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United Nations Development Programme
GLOBAL ENVIRONMENT FACILITY (GEF)



To: Mr. Alfred Duda
Principal Environment Specialist
GEF Secretariat

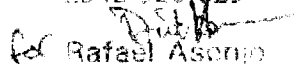
Date: 6 November 1997

Mr. Lars Videaes, Chief
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From:  Rafael Asenjo
Executive Coordinator

Subject: PDF Block A Funding - *Renewable Energy-Based Electrification in Peru*

Please find attached for your review a PDF Block "A" request for funding entitled
"Renewable Energy-Based Electrification in Peru".

We would appreciate receiving your comments no later than c.o.b. on Thursday 13
November 1997.

Thank you

PM

**UNITED NATIONS DEVELOPMENT PROGRAMME
GLOBAL ENVIRONMENTAL FACILITY**

PDF A PROJECT DOCUMENT

Country: Peru

Focal Area: Climate Change

Project Title: *Renewable Energy- based Electrification in Peru*

Project Number: PER/97/G41/A/1G/99

Convention Ratification: June 7, 1993

Duration: 2 weeks

ACC/UNDP Sector & Subsector: 200/201

GEF Theme: Climate Change

Executing Agency: CONAM- Ministry of Energy and Mines

Implementing Agency: CONAM- Ministry of Energy and Mines

Estimated Start Date: November 1997

Government Endorsement: 15 July 1997 (a letter from Mr. Gonzalo Galdos, President of the CONAM Council of Directors, to UNDP)

UNDP/GEF Input PDF Funds: US\$ 25,000

Brief Description: The overall objective of the proposed project is to assist Peru in reducing the long-term growth of the greenhouse gas (GHG) emissions from the burning of fossil fuels for electrification purposes, creating at the same time the conditions to incorporate renewable energy resources in the national energy balance. The project will remove barriers and will create incentives for increased public and private sector participation in this field. It is expected that by project completion a clear strategy for renewable energy, including an enabling regulatory framework for private investments will exist; that transaction costs for investors willing to invest in on-grid wind energy projects will be lowered by feasibility and investment studies; and that through information, training and awareness-building, the end-user benefits as well as the business opportunities in the renewable energy will be enhanced. Finally, special financial mechanisms to overcome the initial high level costs are also expected to exist.

On Behalf of the Government of Peru

Signature

Date

On Behalf of UNDP:

Signature

Date

Proposal for PDF Block "A" Grant

Part I: Eligibility

1. Basic Data:

- | | |
|--------------------------|---|
| a) Project Title: | Renewable Energy -based Electrification in Peru |
| b) Identification No.: | PER/97/G41/A/1G/99 |
| c) Implementing Agency: | UNDP |
| d) IA Focal Point: | Lita Paparoni, GEF Coordinator, RBLAC, UNDP |
| e) Principal Focal Area: | Climate Change |
| f) Cross-cutting area: | n/a |
| g) Scope: | National |
| h) Country: | Peru |
| i) Country Endorsement: | 15 July 1997 (a letter from Mr. Gonzalo Galdos, President of the CONAM Council of Directors, to UNDP) |
| j) National Focal Point: | National Council for the Environment (CONAM) |

2. Country Eligibility

Peru ratified the UN Framework Convention on Climate Change on June 7, 1993.

3. Programme Eligibility

The proposal is consistent with Operational Programme No. 6 "Promoting the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs". The project identifies and targets the barriers to the use of renewable energy in order to achieve large-scale utilization of renewable energy driven by private initiatives. The project aims to create programmatic results that will continue to generate positive global impacts after the termination of the project.

4. Policy Framework/Country Priority

Energy Resources, Electric Capacity and Generation in Peru:

Hydropower: Hydroelectricity is currently used to supply the main industrial and commercial centers of the country. The hydropower potential is estimated to be 60,000 MW. The majority of the resources is located on the eastern slope of the Andes where the population is sparse and electricity demand low. The West-Andean resources closer to the demand are more susceptible to drought. As such, the possibility of meeting the electricity demand of the large cities depends largely on rainfall conditions. The installed hydroelectric capacity in 1996 was 2,464 MW representing 58% of the total installed electric capacity of the country. The production by hydroelectric plants was 13,223 GWh representing 80% of the total produced electricity.

Fossil Fuels

The proven reserves of crude oil were estimated in 1991 at 387 million barrels. The production in 1996 was 43.9 million barrels. The installed thermal power capacity in 1996 was 1,806 MW and most of the thermal power stations run on Diesel 2 or other industrial fuels. The electricity generated by thermal plants in 1996 was 3,319 GWh, or 20% of the total produced electricity. Natural gas is the most promising fossil fuel in Peru due to the significant resources. The proven natural gas reserves are almost completely in the Camisea gas deposit with some smaller deposits in Aguaytza and in the northeast of the country. With estimated 11×10^{12} cubic feet of gas and around 600 million barrels of natural liquid gas, the reserves in Camisea form one of the largest gas deposits in Latin America. This is equivalent of 2,200 million barrels of crude oil, more than six times the proven oil reserves of Peru. The current

production of natural gas is about 20 million cubic feet per day; the Camisea exploration could raise the production as high as 1,200 million cubic feet per day.

The Camisea deposit is being developed by the Shell-Mobil consortium; the plans include the possibilities of a 600 MW gas-fired power plant to be in operation in the year 2000, as well as pipelines to transport natural gas and natural liquid gas to Lima in 2003. The estimated investment in the whole Camisea project is about US\$ 2,700 million.

The Aguaytia deposit (302,000 million cubic feet) is being developed by the Maple Gas Corporation and the agreement includes the construction of a 155 MW gas-fired power station in Tingo María, which should enter into operation in 1998, as well as some 400 km of 220 kV transmission line. The total cost of the project is US\$ 252.8 million including a US\$ 60 million loan from the Inter-American Development Bank (IDB).

Non-Conventional Energy Sources

The renewable resources in Peru are remarkable, although not adequately assessed. They include solar energy, wind energy, biomass/agricultural residues, geothermal energy and municipal and industrial waste. In the Sierra area the average solar irradiation levels reach 5 kWh/m²/day with small seasonal variations. The Ministry of Energy and Mines has installed 313 photovoltaic systems in the country and has purchased additional 1,200 systems to be installed.

The wind velocity measurements on the coastal zone indicate average velocities of 6 m/s at zero level; the average hub height level velocity of 9 m/s has been measured in Malabrigo where the Ministry of Energy and Mines has installed one 250 kW wind generator. The produced wind energy in 1996 was 408 MWh. Another 450 kW generator will be installed in Marcona (Ica) and should be operative by December 1997. Taking into account the penetration capacity of the grid, it would be possible to have 200 MW of wind power feeding the Northern Interconnected System.

The geothermal potential in the southern Peru is estimated at 600 MW. There are currently no geothermal power plants in the country. A special law regulating the use of the geothermal resources was approved by the congress in July 1997.

Policy Framework

The electrification coefficient in Peru was the lowest of South America in 1992: at the national level, 43% of the population and in rural areas only 12% had access to electricity. Government efforts have raised the coefficient to 66% nationally and 19% in rural areas in 1996. It is estimated that 20% of the population currently without electricity, living on the outskirts of large urban areas, could easily be supplied with electricity. The remaining 80%—more than 6 million people—live mainly in small rural settlements, often extremely remote.

The Electrical Concessions Act enacted in 1992 creates a modern framework, permitting the generation, transmission, distribution and sale of electricity as a commercial business, within a market free of any restrictions and with minimum intervention of the State. The goal of The National Electrification Plan 1997-2000 executed by the Ministry of Energy and Mines is to raise the national electricity coverage from 66% to 75% by the year 2000. This will be done by connecting 5,451 rural communities to the main electricity systems of the country which implies setting up 3,459 km of high-tension transmission lines, 12,000 km of distribution lines and by constructing more than 120 small electricity systems. These include 51 mini-hydroelectric plants and 72 small thermal plants donated by the Japanese Government, as well as one 450 kW wind generator and 1000 photovoltaic systems financed by the government and purchased through UNDP. The total investment to realize the plan is about US\$ 800 million.

In the framework of the National Electrification Plan, the projects are divided in three categories:

Category 1: Profitable Projects (the estimated rate of return to the investment equals or supersedes the used discount rate 12%). These projects will be executed by private investments. The role of the

government is to promote and leverage private investment. In the process of privatization these projects will be presented as investment opportunities.

Category 2: Economically sustainable projects in the state's perspective (the rate of return more than 8% as a minimum acceptable growth rate, taking into account externalities). The state's strategy is to reach investment agreements in the process of privatization, use co-financing to capture private investment or directly execute projects for later transference to the private sector.

Category 3: Projects that are not sustainable economically. These projects are justified by the national security or regional development. The government executes these projects directly based on analysis and choice of technologies that minimizes the operation and maintenance costs.

The National Electrification Plan forms the framework for the proposed project. In each of the presented categories there exists possibilities to use renewable resources for electrification. Different barriers, however, prevent these possibilities from being used optimally. The proposed project will identify and remove the barriers in each category and create conditions to integrate renewable resources into the Plan in a holistic manner.

A National Committee for Climate Change was created in November 1993 in order to coordinate the implementation of the UNFCCC and the Montreal Protocol with different sectors. The National Council for the Environment (CONAM) chairs the Committee. A National Climate Change Action Plan will be elaborated during the 1997 - 1998. The present proposal has been discussed in the National Committee for Climate Change and has been endorsed by CONAM as very important for the country's environmental agenda. A Project Coordination Committee was established on 30 September 1997 with representatives from DEP, CONAM, UNDP and the National Committee for Climate Change to provide the necessary link between the project and other climate change activities in the country.

5. Nature and Scope of Expected project

PDF Block A activities are expected to produce a full-scale barrier removal proposal aimed at promoting Peru's renewable energy resources as a cost-effective means to produce electricity within the framework of the 1997-2000 National Electrification Plan. The project will target both off-grid and on-grid applications in the three categories defined by the Plan. GEF financing will be used for the incremental cost component of the proposed project, as determined by PDF activities. Bilateral and multilateral funding will be leveraged for non-incremental activities (e.g. close links will be established with PROER, a US\$ 5,000,000 Renewable Energy Credit Programme funded by the Government of the Netherlands and executed by COFIDE).

In addition - and more in relation to the programme baseline this project will build upon - it is important to mention that the ESMAP programme has sponsored a project in Peru entitled "Rural Energy Electrification" focussing on the commercial issues surrounding small-scale rural hydro-electric installations in Peru. It has worked to provide training and capacity building in a number of small hydro systems (both government and privately operated) in an attempt to ensure sustainability and reduce the costs of the provision of small scale rural electrification in these case study areas. The activity is expected to conclude in early 1998. Also, through the World Bank, the Japanese are sponsoring a technical assistance project entitled "A Strategy for Rural Electrification" in Peru. The project will address primarily the legal, regulatory and institutional questions surrounding rural electrification of remote areas in Peru. It is intended to lay the foundation for a coherent and sustainable strategy for rural electrification, but is not intended to focus on the details of any specific technology. The project will begin in January 1998 and can be expected to require six months for completion.

Compatibility and coordination between these on-going baseline activities and the proposed project will be ensured to maximize programme impact. This will be facilitated by the fact that the Executive Project Directorate of the Ministry of Energy and Mines (DEP) is the executing agency for both the "Strategy for Rural Electrification" and this proposed project.

6. Linkage of Expected project to IA Programme

Since the ratification of the United Nations Framework Convention on Climate Change, UNDP is accompanying Peru as an active partner in implementing the Convention. The first GEF financed UNDP project in the Climate Change operational area in Peru was PER/92/G31 "Technical Assistance to the Centre for Energy Conservation" executed by the DDSMS. Currently there are two ongoing UNDP Climate Change projects financed by GEF: the global project CC:Train executed by UNITAR and the project PER/97/G32 "Enabling Peru to Prepare its First National Communication to the UNFCCC" executed by the National Council for the Environment (CONAM).

In 1988 a National Plan of New and Renewable Energy was elaborated as a part of the UNDP project PER/86/011 "Technical Assistance to CENERGIA". Since 1994 the Ministry of Energy and Mines is executing a UNDP Project PER/94/028, "Non Conventional Energy" funded by the Government. This project has two components: solar photovoltaics and wind energy. A 250 kW grid-connected wind generator has been installed in Malabrigo, as well as 313 photovoltaic systems in different rural communities.

In addition to the equipment purchased by this project, the Ministry has bought 1,200 solar photovoltaic systems and a 450 kW wind generator through the UNDP special procurement project executed by UNOPS. The photovoltaic systems will be installed in rural and remote areas. The 450 kW wind generator will be installed in Marcona, Ica, and should be operative by December.

7. IA Contact Person

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Part II: Information on Grant Activities

1. Summary Description of the Proposed Project in Terms of Objectives and Activities

The overall objective of the proposed project is to assist Peru in reducing the long-term growth of the greenhouse gas (GHG) emissions from the burning of fossil fuels for electrification purposes, creating at the same time the conditions to incorporate renewable energy resources in the national energy balance. The project will remove barriers and will create incentives for increased public and private sector participation in this field. It is expected that by project completion a clear strategy for renewable energy, including an enabling regulatory framework for private investments will exist; that transaction costs for investors willing to invest in on-grid wind energy projects will be lowered by feasibility and investment studies; and that through information, training and awareness-building, the end-user benefits as well as the business opportunities in the renewable energy will be enhanced. Finally, special financial mechanisms to overcome the initial high level costs are also expected to exist.

The project development mission - for which PDF Block A funding is requested - will determine the exact activities and scope of the full-scale proposal. These will include:

- Quantitative and qualitative analysis of the renewable energy markets in Peru;
- Analysis of the national and sector policies, laws and regulations affecting the use of renewable energy, including a concrete proposal for necessary legislative changes or new laws that would create an enabling environment for the use of renewable energy in Peru both in on-grid and off-grid applications;
- Design of national norms and standards on equipment and service quality;

- Design of an Internet-based national information system on renewable energy;
- Definition of public awareness-building campaigns;
- Investment packages for on-grid wind energy generation including the necessary wind resource measurements and feasibility studies;
- Design of concessionary and other mechanisms to operate and maintain renewable energy systems;
- Pilot installations to demonstrate innovative mechanisms on the operation and maintenance of renewable energy systems;
- Training programme for local equipment and service providers and technicians in renewable energy technologies

2. GEF Thematic Area: Climate Change.

3. Expected Global Benefits

The baseline established in the Peru Country Study financed by the US Energy Department estimates that the GHG emissions due to the electricity generation would grow from 2.70 million tons in 1990 to 19.18 million tons in 2015. The proposed project will abate the growth by removing barriers for the use of renewable energy.

4. Activities to be financed by the Block "A" Grant

Block "A" resources will finance a two-week mission of an international consultant, during which two consultative workshops are scheduled. These workshops will bring together key stakeholders and representatives of existing initiatives so as to define the activities for the full-scale project. Block A funding will also finance a national consultant for a one-month period to organize the workshops and assist the international consultant during the mission. Upon completion of the mission, the international consultant will be responsible for drafting the project brief and project document for the full-scale project as per agreed upon Terms of Reference.

5. Expected outputs and Completion Dates

A project brief and project document to be submitted to UNDP/GEF. The international consultant is expected to finalize these documents in November.

6. Other Possible Contributors and Amounts

The Ministry of Energy and Mines will contribute in-kind for the organization of the workshops as well as for logistic and administrative services.

7. Total Budget and Information on How Costs Will Be Met

PDF Block "A"

A two-week mission of an expert on renewable energy as per ToR's attached	US\$	14,000
Visit to renewable electrification projects in Puno	US\$	4,000
A local consultant, one month	US\$	3,000
Two workshops	US\$	3,200
STAP Review	US\$	800
TOTAL	US\$	25,000

Ministry of Energy and Mines

In-kind contribution	US\$	20,000
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Part III: Background on the Applicant Institution

1. **Applicant:** Executive Project Directorate, Ministry of Energy and Mines (DEP/MEM).
2. **Background:** Created by means of Supreme Decree N°021-93-EM, the Executive Project Directorate was set up as an organization under the umbrella of the Ministry of Energy and Mines, having technical, administrative and financial autonomy with a view to ensure the due execution and completion of energy-related projects, channeling funds from various sources.
3. **Organizational Structure:** See enclosure III.
4. **Leadership:** DEP/MEM is a lean, well-respected organization, known for its professionalism and commitment. Through its short existence, it has worked on several projects, among other institutions, with the Inter American Development Bank, the World Bank and the Japanese International Co-operation Agency.
5. **Membership:** Not applicable
6. **Recent Programmes/Project Activities**
See enclosure IV

1. Publications

The most recent ones are:

- National Power Programme 1997-2000
- Guidelines for the design of primary power lines and networks
- Guidelines for the design of secondary networks
- Standards for the supply of materials and equipment for primary power lines and networks
- Standards for the supply of materials and equipment for secondary power lines and networks

1. Annual Budget and Sources of Revenue

SOURCE	AMOUNT (\$/)
Treasury	78,000,000
Grants and transfers	8,717,095
Treasury credit	3,451,288
Direct resource collection	11,976,132
DEO funds with UNOPS	14,000,000
FONAFE	40,000,000
EXFODEIS recovery	22,300,000
FONAVI	2,000,000
Works on behalf of regional power companies	105,858,000
Peru-Japan funding (to be arranged)	1,877,295
OCEF Japan (to be arranged)	241,666,367

FONAVI loan	130,000,000
TOTAL (S/.)	659,846,177
TOTAL (US\$)	248,062,472

9. Contact Person

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ANNEX I

Terms of Reference**Mission to Elaborate a Project Proposal "Renewable-based Electrification in Peru" to be Presented to the Global Environment Facility GEF****Background:**

The UNDP Country Office in Peru is working since 1996 with the Executive Project Directorate (Dirección Ejecutiva de Proyectos, DEP) of the Ministry of Energy and Mines to elaborate a renewable energy project for GEF financing. During this process various institutions working with renewable energy have been contacted. A draft proposal and a request for GEF Project Development Facility (PDF) block B funding to finalize the proposal was presented to the National Committee for Climate Change by DEP in June 1997. The National Council for the Environment (Consejo Nacional del Ambiente, CONAM), who chairs the National Committee for Climate Change and is the GEF Focal Point in the country, endorsed the proposal as a national priority on 15 July 1997 asking for its presentation to the GEF.

Further discussions between the UNDP climate change specialists showed that the proposal was well advanced and the rather long PDF B phase would unnecessarily delay the project implementation. Instead, a short mission to finish the proposal funded by PDF A was suggested.

Objective of the mission:

The objective of this mission is to elaborate a project proposal to be presented to the Global Environment Facility (GEF) for its inclusion to the GEF Work Programme.

The proposal has to follow the standard format of GEF project documentation to be provided by RBLAC/GEF. Furthermore, the proposal will need to be formulated in accordance to the guidelines included in the GEF Operational Strategy¹ and Operational Programme #6 entitled; "Promoting the adoption of Renewable Energy by removing barriers and reducing implementation costs".

The previous work presented in the Draft Proposal and the PDF B request will form the basis for the proposal. The global framework of the proposal will be the National Plan for Electrification 1997 - 2000 of the Ministry of Energy and Mines. The effects and consequences of the National Plan for Climate Change, which is currently being elaborated by CONAM, have to be included into the proposal, as well.

The links, synergies, and complementarities with other ongoing renewable energy initiatives and programmes in the country have to be clearly defined. These programmes include, but are not limited to, PROER (Programa de Crédito para Energías Renovables COFIDE-The Netherlands) and SMSE (Sustainable Markets for Sustainable Energy, IDB). Potential coordination arrangements between these related programmes should also be described to the extent possible.

¹ GEF Operational Strategy, Washington D.C. February 1996

The proposed project will be executed by DEP of the Ministry of Energy and Mines. The Executing Agency will officially present the elaborated project proposal to the national GEF focal point CONAM, which then presents it to UNDP as a national priority project asking its presentation to the GEF.

Proposed agenda of the mission:

In order to fulfill the mission objective, a clear picture of all the ongoing renewable energy initiatives and programmes is necessary. Therefore a two-week mission by an international expert, whose qualifications are presented below, is needed. The draft agenda consists of workshops and individual meetings. Based on the international experience of the consultant, changes and additions may be suggested. After terminating the two-week mission, the consultant has one week to submit the final project proposal to the Ministry of Energy and Mines and the UNDP in Peru.

1st Week:

Monday	Briefing in the UNDP/GEF Unit, New York
Tuesday	Meetings with the UNDP Country Office and DEP/Ministry of Energy and Mines
Wednesday	Meeting with CONAM, workshop preparation
Thursday	Workshop with different institutions working on renewable energy
Friday	Individual meetings with different institutions
Saturday	Visit to Puno: Isla Taquile Solar Village, Los Uros, Solar Charger
Sunday	Visit to Puno cont.

2nd Week:

Monday	Individual meetings cont.
Tuesday	Workshop with DEP, UNDP, CONAM, CNCC and possible invited participants
Wednesday	Elaboration of the proposal with possible meetings
Thursday	cont.
Friday	Presentation of a draft project proposal to the Coordinating Committee

3rd Week:

Finalization of the Project Proposal

Qualifications of the consultant:

1. Master's or higher university degree in renewable energy, rural electrification, energy economics or other related field;
2. Strong experience in renewable energy-based electrification, especially in the market-based approaches for rural electrification, institutional frameworks like concessions and the public-private sector cooperation;
3. Familiarity with the GEF procedures and climate change, including full understanding of the basic concepts like barrier removal, incremental costs and global benefits;
4. Good command of Spanish and English combined with strong presentation skills. These include: ability to negotiate, organize a workshop and give presentations in Spanish, ability to read and draft technical documents in Spanish and ability to write final technical documents in correct English.
5. Work experience in South America, preferably in Peru or another Andean country.

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FROM RBLAC DRP 212 906 5893 UNDP

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Lima, 15 de Julio de 1997

CARTA No 437-97-CONAM/PCD

Señora
MARIA LUISA SILVA
Representante Residente a.i.
PNUD-Lima
Presente.-

Ref: Aval al Proyecto "Electrificación
basada en energías renovables en el
Perú"

Tenemos el agrado de dirigirnos a usted para expresar el aval de CONAM al proyecto de la referencia, en su condición del Punto Focal Operacional del GEF en el Perú.

La propuesta está diseñada para acceder al Fondo de Desarrollo de Proyectos del GEF - Block "A" y su presupuesto asciende a US\$ 25,000. Dicho Proyecto será ejecutado por la Dirección Ejecutiva de Proyectos (DEP) del Ministerio de Energía y Minas y cuenta con la aprobación de la Comisión Nacional de Cambios Climáticos.

Tomando en cuenta la importancia del tema para el desarrollo nacional, la trayectoria del ejecutante y el proceso de consulta y diálogo del cual se ha originado, CONAM avala este Proyecto y considera su ejecución como muy importante dentro de la Agenda Ambiental del país. Por ello, solicitamos a su despacho se sirva realizar las gestiones correspondientes ante el GEF para su pronta puesta en marcha.

Sin otro particular, y siempre a su disposición para trabajar por el Desarrollo Sostenible del Perú, quedamos de usted.

GONZALO GALDOS
Presidente del Consejo Directivo