



Jesús Beoutis Ledesma
Ing. Jesús Beoutis Ledesma
Dirección Ejecutiva de Proyectos
Ministerio de Energía y Minas

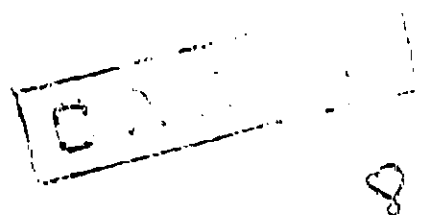
Peter Lowenthal

Sr. Peter Lowenthal
Solar Energy Industries Association
Vice President, Internaccional

Commercial in Confidence

ANNEX 2

Endorsement from CONAM (GEF Focal Point in Perú)



Lima, 02 de setiembre de 1999


Carta No. 135-99-CONAM/SE

Doctors
Kim Bolduc
Representante residente
PNUD-Perú
Presente.-

Tengo el agrado de dirigirme a usted para expresar el respaldo de CONAM en su condición de punto focal operacional del GEF en el Perú, al Proyecto "Sistemas de energía renovable en la Amazonia Peruana", presentado por ILZRO Perú.

Sin otro particular, quedo de usted.

Atentamente,


Paul Bomy
Secretario Ejecutivo



ANNEX 3

Letter of Concept Paper Clearance from UNDP-NY

10

REGIONAL BUREAU FOR LATIN AMERICA AND THE CARIBBEAN
Fax No. 212-906-6688
Telephone No. 212-906-5468

GEF ENVIRONMENT FACILITY UNIT

Facsimile Transmittal Form

DATE: March 17, 2000

No. of PAGES: 1
(including this one)

TO: **KIM BOLDUC**
RESIDENT REPRESENTATIVE
UNDP - PERU

ATTENTION: **ALBERTO GIESECKE**
ENVIRONMENT FOCAL POINT

FAX NO: **PROGRAMMED**

FROM: **Nick Remple**
Regional GEF Coordinator
e-mail: nick.rempl@undp.org

Subject: Approval of GEF Medium Size Projects

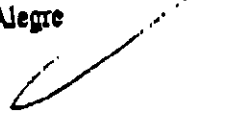
We are pleased to inform you that the concept entitled Renewable Energy Systems in the Peruvian Amazon Region (RESPAR) has been accepted by the Secretariat of the Global Environment Facility as potentially eligible for GEF funding upon further development (see attached email correspondence).

We look forward to assisting you in the formulation of this Medium Size Project.

Thanks and regards,



cc. Mr. Marcos Alegre/ Mr. Juan Carlos Alegre



ANNEX 4

Relationships between Identified Barriers and Project Activities

Relationships between Identified Barriers and Project Activities

	Activity 1 Installation and operation of RAPS systems	Activity 2 Identification and training of private RAPS system operators	Activity 3 Energy efficiency program and establishment of tariff structure	Activity 4 Identification and promotion of income generating activities	Activity 5 Coordination, monitoring and evaluation	Activity 6 Policy dialogues for renewable energy and rural electrification
Institutional Barriers:						
xvi. There is no integral plan nor a national strategy that involves public and private sector in order to implement RE systems in rural electrification	X	X	X		X	X
vii. Lack of legal framework to promote the private sector investments in electrical infrastructure to supply energy to rural and remotes areas.		X	X		X	X
viii. RE are not integrated into a more wider and comprehensive rural development programme		X	X	X	X	
Technical Barriers:						
xix. Lack of capacity and knowledge of the know-how for building, operating, and maintenance of RAPS systems.	X	X	X		X	
xx. Perceived technology performance uncertainty and risk.	X	X	X		X	
xxi. Limited qualified human capacity in the region.	X	X	X		X	
xii. The rural area largely inaccessible and the relative remoteness of most communities coupled to the relative lack of local engineering services does not facilitate broad access to RAPS in the region.	X	X	X		X	
xiii. Lack of technical RAPS standards and norms.	X	X				

Relationships between Identified Barriers and Project Activities (Cont.)

	<i>Activity 1</i> Installation and operation of RAPS systems	<i>Activity 2</i> Identification and training of private RAPS system operators	<i>Activity 3</i> Energy efficiency program and establishment of tariff structure	<i>Activity 4</i> Identification and promotion of income generating activities	<i>Activity 5</i> Coordination, monitoring and evaluation	<i>Activity 6</i> Policy dialogues for renewable energy and rural electrification
Financial Barriers:						
xiv. RAPS Systems and other RET investments imply high initial costs.			X	X	X	X
xxv. There is limited payment capacity in the target areas because of the high poverty level			X	X	X	X
xvi. The government does not have a strategy for climate change mitigation.					X	X
vii. The capacity of local development banks to finance RE systems like RAPS systems is non-existent.				X	X	X
Informational Barriers:						
viii. Lack of information. Consumers, managers, engineers or planners may lack information RAPS characteristics, economic and financial costs and benefits.	X	X	X	X	X	
xix. Lack of information on RAPS project cycle development activities.	X	X	X	X	X	
xxx. There is limited knowledge on the potential markets for RAPS services, such as the capacity to pay and the potential productive uses of renewable services.		X	X	X	X	

ANNEX 5
Letters of Support



GOBIERNO TRANSITORIO DE ADMINISTRACION REGIONAL

REGION LORETO
IQUITOS

Iquitos,

05 MAR 1999

Señor

Marcos **ALEGRE ANGELES**

Gerente de la Asociación Civil **ILZRO RAPS PERU**

Iquitos-Loreto.

De mi mayor consideración:

Por intermedio de la presente, comunico a usted, que de acuerdo a las conversaciones efectuadas con vuestra persona sobre las observaciones anotadas por la Dirección Ejecutiva de Proyectos del Ministerio de Energía y Minas en su Fax de fecha 01-03-99; el CTAR Loreto alcanza la siguiente propuesta para su evaluación y determinación:

La suscripción de un Convenio Tripartito entre la **DEPIMEM**, **LA ASOCIACION ILZRO RAPS PERU** y el **CTAR LORETO**, en donde la participación del **CTAR Loreto** en el Convenio sería en los siguientes términos:

CLAUSULA PRIMERA: ANTECEDENTES

El **CTAR Loreto** es una organización descentralizada del Ministerio de la Presidencia que tiene como funciones entre otras la de conducir y ejecutar de manera coordinada la formulación, seguimiento y evaluación de acciones de desarrollo de alcance departamental, con énfasis en la programación sectorial regional de los Programas Nacionales de Inversión a toda fuente.

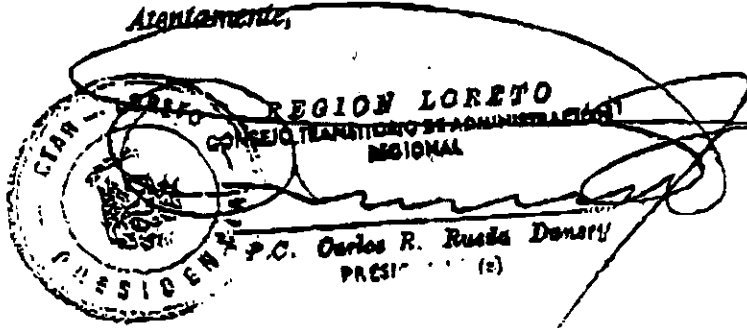
Commercial in Confidence

CLAUSULA SEXTA: OBLIGACIONES DEL CTAR LORETO

- 6.1 *Aportar una contribución de US \$ 500,000.00 para el financiamiento de cinco (05) RAPS, los cuales serán inicialmente dos (02), uno para la localidad de Padre Cocha y otro para la localidad de Indiana, y como segunda etapa del Proyecto otros tres (03) cuando se consiga el financiamiento.*
- 6.2 *Contribuir con el apoyo operativo y técnico de sus Oficinas y Gerencias especializadas en los estudios y ejecución de actividades.*

Aprovecho la oportunidad para expresarle los sentimientos de mi especial consideración y estima personal.

Cc
DEPMEM
SELA.



Commercial in Confidence

MUNICIPALIDAD DISTRITAL DE INDIANA
Calle Andrés Cardó Franco s/n
Teléfono 094-22-0901
INDIANA

17

OFICIO N° 073-99-MDI-RL

Indiana, 28 de junio de 1,999

Señor
Marcos Alegre
Gerente General
ILZRO RAPS Perú
Jr. Arica 431
Iquitos

Asunto: Proyecto RAPS

De mi mayor consideración:

Por intermedio del presente Oficio me dirijo a usted como Alcalde del Distrito de Indiana, Provincia de Maynas, Región Loreto, para expresarle mi cordial saludo.

Comunicamos a usted que la Municipalidad de Indiana, autoridades y pobladores apoyaremos totalmente la realización del Proyecto RAPS que incluye la instalación de un sistema híbrido piloto para suministrar electricidad por 24 horas a la localidad de Indiana de acuerdo a los estudios técnicos previamente realizados.

En tal sentido confirmamos a usted que pondremos a disposición de ILZRO RAPS Perú el sistema eléctrico convencional que a la fecha venimos operando y administrando en Indiana para que ILZRO RAPS Perú instale los componentes que conforman el mencionado sistema RAPS y nos brinden un suministro de 24 horas con un importante ahorro del consumo de combustible y considerables menores emisiones de gases contaminantes.

Asimismo nosotros vemos con especial expectativa que el servicio de electricidad con los sistemas RAPS, incluye el suministro de energía para el desarrollo de actividades productivas que ustedes nos están apoyando para identificar y promover.

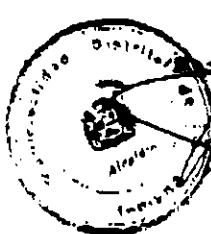
Nuestros pobladores con el desarrollo de estas actividades productivas seleccionadas de acuerdo a sus habilidades y el uso adecuado de nuestros recursos naturales generarán sus ingresos económicos que les permitirán mejorar su calidad de vida y pagar por sus consumos de electricidad tarifas adecuadas a su capacidad económica.

Por lo expuesto solicitamos a usted su importante colaboración para la más pronta implementación de este Proyecto RAPS que

sabemos no solo será en beneficio de nuestra comunidad sino también de otras localidades de nuestra región Amazónica, y en tal sentido les solicitamos realicen las gestiones para obtener el financiamiento de la GEF y de las otras fuentes nacionales e internacionales que sean necesarias.

Agradeciéndole por su atención al presente Oficio, hacemos propicia la oportunidad para reiterarle los sentimientos de nuestra especial consideración y estima personal

Atentamente



Ministerio de Salud
Dirección Nacional de Asuntos Indígenas
ALDI

19

COMUNIDAD DE PADRE COCHA
Teléfono 094-800007
Padre Cocha - Río Nanay
Punchana - Iquitos


OFICIO N° 112-PC-RN-RL

Padre Cocha, 28 de junio de 1,999

Señor
Marcos Alegre
Gerente General
ILZRO RAPS Perú
Jr. Arica 431
Iquitos


Asunto: Proyecto RAPS

Estimados señores:



Por intermedio del presente Oficio nos dirigimos a usted las autoridades y pobladores de la Comunidad de Padre Cocha para saludarlos afectuosamente y pasar a referirnos al Proyecto RAPS.

Confirmamos a ustedes que nosotros, autoridades y pobladores apoyaremos totalmente la realización del Proyecto RAPS que incluye la instalación de un sistema híbrido piloto para suministrar electricidad por 24 horas a la comunidad de Padre Cocha de acuerdo a los estudios técnicos previamente realizados.



En tal sentido confirmamos a usted que ponemos a disposición de ILZRO RAPS Perú el terreno seleccionado para la instalación de los componentes que conforman el sistema piloto RAPS y nos brindan un suministro de 24 horas con un importante ahorro del consumo de combustible y considerables menores emisiones de gases contaminantes.

Tal como venimos estrechamente trabajando, hemos tomado conocimiento y vemos con especial expectativa el suministro de electricidad para el desarrollo de actividades productivas que ustedes nos están apoyando para identificarlas y promoverlas

Nuestros pobladores con el desarrollo de estas actividades productivas seleccionadas de acuerdo a sus habilidades y el uso adecuado de nuestros recursos naturales, como es el caso de la cerámica, carpintería, pesca, etc. generarán sus ingresos económicos que les permitirán mejorar su calidad de vida y pagar por sus consumos de electricidad tarifas adecuadas a su capacidad económica.

Solicitamos a ustedes su importante colaboración para la más pronta implementación de este Proyecto RAPS que sabemos no solo será en beneficio de nuestra comunidad sino también de otras

20

localidades de nuestra región Amazónica, y en tal sentido les pedimos realicen a la brevedad las gestiones para obtener el financiamiento de la GEF y de las otras fuentes nacionales e internacionales que sean necesarias.

Agradeciéndoles de antemano por su apoyo, les presentamos las muestras de nuestra más alta consideración y estima

Muy Atentamente



[Handwritten signature]
Armando Arimura Naranjo
Teniente Gobernador
Pueblo Ceche Rio Napo



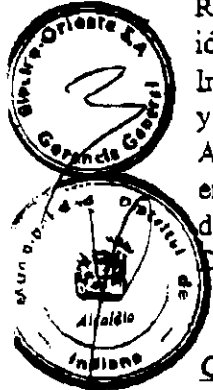
[Handwritten signature]
M. Arimura Naranjo
Municipal
Pueblo Ceche
Rio - Napo

ANNEX 6

Agreement between IRP and DEP/MEM

CONTRATO DE COMODATO PARA LA EJECUCIÓN DE UN PROYECTO PILOTO RAPS EN LA LOCALIDAD DE INDIANA, EN EL DISTRITO DE INDIANA, PROVINCIA DE MAYNAS, DEPARTAMENTO DE LORETO

Conste por el presente, el Contrato de Comodato para la Ejecución de un Proyecto Piloto RAPS en la localidad de Indiana, en el Distrito de Indiana, Provincia de Maynas, departamento de Loreto, que celebran la Empresa de Servicio Público de Electricidad **ELECTRO ORIENTE S.A.**, con RUC N° 10379563, representada por su Gerente General Ing. JAIME BUENO GALDO, identificado con L.E. N° 07852117, con domicilio en Av. Freire N° 220 - Distrito de Iquitos - Provincia de Maynas, a quien en adelante se denominará **ELECTRO ORIENTE**, la **DIRECCION EJECUTIVA DE PROYECTOS DEL MINISTERIO DE ENERGIA Y MINAS**, con RUC N° 38041835, representada por su Director Ejecutivo de Proyectos Ing. LUIS NICHU DIAZ, identificado con L.E. N° 10320098, a quien en adelante se denominará **DEP/MEM**, con domicilio en Av. De Las Artes N° 260 - San Borja, Lima, la **MUNICIPALIDAD DISTRITAL DE INDIANA**, con RUC N° 17869884, representada por su Alcalde don LUIS EDWIN TUESTA HIDALGO, identificado con L.E. N° 05289497, con domicilio en Calle Andrés Franco s/n, Distrito de Indiana, Provincia de Maynas a quien en adelante se denominará **LA MUNICIPALIDAD**, y la Asociación Civil **ILZRO RAPS PERU**, con RUC N° 40895256, con domicilio en Jr. Arica N° 431 - Distrito de Iquitos, Provincia de Maynas, Departamento de Loreto, a quien en adelante se denominará **ILZRO RAPS PERU**, representada por su Gerente General don MARCOS ALBERTO ALEGRE ANGELES, identificado con L. E. N° 07732766, Departamento de Loreto, quienes se obligan en los términos y condiciones siguientes :



CLAUSULA PRIMERA.- MARCO INSTITUCIONAL

1.1 **ELECTRO ORIENTE S.A.**, es una Empresa de Servicio Público de Electricidad, que desarrolla actividades de generación, transmisión y distribución de energía eléctrica en su ámbito de concesión en el oriente del país, entre otros, en la localidad de Indiana, distrito de Indiana, provincia de Maynas, departamento de Loreto, cuyo Sistema Eléctrico es de su propiedad.

La **DIRECCION EJECUTIVA DE PROYECTOS DEL MINISTERIO DE ENERGIA Y MINAS**, es un órgano del Sector de Energía y Minas, con autonomía técnica, administrativa y financiera, que tiene por objeto atender las necesidades de la población a través del desarrollo de las obras de infraestructura eléctrica en el marco del Programa de Electrificación Nacional.

La **DEP/MEM**, dentro del marco del Plan de Electrificación Nacional, y en concordancia con la política ambiental y de desarrollo sostenible del Gobierno del Perú, promueve un programa de introducción de energías renovables y no



convencionales para suministrar electricidad a las localidades rurales y remotas del interior del país.

- 1.3 La **MUNICIPALIDAD DISTRITAL DE INDIANA**, es la autoridad municipal del distrito de Indiana, provincia de Maynas, departamento de Loreto, que a la fecha viene ejerciendo la administración del Sistema Eléctrico de Indiana.

- 1.4 La Asociación Civil **ILZRO RAPS PERU**, constituida por Escritura Pública del 16 de Febrero de 1999, modificada por Escritura Pública del 20 de Abril de 1999, otorgadas ante el Notario Público de Lima Dr. Aníbal Corvetto Romero, inscrita el 12 de Marzo de 1999 en el Asiento N° 1 de la Ficha N° 472 del Libro de Asociaciones del Registro de Personas Jurídicas de Iquitos de la Oficina Registral de Maynas - Región Loreto, de la Superintendencia Nacional de los Registros Públicos, es una asociación civil sin fines de lucro conformada por **ILZRO RAPS LLC**, sociedad de responsabilidad limitada establecida bajo las leyes del Estado de Carolina del Norte, Estados Unidos de América, y **DOE RUN PERU S.R.L.**, con RUC N° 37630381, sociedad constituida en el Perú, inscrita en la Ficha N° 41022 del registro Público de Minería, dedicada a actividades mineras y metalúrgicas.

La Asociación Civil **ILZRO RAPS PERU** tiene por objeto desarrollar la promoción de Sistemas de Energía para Areas Rurales y Remotas (RAPS), orientado a generar beneficios socioeconómicos y ambientales en zonas aisladas del Perú.

CLAUSULA SEGUNDA.- ANTECEDENTES

- 2.1 El 15.07.97, la DEP/MEM, International Lead Zinc Research Organization Inc. - ILZRO y la Solar Energy Industries Association - SELA, de los Estados Unidos de América, suscribieron un Memorandum de Entendimiento mediante el cual expresaron su interés mutuo en desarrollar la tecnología de Sistemas de Energía para Areas Rurales y Remotas - RAPS (Remote Areas Power Supplies), reconociendo que esta tecnología promoverá el desarrollo de la energía solar y otras energías renovables y la industrialización del plomo del cual el Perú es uno de los principales productores mundiales, con la finalidad de reducir la generación eléctrica a base de grupos diesel reemplazando combustible fósil por sistemas RAPS complementados mediante generación solar fotovoltaica y almacenaje eléctrico utilizando baterías especificadas para este uso, a efecto de lo cual se consideró necesario desarrollar en forma conjunta un proyecto piloto, previa realización de los estudios necesarios.

- 2.2 El 06.02.98, la DEP/MEM, CTAR Loreto, ILZRO, SELA, y luego que ILZRO y SELA desarrollaran el "Análisis Preliminar - Estudio de Ingeniería y Factibilidad para la Implementación de Sistemas RAPS en la Región Amazónica del Perú", suscribieron una Carta de Intención, con el objeto de realizar proyectos pilotos RAPS híbridos con la utilización eficiente de generadores diesel existentes, paneles solares,



29

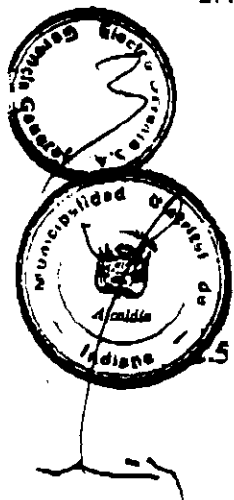
partes electrónicas y batería especiales para el almacenaje de la energía, con el objeto de lograr una reducción sustancial del consumo de combustible diesel y considerables menores emisiones, que asegura menores costos de operación y mantenimiento y provisión de energía en forma permanente y de mayor calidad y garantía, y que finalmente representa beneficios socioeconómicos y ambientales a las zonas aisladas del Perú.

2.3 Sobre la base de la Carta de Intención, se elaboró el estudio "Peru/Loreto RAPS Community, Power Project, Project Implementation Plan", que define las actividades a desarrollarse con el objetivo de instalar Sistemas RAPS, entre otros, en la localidad de Indiana, ubicada en el Departamento de Loreto.

2.4 La DEP/MEM, en el marco del Programa de Electrificación que desarrolla a nivel nacional, ha instalado un generador térmico de 200 KW en la localidad de Indiana, cuya propiedad ha sido transferida a ELECTRO ORIENTE, habiendo asumido la Municipalidad de Indiana la administración de las instalaciones.

El suministro actual en la localidad de Indiana, y el que se garantizaría con tecnología convencional, están limitados a 5 ó 6 horas al día, principalmente por los altos costos de operación y mantenimiento y considerables emisiones de gases contaminantes.

La SEIA e ILZRO, mediante cartas notariales del 07.06.99, certificadas por el Cónsul del Perú en Washington, Estados Unidos de América, han cedido sus derechos a ILZRO RAPS PERU, asociación civil sin fines de lucro, cuyo objeto es desarrollar la promoción de Sistemas de Energía para Areas Rurales y Remotas (RAPS), orientado a generar beneficios socioeconómicos y ambientales en zonas aisladas del Perú.



CLAUSULA TERCERA.- BASE LEGAL

- Decreto Supremo N° 021-93-EM
- Resolución Ministerial N° 068-97-MEM/SG - ROF de la DEP/MEM.
- Artículos 1728 al 1754 del Código Civil



CLAUSULA CUARTA.- OBJETIVOS

El presente Contrato tiene como propósito, establecer las responsabilidades de las partes que lo suscriben, en el desarrollo del Proyecto "Peru/Loreto RAPS Community", en la localidad de Indiana, en el departamento de Loreto, que tiene los siguientes objetivos :

4.1 Suministrar energía en forma confiable y permanente a la localidad de Indiana, promoviendo el desarrollo económico y social de la población, mediante el uso de la



tecnología RAPS que permite un suministro de energía de 24 horas al día, con un sustancial ahorro de combustible diesel y considerables menores emisiones de gases contaminantes.

Los sistemas RAPS están desarrollados para proveer energía tanto para usos domésticos como para servicios públicos como suministro de agua y alumbrado público, permitiendo además el uso de la energía para actividades productivas.

En adición a los beneficios socioeconómicos y ambientales a las poblaciones del país distantes a los sistemas interconectados de energía eléctrica, el uso de sistemas RAPS puede promover el desarrollo de la energía solar y otras energías renovables, así como la industrialización del plomo, uno de cuyos principales productores es el Perú.

- 4.2
- 4.3
- 4.4
- 4.5

Efectuar las acciones necesarias para demostrar que la operación y mantenimiento de sistemas híbridos piloto RAPS es sostenible con los pagos que la población de las localidades seleccionadas está en posibilidad de efectuar.

Confirmar el adecuado funcionamiento de los sistemas RAPS desde el punto de vista técnico y económico.

Verificar la performance de un modelo de electrificación de localidades aisladas que puede ser replicado para resolver el problema de la escasa cobertura eléctrica en áreas remotas.

Fomentar el desarrollo de actividades productivas (pesca, agroindustria, comercio, etc).

CLAUSULA QUINTA.- RESPONSABILIDADES

DE ELECTRO ORIENTE S.A. :

Ceder en COMODATO, y en buenas condiciones de operación, a favor de ILZRO RAPS PERU, el Grupo Electrógeno de 200 kW, redes primarias y secundarias y otros equipos electromecánicos, de su propiedad, que conforman el Sistema Eléctrico de la localidad de Indiana, instalados en el distrito de Indiana, provincia de Maynas, departamento de Loreto, según detalle que aparece en el Anexo N° 01 adjunto, exclusivamente para el cumplimiento de los fines indicados en la Cláusula Cuarta, y por el periodo de vigencia de este Contrato, cuya entrega constará en Acta que será suscrita por los representantes autorizados de las partes.

b) Ser receptor de los bienes cedidos en comodato o del retorno del costo de los mismos, en el caso que ILZRO RAPS PERU de uso distinto a los bienes antes



señalados, no continúe en el uso de los mismos, y por cualquier otra razón que no esté relacionada a los fines de este Contrato.

- c) Dar cuenta a la DEP/MEM, en su condición de concesionario local, del cumplimiento de las obligaciones asumidas por ILZRO RAPS PERU en virtud del presente documento.

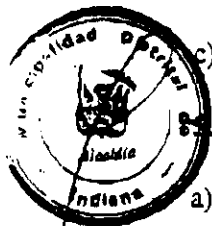
5.2 DE LA DIRECCION EJECUTIVA DE PROYECTOS DEL MINISTERIO DE ENERGIA Y MINAS :

- a) Intervenir en la ejecución del Proyecto como Contraparte Nacional del Proyecto RAPS. En tal sentido, se compromete a brindar apoyo que esté a su alcance para que ILZRO RAPS PERU obtenga financiamiento de la Global Environment Facility (GEF) así como de otras instituciones nacionales e internacionales.



- b) Verificar la instalación y funcionamiento de los equipos que forman parte del Proyecto RAPS a que se refiere el Proyecto "Peru/Loreto RAPS Community", en la localidad de Indiana, en el departamento de Loreto.

- c) Supervisar el fiel cumplimiento del presente Contrato.



5.3 DE LA MUNICIPALIDAD DISTRITAL DE INDIANA :

- a) Dar las facilidades del caso para la ejecución de los trabajos de instalación de los Sistemas RAPS en la localidad de Indiana materia del presente Convenio, cuyo Sistema Eléctrico de generación térmica y redes primarias y secundarias son de propiedad de ELECTRO ORIENTE.

- b) Dar cuenta a la DEP/MEM, en su condición de gobierno local, del cumplimiento de las obligaciones asumidas por ILZRO RAPS PERU en virtud del presente documento.



DE LA ASOCIACION CIVIL ILZRO RAPS PERU :

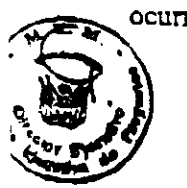
Efectuar con autonomía y a su costo, la instalación y puesta en funcionamiento de los Sistemas RAPS en la localidad de Indiana, de acuerdo a lo previsto en el Proyecto "Peru/Loreto RAPS Community", aportando para ello los equipos, materiales, personal especializado y financiamiento necesarios, los mismos que serán transferidos a la DEP/MEM, en calidad de DONACIÓN, a la conclusión de la vigencia del presente Convenio.

- b) Otorgar las máximas facilidades para las actividades que corresponde ser realizadas por la DEP/MEM y por ELECTRO ORIENTE.



37

- c) Encargarse de los permisos, licencias, y otros que fueran necesarios.
- d) Suministrar energía eléctrica, con carácter prioritario y a una tarifa mínima y hasta una máxima de aquella que establezca la Comisión de Tarifas Eléctricas (CTE), a solicitud de las partes, a la localidad de Indiana y demás localidades que lo requieran, por un periodo de tres (03) años o el periodo de vida útil de los Sistemas RAPS, lo que ocurra primero. Esta condición no podrá ser modificada por ninguna circunstancia.
- e) Supervisar y monitorear el funcionamiento de los Sistemas RAPS híbridos, dando cuenta oportuna a las demás partes intervinientes en este Convenio, mostrando las bondades del proyecto a través de los resultados de la administración, costos de generación, producción de energía, eficiencia del sistema híbrido, consumo de combustibles, lubricante y otros que conciernen al monitoreo técnico económico.
- f) Asumir a su costo los trabajos de reparación y mantenimiento de los equipos y componentes de los Sistemas RAPS y del Sistema Eléctrico de Indiana cedidos en comodato, durante la vigencia del presente Convenio, así como su mantenimiento preventivo y correctivo.
- g) Capacitar al personal que designen las demás partes intervinientes, en lo referente a la administración eficiente del Sistema Eléctrico objeto del presente Contrato.
- h) Devolver a ELECTRO ORIENTE, los bienes señalados en literal a) del numeral 5.1. de la Cláusula Quinta de este Contrato, o el costo de los mismos, en caso de incumplimiento de las obligaciones citadas precedentemente.
- i) Adicionalmente, son obligaciones de ILZRO RAPS PERU las señaladas en el Artículo 1738 del Código Civil.



CLAUSULA SEXTA.- COSTO DE LOS BIENES CEDIDOS EN COMODATO

Para efectos del Artículo 1743 del Código Civil, se expresa que el valor de los bienes que entrega ELECTRO ORIENTE a ILZRO RAPS PERU, señalado en el literal a) del numeral 5.1. de la Cláusula Quinta de este Contrato, es de Un Millón Quinientos Setenticuatro Mil Novecientos Sesentisiete con 33/100 Nuevos Soles (S/1'574,967.33), valor ajustado al 30 de Junio de 1,999.

CLAUSULA SEPTIMA.- VIGENCIA

El presente Contrato tiene una vigencia de cuarentidós (42) meses calendario, contados a partir de la fecha de su suscripción o el periodo de vida útil de los Sistemas RAPS, lo que ocurra primero, que puede ser prorrogado por acuerdo expreso de las partes.

CLAUSULA OCTAVA- DISPOSICIONES FINALES

- 8.1 El incumplimiento de las partes, respecto a las obligaciones señaladas en la Cláusula Quinta, dará lugar a la resolución automática del presente Convenio, sin más aviso que una carta simple.
- 8.2 Tratándose de un proyecto a desarrollarse en forma conjunta, cada parte interviniente mantendrá la propiedad de los bienes aportados inicialmente.
- 8.3 El financiamiento obtenido para la ejecución de proyectos RAPS y los activos adquiridos mediante éste, formarán parte del patrimonio del Estado Peruano, por lo que a la conclusión de la vigencia del Convenio, por cumplimiento de sus objetivos o resolución del Convenio, los saldos no utilizados y los bienes adquiridos mediante dicho financiamiento serán asumidos inmediatamente por la DEP/MEM.
- 8.4 Lo que no estuviera expresamente previsto en este Convenio, pero si fuere indispensable para su mejor aplicación o entendimiento, constará en Memoranda de Entendimiento que, suscrita por las partes, formará parte de este documento.
- 8.5 Este Convenio tiene carácter definitivo; no obstante cualquiera de las partes podrá elevarlo a Escritura Pública, siendo de su cuenta los gastos pertinentes.

Las Entidades que intervienen expresan plena conformidad con este Contrato, y lo suscriben los representantes legales que se indican en la parte introductoria.

Lima,
Iquitos, 25 de agosto de 1999.

p. DEP/MEM

p. ILZRO RAPS PERU

Ing. LUIS NICHÓ DIAZ
Director Ejecutivo de Proyectos

St. MARCOS A. ALEGRE ANGELES
Gerente General

p. ELECTRO ORIENTE S.A.

p. LA MUNICIPALIDAD

Ing. JAIME BUENO GALDO
Gerente General

Ing. LUIS E. TUESTA HIDALGO
Alcalde



ANNEX 7

MEM Ministry Resolution



ES COPIA AUTÉNTICA

LIC. LUIS ALBERTO DAVILA DAV
SECRETARIO GENERAL
MINISTERIO DE ENERGIA Y MINAS

MINISTERIO DE ENERGIA Y MINAS

Resolución Ministerial Nº386-99-EM/SG

Lima, 26 de julio 1999

30

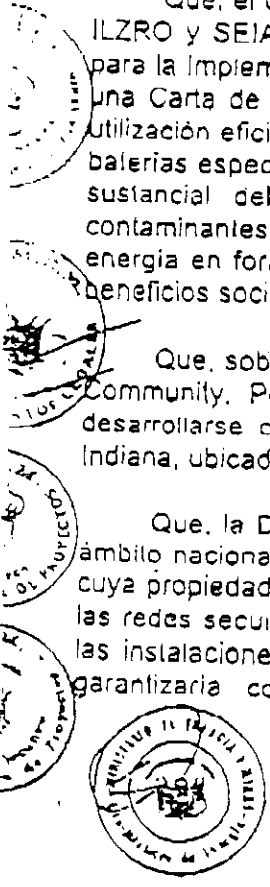
CONSIDERANDO :

Que, el 15 de Julio de 1997, la Dirección Ejecutiva de Proyectos del Ministerio de Energía y Minas - DEP/MEM, International Lead Zinc Research Organization Inc. - ILZRO y la Solar Energy Industries Association - SEIA, de los Estados Unidos de América, suscribieron un Memorandum de Entendimiento mediante el cual expresaron su interés mutuo en desarrollar la tecnología de Sistemas de Energía para Areas Rurales y Remotas - RAPS (Remote Areas Power Supplies), reconociendo que esta tecnología promoverá el desarrollo de la energía solar y otras energías renovables y la industrialización del plomo del cual el Perú es uno de los principales productores mundiales, con la finalidad de reducir la generación eléctrica mediante grupos diesel reemplazando combustible fósil por sistemas RAPS complementados mediante generación solar fotovoltaica y almacenaje eléctrico utilizando baterías especificadas para este uso, a efecto de lo cual se consideró necesario desarrollar en forma conjunta un proyecto piloto, previa realización de los estudios necesarios;

Que, el 06 de febrero de 1998, la DEP/MEM, CTAR Loreto, ILZRO, SEIA, y luego que ILZRO y SEIA desarrollaran el "Análisis Preliminar - Estudio de Ingeniería y Factibilidad para la Implementación de Sistemas RAPS en la Región Amazónica del Perú", suscribieron una Carta de Intención, con el objeto de realizar proyectos pilotos RAPS híbridos con la utilización eficiente de generadores diesel existentes, paneles solares, partes electrónicas y baterías especiales para el almacenaje de la energía, con el objeto de lograr una reducción sustancial del consumo de combustible diesel y considerables menores emisiones contaminantes, que asegura menores costos de operación y mantenimiento y provisión de energía en forma permanente y de mayor calidad y garantía, y que finalmente representa beneficios socioeconómicos y ambientales a las zonas aisladas del Perú;

Que, sobre la base de la Carta de Intención, se elaboró el estudio "Peru/Loreto RAPS Community. Power Project. Project Implementation Plan", que define las actividades a desarrollarse con el objetivo de instalar Sistemas RAPS, entre otros, en la localidad de Indiana, ubicada en el Departamento de Loreto;

Que, la DEP/MEM, en el marco del Programa de Electrificación que desarrolla en el ámbito nacional, ha instalado un generador térmico de 200 KW en la localidad de Indiana, cuya propiedad ha sido transferida a ELECTRO ORIENTE S.A, empresa que ha ejecutado las redes secundarias, habiendo asumido la Municipalidad de Indiana la administración de las instalaciones, siendo que el suministro actual en la localidad de Indiana, y el que se garantizaría con tecnología convencional, están limitados a 5 ó 6 horas al día.



3

15 Julio de 1997, Lima, Perú

Memorándum de Entendimiento

Las Organizaciones mencionadas en este Documento expresan su interés mutuo en desarrollar la promoción de la tecnología RAPS, (Sistemas de Energía para áreas remotas) reconociendo que esta tecnología provee varios beneficios socioeconómicos y ambientales para el Perú en las zonas aisladas de los sistemas interconectados de suministro de Energía Eléctrica. El fomento de esta tecnología promoverá el desarrollo de la energía solar y otras energías renovables y la industrialización del plomo del cual el Perú es uno de los principales productores mundiales con la fabricación de baterías, hecho tanto como la provisión de energía en las zonas de valor ambiental nos motiva a desarrollar esta tecnología en forma concreta.

[Handwritten mark]

Objetivos:

Reducir la dependencia de generación eléctrica a base de grupos diesel reemplazando generación fósil con sistemas RAPS incluyendo generación solar fotovoltaica con almacenaje eléctrico utilizando baterías especificadas para este uso.

Estrategias:

- 1) Definir las cargas necesarias de los pueblos y áreas rurales que vienen utilizando generación diesel en la zona de la cuenca Amazónica.
- 2) Desarrollar un software con las fórmulas tecnico-economicas que permitan determinar el disueno optimo de los RAPS especificos para diferentes localidades de la cuenca Amazónica, en base al calculo de la viabilidad económica desarrollado con la información de costos y valores ambientales de la región.
- 3) Diseñar sistemas standard de los tamaños adecuados para los sistemas RAPS con generación fotovoltaica y diesel para reducir horas de generación diesel.
- 4) Desarrollar mecanismos financieros para la instalación , mantenimiento, y monitoreo de los sistemas RAPS.
- 5) Concluido 1-4 licitar la instalación del sistema demostrativo piloto para evaluar esta tecnología y sus beneficios.

[Handwritten signature]

Itinerario:

Estrategias 1-4 se cumplirán en los próximos 6 meses una vez aprobado el plan de trabajo para realizar las estrategias. La selección de consultoria e ingeniería se realizara a través de selección de una lista corta de empresas calificadas en la materia. El proyecto demostrativo piloto se realizara cuando el financiamiento este disponible para comenzar.

[Handwritten signature]

4

Roles:

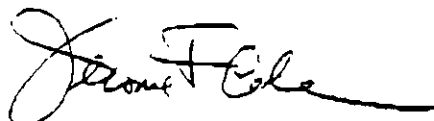
Las siguientes organizaciones aportaran en forma conjunta el financiamiento: el Ministerio de Energía y Minas, Perú, (MEM), la International Lead and Zinc Research Organization (ILZRO) y la Asociación de Industrias de Energía Solar, (SEIA) y otros interesados en esta materia. Cada organización aportara lo posible para adelantar esta actividad. El monto estimado es de US\$ 100,000 y la participación del Ministerio de Energía y Minas no podrá superar el 25%.

MEM: Será responsable de adjuntar la información técnica de la energía necesaria para las poblaciones rurales, uso de generadores diesel actuales, datos necesarios para la selección de sitios y capacidad económica de las poblaciones para pagar el valor real de esta energía y los costos de capital. Datos económicos de la situación prevista.

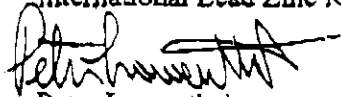
ILZRO: Será responsable del diseño del equipo de almacenaje eléctrico, las baterías y todo los equipos asociados para el almacenaje y carga de esta reserva eléctrica. Asistirá en el financiamiento del estudio de factibilidad utilizando fondos propios y de otras fuentes, propondrá los términos de refería a la firma consultora que proveera el estudio economico y controlara al consultor.

SEIA: Asistirá en el respaldo político y promocional de este proyecto con las entes financieros y gobiernos internacionales para integrar los aspectos ambientales, energéticos y de desarrollo económico. Asistirá en la selección y manejo de consultora del proyecto.

Estando a los quince Días del mes de Julio las organizaciones mencionadas firman este documento en señal de sus conformidad.



Dr. Jerome F. Cole
International Lead Zinc Research Organization



Peter Lowenthal
Solar Energy Industries Association



Jesús Beoutis Ledesma
Dirección Ejecutiva de Proyectos
Ministerio de Energía y Minas

ACRONYMS

CTAR Loreto	Regional Government of Loreto
CONAM	National Environmental Commission (Focal Point) in Perú
DEP/MEM	Directorate Executive of Projects/Ministry of Energy and Mines
FONAM	National Environmental Fund in Perú
GHG	Greenhouse Gases
GEF	Global Environmental Facility
GOP	Government of Peru
ILZRO	International Lead-Zinc Research Organization
INEI	National Institute of Statistics and Informatics
IRP	ILZRO RAPS Peru
MOU	Memorandum of Understanding
NEP	National Electrification Plan
PAE	Energy Saving Program
RE	Renewable Energies
RESPAR	Renewable Energy Systems in the Peruvian Amazon Region
RET	Renewable Energy Technologies
SEIA	Solar Energy Industries Associations
SHS	Solar Home Systems
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change