

# OFFICE MEMORANDUM

DATE: January 11, 2001

TO: Mr. Ken King, Assistant CEO, GEF Secretariat  
Att: GEF PROGRAM COORDINATION

FROM: Lars Vidaeus, GEF Executive Coordinator



EXTENSION: 3-4188

SUBJECT: **Ecuador: Public Enterprise Reform and Privatization Project  
Submission for Work Program Inclusion**

Please find enclosed the electronic attachment of the above mentioned project brief for work program inclusion. We would appreciate receiving any comments by January 23, 2001 and look forward to discussing the proposal at the bilateral meeting with GEFSEC scheduled for January 25, 2001.

The proposal is consistent with the *Criteria for Review of GEF Projects* as presented in the following sections of the project brief:

- Country Drivenness: Please see Section B2, *Main Sector Issues and Government Strategy*, and Section D4, *Indications of borrower commitment and ownership*.
- Endorsement: The Government of Ecuador's endorsement letter by the GEF operational focal point, Ministry of Environment, dated November 10, 2000 is attached to the Project Brief.
- Program Designation & Conformity: Please see Section B1a, *Global Operational Strategy/Program Objective addressed by the Project*.
- Project Design: Please see Section C, *Project Description Summary*, Annex 1, *Project Design Summary*, and Annex 2, *Detailed Project Description*.
- Sustainability: Please see Section E1 – para. 4, *Summary Project Analysis*, and Annex 3, *Estimated Project Costs*.
- Replicability: Please Sections D2, *Major related projects financed by the Bank and other development agencies*, D3, *Lessons learned and reflected in proposed project design*, and F1, *Sustainability*.
- Stakeholder Involvement: Please see Sections C3, *Benefits and target population*, E5, *Summary Project Analysis – Environmental*, and E7, *Summary Project Analysis – Safeguard Policies*.
- Monitoring & Evaluation: Please see Annex 2 – Component 6, *Detailed Project Description*, and Annex 1 – third column, *Project Design Summary – Monitoring & Evaluation*.

- Financing Plan: Please see Finance Section (page 1), Table in Section C1, *Project Description Summary – Project Components*, and Annex 4 -Tables 7a and 7b, *Cost Effectiveness Analysis Summary – Incremental Costs and Benefits Matrix – Energy Efficiency; and Incremental Costs and Benefits Matrix – Rural Electrification*
- Cost-effectiveness: Please see Annex 4, *Cost Effectiveness Analysis Summary*.
- Core Commitments and Linkages: Please see Sections B1, *Sector-related Country Assistance Strategy (CAS) goal supported by the project*, and D4, *Indications of borrower commitment and ownership*.
- Consultation, Coordination and Collaboration between IAs: Please see Section D2, *Major related projects financed by the Bank and other development agencies*.
- Response to Reviews: (*GEFSEC comments at time of pipeline entry*):
  1. **Describe what types of investments are expected after the project is completed, and what the likely financing sources for those investments are (and degree of viability), including both public and private sources:** Once the barriers to development of energy efficiency projects are removed through the successful implementation of the project's energy efficiency subcomponent, investments in energy efficiency projects are expected from energy services private companies (the ones supported through the subcomponent and others) in partnership with financial institutions, as well as from privatized distribution utilities regarding load management, and the users themselves (in the industrial, commercial and residential sectors); limited government funding would still be required for information purposes. Regarding decentralized rural electrification, investments are expected from private operators, users and associations, with support of public funds (from FERUM, the rural electrification fund).
  2. **Elaborate on the specific ways in which various stakeholders will participate, to both strengthen the political support for the types of policy reforms being considered, and to facilitate replication.** CONAM has briefed principal stakeholders on project objectives and scope. However, additional consultations with stakeholders will be conducted prior to and during appraisal under the leadership of the civil society specialist located in Quito. A public information strategy is a prerequisite for project negotiations and financing for this component is included in the project. The dialogue with stakeholders will be continued during the project launch workshop and during project implementation. Regarding the GEF financed energy efficiency and off-grid electrification components, workshops, focus groups, as well as other consultation mechanisms will be conducted during project appraisal and launch workshop in order to ensure proper consultation and participation of the beneficiaries and actors of these components.
  3. **Importance of monitoring and evaluation, given the value as a model that the project has for the GEF and the region. Progress with reform and evidence of a “level playing field” for renewable energy and energy efficiency both during the project and after project completion should be carefully monitored.** A monitoring and evaluation component is included in the project. In the case of the rural telephone

and electricity component, the market study can serve as a baseline--to be compared with the results of a second sample survey to be conducted at project completion. The project would rely upon existing institutions that monitor social development progress. The Bank would use this project's experience in the design of further projects in the region and elsewhere, and will disseminate the lessons and experience obtained from this project within and outside the Bank.

4. **Take note of the recommendations and lessons to emerge from the GEF STAP workshop on power sector reform, which was held in Bangalore, India, in June 2000. A meeting of the project team and GEFSEC early in PDF activities to review these recommendations and lessons and how they might apply to this project is suggested.** The project has tailored the electricity efficiency (EE) and rural electrification (RE) initiatives to both integrate with, and help rationalize power sector reforms taking place in Ecuador.

Regarding energy efficiency, the electricity law in Ecuador recognizes the desirability of stimulating energy conservation and improved efficiency. The project will directly address the current absence of specific plans, regulatory approaches and technical capacity to implement this law by: i) supporting design of regulatory incentives to encourage distribution utility technical and financial support, and design of tariffs which provide end user incentives, ii) supporting innovative utility/financial institution collaboration to finance efficiency investments, iii) supporting residential and commercial lighting demonstrations to reduce this key end use demand, iv) supporting appliance and equipment standards to raise the overall efficiency of appliance and equipment, v) supporting ESCO service providers both as implementers of utility DSM and efficiency initiatives, and as a separate market force, vi) developing a collaborative program of support for private sector "strategic partners" in industry and commerce (and other sectors) to reduce electricity costs, and vii) promoting introduction of IRP considerations in the referential supply expansion plan and related policies to stimulate cleaner alternatives. In a related effort, the project will support elimination of policy constraints to run-of-the-river small hydro, for example, with development of standardized PPAs.

Regarding off-grid electrification, power sector reform has seldom addressed rural electrification policy or financial needs and the same is the case for off-grid electrification in Ecuador. The GEF Alternative is designed to help address this deficiency by: i) supporting development of an off-grid rural electrification strategy which can be incorporated within the restructured utility system including clarifying utility responsibilities for off-grid supply; ii) developing institutional capacity to implement rural electrification including strengthening private commercial and public interest and community participation, and iii) stimulating the expansion of clean, cost-effective and appropriate (in scale, cost and output) technical solutions for meeting rural household and infrastructure electricity needs, and defining appropriate and sustainable financial mechanisms and sources. The project discussed briefly these issues with GEFSEC and further meetings will take place as needed prior to project appraisal.

5. **Brief should describe how the experiences in Ecuador might translate into similar activities in other countries in the region.** The monitoring and evaluation component of the project, and the lessons drawn and demonstration aspects of the pilot subprojects in particular will provide important lessons learned for other countries with similar barriers related to energy conservation and adoption of renewable energy.

Please let me know if you require any additional information to complete your review prior to inclusion in the work program. Many thanks.

**Distribution:**

**Messrs.:** R. Asenjo, UNDP  
A. Djoghlaif, UNEP (Nairobi)  
K. Elliott, UNEP (Washington, DC)  
M. Gadgil, STAP  
M. Griffith, STAP (Nairobi)  
C. Parker/M. Perdomo, FCCC Secretariat

cc w/o attachments: Messrs./Mmes. Guerrero, Silverman, Werbrouck (LCC6C); Serra (LCSEN); Leipziger (LCSFP); Goldmark, Torres, Richter (LCSFE)

cc: Messrs./Mmes. Bradley (LCSES); Durand (LCSFE); Johnson, Khanna, Aryal (ENV); Jones (Consultant), ENVGC ISC, LCSFP IRIS 1

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## PROJECT BRIEF

### 1. IDENTIFIERS

<b>PROJECT NUMBER</b>	<b>P072527/P063644</b>
<b>PROJECT NAME</b>	<b>Ecuador: Public Enterprise Reform and Privatization Project</b>
<b>DURATION</b>	4 years
<b>IMPLEMENTING AGENCY</b>	World Bank
<b>EXECUTING AGENCY</b>	State Modernization Council (CONAM)
<b>REQUESTING COUNTRY OR COUNTRIES</b>	Ecuador
<b>ELIGIBILITY</b>	Ecuador ratified FCCC on 02/23/93
<b>GEF FOCAL AREA</b>	Climate Change
<b>GEF PROGRAMMING FRAMEWORK</b>	OP 5 & 6

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### 2. SUMMARY

The Project will support the Government's efforts to deepen pro-competition reforms in the telecommunications and electricity sectors, implement policies that will extend these services to the poor in rural areas as well as communication services for small and micro businesses, and adopt programs that foster efficient use of energy. The project will have the following six major components: (a) Strengthening legal, regulatory and institutional framework; (b) Promotion of competition and private investment; (c) Service extension in rural and peri-urban areas, including off grid electrification with GEF financing; (d) Enhancement of energy efficiency with GEF financing; (e) Development of communications and information activities; and (f) Project coordination and management.

The main global benefits of the projects would be: (a) sustainable improvement in end-use energy efficiency and electricity load management through the energy efficiency program, that will result in significant reductions in greenhouse gas (GHG) emissions. This will occur initially at small levels through project implementation throughout the residential, commercial and industrial sectors; and (b) the electrification of about 2,000 households and 350 public service installations in rural areas, with consequent improvement of household living standards and reduction in GHG emissions; as well as, the development of an overall strategy to ensure that project design including dissemination approaches, technology and equipment, and subsidy and financing policy are compatible and replicable to a larger number of rural households.

The carbon savings of the project are estimated at between 1 and 1.5 million tC over 15 years.

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### 3. COSTS AND FINANCING (MILLION US)

<b>GEF</b>	-Project	2.150
	- PDF	0.350
	<b>Subtotal GEF</b>	<b>2.500</b>
<b>CO-FINANCING</b>	-IA: IBRD	17.640
	-Other International:	n/a
	-Gov. of Ecuador	4.180
	-Private	2.890
	<b>Subtotal Co-Financing:</b>	<b>24.710</b>

**TOTAL PROJECT COST**

**27.210**

**4. ASSOCIATED FINANCING (MILLION US\$)**

**N/A**

**5. OPERATIONAL FOCAL POINT ENDORSEMENT**

**Name: Rodolfo Rendón**

**Title: Minister of Environment**

**Organization: Ministry of Environment**

**Date: 11/10/00**

**6. IA CONTACTS**

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ECUADOR

PUBLIC ENTERPRISE REFORM & PRIVATIZATION

## Project Appraisal Document

Latin America and Caribbean Region  
LCSFE

<b>Date:</b> January 31, 2001	<b>Team Leader:</b> Philippe J. Durand
<b>Country Manager/Director :</b> Isabel M. Guerrero	<b>Sector Manager/Director :</b> Danny M. Leipziger
<b>Project ID :</b> P063644	<b>Sector(s):</b> DI - Private Infrastructure
<b>Lending Instrument:</b> Specific Investment Loan (SIL)	<b>Theme(s):</b> Energy; Private Sector; Telecom & Informatics
	<b>Poverty Targeted Intervention :</b> N

<b>Global Supplemental ID:</b> P072527	<b>Team Leader:</b> Philippe J. Durand
<b>Supplement Fully Blended?</b> Yes	<b>Sector Manager/Director :</b> Danny M. Leipziger
	<b>Sector(s):</b> DI - Private Infrastructure

**Project Financing Data**  
 **Loan**     **Credit**     **Grant**     **Guarantee**     **Other:**

For Loans/Credits/Others:

**Amount (US\$m):** 17.65

**Proposed Terms:** Variable Spread & Rate Single Currency Loan (VSCL)

**Grace period (years):** 5

**Years to maturity:** 17

**Commitment fee:** 0.75%

**Front end fee on Bank loan:** 1.00%

<b>Financing Plan:</b>	<b>Source</b>	<b>Local</b>	<b>Foreign</b>	<b>Total</b>
BORROWER		3.03	1.15	4.18
IBRD		4.70	12.94	17.64
OTHER SOURCES OF BORROWING COUNTRY		0.00	2.89	2.89
GLOBAL ENVIRONMENT FACILITY		0.23	2.27	2.50
<b>Total:</b>		7.96	19.25	27.21

**Borrower/Recipient:** REPUBLIC OF ECUADOR

**Responsible agency:** STATE MODERNIZATION COUNCIL

CONAM

**Address:** Av. Juan León Mera 130, Edif. Corporación Financiera Nacional, Piso 9

**Contact Person:** Arq. Patricio Donoso, Principal Coordinator, UEP

**Tel:** (593-2) 509 432

**Fax:** (593-2) 509 437

**Email:** pdonoso@conam.gov.ec

**Other Agency(ies):**

National Electricity Council (CONELEC), National Center for Electricity Control (CENACE), National Telecommunications Council (CONATEL), Superintendency of Telecommunications (SUPTTEL), Ministry of Energy and Mines (MEM), Ministry of Trade and Industry (MICIP)

### Estimated disbursements ( Bank FY/US\$M):

<b>FY</b>	2002	2003	2004	2005				
<b>Annual</b>	5.10	7.20	3.20	2.15				
<b>Cumulative</b>	5.10	12.30	15.50	17.65				



**Project implementation period:** 08/31/2001 - 06/30/2005  
**Expected effectiveness date:** 08/31/2001 **Expected closing date:** 12/31/2005

**GEF Grant: Project ID P072527**

**Estimated disbursements ( Bank FY/US\$M):**

<b>FY</b>	2002	2003	2004	2005				
<b>Annual</b>	0.60	1.10	0.50	0.30				
<b>Cumulative</b>	0.60	1.70	2.20	2.50				

OCS PAD Form: Rev. March, 2000

## A. Project Development Objective

### 1. Project development objective: (see Annex 1)

The Project would support the Government's efforts to deepen reforms in the telecommunications and electricity sectors, by strengthening regulatory institutions, fostering competition, increasing private participation, promoting efficient use of energy, extending coverage in underserved areas and providing modern information technology services to micro and small businesses (MSB).

### 2. Global objective: (see Annex 1)

The GEF-funded components would promote private financing and management to reduce greenhouse gas emissions, by removing barriers to the use of: (i) renewable energy technologies (RET) to extend electricity supply in rural areas (GEF Operational Program No.5); and (ii) energy efficiency measures (GEF Operational Program No.6).

### 3. Key performance indicators: (see Annex 1)

The performance indicators are listed below and elaborated upon in annexes 1 and 1a. Baselines will be based on sector statistics and on studies/surveys done as part of Project preparation and implementation.

#### *Regulatory and institutional development*

- Improved effectiveness of the regulatory agencies for telecommunications (CONATEL and SUPTEL) and electricity (CONELEC), to regulate the sector, consult with the public, and finance and administer the programs for rural telephony (FODETEL) and rural electricity (FERUM).
- Improved effectiveness of the administrator of the electricity wholesale market, CENACE.

#### *Increased competition and private participation*

- Successful privatization of ANDINATEL and PACIFICTEL.
- Issuance of licenses for telecommunications services and networks.
- Establishment of a liberalized wholesale electricity market.
- Increased number of private operators providing power to the grid, rural telephony, decentralized rural electrification and energy efficiency services.

#### *Extension of rural electricity and telecommunications services*

- Adoption of a sustainable strategy to extend rural telephony and electricity services, including efficient subsidization, financing and delivery mechanisms, and community participation.
- Successful completion of replicable pilot projects for rural telephony and electricity.

#### *Expanded internet access and business services to MSB*

- Successful completion of a replicable pilot project for information and communication technologies (ICT)-based business development services to MSB in urban and peri-urban areas, showing improvement in MSB market outreach, competitiveness and growth.

#### *Increased end-use energy efficiency*

- Design and launching of a program to enhance efficiency in the use of energy.
- Successful implementation of demonstration projects with good replicability prospects.

*Implementation of effective public consultations and information mechanisms*

- Systematic consultation and dissemination of regulatory and privatization decisions.
- Growing public consensus in support of the Government's sector reform and privatization program.

*GEF performance indicators*

- Actual tons of CO<sub>2</sub> reduced through the energy efficiency program.
- Estimated tons of CO<sub>2</sub> expected to be reduced through the implementation of subsequent energy efficiency projects and through use of RET instead of fossil fuel-based rural electrification.
- Definition and adoption of a strategy, regulations and policies for the sustained development, with private participation, of (i) decentralized rural RET and (ii) enhanced energy efficiency.

## **B. Strategic Context**

### **1. Sector-related Country Assistance Strategy (CAS) goal supported by the project:** (see Annex 1)

**Document number:** 15419

**Date of latest CAS discussion:** June 22, 2000

The Ecuadorian economy had been weak since the early 1980s, with falling GDP/capita and increasing public debt, due primarily to political instability, growing regional tensions and social unrest, which often paralyzed policy actions and lead to inadequate or even inappropriate policy responses. This was exacerbated by external shocks and natural disasters in the late 1990s, and finally resulted in Ecuador's default in September 1999. That year, real GDP fell by over 7% and real wages by 25%, while unemployment increased to over 16% and annual inflation to 60%.

The economic crisis had a profound impact on the poor. The poverty incidence increased from 34% in 1995 to 46% in 1998 and 69% in 2000, while the number of people in extreme poverty (insufficient income for a minimum food basket) doubled from 17% in 1997 to 34% in 1999. Poverty is highest in rural areas and among the indigenous and Afro-Ecuadorian population.

In March 2000, the Government announced an economic program to (i) restore confidence in economic management, (ii) stem the decline of economic activity and living standards, and (iii) lay the foundations for renewed growth. The centerpieces of the program are dollarization and structural reforms, including an enhanced role for the private sector.

The last CAS Progress Report was discussed by the Board on June 22, 2000, setting the Bank strategy for 2000-02. It responds to the difficult economic situation of Ecuador, by focusing Bank assistance on three objectives: (i) increasing social services and safety nets for the poor; (ii) restoring macro-financial stability and economic growth (through, inter alia, expanding the role of the private sector) and (iii) promoting sustainable development and productivity by the poor (including improved environmental management and rural development).

The proposed project, including its GEF component, will contribute directly to CAS objectives (ii) and (iii):

**ii. Restoring macro-financial stability and economic growth:** The Project promotes competition and private participation in the provision of telecommunications, electricity, internet and business services, and supports the development of sound legal, regulatory and institutional sector frameworks. These policies will facilitate private sector growth and employment generation in these sectors, and more efficient delivery of services and hence a reduction in costs for other sectors. In addition, privatization of electricity and telecommunications will generate fiscal revenue and remove the current fiscal burden from government-owned companies in these sectors.

## **1a. Global Operational strategy/Program objective addressed by the project:**

*iii. Promoting sustainable development and productivity by the poor* : The Project promotes RET for rural electrification and assists in the design and implementation of programs to promote energy efficiency and rural telecommunications.

## **2. Main sector issues and Government strategy:**

### **Background**

**Overview of the sectors** : With 9.1 main lines per 100 inhabitants (vs. 13.2 for LAC) and 82 faults per 100 main lines per year (vs. 20 in Bolivia and 5 in Mexico), coverage and quality of telecommunications services in Ecuador lag behind regional averages. National coverage of electricity is relatively high (80% of total population), but Ecuador's power demand has been growing (despite the sluggish economy), it is expected to accelerate as the economy recovers, while generation capacity is having trouble keeping pace (especially during dry years, due to heavy reliance on hydropower), and transmission and distribution facilities have deteriorated. In both sectors, the rural coverage is low (there are only 1.6 main telephone lines per 100 inhabitants in rural areas, 90% of villages have no telephone services at all, and 45% of the rural population has no access to electricity), which accentuates the urban-rural poverty gap. The lack of adequate services hinders the international competitiveness of Ecuadorian firms and limits the provision of education and health services. Information technology has started to develop, but in number of internet users, Ecuador is far behind its neighbors (16 per 10,000 in 1999 vs. 198 average in LAC) .

**Sector Reforms in the early 1990s.** Ecuador initiated electricity and telecommunications reforms in the early 1990s, with the adoption of new sector legislation and regulations, the creation of regulatory and electricity wholesale market institutions, and the break-up of the national monopolies. The new laws and regulations include mechanisms to make services more accessible and affordable to the poor, as well as to make the power sector more environmentally sound. The Bank provided support under the PERTAL. However, the initial effort to sell the new regional telecommunications companies, ANDINATEL and PACIFICTEL failed, and privatization of the electricity companies has been held up pending necessary tariff increases. In 1993, Ecuador joined the United Nations Framework Convention on Climate Change (UNFCCC).

### **Main sector issues**

Despite the progress since the early 1990s, the reforms can only be completed and sustained if actions are taken to address the following issues:

#### **Telecommunications**

##### ***Incomplete legal and regulatory framework:***

The 1995 reforms to the telecommunications law, important as they were, did not provide a complete and coherent legal framework for long term growth. The March 2000 Economic Transformation Law made further progress, but left several critical issues unresolved. A new draft telecommunications law was presented to Congress in 1999, but withdrawn a few days later due to lack of political support. This draft law has since been revised, and should be presented to Congress early this year.

Current legislation differentiates between services, and establishes different procedures for obtaining concessions and licenses in each service. As new technological developments force services to converge (for example, voice, data and video are now sent through the same lines), legislation should regulate networks, rather than services, and guarantee interconnection between networks, so that operators can provide services in a seamless manner.

Although the cellular companies can compete effectively against ANDINATEL and PACIFICTEL by connecting international calls using their own networks, other fixed-service operators cannot. Because ANDINATEL and PACIFICTEL are unable to meet demand, these other operators rent facilities to private companies illegally. Legalization of this activity would contribute to transparency and facilitate fair competition among all participants.

Current tariff levels are inadequate to cover the cost of local telephone services, which makes it difficult to attract badly needed private investment. At the same time, however, the recent economic crisis has made it more difficult for the poor to bear an increase in the rates. The 1995 law launched the process of tariff rebalancing and created special "popular tariffs," but these are ill targeted as they are based on location rather than income level. Local rates have remained significantly below costs, cross-subsidized by high international rates, but the latter are not sustainable in light of international competition.

#### ***Insufficient institutional capacity and cumbersome regulatory setup***

Although the institutions created by law in 1992 and modified in 1995 are already functional, they are still building up their technical expertise and capacity to regulate and supervise the sector, and to communicate with sector enterprises and consumers. The success of other important measures, like privatization of existing operators, opening of the sector to new investors, and increasing access of the poor will depend heavily on the performance of the sector regulators.

There are four institutions in charge of defining sector policies and regulating the sector: CONATEL, SENATEL (which is *de facto* CONATEL's executive implementing agency), CONARTEL and SUPTEL. While the unusual division between CONATEL as regulator and SUPTEL as monitoring agency may be viable, the division of the allocation and control of licenses between CONATEL (for telecommunications) and CONARTEL (for broadcasting services) is not consistent with the rapid convergence of all communication and information services.

#### ***Poor performance and financial weaknesses of operators***

ANDINATEL and PACIFICTEL are the sole providers of fixed-line telephony (except in Cuenca). Since their creation in 1992, these government-owned enterprises have been slow in introducing new lines and services and in improving service quality, as they have lacked the financial resources and autonomy to make needed investments. Their financial weaknesses are due primarily to overstaffing, inadequate local tariffs, and, in the case of PACIFICTEL, weak management. This has made it difficult for the two operators to compete effectively with private cellular companies in both local and long distance telephony.

#### ***Mistakes of the previous privatization effort***

The attempted sale in 1997-98 of 35% of the shares of ANDINATEL and PACIFICTEL failed because no investors would meet the base price of over \$2,000/line. This floor price was high relative to those set in other LAC countries, especially in light of (i) the low initial local rates and high investment obligations under the proposed concessions, (ii) sharply reduced price ceilings on calls to the U.S. (as set by the U.S.

Federal Communications Commission), (iii) the small size of the separate ANDINATEL and PACIFICTEL operations, (iv) the fact that only a minority share (35%) of the companies was for sale, (v) the limited credibility of the 1997-98 transition government, (vi) the major turmoil in international financial markets then, and (vii) legal and constitutional challenges to the changes in the Telecommunications Law.

## **Electricity**

### ***Gaps in the regulatory framework***

While the overall reformed framework is satisfactory, specific regulations need to be elaborated and applied, especially on (i) tariff setting and transmission charges, (ii) environmental management, (iii) the operation of the wholesale market, and (iv) rural electrification. Also, as the segmentation of the state monopoly INECEL was delayed until early 1999, the Government still needs to resolve the financing of severance payments for terminated INECEL staff.

### ***Weak institutional capacity***

While CONELEC and CENACE have been operating since 1997 and 1998, respectively, both entities need to improve considerably their procedures, inter-agency relationships, and dealings with sector enterprises and consumers, in order to ensure adequate protection to investors and consumers, foster the introduction of effective competition, and extend services in rural areas.

### ***Inadequate tariffs***

Electricity prices on average cover only 55-60% of economic costs. During November 1999-May 2000, tariffs were frozen despite rapidly accelerating inflation, and fell to less than one-third of economic costs. In June, average tariffs were increased by 70%, followed by regular monthly increases of 4% -- but with monthly inflation of 2-3%, it will take 3-4 years to reach economic costs. (On October 30, 2000, CONELEC did not accept a request from the distribution companies for an additional 30% increase, pending an evaluation of the cost information.) The resultant total subsidization for consumption of electricity was nearly US\$300 million (1.5% of GDP) in 2000. The consumption ceilings for subsidies, 300 kwh/mo. in the Andean region and 400 kwh/mo. in the Coastal region, are inordinately high, and benefit mainly the better off -- low-income households rarely consume above 200 kwh/mo.

### ***Sub-optimal investment in the sector.***

Inadequate tariffs over extended periods have lead to a serious deterioration of the financial position of the sector enterprises. Distribution enterprises are the most directly affected, but they in turn are late in paying the generation and transmission entities. These financial problems, and the weak planning capacity of the sector institutions, are two major reasons why expansion of generating capacity has not kept pace with demand, and investment has traditionally been high cost in order to meet emergency needs, rather than part of a least-cost expansion plan. Some US\$200 million/year in new generation capacity will be required during 2001-03 to meet demand, with a similar investment need for distribution and transmission.

### ***Lack of access to electricity in remote areas***

The 2000-09 Rural Electrification Plan prepared by CONELEC, and to be financed in part by FERUM, is expected to increase rural penetration of electricity from the current 55% up to 65% over ten years, through

grid extensions. However, there is also a need to reach remote areas far from the grid, where RET is the efficient solution. In these areas, where the population also lacks other infrastructure such as roads, telephones, potable water and easy access to health and education, the social and economic benefits of electrification may be high, but there are many barriers to service, such as: (i) weak government capacity for development and implementation of an electrification strategy for these areas, (ii) high first-cost of RET relative to consumers' ability to pay, and lack of financing/credit systems to facilitate purchase, (iii) lack of financial motivation, appropriate cost structures and regulatory obligations for existing distribution utilities to serve dispersed populations, and (iv) lack of other established commercial enterprises which understand and are willing to serve such markets.

### ***Inefficient Use of Energy***

Due to a history of energy subsidies, the efficiency of both electricity and fuels use in Ecuador is very poor, as shown by both the wasteful habits of end users and the high energy consumption of existing lighting, appliances and equipment in homes, buildings and factories, or currently available in the marketplace. Rising electricity prices should begin to change attitudes regarding electricity usage and associated equipment purchase. Nevertheless, to optimally improve its energy efficiency, Ecuador must correct the lack of: (i) additional financial incentives, such as rebate programs for higher-first-cost but energy-efficient residential and commercial lights, or more sophisticated time of use tariffs for industry; (ii) a general understanding (in all end-use sectors) of energy costs and how these can be reduced; (iii) availability of more energy-efficient appliances such as refrigerators and air conditioners, and standards and efficiency labeling for these equipment; (iv) institutional and technical capacity in government and private sector institutions to develop a strategy to address efficiency needs, with involvement of stakeholders; and (v) economic pricing of some fuels such as LPG, the primary household fuel for cooking and water heating.

### **ICT-based Services for Micro and Small Businesses (MSB)**

#### ***Shortage of available business services overall for MSB***

In Ecuador, some 20,000 small businesses and 60-85,000 microbusinesses (employing fewer than 12 people) produce tradable goods. Together, they predominate in the labor-intensive areas of food, textiles and clothing, leather goods, wood products, metalworking, and artisanry. About one-half of the microbusiness entrepreneurs are women. In more advanced economies, ICT-based services such as business skills training, counseling, information and networking, and facilities and infrastructure support, have been shown to help such firms increase market outreach and competitiveness. However, even basic business services in Ecuador are accessible to less than 5% of MSB, and the development of business know-how generally remains an informal, in-house or in-family process. There are skills development programs operated by NGOs for MSBs, at little or no cost, but these are generally narrowly focused on credit-related activities (bookkeeping, loan application preparation, etc.). There have also been free purely Government initiatives, but these have been sharply limited by the scarcity of fiscal resources, have often been characterized by inadequate client orientation, service quality and efficiency, and may have discouraged commercial services. Public-private cooperation has hardly been tried.

#### ***Lack of access to personal computers and the Internet***

Internet usage in Ecuador, while extremely low, is doubling every two years, and internet content in Spanish is growing rapidly (Spanish speakers are the second largest on-line language group). However, internet diffusion has so far been driven primarily by wealth, education and (the male) gender, due to the high up-front cost of a personal computer and modem, and the shortage of systems maintenance and

technical assistance, ICT skills, readily usable ICT applications and local content, reliable power and telecommunications supplies, and simply the awareness of ICT potential. ICT-based services are available in modest quantities in Ecuador, but highly concentrated in the modern sector. Commercial internet cafes have become popular in the larger cities, but their clientele consists mainly of students, tourists, and a few better-educated small entrepreneurs. Most MSBs have little access to personal computers or business applications. In addition, few entities provide access to multiple on-line services in one location, and most services are not accompanied by skilled human assistance and guidance on content and quality---a vital input particularly for those with lower formal education.

### *Communications with stakeholders*

#### *Weak communications capacity*

Professional communications skills - except in journalism - are scarce in Ecuador, and the value of key functions such as strategic communications, opinion research, and social marketing has yet to be recognized. CONAM, CONELEC, CONATEL etc. have not been able to develop and implement an effective communications strategy with stakeholders on the reform and privatization program.

#### *Lack of public understanding and support for reforms*

As a result of this lack of dialogue with stakeholders on the reform programs, wide segments of the population have little understanding of the costs and benefits of regulation and privatization of the telecommunications and electricity sectors. The resultant suspicion of and opposition to the reforms, especially to privatization, has been a serious obstacle to the Government's efforts.

### **Government Strategy**

The Government is committed to reducing poverty and reactivating the economy by deepening the sectoral reforms started under previous administrations (1995-99), promoting Ecuador's integration into international markets, and fostering private participation. To help achieve this, the administration has adopted a development strategy in the telecommunications and electricity sectors that extends the market-oriented reforms initiated in the early 1990s and addresses explicitly the most critical issues still pending in each sector, as discussed above. Specifically, the strategy in the two sectors has five main objectives:

- completing the legal and regulatory frameworks and strengthening the regulatory and supervisory agencies to provide a stable environment with clear rules that will attract investment while protecting consumers and investors;
- promoting competition and private investment by opening the sectors to new investors and going forward with the privatization of the two fixed-line telecommunications operators and the electricity generation, transmission and distribution firms, starting with the 18 distribution companies;
- improving living standards of the poor and broadening opportunities for MSB by extending access to electricity, telecommunications, internet, and ICT-based business services in rural and peri-urban areas.
- implementing environmentally sound policies in the electricity sector that reduce pollution and the emission of CO<sub>2</sub>. To this end, the Government will undertake campaigns and implement investment programs to support the supply of renewable energy technologies (RETS) and more energy-efficient equipment and facilities.
- developing effective communications and consultation mechanisms in order to build social consensus



around the reform programs in the two sectors.

**Telecommunications.** The March 2000 Economic Transformation Law increased the allowed level of private participation in ANDINATEL and PACIFICTEL from 35% to 51%, while eliminating the existing exclusivity arrangements for the provision of basic services. On these bases, the Government plans to sell majority shareholdings in ANDINATEL and PACIFICTEL, possibly as a single entity. The new company(ies) would be concessioned to operate fixed and wireless services, in competition with existing and new providers, without any exclusivity. In accordance with legislation already in place, Government provided for the financing of FODETEL with contributions from all service and network operators of 1% of annual gross revenues (the percentage to be reviewed by CONATEL every five years based on need).

**Electricity.** The Government is writing and implementing regulations to (i) create a liberalized wholesale market for electricity, (ii) move tariffs closer to long run marginal costs, and (iii) ensure that investments meet environmental standards. It has also decided to privatize the sector both through: (i) selling majority participation in existing generation, transmission and distribution enterprises; and (ii) inviting new private investment in generation. It has initiated the privatization process through assessment of the relevant legal, financial, and technical issues, and the preparation of the promotion campaign, with the assistance of Hagler Bailly, a reputable firm of international specialists. The Inter-American Development Bank (IDB) is financing these advisors and providing technical advice.

**Rural electrification.** The Government is committed to the extension of electricity service, using private/public partnerships. CONELEC has prepared the 2000-09 Rural Electrification Plan, which will connect about 750,000 additional households, increasing the rural penetration rate from 55% to 65%. The plan will be implemented by the distribution companies through extension of the existing grid, and will be financed in part through the FERUM, with resources principally from levies on commercial and industrial users. In addition, the Department of Alternative Energy (DEA) in the Ministry of Mines and Energy (MEM) is in charge of off-grid projects to extend services to remote rural areas. Within the framework of the Peru-Ecuador Bilateral Technical Committee on Energy and Mining, a PV-based Rural Electrification Program (of US\$13.8 million) aims to provide RET-based electricity to communities on both sides of the border. Also, in July 2000, the MEM and the Ministry of Health jointly prepared a US\$0.9 million program for the installation of PV-based electricity systems for medical refrigerators in 97 remote, rural clinics. However, financing for these programs has not yet been secured.

**Energy efficiency.** Also within the framework of the Peru-Ecuador cooperation, MEM proposed the 2000-05 Energy Saving Program for Ecuador (of about US\$4.4 million) to: (i) improve the energy efficiency of the power system itself; (ii) create a culture of rational use of energy among the population; (iii) increase Ecuador's industrial competitiveness; and (iv) protect the local and global environment. This program has a potential to reduce peak demand for electricity by about 150 MW (...%).

**Support for MSB.** The Government, through the Ministry of Commerce, Industry and Fisheries (MICIP), is committed to promote modern ICT-based business services as part of its assistance to MSB. It will build on the existing pipeline of MICIP programs for MSB, some of which are undertaken in conjunction with NGOs such as the Camara Nacional de Microempresas (CANAMIEC), the Centro de Promocion y Empleo para El Sector Informal Urbano (CEPESIU), the Fundacion Ecuatoriana de Desarrollo (FED), and the Corporacion Femenina Ecuatoriana (CORFEC). MICIP also manages the World Bank-financed International Trade and Integration Project, which is supporting a large number of microbusinesses in Ecuador to develop direct or indirect exports. It also has worked with PEOPLink, an INFODEV-supported US-based NGO, which acts as a direct on-line marketing service for grassroots producers in Ecuador and other countries by displaying their products digitally on its web site.

**Communications.** The Government is now well aware of the need to develop systematic channels of public consultation and dissemination of the major regulatory decisions and sector programs in order to increase social acceptance of the reforms, especially in light of the failed first attempt at privatization and the need to raise tariffs. To this end, the Government has decided to strengthen CONAM's communications capabilities and to devise a comprehensive communication and information strategy. This strategy will include: (i) research on stakeholders' perceptions vis-a-vis reforms in general and the controversial aspects (i.e., tariff increases; sale of state-owned enterprises to foreign investors; retrenchment of surplus labor) in particular; (ii) media campaigns to inform the public about past, ongoing and planned measures; (iii) seminars and workshops directed at members of the National Congress, labor unions, indigenous groups, and NGOs, with a view to building consensus on the principal reform issues; and (iv) programs aimed at the employees of the enterprises slated for privatization.

### **3. Sector issues to be addressed by the project and strategic choices :**

The project would support the Government's efforts to address the above issues by:

- completing the legal and regulatory framework with the definition of specific regulations and procedures for the operation and expansion of the sectors, and the strengthening of the entities in charge of the sectors in order to increase the effectiveness of economic and technical regulation.
- promoting competitive markets and private sector-led growth in order to enhance efficiency in the provision of services and attract the resources needed for expansion.
- ensuring that the rural poorest also benefit from the sectoral reforms, by designing and piloting programs to extend electricity and telephony services in rural areas.
- assisting MSB through the provision of internet access and ICT-based business services.
- ensuring that environmental considerations are incorporated into sector policies and investment decisions, promoting the use RET for rural electrification, and promoting efficient use and conservation of electricity.
- assisting CONAM and the sector regulatory institutions to strengthen their capacity to consult and communicate with the various stakeholders affected by the reforms in the two sectors.

## **C. Project Description Summary**

**1. Project components** (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):

The project will have six major components, supporting the key areas in the Government's reform strategy.

### **a. Strengthening of the legal/regulatory/institutional frameworks in telecommunications and electricity**

#### **Telecommunications:**

- i. Strengthening CONATEL and providing it with assistance in the completion of the legal and regulatory framework of the telecommunications sector;
- ii. Strengthening SUPTEL and financing necessary software programs and equipment to undertake effectively its supervisory functions.
- iii. Completing a telecommunications tariff rebalancing study and plan;

#### **Electricity:**

- iv. Strengthening CONELEC and assisting it in the completion of electricity regulations and procedures;

- v. Strengthening CENACE by completing a procedures manual, staffing plan and staff training program.

**b. Increased competition and private investment in telecommunications and electricity.**

**Telecommunications**

- i. Diagnostic and recommendations for a sector strategy, including options for privatization.
- ii. Assistance to CONAM for ANDINATEL and PACIFICTEL privatization
- iii. Assistance to CONATEL for issuing service and network licenses

**Electricity**

- iv. Assistance to CENACE to supervise and manage the electricity wholesale market so as to enable effective competition in electricity.

**c. Extension of services to low income groups and MSB in rural and peri-urban areas**

- i. Joint demand survey for rural telecommunications and electricity services.
- ii. Pilot telecommunications projects to be financed through FODETEL
- iii. Development by MEM-DEA and CONELEC of rural electrification program
- iv. Pilot Projects for decentralized off-grid RET-based systems
- v. National E-readiness assessment (review of regulations and IT inventory)
- vi. Pilot projects to develop business centers with computer and internet access and ICT-based business services to MSB in peri-urban and large rural communities.

**d. Design and implementation of a program to promote efficient use and conservation of electricity**

- i. Identification of barriers to efficiency enhancement, through surveys on electricity demand and efficiency enhancement options;
- ii. Strategies and policies to remove barriers, including (i) tariff incentives to enhance end-use efficiency; (ii) standards for efficient design and use of buildings and electrical appliances, including appliance labeling; (iii) public information and training of management and operational staff, and (iv) support to the formation of local energy service companies (ESCOs), through relevant market assessment and training.
- iii. Demonstration projects in textiles factories, public lighting, hotels, commercial centers, etc.
- iv. Monitoring and evaluation of the entire program.

**e. Communication and information campaign on sector reforms**

- i. CONAM communication and consultation campaign with stakeholders and relevant civil society organizations on the Government's aims and policies in regard to the reform and privatization program.
- ii. Action plan and staff training program to strengthen the capacity of CONAM, CONATEL, SUPTEL and CONELEC, to undertake timely public consultations on major regulatory decisions, and systematically disseminate sector programs, regulatory decisions and procedures.

**f. Project coordination and management**

- i. General project coordination and management by CONAM
- ii. Management of telecommunications components by CONATEL and SUPTEL
- iii. Management of the electricity components by CONELEC, CENACE and MEM-DEA
- iv. Management of the component for assistance to small and microbusinesses by MICIP
- v. Monitoring and Evaluation
- vi. Audit of project accounts.

Component	Sector	Indicative Costs (US\$M)	% of Total	Bank financing (US\$M)	% of Bank financing	GEF financing (US\$M)	% of GEF financing
A. Strengthening of legal, regulatory, and institutional framework		2.80	10.3	2.80	15.9	0.00	0.0
B. Increased Competition and Private Sector Participation		7.26	26.7	6.10	34.6	0.00	0.0
C. Extension of Services to Low-Income Groups and MSB		9.53	35.0	5.04	28.6	1.32	52.8
D. Energy Efficiency		1.89	6.9	0.43	2.4	1.18	47.2
E. Communication and Information		1.96	7.2	1.41	8.0	0.00	0.0
F. Project Coordination and Management		3.61	13.3	1.69	9.6	0.00	0.0
<b>Total Project Costs</b>		27.05	99.3	17.47	99.0	2.50	100.0
<b>Front-end fee</b>		0.18	0.7	0.18	1.0	0.00	0.0
<b>Total Financing Required</b>		27.23	100.0	17.65	100.0	2.50	100.0

## 2. Key policy and institutional reforms supported by the project:

### *Telecommunications and ICT-based Services*

- Financial strengthening of sector enterprises, through tariff rebalancing
- Rural telecommunications development, through demand evaluation and development of financing instruments (FODETEL) to improve access to service, including through community telephones
- Enhancement of sector efficiency, through ANDINATEL and PACIFICTEL privatization
- Liberalization of the sector through modernization of legislation
- Establishment of new technical regulations
- CONATEL and SUPTEL institutional strengthening and increased operational autonomy
- Issuance of new network services and licenses
- Establishment of ICT-based business service centers for MSB

### *Electricity and Energy Efficiency*

- Modernization of the legal/regulatory/institutional framework to establish a competitive, market-oriented system, based on arms-length regulation and majority-private enterprise
- Creation of a wholesale market and retail markets based on competitive generation and open access to transmission and distribution (which are to be regulated as natural monopolies)
- Tariffs based on economic (long-run marginal) cost, with protection of the poor via targeted subsidies
- Preparation and application of environmental regulations
- Strengthening of CONELEC for arms-length regulation
- Strengthening of CENACE for operating and administering the competitive wholesale market
- Extending electricity supplies in rural areas, using RET when appropriate
- Enhancing the efficiency of electricity end-use

### *Communication and Consultation*

- Enhancing consultation on policy decisions affecting wide segments of the population

- Strengthening the effectiveness of CONAM in communications.

### **3. Benefits and target population:**

**General.** Through improving telecommunications and electricity services, the Project would contribute to development and the quality of life, by improving health and education services and strengthening public administration. Residents of rural areas would obtain access to telecommunications and electricity. Consumers and investors would benefit from strengthened regulatory enforcement and more transparent and accountable procedures, which reduce the risks of arbitrary decisions.

**Public Finance.** Public expenditures would be reduced by the streamlining of the regulatory and enforcement agencies, and their becoming financially self-sustaining via levies on the sector enterprises. Greater competition would lead to improved and expanded services, thereby stimulating economic growth and generating additional government revenues from operator licenses and a broadened tax base. And the sale of ANDINATEL and PACIFICTEL would provide a large one-shot revenue boost.

**Telecommunications and MSB.** The Project would increase the availability of telephone lines in rural areas. The introduction of competition and more efficient regulation would serve to control the cost of services and improve the quality and scope of services. Businesses, in particular, which increasingly depend on telecommunications, would benefit from lower fees for interconnection and international communications and greater variety of value-added services. The Project would also extend the benefits to MSB through the development of ICT-based business centers. CONATEL/SUPTTEL's enhanced capacity to manage the radio spectrum would ensure the availability of frequencies, reduce radio interference, make private investment in wireless technologies more attractive, and improve the quality of services.

**Electricity.** Electricity consumers would benefit from: (i) more efficient, higher-quality, and environmentally sustainable service; and (ii) extension of supplies to unserved rural areas. The risk of future power shortages would be reduced. The project will develop an overall implementation strategy for decentralized rural electrification, and contribute directly to improved living conditions in rural remote areas, through the installation of photovoltaic systems for some 2,000 households and 350 public service installations such as schools and health clinics. Direct CO<sub>2</sub> emission reductions from this component would total at least 25,000 tons over the project life.

**Energy Efficiency.** This program will result in significant reductions in electricity end use and associated GHG emissions (see details in Annex 4a). This will start small through the project's demonstration activities, and expand substantially through application in the residential, commercial and industrial sectors. The project also assist the commercial and industrial sectors in reducing their costs of production and becoming more competitive. Improved end-use of electricity by customers in all sectors will help compensate for average tariff increases.

#### **4. Institutional and implementation arrangements:**

**Implementation responsibilities.** CONAM's Public Enterprise Reform Unit (UEP) would coordinate the Project. UEP's Telecommunications Group would prepare and advance the legal/regulatory/institutional reforms and privatization of ANDINATEL and PACIFICTEL, in close coordination with CONATEL, SUPTEL, the Solidarity Fund (which is in charge of state-owned enterprises) and the enterprises. Other project components would be implemented by the sector agencies -- CONATEL and SUPTEL for telecommunications, CONELEC and CENACE for electricity. MEM-DEA would be responsible for rural electrification and energy efficiency, in close collaboration with CONELEC and in consultation with the private sector and potential beneficiaries, and with CONAM handling procurement and disbursements. CONAM's capacity to manage infrastructure reform projects was demonstrated by its success in advancing reforms since 1994 and coordinating PERTAL. It is necessary that the Government centralize decisions in CONAM to ensure appropriate management of this multi-sectoral project.

The ICT-based project pilots for MSB will be prepared and supervised by a steering committee lead by MICIP, and composed of representatives of CONAM, private business, community organizations, the ICT technical community and World Bank experts. MICIP, in close collaboration with CONAM, will (i) manage the design and implementation of the pilot projects, (ii) manage the review of relevant public policies; (iii) ensure electricity/telecom/microbusiness coordination, and (iv) define financing policies to support the project.

**Project Preparation Facility.** The Bank has extended a US\$2.0 million Project Preparation Facility (PPF) to the Government to finance project preparation, especially the continuation of reforms in the two sectors and the privatization of ANDINATEL and PACIFICTEL.

**Financial Management and Accounts.** CONAM's UEP will be responsible for central handling of project accounts and information, budgeting, preparation of financial reports, contracts supervision, and establishment and operation of internal controls. Initially, UEP will follow Statement of Expenditures procedures for replenishing the Special Account. In accordance with the agreed Action Plan (Annex 6), as soon as CONAM becomes compliant with the Bank's Loan Administration Change Initiative (LACI) and has installed an integrated project financial system acceptable to the Bank, UEP will prepare and submit to the Bank quarterly Project Management Reports (PMRs) which enables the linking of expenditures to the Project's financial, physical, and procurement activities and their simultaneous monitoring, while also serving as support for applications for disbursements from the loan account. The basis and format of these reports would be in accordance with the Bank's financial management manual and LACI procedures.

UEP applies an integrated financial management system, SIGEF, which would account for project expenditures and monitor processes. As this system is limited to purposes of accounting and tracking expenditures, UEP agreed to establish, as part of SIGEF, a sub-system to monitor the financial and physical activities of the Project including planning, internal controls, contracts monitoring, and financial reporting and controls. The chart of accounts for the Project would be structured accordingly, thus ensuring that project expenditures will be accounted by appropriate components and categories. The project accounting and financial system would gather processes and accounting data so as to produce accurate information. To ensure reliable information, the accounting and financial systems would be linked with other project monitoring systems.

**Audits.** Annual standard audits of Project and CONAM financial statements will be prepared in accordance with terms of reference acceptable to the Bank, and be furnished to the Bank not later than six months after the close of the Project's financial year (December 31). CONAM has selected an independent

and qualified local firm for the audit, in agreement with the Bank. CONAM's financial administrator will work with this firm to carry out interim audits throughout the year, in order to prepare the annual audits within the specified timeframe.

**Disbursements.** A special project account will be established at the Central Bank, in accordance with Bank policies and procedures. The amount of the initial deposit will be determined by the disbursement mechanism agreed with the Bank. Disbursements of expenditures paid out of the advance to the Special Account will be made initially on the basis of SOEs, following bank disbursement procedures. It is anticipated that project financial monitoring mechanisms agreed with UEP will make it possible that Bank funds be disbursed based on quarterly project cash forecasts linked to expected project activities.

**Procurement.** The Project will follow the Procurement Plan (part of the Project Implementation Plan), which will be updated semi-annually.

**Reporting.** UEP will submit to the Bank monthly progress reports, as well as more comprehensive semi-annual reports (by June 30 and December 31 of each year). The Borrower shall review the semi-annual reports with the Bank, not later than one month after reception. UEP will conduct a mid-term review on or about June 30, 2003, to evaluate implementation progress against set objectives, and will furnish to the Bank at the closing a plan for the future operation of the Project. It will prepare a project Implementation Completion Report, to be submitted to the Bank not later than six months after the closing.

**Operations Manual.** Project management functions and responsibilities will be governed by the Operations Manual, which will cover, *inter alia*, project procedures, financial guidelines, staffing and staff responsibilities, contracts supervision, flow of funds, special account, budgeting, auditing and reporting, as well as procurement and disbursement procedures. CONAM is preparing the Operations Manual based on the one used for the Public Enterprise Reform Technical Assistance Loan (PERTAL).

## **D. Project Rationale**

### **1. Project alternatives considered and reasons for rejection:**

**Separate Projects.** The Bank initially considered two separate follow-up TA projects to PERTAL for electricity and telecommunications, respectively, so that each operation could focusing on a particular sector reform agenda, allowing support for reforms in one sector to not be delayed by problems in the other. However, the Government requested that the Bank merge the assistance to these sectors into a single operation, due to the synergy of approaches to similar issues in the two sectors, and the efficiency of project preparation and implementation by both the Bank and CONAM (which is handling reforms in both sectors, and whose UEP would be in charge of Project implementation).

**Electricity Privatization.** The Bank and the Government considered having the Project assist privatization in the electricity sector as well as in telecommunications. However, because of the ready availability of funds from IDB's Private Provision of Infrastructure Loan, and Government's desire to accelerating the electricity privatization, the Government decided to use IDB funding for this purpose. This activity will be coordinated by CONAM, with close cooperation between the Bank and IDB.

**Hydrocarbons.** At one point, it was planned to include in the Project reform and enhanced private enterprise participation in hydrocarbons, which forms part of CONAM's mandate. However, the complex economic, social, environmental and political issues associated with that sector reform would have entailed

the risk of serious delays in preparing the relevant project components. Given that PERTAL was completed by end-1999, the Government requested that the proposed Loan be processed quickly so that the momentum of the overall reform program not be lost and a hiatus in external financing be avoided. Hydrocarbons was therefore dropped from this project.

**GEF Components.** The Bank and the Government also decided to include components aimed at removing barriers to expanding rural electrification and to enhancing the efficiency of electricity use. These form part of the Government's sector objectives, and are consistent with GEF global objectives to which the Government has subscribed. Without Bank and GEF support, the Government would not be able to implement such programs in the short term and would most likely wait until the wider sector reforms were consolidated. To enhance effectiveness, it was decided to focus Bank financing on the strategic and institutional requirements, such as preparing relevant legal/regulatory/institutional reforms including strengthening of the rural electrification fund FERUM, and to seek GEF funding for (i) assessment of barriers impeding the efficiency of electricity use and expansion of RET in rural areas, and options and requirements to overcome these barriers, and (ii) follow-on activities such as pilot projects, dissemination campaigns, and activities-specific training.

**ICT-based Centers.** It was recently agreed to include a component to develop ICT-based business development centers for MSB, in recognition of the new ICT tools' importance for increasing competitiveness, reaching new markets, and diminishing the size advantages of larger firms. This component complements policy and institutional measures in the overall telecommunications sector and the expansion of rural electricity and telecommunications services (by setting up at least one ICT-based center in a rural community).

**Regulatory Structure.** Consideration was given to creating a unified regulatory agency for telecommunications and electricity, so as to gain synergies and use scarce expertise more efficiently. However, this would have necessitated amendment of several laws and regulations, as well as the dissolution of existing regulatory and enforcement agencies in both sectors. While there are common elements in price regulation and retail provision of telecommunications and electricity, issues of technical regulation are quite distinct. Therefore, it was decided to support the Government's approach by strengthening the existing agencies in both sectors, with focus on increasing their autonomy and efficiency.

## 2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
<p><b>Bank-financed</b></p> <p>a. Enactment of a new Telecommunications Law, establishment of an autonomous regulatory agency. (conditionality)</p> <p>b. Adoption of efficient tariffs for telecommunications and electricity. (conditionality)</p>	Ecuador - SAL (approved May 2000)		



Technical assistance to reform telecommunications and electricity;	Ecuador - PERTAL (TA) (closed December 1999)	S	S
Privatization of electricity distribution companies (conditionality)	Ecuador - SAL (closed October 1997)	U	S
Enhancement of energy efficiency	- Brazil - Energy Efficiency - Jamaica - Demand Side Management - Mexico - High Efficiency Lighting - China - Energy Conservation		
Promotion of decentralized rural electrification	-Argentina - PERMER  -Bolivia - ESMAP Country Program II	S	S
<b>Other development agencies</b>			
Financing of investment bank and other advisors to privatize electricity sector enterprises	Ecuador - Private Provision of Infrastructure TA Loan, IDB (on-going)		
Enhancement of energy efficiency	European Union and USAID financed projects in Ecuador		
Removing barriers to use of windpower (Galápagos pilot)	UNDP/GEF project in Ecuador, implemented in 1997-2000 by MEM/DEA		
Privatization of telecommunications (conditionality)	Ecuador SAL, IDB		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

### 3. Lessons learned and reflected in the project design:

Lessons learned from similar projects in Ecuador and LAC at large are reflected in the project design.

#### *Sector reform*

- A clear, predictable, and modern legal/regulatory/institutional framework, with autonomous regulatory agencies, arms-length regulation ensuring a level-playing field, liberalized markets with open access, and anti-trust provisions are needed to attract private investment in infrastructure;
- Autonomous, technically competent, and self-financed regulatory and enforcement entities are needed to grant new licenses, resolve disputes among operators, and protect the public interest;
- Newly-created regulatory entities are frequently overwhelmed but have little expertise to draw upon. On-site consultant support and operational advise during the initial phase is invaluable;
- A tariff system based on long-run marginal cost need to be established at the start of the reform process. Subsidies to low-income/low-volume consumers should be well-targeted;
- Consultations with stakeholders are essential for the success of reforms. These consultations should start at the design stage of the program so as to integrate the stakeholders concerns into the reform policies. The Government should proactively explain its program to specific stakeholders and the

public at large, by means of a professionally designed public information campaign.

- The reformed legal/regulatory/institutional framework needs to be constantly monitored and adjusted.

### ***Privatization***

- A well defined, communicated and implemented program of reforms, with broad stakeholder support, needs to precede privatization;
- The segmentation of the state-owned monopoly needs to be completed prior to offering the enterprises for sale;
- Privatization, as the most visible reform action, requires top-level political support from the executive and legislative branches, as well as a centralized and professional approach.
- The privatization agency needs operational flexibility to make expeditious decisions independent of other agencies;

### ***Rural infrastructure***

- Infrastructure investments in rural areas can yield high economic and social returns, but the financial returns may be too low to attract private firms. Therefore, these schemes often require subsidization and other government financing, which must be carefully analyzed and planned.
- "Universal access" funds have been successful in industrialized and developing countries. A least-subsidy approach has proven effective, providing for a one-time subsidy for capital, rather than for recurrent costs. (In Chile, low, competitively distributed subsidies - not exceeding US\$10,000/line - provided considerable leverage to accelerate rural telecommunications development.)
- Complementary sector reforms largely determine the success of rural infrastructure programs. Major risk factors include policy variables (especially interconnection rules and tariffs), in addition to financial and technical aspects.
- Local priorities should guide investments, and strong local participation should be encouraged. Market studies should be undertaken before deciding on a course of action. Flexibility and adaptability need to be designed into projects.
- There is no one best institutional or implementation approach, but strong motivation is essential on the part of the implementing entity, and private participation is key to sustainability.
- Joint planning and/or implementation of rural infrastructure projects in several sectors makes practical and economic sense.

### ***Energy efficiency***

- Pricing and regulatory reforms are necessary but not sufficient to maximize and capture energy efficiency potential; key market barriers must also be addressed in a comprehensive and sustainable way;
- The expansion of energy efficiency activities entails a learning process, requiring that firms receive the correct market and regulatory signals over an extended period of time. Because of this, and the need to build collaboration and consensus, a phased approach is desirable. The first phase should demonstrate early successes, while laying the groundwork for more substantial investments. This approach also permits an exit strategy if conditions turn out to be unsatisfactory.
- A longer term, appropriately-funded dissemination and replication strategy is necessary to avoid post-project reduction in efficiency improvement momentum.
- Energy conservation investments provide good to excellent economic rate of returns where energy prices reflect economic costs.

#### **4. Indications of borrower and recipient commitment and ownership:**

Successive governments have maintained the commitment to modernize and privatize these sectors, despite setbacks resulting from frequent changes in government and in principal policy makers, and achieved considerable progress under difficult circumstances. With support of the Bank's PERTAL, new laws and attendant regulations and guidelines have established the basis for restructuring the two sectors and preparing them for privatization. However, these efforts need to be completed, especially the enhancement of private participation and further improvements to the sector frameworks. The Government also has shown concern about global climate change, and has initiated modest programs to promote energy efficiency. The Government's commitment to the Project objectives is demonstrated specifically by:

##### ***Telecommunications and ICT-based Services***

- The 1992 Law which separated operations (EMETEL) from regulatory and control functions (SUPTTEL);
- The 1995 Law which created new regulatory and enforcement entities (CONATEL and SENATEL) and allowed privatization of EMETEL, which was segmented into ANDINATEL and PACIFICTEL;
- Official launching of the privatization process of EMETEL in 1996;
- Creation of a sectoral modernization and privatization unit within CONAM (November 1997), and attempts to sell 35% of shares in ANDINATEL and PACIFICTEL (April 1998);
- Tariff rebalancing in December 1996, July 1997, November 1997, and September 1999; and
- The March 2000 Economic Transformation Law which eliminated exclusivity and increased the share of ANDINATEL and PACIFICTEL that can be held by the strategic investor(s) from 35% to 51%.
- MICIP's programs with NGOs in support of MSB development

##### ***Electricity***

- Establishment during 1996-98 of a modern legal/regulatory/institutional framework based on arms-length regulation, competition, and maximum participation by private enterprise;
- Creation of CONELEC for regulation and enforcement and CENACE for least-cost dispatch and administration of the liberalized wholesale market; ;
- Segmentation of INECEL into separate companies for generation, transmission, and distribution, in March 1999;
- Major tariff increases during November 1998 - October 1999 and since June 2000, raising average electricity prices to over 50% of economic costs and eliminating cross-subsidies;
- Elimination of restrictions to private participation in electricity enterprises, through the March and July 2000 Economic Transformation Laws; and
- IDB-assisted privatization, aiming to start with distribution companies this year, to be followed by similar offerings of shares in generation companies and the transmission company;

##### ***Energy Efficiency and Decentralized Rural Electrification***

- Creation within MEM of the DEA charged with fostering an energy conservation culture and removing barriers to the use of renewable energy, especially in rural areas.
- Through the MEM, Government beginning to address some of the electricity needs of rural public services such as health clinics, schools and community centers. Some \$1.3 million (\$1.0 million from Corporación Andina de Fomento -- CAF, and \$300,000 from the Government) has recently been made available to install PV systems in public services in remote frontier and Amazonian regions. There is also a Ministry of Defense PV-based rural electrification initiative in the frontier areas near Peru.
- Carrying out of energy efficiency programs with European Union and USAID support.

- MEM's preparation of a public information oriented energy efficiency initiative, for which it is seeking financial support (the GEF Alternative provides partial support for this).
- Endorsement of the proposed Project by the GEF focal point in Ecuador (Ministry of Environment), through a letter dated November 10, 2000.

### 5. Value added of Bank and Global support in this project:

The Bank's global and regional (e.g., Argentina, Bolivia, Dominican Republic, Mexico, Nicaragua, Peru, Venezuela) experience in reforming the legal/regulatory/institutional frameworks of the infrastructure sectors, and supporting privatization, would provide critical support to the Government's program, and help avoid mistakes in carrying it out. In particular, the Bank would transmit its experience in addressing social and environmental concerns, and promoting public dialogue and understanding of reforms, to design programs that are more responsive to the concerns of key stakeholders, and thus more viable politically. The Bank's presence would lend international credibility to the privatization process, and thereby encourage more competitive bids. The Bank's ability to promote change in key regulatory areas such as telecommunications interconnection and tariffs would enhance the results of increased competition in the sectors. In addition, the Bank would provide advice on second-generation reform issues, especially anti-trust and refinement of existing regulations and tariff-setting methodologies. The Bank and GEF would also transmit their international experience in removing barriers and developing relevant programs for end-use efficiency of electricity and rural electrification.

The Bank has developed experience in a few countries (notably Guatemala) in supporting the development of IT-based business centers for MSB, together with the necessary training and development of applications tailored to local needs. (However, this is still an experimental activity for the Bank, and flexibility will be needed in adapting the project to what does and doesn't work.) With the active support of the local business community, international software corporations and the affected MSBs, the Bank has developed several products that could be adapted to the specific needs of Ecuador (MicroKnow, MicroMarket and MicroTech). The Bank will also be able to mobilize international technical expertise in e-assessments, e-commerce policy analysis and e-government experience. Finally, the component will benefit from the ongoing work to support small and micro firms' international competitiveness that is taking place under the World Bank , the International Trade and Integration loan to Ecuador.

## E. Summary Project Analysis (Detailed assessments are in the project file, see Annex 8)

### 1. Economic (see Annex 4):

- Cost benefit      NPV=US\$ million; ERR = % (see Annex 4)
- Cost effectiveness
- Incremental Cost
- Other (specify)

More effective regulation, institutional modernization, and increased private participation will enhance the efficiency of telecommunications and electricity services, resulting in higher output and more productive employment economy-wide, and increased government revenues from sector enterprises. However, sustained efforts are needed to achieve these results and to avoid backtracking of reforms. The economic impact of the new frameworks - in terms of efficiency improvements, increased investment, expansion of service, and higher revenues - can be more fully evaluated only after several years.

### ***Telecommunications***

The economic benefits of the telecommunications reform and privatization component would derive from increased competition, leading to an improved range and quality of services at reduced prices. Leveraging rural investments with broader sectoral reform will yield significant returns over the longer term. The subsidies which may be required in support of rural programs are likely to be small relative to the benefits. Increased access to international telecommunications will reduce transaction costs for international trade and open up new export opportunities. Advanced information technology also has wide-ranging applications for improving health and education services, and will become more affordable over time.

### ***Electricity***

Ensuring adequate electricity supplies will protect economic recovery and long term growth. Pilots in rural areas that bundle energy and telecommunications services will help reduce costs while demonstrating how to use infrastructure to improve health, education and business opportunities. The impact of tariff adjustments on (i) the cost of living and production costs in the economy, and (ii) future electricity demand and capacity requirements, is being evaluated, supported by PPF 360-EC. The impact of the development of a competitive wholesale market also needs careful monitoring.

### ***GEF Energy Efficiency and Decentralized Rural Electrification***

A cost-benefit analysis has been carried out for components that would receive GEF cofinancing. For the energy efficiency component, full implementation is estimated to result in NPV's in the economic base case ranging from \$26.9 million to \$111.7 million. For rural electrification, as no market information is currently available, we have instead determined the required payment, approximately US\$0.28/kWh, which is necessary for full life-cycle cost recovery (excluding the GEF capital contribution). The tables below summarize the results of the GEF incremental cost analysis - see Annex 4a for details:

#### **Incremental Costs and Benefits Matrix - Energy Efficiency**

	<b>Baseline</b>	<b>Alternative</b>	<b>Increment</b>
<b>Global Environmental Benefit</b>		Barriers reduced or eliminated Reduced CO2 emissions compared with forecast Creation of sustainable EE programs in private sector (end users), distribution utilities and ESCOs.	Reduced or eliminated barriers Reduced CO2 emissions (625,000 tons) / year at project end Additional viable EE measures which can be replicated in region
<b>Costs</b>	US\$ 250,000	US\$ 1,800,000	US\$ 1,550,000
<b>GOE/WB financing GEF financing</b>	US\$ 250,000		US\$ 375,000 US\$ 1,175,000

#### **Incremental Costs and Benefits Matrix - Rural Electrification with RET**

	<b>Baseline</b>	<b>Alternative</b>	<b>Increment</b>
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<b>Global Environmental Benefit</b>		Barriers reduced or eliminated Reduced CO2 emissions compared with forecast Creation of sustainable RE with renewable energy	Reduced or eliminated barriers Reduced CO2 emissions ( 108,005 tons) cumulatively at project end
<b>Costs</b>	US\$ 715,000	US\$ 3,510,000	US\$ 2,795,000
<b>GOE/WB financing GEF financing</b>	US\$ 715,000		US\$1,505,000 US\$ 1,290,000

## 2. Financial (see Annex 4 and Annex 5):

NPV=US\$ million; FRR = % (see Annex 4)

The appropriate financial conditions to attract strategic investors, especially the base prices for privatizations, need to be proposed by the financial advisors chosen for the telecommunications and electricity privatizations. In addition, the following sector-specific issues need to be addressed:

### *Telecommunications*

*Tariff rebalancing* : The tariff policy needs to give predictability to future unit revenues. To better reflect actual costs and thereby encourage competition in local services, CONATEL, in September 1999, increased tariffs for monthly line rentals and local calls. Nevertheless, cross-subsidies still exist between international and local services, requiring further adjustments. To this end, in December 2000, a tariff rebalancing study was submitted to CONATEL for review and follow-up action.

*Financial Administration*: Prior to their privatization, ANDINATEL and PACIFICTEL, with assistance from the privatization advisors, will adopt generally acceptable accounting principles and systems.

### *Electricity*

Assets and liabilities of the sector enterprises need to be clearly defined prior to offering these enterprises to private investors. This task is being undertaken by the privatization advisors.

The impact of the program of gradual tariff increases - in terms of strengthening sector finances and reducing the US\$300 million subsidies to consumption - need to be evaluated in detail.

### *Fiscal Impact:*

The Project would have a positive impact on central government finances, due to: (i) incremental tax revenues from the privatized and additional private sector enterprises; and (ii) a reduction in subsidies in line with the move toward cost-covering tariffs. This impact would be permanent and would far more than compensate for the cost of the Project. Administrative expenditures of the regulatory, enforcement, and market management entities would be covered by charges on sector enterprises. There would also be a large one-time revenue boost from the privatization sales themselves.

## 3. Technical:

The technical issues will be analyzed in greater detail at appraisal. Private investors will tend to bring leading technologies and modern management and operational techniques. The Project will finance the acquisition of hardware and software, including monitoring and measuring equipment, for CONELEC and CENACE; technical consultants have identified the required items. SUPTEL will also receive equipment to help monitor the telecommunications sector; consultants will be hired to define the technical specifications for this equipment during early project implementation. For the rural telephony and energy components, market demand studies will provide the information needed to determine the location and technology parameters for bidders. Bidding documents will contain technical as well as coverage specifications, although some flexibility will be left to the winning bidders. The business centers will require modest amounts of computer hardware; software design will be based upon feedback from focus groups and discussions with MSB, suppliers, buyers and software design specialists. Cost estimates for consulting services, studies, training, and other technical assistance activities are based on experience. Allowances for physical and price contingencies are in line with those generally applied in Ecuador.

#### **4. Institutional:**

CONAM and the participating agencies have the necessary capacity and experience to carry out the Project, including monitoring and evaluation. The UEP is fully staffed, including a full-time coordinator for the Project. Nevertheless, the project will strengthen CONAM's procurement and disbursement capacity. While the regulatory agencies are relatively well-functioning, their longer-term autonomy, competence, and financial viability need to be ensured through appropriate policies, proper application of laws and regulations, and clear procedures. To strengthen the public sector's new role in telecommunications and electricity, the managerial and professional staffs of the relevant agencies will receive formal training as well as visit other countries undertaking similar reforms and initiatives. The project will test and evaluate innovative organizational and financing mechanisms for energy efficiency and rural RET schemes.

##### **4.1 Executing agencies:**

CONAM is the project's executing agency; in charge of procurement and disbursement, project coordination and oversight of sector reform and modernization. It will work closely with the participating sectoral agencies that have direct implementation responsibilities for their respective components.

##### **4.2 Project management:**

CONAM's UEP, which has been coordinating PERTAL and PPF 360-EC, will be responsible for this Project's coordination and financial administration (procurement; disbursement; accounting). UEP will have authority to decide on technical matters related to the project, while CONAM's management will limit itself to policy decisions. UEP is supported by a team of competent specialists in telecommunications, electricity, privatization, tariffs, public information, project economic analysis, and financial administration, who have wide-ranging experience in their respective fields as well as in liaising with other government entities and international financial institutions. The Project management component will provide resources for key advisors to UEP and for technical assistance to the sector agencies. An important aspect of project supervision will be to ensure that adequate counterpart funds are made available and that competent project management continues.

In telecommunications, the structure and responsibilities of CONATEL (for regulation) and SUPTEL (for enforcement) need to be more clearly defined to avoid overlap; this is to be addressed through the proposed legislation. Suitable conditions for FODETEL's administration by CONATEL will be established early in the Project. In the electricity sector, while CONELEC's and CENACE's respective responsibilities and functions have been adequately established as part of the sector framework, the agencies need to improve coordination in some area (e.g. preparation of the indicative sector development program). Coordination between MEM and CONELEC with regard to rural electrification and energy efficiency still needs to be developed. The sector agencies also need to improve their consultation arrangements with the sector enterprises. These requirements will also be addressed early in the Project.

#### 4.3 Procurement issues:

A preliminary review of procurement aspects was conducted in December 2000, regarding CONAM's organization and staff, legal aspects, procurement procedures and environment. An action plan was agreed with CONAM to address the gaps and deficiencies that were identified. A detailed procurement assessment will be finalized prior to Project appraisal.

#### 4.4 Financial management issues:

A review of CONAM's procedures and organization for the project financial management was conducted in October 2000. An action plan to address deficiencies was agreed with CONAM and is being satisfactorily implemented.

### **5. Environmental:** Environmental Category: B (Partial Assessment)

#### 5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.

Environmental category: B

After market studies identify the geographic areas and technologies for rural telephony and electricity pilots, environmental experts would review the studies; if negative environmental impacts are anticipated, an environmental assessment, following World Bank Guidelines, would be carried out. The bidding documents that invite private operators to supply and operate such systems, and the subsequent contracts, would require that the recommendations of the environmental assessment be applied. Environmental guidelines will be incorporated into the design and operational manuals of FODETEL and FERUM.

Sector reforms that promote private investments could lead indirectly to potentially adverse environmental impacts. These would necessitate specific environmental regulations, guidelines, and norms covering investments, operations (including closure of operations), as well as strict monitoring and enforcement of compliance. Therefore, the Project would modernize and strengthen relevant environmental/social regulations and guidelines. In particular, to improve environmental management of the power sector, the Project will include technical assistance to (i) prepare environmental regulations for electricity operations, and norms and guidelines for their applications, and (ii) strengthen CONELEC and the Ministry of Environment in their regulatory and enforcement functions. This component of the Project will be defined during project appraisal, and has not yet been included in project scope/costs.

Since the dearth of information would preclude even a rapid environmental assessment of the Project prior to Board presentation, a definition of the environmental requirements that are to be addressed during project implementation would serve as the requisite environmental assessment for processing the Project.



This study will be concluded prior to project appraisal.

5.2 What are the main features of the EMP and are they adequate?

NA

5.3 For Category A and B projects, timeline and status of EA:

Date of receipt of final draft: March 1, 2001

5.4 How have stakeholders been consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed environment management plan? Describe mechanisms of consultation that were used and which groups were consulted?

Project preparation missions have met in the field with representatives of indigenous populations, and the principal environmental NGOs (local and international), explaining the project objectives and plans. CONELEC and CONATEL are governed by norms that define procedures for public audiences and include the questionnaires to survey those who would be affected by new investments.

5.5 What mechanisms have been established to monitor and evaluate the impact of the project on the environment? Do the indicators reflect the objectives and results of the EMP?

The Bank will carry out formal communications and consultations with the stakeholders on environmental issues related to the Project. During the appraisal mission and the project launch workshop, the dialogue with stakeholders will be broadened, inviting their comments on the relevant aspects of project implementation and seeking ways to involve them in project monitoring and evaluation.

**6. Social:**

6.1 Summarize key social issues relevant to the project objectives, and specify the project's social development outcomes.

Both sectors have legal requirements for consultation with consumers. For telecommunications, these involve public hearings, announced in the press, before and after the authorization of concessions. CONATEL also holds other open meetings at which it discusses technical, administrative and tariff aspects, and its web page ([www.conatel.gov.ec](http://www.conatel.gov.ec)) provides information on sector laws, regulations and resolutions. (However, these public meetings have generally had a greater attendance from Government than from civil society.) In electricity, since 1998 the regulations themselves have been the subject of public hearings, prior to issuance. CONELEC also maintains a complaints book, and its annual report includes users' assessment of service quality. Since 2000, the environmental regulations also incorporate public hearings with consumers.

The optimal approaches to delivery of telecommunications and electricity services to rural populations, including the use of subsidies, will be addressed in the market studies.

While privatization in the telecommunications and power sectors may produce some short-term redundancies, experience shows that liberalizing the sectors soon results in substantial net increases in employment.

The impact of telecommunications and electricity tariff reform on low-income groups will be reviewed in the context of the ongoing and planned tariff studies, whose recommendations will be incorporated into the revised tariff schedules. The key is to ensure that subsidies are well targeted to the poor. The Government is committed to protecting vulnerable groups.

6.2 Participatory Approach: How are key stakeholders participating in the project?

Key stakeholders include (a) state enterprises to be privatized, and potential investors in them, (b) inhabitants of rural areas to receive telephony and electricity services, (c) MSB to receive training and access to ICT services in the pilot business centers, (d) large consumers of energy, who might be targeted by the energy efficiency component, (e) labor unions and (f) NGOs. Some labor unions and NGOs are opposed to sector reform and privatization; they should be engaged in the public consultation and information process. CONAM has briefed principal stakeholders on project objectives and scope. However, additional consultations will be conducted prior to and during appraisal, under the leadership of the Bank's civil society specialist in Quito. Participative methodologies such as surveys, focus groups and workshops will be used.

A public information strategy for CONAM is a condition for project negotiations, and financing for this component is included in the Project. The dialogue with stakeholders will be continued during the Project launch workshop and Project implementation. ANDINATEL and PACIFICTEL have been consulted. The market studies will involve substantial consultation with the relevant rural communities.

### 6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?

While some consultations have already taken place, World Bank experts and consultants on participation and public information techniques will advise CONAM and other parties on appropriate mechanisms, target groups, content and timing of greater consultations. This will form part of a public information and consultation strategy to be agreed prior to loan negotiations.

### 6.4 What institutional arrangements have been provided to ensure the project achieves its social development outcomes?

To be defined prior to project appraisal.

### 6.5 How will the project monitor performance in terms of social development outcomes?

A monitoring and evaluation component is included in the project. In the case of the rural telephony and electricity component, the market study can serve as a baseline--to be compared with the results of a second survey to be conducted at project completion. The project would contract existing Ecuadorian institutions to monitor social development progress.

## 7. Safeguard Policies:

### 7.1 Do any of the following safeguard policies apply to the project?

Policy	Applicability
<b>Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No
<b>Natural habitats (OP 4.04, BP 4.04, GP 4.04)</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<b>Forestry (OP 4.36, GP 4.36)</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<b>Pest Management (OP 4.09)</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<b>Cultural Property (OPN 11.03)</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<b>Indigenous Peoples (OD 4.20)</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No
<b>Involuntary Resettlement (OD 4.30)</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No
<b>Safety of Dams (OP 4.37, BP 4.37)</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<b>Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<b>Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No

### 7.2 Describe provisions made by the project to ensure compliance with applicable safeguard policies.

The Project is expected to lead to increased activity by private telecommunications and electricity providers

in some vulnerable areas, which could lead indirectly to issues related to environmental assessment, indigenous peoples, and involuntary resettlement. However, the strengthened legal/regulatory/institutional framework as result of the Project would provide social and environmental safeguards and maximum feasible participation by stakeholders in decision making. Although any adverse environmental and social impacts are likely to be minor, the Project would, in consultation with stakeholders, (i) finance the preparation of relevant regulations, guidelines, and norms, and (ii) give high priority during project supervision to compliance with safeguard policies.

## **F. Sustainability and Risks**

### **1. Sustainability :**

The Project would strengthen the legal/regulatory/institutional framework and the regulatory agencies, and enhance private participation in the telecommunications and electricity sectors. Results from these efforts ought to be sustainable, provided the underlying policies are maintained and the regulatory institutions retain the necessary autonomy and resources to adequately exercise their functions. Crucial in this respect is that the regulatory agencies continue to be financed directly from fees charged to sector enterprises, rather than from the general budget.

Although there has been strong resistance to privatization, once it occurs it will be difficult to reverse because of legal protections and international attention. Recent surveys indicate high public support for private participation in telecommunications. The Project's public information campaign should increase appreciation of the benefits of reform. Linking overall reform with the expansion of services to rural areas should also serve to build support for the reform process, as would better targeting of subsidies to those in need. The energy efficiency component, by partially offsetting tariff increases, should also contribute to the overall sustainability of reforms.

The energy efficiency component itself should be sustainable, especially once ESCOs are established and consumers begin to appreciate the savings possible. Similarly, the rural electrification component should develop the interest of private investors to install and maintain isolated systems. Furthermore, experience in other countries indicates that once modern electricity is installed in rural areas, if properly managed and maintained, demand grows. A continuation of Government commitment to the process--backed by the support of rural stakeholders--combined with financing to FERUM from regulated enterprises, should ensure that the process is sustainable. The option of a dedicated financial mechanism for decentralized rural electrification will be reviewed during project implementation and the corresponding regulations and institutional framework will be developed or strengthened. Public sector entities benefiting from decentralized energy systems will have to allocate sufficient funds for system O&M by private operators. These financial sustainability issues will be discussed with the Government and relevant entities during the project appraisal mission. The emergence of local private equipment supply and maintenance companies, and the use of these new electricity and telephony services in community centers, businesses, schools and health clinics, will be an indication of sustainability.

In the case of energy efficiency and decentralized rural electrification, sustainability will hinge on replicability of demonstration projects in a scale sufficient to attract interest from private operators and further improve financial viability of corresponding activities. Key factors to facilitate project replication include the establishment or strengthening of appropriate policies, regulations and incentives, market conditions, financing mechanisms and institutional capacity. These aspects will be further discussed during the project appraisal mission.

**2. Critical Risks** (reflecting the failure of critical assumptions found in the fourth column of Annex 1) :

Risk	Risk Rating	Risk Mitigation Measure
<b>From Outputs to Objective</b>		
Continued instability of Ecuador's macroeconomic (especially fiscal) and financial positions; policy reversals, no telecommunications reform legislation passed; delays in enacting the revised legal/regulatory/institutional framework	S	Policy coordination between Government and IFIs to overcome fiscal and financial sector weaknesses; Assistance through qualified consultants in: (i) preparing government initiatives; (ii) communication and consultations with Congress and principal stakeholders; (iii) public information campaign. IMF/Bank (SAL) condition regarding the passage of telecommunications legislation. Promote reforms through regulations to existing legislation
Weakened commitment of the Government to implement laws and regulations ensuring the financing of FODETEL and FERUM	M	Market demand surveys that have begun to continue followed by public information campaign targeting beneficiaries and policymakers.
Solidarity Fund assumes interventionist stance vis-a-vis enterprises, thus sidelining sector agencies and constraining enterprise managements;	M	Ensure government consensus on, and assistance in, strengthening the sector frameworks prior to privatization; ensure autonomy of sector agencies and enterprise managements
Potential investors not interested in acquiring ANDINATEL and PACIFICTEL at socially acceptable price; Private investors not interested in participating in providing telecommunications, electricity services in rural areas and internet and business service centers in peri-urban areas.	S	Design privatization transaction to make ANDINATEL and PACIFICTEL attractive to potential investors; open sector to new investors rather than privatization of existing assets. Use detailed market study information to design rural concessions and business centers. Consult extensively with potential investors and users to determine interest.
Strengthening of sector regulatory and enforcement agencies not attained due to lack of qualified staff (especially at mid-levels) and of sufficient financial resources;	M	Continuous dialogue with Government on need for strong and autonomous agencies; continuation of policy that finances regulatory agencies through fees imposed on sector firms. Project to give management and staff development at sector institutions high priority.
Government commitment to tariff adjustments weakens; full economic cost proves to be politically unattainable, thus impeding progress toward privatization, especially of power sector.	S	Make tariff adjustments priority topic of project/sector/CAS dialogue and of public information campaign; determine fiscal impact of transparent subsidies needed to maintain the system.

Public opposition to reform and privatization of telecommunications and electricity.	S	Communication and consultations with groups opposing changes; preparation and implementation of remedial measures (lifeline tariffs; stock options for workers, etc.). Public awareness of telephone and electricity expansion plans and link to sector reform.
<b>From Components to Outputs</b>		
Inadequate quality of preparatory and other technical outputs	N	Bank's non-objections are needed for consultancies' TORs and acceptance of reports
Inadequate capacity to implement project; high staff turnover	M	Project to support CONAM and sector implementing agencies under the loan
Inadequate coordination between CONAM and implementing entities	M	CONAM to maintain project coordination authority
Inadequate project preparation and implementation; high staff turnover	M	PPF to finance and supervise adequate project preparation; monthly reporting by CONAM on project implementation; Bank supervision
Inadequate coordination between CONAM and sector implementing agencies, including MEM	M	Bank to monitor inter-agency coordination based on CONAM and sector agency reporting and supervision missions.
Public Communications and Consultation component poorly executed or used for purposes outside project scope	M	Bank no objection to terms of reference and award of contract; careful supervision and review of materials prior to diffusion.
<b>Overall Risk Rating</b>	S	

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N (Negligible or Low Risk)

### 3. Possible Controversial Aspects :

#### *Telecommunications and Electricity*

Risk	Type of Risk	Risk Rating	Risk Minimization Measure
Lack of political and social acceptance of principles of the Government's sector reform and privatization programs and of the implementation strategies	S; G; M	S	Consultations with stakeholders; public relations campaigns designed to stress benefits of reform and privatization measures

*Type of Risk – S (Social), E (Ecological), P (Pollution), G (Governance), M (Management capacity), O (Other); Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N (Negligible or Low Risk)*

## **G. Main Loan Conditions**

### **1. Effectiveness Condition**

The Government will submit to the Bank satisfactory evidence that it has carried out the Action Plans to improve CONAM's financial and procurement management systems, organization, and functions that were agreed upon in October and December 2000 (Annex 6).

### **2. Other [classify according to covenant types used in the Legal Agreements.]**

#### ***Conditions of Negotiations***

- Agreement with the Bank on final documents on: (i) project implementation plan, (ii) institutional development plans for CONATEL, SUPTEL, CONELEC and MEM, and a business plan for CENACE, and (iii) an operational manual for CONAM;
- Recruitment of investment bank to support privatization in the telecommunications sector;
- Submission to the Bank of: (i) CONAM's draft plan for communication and consultation with stakeholders, (ii) the telecommunications tariff rebalancing plan, (iii) FODETEL's draft Operational Manual, (iv) the rural telecommunications development plan, (v) the electricity tariff adjustment plan for 2001, and (vi) the rural electrification and electricity efficiency enhancement plans;
- Submission of the draft telecommunications legislation to the National Congress.

#### ***Conditions of Disbursements***

- CONAM will enter into subsidiary agreements with all project entities setting forth their respective responsibilities for implementation and the conditions for transfer of loan proceeds to them, under terms and conditions satisfactory to the Bank. These include agreements with: (i) CONATEL in regard to project components 1, 2, 3, 5 and 6 (as defined in C.1, Project Description Summary); (ii) SUPTEL for project components 1, 5 and 6; (iii) CONELEC for project components 1, 3, 4, 5 and 6; and (iv) CENACE for project components 1, 2 and 6.

## **H. Readiness for Implementation**

- 1. a) The engineering design documents for the first year's activities are complete and ready for the start of project implementation.
- 1. b) Not applicable.
- 2. The procurement documents for the first year's activities are complete and ready for the start of project implementation.
- 3. The Project Implementation Plan has been appraised and found to be realistic and of satisfactory quality.
- 4. The following items are lacking and are discussed under loan conditions (Section G):

#### ***Telecommunications***

- Tariff rebalancing plan
- Submission of draft telecommunications legislation to National Congress
- Submission to the Bank of FODETEL Operational Manual
- Submission to the Bank of rural telecommunications development plan

***Electricity***

- Tariff adjustment plan for 2000-01
- CONELEC institutional development plan
- CENACE business development plan
- Rural electrification development and electricity end-use efficiency enhancement plans

**I. Compliance with Bank Policies**

1. This project complies with all applicable Bank policies.
2. The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.

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Philippe J. Durand  
**Team Leader**

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Danny M. Leipziger  
**Sector Manager**

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Isabel M. Guerrero  
**Country Manager**

**Annex 1: Project Design Summary**  
**ECUADOR: PUBLIC ENTERPRISE REFORM & PRIVATIZATION**

Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
<p><b>Sector-related CAS Goal:</b></p> <p>1. Restore macro-financial stability and accelerate economic growth, through, <i>inter alia</i>, an enhanced private sector role</p> <p>2. Setting the basis for poverty reduction and human development.</p>	<p><b>Sector Indicators:</b></p> <p>1.1. Evidence of wider access to, and enhanced efficiency and quality of, telecommunications, electricity and internet access and business services with increased participation of private providers. (See annex 1a for detailed indicators).</p> <p>2.1. Increased living standards and broadened opportunities for the poor in the communities receiving, through the pilot projects, access to telecommunications, electricity and internet and business services</p>	<p><b>Sector/ country reports:</b></p> <p>CONATEL, CONELEC and ODEPLAN statistics.</p> <p>ITU and OLADE statistics.</p> <p>CONATEL and CONELEC statistics.</p> <p>SIISE information system for social indicators</p> <p>rural demand studies and surveys.</p>	<p><b>(from Goal to Bank Mission)</b></p> <p>Continued government commitment to market-oriented reforms and to efficient private sector participation.</p> <p>Private investors willing to invest in the telecommunications, electricity and IT sectors.</p> <p>Private investors willing to participate in the privatization of Andinatel and Pacifictel</p> <p>Successful privatization of power sector companies (under IDB-financed project).</p> <p>Private sector interest in expanding access.</p>
<p><b>GEF Operational Program:</b></p> <p>3. Support sustainable development and productivity by the poor.</p>	<p>3.1. Improved environmental management through use of renewable energy technologies (RET) in rural areas and promotion of efficient end-use of electricity.</p>	<p>Market and consumer surveys.</p>	<p>Private sector/consumers interest.</p> <p>Consumers' sufficient affordability and willingness to pay for decentralized systems</p>



Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
<p><b>Project Development Objective:</b></p> <p>The project would support the Government's efforts to deepen reforms in the telecommunications and electricity sectors, by strengthening regulatory institutions, fostering competition, increasing private participation, promoting efficient use of energy, extending coverage in underserved areas and providing modern information-technology services to micro and small businesses.</p> <p>More specifically the project aims to support: (1) the development of sound legal &amp; regulatory frameworks and efficient regulatory institutions, (2) the fostering of competition and of increased private participation in the sectors, (3) the extension of services to low income groups on a pilot basis, (4) the implementation of programs to promote efficient use of electricity, and (5) the development of appropriate public consultation and information mechanisms.</p>	<p><b>Outcome / Impact Indicators:</b></p> <p><b>1. Legal, regulatory and institutional development</b></p> <p>1.1. Improved effectiveness of telecommunications regulatory agencies (CONATEL and SUPTEL) to regulate the sector, finance and administer the program for rural telephony (FODETEL) and undertake timely public consultations and dissemination of policy decisions. (See annex 1a for specific indicators).</p> <p>1.2. Improved effectiveness of the regulatory agency, CONELEC, to regulate the sector, finance and administer the program for rural electricity (FERUM), and undertake timely public consultations- and disseminations of policy decisions. (See annex 1a).</p> <p>1.3. Efficient performance of wholesale market administrator, CENACE. (See annex 1a).</p> <p><b>2. Increased competition and private participation</b></p> <p>2.1. Privatization of ANDINATEL and PACIFICTEL</p> <p>2.2. Issuance of licenses for telecom services and networks.</p> <p>2.3. Establishment of liberalized wholesale electricity market.</p> <p>2.4 Number of private operators in the power grid.</p> <p>2.5 Number of private operators providing rural telephony, decentralized rural electrification and energy efficiency services.</p>	<p><b>Project reports:</b></p> <p>Project progress reports</p> <p>Independent assessment (consultant's report).</p> <p>Project progress reports</p> <p>Independent assessment (consultant's report).</p> <p>CONELEC's and CENACE's reports and statistics.</p> <p>CONAM's and CONATEL's reports</p> <p>CONATEL's reports</p> <p>CONELEC and CENACE reports.</p>	<p><b>(from Objective to Goal)</b></p> <p>Continued government commitment to sector reforms and increased participation of private firms in the sectors.</p> <p>CONATEL, SENATEL and SUPTEL committed to fulfill their mandate and abide by the rules established in the new legal and regulatory framework.</p> <p>CONELEC and CENACE committed to fulfill their mandate and abide by the rules established in the new legal and regulatory framework.</p> <p>Commitment of the Government to implement and maintain pro-competitive laws and regulations.</p> <p>Congress approves reforms of the telecommunication legislation.</p> <p>Political and social acceptance of privatization</p> <p>Successful privatization of power sector companies (under IDB-financed project).</p>

	<p><b>3. Extension of telecommunications, electricity and ICT-based business services to low income groups</b></p> <p>3.1. Adoption of a sustainable strategy to extend telecommunications and electricity services to the poor, including the adoption of cost efficient financing and delivery mechanisms.</p> <p>3.2. Successful completion of pilot projects for rural telephony and electricity, testing the cost-efficiency, subsidy optimization, service quality, effective community participation and replicability of the models adopted by the Government. (See annex 1a).</p> <p>3.3 Successful completion of pilot projects for renewable-energy based decentralized electrification, testing several delivery mechanisms and conditions for sustainability and replicability.</p> <p>3.4. Successful completion of the pilot project for ICT-based business development services to MSB in urban and peri-urban areas, showing evidence of changes in MSB' conduct, market outreach and competitiveness leading to incremental direct and indirect value added and employment, and showing replicability of the delivery and financing models adopted by the government. (see annex 1a).</p>	<p>Government's official resolutions</p> <p>Surveys of a representative sample of project clients compared with a baseline control group to be established during the project.</p> <p>Evaluation of a sample of pilot projects</p> <p>Periodical surveys of a representative sample of project clients compared with a baseline control group to be established during the project.</p> <p>CONAM and CONATEL monthly and bi-annual progress reports.</p> <p>MICIP reports</p>	<p>Commitment of the Government to implementation laws and regulations ensuring the financing of FODETEL and FERUM and specifying rights and obligations of private and public operators related to Universal Service in the two sectors.</p> <p>Effective CONAM- sector institutions-other stakeholder cooperation</p> <p>System designs able to reach smaller firms and beyond urban areas.</p> <p>Active participation of clients in the design and use of the project.</p>
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<p><b>GEF Global Development Objective</b></p> <p>Mitigation of climate change through reduction of greenhouse gas emissions, achieved by removing barriers to the use of (i) RET to extend electricity supply in rural areas (GEF Operational Program No.6) and (ii) energy-efficiency measures (GEF Operational Program No.5).</p>	<p><b>4. Increase in use-efficiency use and conservation of electricity</b></p> <p>4.1. Successful implementation of a program to enhance efficiency in the use and conservation of energy.</p> <p>4.2. Successful implementation of demonstration projects testing cost- efficiency, service quality, effective community participation and replicability of the programs adopted by the Government. (See annex 1a).</p> <p><b>5. Implementation of effective public consultations and information mechanism</b></p> <p>5.1. Adoption of sector reforms that balance appropriately various stakeholders' interests, and include effective enforcement and dispute resolution mechanisms</p> <p>5.2 Public consensus around the Government's modernization and privatization program.</p> <p><b>Outcome/Impact Indicators</b></p> <p>1. Actual tons of CO<sub>2</sub> reduced through (i) the implementation of pilot project based on renewable energy technologies in rural areas; and (ii) the implementation of a program to enhance end-use energy efficiency (see annex 1a).</p> <p>2. Estimated tons of CO<sub>2</sub> that should be reduced through the implementation of subsequent investments resulting from the project activities, over the next five or ten years.</p>	<p>Measurements of energy consumption in a representative sample of project clients compared with a baseline control group to be established during the project</p> <p>Surveys and opinion polls</p> <p><b>Project Reports</b></p> <p>Measurement of energy consumption in pilot project and in a baseline control group. Calculations and survey-based projections for consumers targeted for decentralized electrification and end-use energy efficiency.</p>	<p>Establishment of incentives and regulations to foster efficient use and conservation of electricity.</p> <p>Consumers will utilize efficient electricity systems and appliances</p> <p>Private energy services companies (ESCOs) will emerge.</p> <p>Effective CONAM- sector regulator-other stakeholder cooperation</p> <p><b>(From Objective to Goal)</b></p> <p>Establishment of incentives for private development of renewable energy and energy efficiency investments.</p> <p>Consumers will afford and utilize renewable energy technologies and energy-efficient systems and appliances.</p> <p>Several private energy services companies (ESCOs) and private providers of decentralized rural electrification will be operating.</p>
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Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
<p><b>Output from each Component:</b></p> <p><b>1. Modernization of legal, regulatory, and institutional sector frameworks</b> <i>Telecommunications</i></p> <ul style="list-style-type: none"> <li>● Improved regulations and procedures for sector operation and expansion.</li> <li>● Clear attributions of responsibilities for CONATEL and SUPTEL</li> <li>● Strengthening of CONATEL and SUPTEL</li> </ul>	<p><b>Output Indicators:</b></p> <p>1.1. Strengthening of CONATEL and SUPTEL's operational autonomy and regulatory performance, and completion of specific legislation and regulations, including: (i) radio frequency management, (ii) interconnection agreements issued; (iii) leased lines and data transmission, (iv) conflict resolution mechanism, and (v) protection of consumers. [ <b>Verify with CONATEL specific needs</b>] (See annex 1a).</p> <p>1.2. Tariff policies adopted and tariff rebalancing plan prepared by CONATEL and implemented by all operators [ <b>check with CONATEL if tariffs for all regulated services and all operators or only Andinatel, Pacifictel and Etapa</b>]. (See annex 1a).</p> <p>1.3. Action plan to strengthen CONATEL's and SUPTEL regulatory capacity designed and implemented, including staff training programs. (See annex 1a).</p>	<p><b>Project reports:</b></p> <p>Monitoring by CONAM, regulator, and the Bank (bi-annual supervision missions)</p>	<p><b>(from Outputs to Objective)</b></p> <p>Full support by Government and other stakeholders to project implementation and underlying sector reforms, as demonstrated by:</p> <ul style="list-style-type: none"> <li>● Congress approval of reform legislation on telecommunications</li> <li>● Timely implementation of the new legal/regulatory regime.</li> <li>● Sector institutions receive adequate financial resources and managerial autonomy to carry out their function.</li> </ul>

*Electricity*

- Definition and implementation of regulations and procedures for sector operation and expansion.
- Strengthening of CONALEC and CENACE

1.4. Existing legislations updated to facilitate the operation and growth of a competitive, private sector led electricity sector. Additional regulations prepared, including those detailed below. (See annex 1a).

1.5. Tariff adjustment plan prepared by CONALEC to progressively achieve economic cost recovery. (See annex 1a).

1.6. Specific rules and regulations prepared and implemented, including those for: (i) environmentally sustainable investment and operations in generation, transmission, and distribution, **[CONALEC will list specific needs for assistance in elaboration of regulations ]** ii) the operation of the liberalized MEM, including third-party access to transmission and distribution and prevention of monopolistic abuse, and (iii) the financing and delivery of rural electrification programs. (See annex 1a).

1.7. Action plan to strengthen CONALEC prepared and implemented, including : (a) procedures manual and staffing plan; and (b) management and staff training program. **[CONALEC will list specific needs for assistance in capacity building or purchase of equipment]** (See annex 1a).

1.8. Action plan to strengthen CENACE prepared and implemented, including (a) agency's procedures manual and staffing plan; (b) staff training program, specially in modern wholesale market management techniques. . (See annex 1a).

Monitoring by CONAM, regulator, and the Bank (bi-annual supervision missions)

Full support by Government and other stakeholders to project implementation and underlying sector reforms, as demonstrated by:

- Enactment of legislative changes by Congress
- New legal, regulatory, institutional framework is fully applied and maintained, especially autonomy of regulator and of sector enterprises
- Sector institutions receive adequate resources to carry out their functions

<p><b>2. Increased competition and private investment in the telecommunications and electricity sectors.</b></p> <p><i>Telecommunications</i></p> <ul style="list-style-type: none"> <li>●Sector strategy adopted and implemented.</li> <li>●Successful privatization of Andinatel and Pacifictel.</li> <li>●Increased number of operators in the sector.</li> </ul>	<p>2.1. Adoption by the Government of a strategy for the development of the sector. (Annex 1a).</p> <p>2.2. Privatization of ANDINATEL and PACIFICTEL by CONAM concluded through international competitive bidding and transfer of management control to strategic investor. (See annex 1a)</p> <p>2.3. Issuance of several licenses by CONATEL for telecommunications services and network through international competitive bidding. (Annex 1a).</p>	<p>Consultant's report endorsed by CONAM and CONATEL.</p> <p>Official announcement by the Government of its vision for the sector.</p> <p>Transaction concluded.</p> <p>Transaction concluded, licenses granted.</p>	<p>Government to decide on realistic base price for ANDINATEL and PACIFICTEL, and inclusion or not of a PCS license</p>
<p><i>Electricity</i></p> <ul style="list-style-type: none"> <li>●Establishment of a liberalized electricity wholesale market.</li> </ul>	<p>2.4. Improve administration of the wholesale electric market (MEM) by CENACE through the : (a) application of rules for MEM's operation; b) acquisition of necessary equipment and software; and (c) application of modern wholesale market management techniques. (See annex 1a).</p>	<p>Reports from CONELEC and CENACE.</p>	<p>New regulations for the operation of the MEM are implemented.</p> <p>Attributions of CONELEC and CENACE are well defined.</p>

**3. Extension of services to low income groups in rural and peri-urban areas**

- Pilot projects to provide telecommunications services to rural areas, with the option of a joint bid to also provide electricity services.

3.1. 600 public telephones or booths with internet access and X telecenters in villages and towns of the north and south border areas, the Amazonas and other zones, installed during 2001-2004 by private companies under concessions/contracts through a competitive bidding for the least subsidy and option for joint provision of electricity services in at least one concession/contract.

Rules and TORs for the interested bidders

Other bidding documents

Strong commitments of Government Institutions to design, implement and monitor the activities.

Significant interest among private providers.

Active involvement of targeted communities in monitoring of performance by suppliers and payments by the users.

- Design and implementation of a sustainable strategy for rural electrification with private sector participation and promotion of RETs, including (a) the design and implementation by CONELEC and DEA of sustainable financial (including FERUM) and delivery mechanisms to extend electricity supply services in rural areas; and (b). the identification and evaluation of rural electrification projects (grid-extension and off-grid)

3.2. Electrification Program defined for the next 10 years by CONELEC for rural and peri-urban electrification (on-grid and off grid ) with private sector participation and promotion of RETs, adopted and implemented. Specific projects identified and evaluated, through a demand survey, cost analysis and investment needs.

CONELEC's reports

Rules for granting concessions and other contracts.

Action plan for rural electrification projects over x years.

Strong commitments of Government Institutions to design, implement and monitor the activities.

Significant interest among private providers.

Willingness of consumers to use RETs.

Active involvement of targeted communities in monitoring of performance by suppliers and payments by the users.

3.3. Market barriers to utilization of RETs reduced, through capacity building, public information campaign, market surveys and definition of standards for RETs equipment and installations.

Market surveys.

- Pilot projects to provide electricity services to off-grid rural areas, and promote the use of RETs, with the option of a joint bid to also provide telecommunication services.

3.4. X Contracts granted to qualified firms through competitive bidding for the least subsidy, and option for joint provision of telecom services in at least one contract to:  
 -install SHS for lighting and communications in about 2000 rural households.  
 -install PV systems to supply electricity to refrigerators in about 200 rural clinics  
 -provide electricity and communication in about 150 rural schools.

Rules and TORs for the interested bidders

Other bidding documents

Strong commitments of Government Institutions to design, implement and monitor the activities.

Significant interest among private providers and willingness of consumers to use RETs.

Active involvement of targeted communities in monitoring of performance by suppliers and payments by the users.

<ul style="list-style-type: none"> <li>• Pilot projects to provide, computer and internet access and ICT-based business services to micro and small business in peri-urban and large rural communities</li> </ul>	<p>3.5. Assessment of key regulations affecting e-commerce (electronic signature, privacy issues, etc..) presented to the Government.</p> <p>3.6. One hub and 4 community ICT-based BDS centers designed and implemented by 12/31/02 in peri-urban areas, and another 3 BDS centers in peri-urban areas and 1 BDS center in rural areas launched by 12/31/03 offering: (i) ICT applications adapted for local MSB; (ii) software with local content to fit needs of local businesses; (iii) computer-training courses and (iv) internet access at least for the BDS in peri-urban areas.</p>	<p>Consultant's report endorsed by relevant authorities (MICIP, CONAM).</p> <p>Business plans of the centers.</p> <p>CONAM monthly and bi-annual progress reports</p>	<p>Government committed to promote of IT and IT related activities to promote growth and enhance competitiveness.</p> <p>Effective coordination between CONAM, MICPI. (ministry of industry and commerce) and relevant NGOS.</p> <p>Strong interests of the business community in the pilot sites to participate.</p>
<p><b>4. Design and implementation of a program to promote efficient use of electricity</b></p> <ul style="list-style-type: none"> <li>• Reduction in barriers to efficiency enhancement, through (a) electricity tariff adjustments, (b) issuance of related standards and norms, and labeling of electrical appliances.</li> <li>• Dissemination of best practices for rational use of electricity.</li> <li>• Support to the development of ESCOs.</li> <li>• Implementation of demonstration projects</li> </ul>	<p>4.1. Standards and norms for efficient energy use and conservation are issued, and electrical appliances are appropriately labeled.</p> <p>4.2. Information campaign undertaken on best practices for rational use of electricity.</p> <p>4.3. Increased in the number of successful ESCOs, private providers of efficient energy equipment.</p> <p>4.4. Demonstration projects successfully implemented.</p>	<p>Surveys of impacts on electricity consumers</p> <p>CONAM monthly and bi-annual progress reports</p> <p>Bi-annual supervision report</p>	<p>Strong commitment of CONAM, DEA and other sector institutions well to design implement and monitor the activities.</p> <p>Significant interest among public, commercial and industrial users to participate.</p> <p>Significant interest among private providers ESCOS.</p>



<p><b>5. Effective Communication and Consultation Campaign</b></p> <ul style="list-style-type: none"> <li>● Stakeholder participation in the design of the reform program</li> <li>● Broad public dissemination of the content and impact of sector reform programs.</li> <li>● Increased transparency in sector regulation</li> </ul>	<p>5.1. Public consultations on proposed reforms in electricity and telecommunications adopted, including the: (a) organization of workshops and focus groups to identify concerns ; and (b) design and implementation of channels for stakeholders to further express their views (Government's website; hot-line number, etc..) .</p> <p>5.2. Public media campaign on the content and impact of sector reforms designed, opinion researches completed and outreach and public information activities launched.</p> <p>5.3. Action plan and staff training program adopted and implemented for strengthening CONATEL, SUPTEL and CONELEC's capacity to undertake timely public consultations, and systematically disseminate regulatory decisions and procedures.</p>	<p>Project progress reports</p> <p>Project progress reports</p> <p>Project progress reports</p>	<p>Full government commitment to openness and dialogue with civil society</p> <p>Effective CONAM- sector agencies cooperation in the design and implementation of the campaign. Full government commitment to openness and dialogue with civil society.</p> <p>Effective CONAM- sector agencies cooperation in the design and implementation of the campaign.</p> <p>Effective cooperation between CONAM and sector agencies.</p> <p>Financial and human resources committed on continuous basis to these tasks.</p>
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Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
<b>Project Components / Sub-components:</b>	<b>Inputs: (budget for each component)</b> (US\$'000) (Total Cost w/contingencies)	<b>Project reports:</b>	<b>(from Components to Outputs)</b>
<b>1. Modernization of legal, regulatory, and institutional sector frameworks</b>	2,798		
<i>1) Telecommunications</i>			
a) Tariff rebalancing study	175		
b) CONATEL institutional strengthening	230	CONAM; CONATEL; consultants	Adequate quality of preparation and analysis by competent specialists
c) SUPTEL institutional strengthening	1,150	Project progress reports	
		Project progress reports	
<i>2) Electricity</i>			
d) Technical Assistance to CONELEC	1,128	Project progress and final reports	Adequate quality of preparatory and other technical outputs
e) Technical assistance to CENACE	115		
<b>2. Increased competition and private investment in the telecommunications and electricity sectors.</b>	7,261		
<i>Telecommunications</i>			
a) Diagnostic and recommendations for a sector strategy, including options for privatization.	46	Project progress and final reports	Adequate quality of preparation and evaluation by competent specialists
b) Assistance to CONAM for ANDINATEL and PACIFICTEL Privatization	990	Project progress reports by international legal/financial advisors	Preparation and implementation of privatization to ensure successful transaction
c) Assistance to CONATEL for issuing services and network licenses	115	Project progress reports by international legal/financial advisors	Preparation and implementation of the selection process to ensure successful bidding.
<i>Electricity</i>			
d) Equipment/studies for CENACE to organize and manage the MEM	6,110	Project progress reports	Adequate quality of preparatory and other technical outputs

<b>3. Extension of services to low income groups in rural and peri-urban areas</b>	9,531		
<i>Rural telephony</i>		FODETEL activity reports	Satisfactory activity preparation and implementation by CONAM, and CONATEL.
a) Rural telecom&electricity joint demand survey.	88		
b) Preparation, implementation and evaluation of pilot projects.	4,600	PERPTAL supervision reports and mid-term review	
<i>Rural Electrification (GEF)</i>	1,551	CONELEC activity reports	Satisfactory activity preparation and implementation by CONAM, DEA, and other sector entities
a) Assistance to MEM and CONELEC		PERPTAL supervision reports and mid-term review	
b) Preparation, implementation and evaluation of pilot projects.	2,292		
<i>ICT- based business services</i>	1,000		
a) E-readiness assessment (review of regulations and IT inventory)	200	CONAM and MICIP activity reports	Satisfactory activity preparation and implementation by CONAM, MICIP, and other sector entities
b) Preparation, implementation and evaluation of pilot project.	800	PERPTAL supervision reports and mid-term review	
<b>4. Design and implementation of a program to promote efficient use and conservation of electricity (GEF)</b>	1,894	PERPTAL supervision reports and mid-term review	Satisfactory activity preparation and implementation by CONAM, MEM, and other sector entities
a) Removing barriers to energy efficiency development	1,594		
b) Demonstration projects	300		
<b>5. Effective Communication and Information Campaign</b>	1,958	Consultants reports	Satisfactory activity preparation and implementation by consultants and CONAM
a) Assistance to CONAM	1,785	PERPTAL supervision reports and mid-term review	
b) Assistance to regulatory agencies: CONATEL, SUPTEL and CONELEC	173		

<b>6. Project coordination and management</b>	3,605		
a) General project coordination and studies by CONAM	1,936	CONAM( UEP) monthly and semi-annual activity reports	Further strengthening of CONAM (UEP) project coordination team
b) Project management CONATEL and SUPTEL	575	Project progress reports	Capacity building for project implementation
c) Project management CONELEC, CENACE y MEM	805	Project progress reports	Capacity building for project implementation
d) Project management by MICIP	100	Project progress reports	Capacity building for project implementation
e) Monitoring and Evaluating activities.	115	Project progress reports Periodical surveys	Adequate quality of preparatory and other technical outputs.
f) Audits	74		Satisfactory survey/report preparation and follow up by consultants and CONAM, and sector entities.

ANNEX 1a.								
I. A. Key Sector Indicators								
Objective	Sector Indicators	Year End					Document <sup>1</sup>	
		Base-line	2001	2002	2003	2004		2009
<b>TELECOMMUNICATIONS</b>								
<ul style="list-style-type: none"> <li>Coverage</li> </ul>	Main telephone lines per 100 inhabitants (country wide). (1999)	9.1						B, C, D, F, G
	Main telephone lines per 100 inhabitants outside of main city (1998)	4.76						B, D, E
	<ul style="list-style-type: none"> <li>Cellular mobile subscribers per 100 inhabitants (1999)</li> </ul>	3.09						B, D
	<ul style="list-style-type: none"> <li>Number of internet users per 10,000 inhabitants.(1999)</li> </ul>	16.11						B, D
<ul style="list-style-type: none"> <li>Quality</li> </ul>	<ul style="list-style-type: none"> <li>Faults per 100 lines per year (1998)</li> </ul>	82.0						B, C, D
<b>ELECTRICITY</b>								
<ul style="list-style-type: none"> <li>Coverage</li> </ul>	<ul style="list-style-type: none"> <li>Coverage (1997?) %</li> </ul>	80.3						H,
	<ul style="list-style-type: none"> <li>Rural coverage (1997?)%</li> </ul>	55						E
	<ul style="list-style-type: none"> <li>Installed capacity (1997)MW</li> </ul>	3,119						I,J
<ul style="list-style-type: none"> <li>Quality</li> </ul>	<ul style="list-style-type: none"> <li>Transmission and distribution losses (1997) % of output</li> </ul>	23						I,J
<b>I.B. Poverty Reduction Indicators in Project Pilot Areas</b>								
<ul style="list-style-type: none"> <li>Increased living standards and broader opportunities for poor in the communities benefiting from pilot projects in electricity, telecommunications and business development services to small and micro business es.</li> </ul>	<b>TBD during appraisal mission</b>							E, H, L,M

<sup>1</sup> A: CONAM Report; B: CONATEL Report; C: SUPTEL Reports; D: ITU Statistics; E: Rural Demand Studies; F: National and Industrial statistics; G: Project progress reports; H: Independent Assessment (consultant's report); I: CONELEC Report; J: OLADE Report; K: CENACE report; L: SIISE Information System for Social Indicators.; M: MICIP Reports; N: Periodical surveys of representative samples compared with a baseline control group; O: Impact Surveys.; Q: TORs and other bidding documents; R: MEM-DEA reports.

**Annex 1a.  
II. Key Outcome Indicators**

Objective	Performance Indicators	Year End				Docu- ment
		Base- line	2001	2002	2003	
<b>MODERNIZATION OF LEGAL, REGULATORY AND INSTITUTIONAL DEVELOPMENT</b>						
<b>TELECOMMUNICATIONS</b>						
<ul style="list-style-type: none"> <li>Improved effectiveness of regulatory agencies, CONATEL</li> </ul>	<ul style="list-style-type: none"> <li>Number of specific regulations completed and presented to Government</li> </ul>					B
	<ul style="list-style-type: none"> <li>Timely processing of licenses, and improvements in other regulatory functions <b>TBD</b></li> </ul>					B
	<ul style="list-style-type: none"> <li>Rural telephony program (FODETEL) in operation with participation of private providers ( number of additional phones in rural areas).</li> </ul>					B
	<ul style="list-style-type: none"> <li>Mechanism for public consultation and dissemination of results in place and operating (website, public hearings)</li> </ul>					B
<ul style="list-style-type: none"> <li>Improved effectiveness of regulatory agencies SUPTEL</li> </ul>	<ul style="list-style-type: none"> <li>Timely processing of consumers' complaints and improvement in other regulatory functions <b>TBD</b>.</li> </ul>					C, H
	<ul style="list-style-type: none"> <li>Mechanism for public consultation and dissemination of results in place and operating (website, public hearings)</li> </ul>					C

<b>ELECTRICITY</b>							
<ul style="list-style-type: none"> <li>Improved effectiveness of regulatory agency, CONELEC</li> </ul>	<ul style="list-style-type: none"> <li>Timely processing of concessions, licenses and other authorizations.</li> </ul>						H
<ul style="list-style-type: none"> <li><b>Improved effectiveness of regulatory agencies</b> CONELEC</li> </ul>	<ul style="list-style-type: none"> <li>Timely processing of consumer complaints, and improvement in other regulatory functions <b>TBD</b>.</li> </ul>						I
	<ul style="list-style-type: none"> <li>Rural and peri-urban electrification program (FERUM) in operation with participation of private investors . (number of additional users covered per year).</li> </ul>						I, J.
	<ul style="list-style-type: none"> <li>Mechanism for public consultation and dissemination of results in place and operating(website, public hearings)</li> </ul>						
<ul style="list-style-type: none"> <li>Efficient wholesale market administrator, CENACE</li> </ul>	<ul style="list-style-type: none"> <li><b>TBD</b> during evaluation mission</li> </ul>						I, K.
<b>INCREASED COMPETITION AND PRIVATE PARTICIPATION</b>							
<ul style="list-style-type: none"> <li>Increased competition and private participation in telecommunication and electricity.</li> </ul>	<ul style="list-style-type: none"> <li>Privatization of Andinatel and Pacifitel completed through international competitive bidding.</li> </ul>						A
	<ul style="list-style-type: none"> <li>Number of licenses issued for telecommunications services and network.</li> </ul>						B
	<ul style="list-style-type: none"> <li>Liberalized wholesale market for electricity in operation ( <b>indicator TBD</b>)</li> </ul>						
<b>EXTENSION OF SERVICES TO LOW INCOME GROUPS IN RURAL AND PERI -URBAN AREAS</b>							
<ul style="list-style-type: none"> <li>Adoption of sustainable strategy to extend electricity services to the poor with participation of private provider</li> </ul>	<ul style="list-style-type: none"> <li>Issuance and applications of regulations specifying delivery and financing mechanisms, with participation of private providers</li> </ul>						I
<ul style="list-style-type: none"> <li>Successful completion of pilot projects for rural telephony and electricity testing the models adopted by the Government, and their replicability</li> </ul>	<ul style="list-style-type: none"> <li>Improvement in services in the areas covered by the pilot projects, and financial sustainability of the projects..</li> </ul>						B, E, N

<ul style="list-style-type: none"> <li>• Successful completion of pilot projects for ICT-based business development services to small and micro businesses (MBS), testing the models adopted and their replicability.</li> </ul>	<ul style="list-style-type: none"> <li>• Changes in MBS' conduct, market outreach and competitiveness, leading to incremental direct and indirect value added and employment,,</li> </ul>							N, M
<b>INCREASED END-USE ENERGY EFFICIENCY</b>								
<ul style="list-style-type: none"> <li>• Adoption and launching of a program to enhance efficiency in the use of energy</li> </ul>	<ul style="list-style-type: none"> <li>• Issuance of regulations and publication of short and medium term program to enhance efficiency in the use of energy</li> </ul>							I, R
<ul style="list-style-type: none"> <li>• Successful implementation of demonstration projects with good replicability prospects.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction in energy consumption of users participating in the pilot projects.</li> </ul>							N
<b>IMPLEMENTATION OF EFFECTIVE PUBLIC CONSULTATIONS AND INFORMATION MECHANISMS</b>								
<ul style="list-style-type: none"> <li>• Adoption of sector reforms that balance various stake-holders' interests, and include effective enforcement and dispute resolution mechanisms.</li> </ul>	<ul style="list-style-type: none"> <li>• Overall public consensus around the Government' s modernization and privatization program, measured in surveys and opinion polls</li> </ul>							O
<ul style="list-style-type: none"> <li>• Increased transparency in sector regulation</li> </ul>	<ul style="list-style-type: none"> <li>• Systematic adoption of public consultations and dissemination of main regulatory decisions by CONATEL, SUPTEL and CONELEC (TBD).</li> </ul>							B, C, I
<b>GEF GLOBAL DEVELOPMENT OBJECTIVE</b>								
<ul style="list-style-type: none"> <li>• Mitigation of climate change through reduction of greenhouse gas emissions, achieved by (i) removing barriers to the application of RETS at lower cost to produce electricity in rural areas; and by (ii) promoting and implementing energy-efficiency measures in the electricity sector .</li> </ul>	<ul style="list-style-type: none"> <li>• Actual tons of CO2 reduced through the implementation of (i) pilot projects based on RETS in rural areas; and of (ii) a program to enhance end-use energy efficiency.</li> </ul>							N
	<ul style="list-style-type: none"> <li>• . Estimated tons of CO2 that should be reduced through the implementation of subsequent investments resulting from the project activities, over the next five or ten years.</li> </ul>							



Objective	Performance Indicators	Base-line	2001	2002	2003	2004	2009	Documents
<b>MODERNIZATION OF LEGAL, REGULATORY AND INSTITUTIONAL DEVELOPMENT</b>								
<b>TELECOMMUNICATIONS</b>								
<ul style="list-style-type: none"> <li>Improved regulations and procedures for sector operation and expansion.</li> <li>Clear attributions of responsibilities for CONATEL and SUPTEL</li> <li>Strengthening of CONATEL and SUPTEL</li> </ul>	<ul style="list-style-type: none"> <li>Specific regulations completed and issued by CONATEL on several issues, including (a) radio frequency management; (b) interconnection agreements; (c) leased lines and data transmission; (d) conflict resolution mechanisms and (e) consumer protection.</li> </ul>							B
	<ul style="list-style-type: none"> <li>tariff policies adopted and tariff rebalancing plan prepared by CONATEL</li> </ul>							B
	<ul style="list-style-type: none"> <li>tariff rebalancing plan implemented by all operators</li> </ul>							B
	<ul style="list-style-type: none"> <li>Action plan designed and implemented to strengthen CONATEL' s , including staff training ( Specific actions TBD).</li> </ul>							B
	<ul style="list-style-type: none"> <li>Action plan designed and implemented to strengthen SUPTEL' s , including staff training (Specific actions TBD).</li> </ul>							C
<b>ELECTRICITY</b>								
<ul style="list-style-type: none"> <li>Definition and implementation of regulations and procedures for sector operation and expansion.</li> <li>Strengthening of CONALEC and CENACE</li> </ul>	<ul style="list-style-type: none"> <li>Updated of existing legislation on specific issues <b>(TBD)</b></li> </ul>							I
	<ul style="list-style-type: none"> <li>Specific regulations and procedures prepared by and implemented by CONELEC on several issues including: (a) environmental issues in the industry; (b) third party access to the transmission grid and prevention of monopolistic abuses in the MEM, and (c) financing and delivery of rural electrification programs with private provider participation.</li> </ul>							I

	<ul style="list-style-type: none"> <li>Tariff adjustment prepared by CONELEC.</li> </ul>								I
	<ul style="list-style-type: none"> <li>Action plan designed and implemented to strengthen CONELEC , including (a) procedure manual, (b) staffing plan, and (c) management and staff training (Specific actions TBD).</li> </ul>								I
	<ul style="list-style-type: none"> <li>Action plan designed and implemented to strengthen CENACE, including (a) procedure manual, (b) staffing plan, and (c) staff training in modern wholesale market management techniques (Specific actions TBD).</li> </ul>								K
<b>INCREASED COMPETITION AND PRIVATE PARTICIPATION</b>									
<b>TELECOMMUNICATIONS</b>									
<ul style="list-style-type: none"> <li>Sector strategy adopted and implemented.</li> <li>Successful privatization of Andinatel and Pacifitel.</li> <li>Increased number of operators in the sector.</li> </ul>	<ul style="list-style-type: none"> <li>Adoption by the Government of a strategy for the development of the Sector.</li> </ul>								B
	<ul style="list-style-type: none"> <li>Privatization of Andinatel and Pacifitel completed through international competitive bidding and transfer of management control to strategic investor.</li> </ul>								A
	<ul style="list-style-type: none"> <li>Number of licenses issued for telecommunications services and network.</li> </ul>								B
<b>ELECTRICITY</b>									
<ul style="list-style-type: none"> <li>Creation of a liberalized wholesale electricity market</li> </ul>	<ul style="list-style-type: none"> <li>Improved administration of the MEM ( <b>performance indicator TBD</b>)</li> </ul>								K

**EXTENSION OF SERVICES TO LOW INCOME GROUPS IN RURAL AND PERI-URBAN AREAS**

<ul style="list-style-type: none"> <li>• Pilot projects to provide telecommunications services to rural areas, with the option of a joint bid to also provide electricity services.</li> </ul>	<ul style="list-style-type: none"> <li>• A total of 600 public telephones or booths with internet access and of X telecenters in villages and towns, installed during 2001-2004 by private companies under concessions/contracts through a competitive bidding for the least subsidy and option for joint provision of electricity services in at least one concession/contract.</li> </ul>							B, Q
<ul style="list-style-type: none"> <li>• Design and implementation of a sustainable strategy for rural electrification by CONELEC and MEM-DEA with private sector participation and promotion of RETs.,</li> </ul>	<ul style="list-style-type: none"> <li>• Electrification Program defined for the next 10 years by CONELEC for rural and marginal urban electrification (on-grid and off grid ) with private sector participation and promotion of RETS adopted and implemented.</li> </ul>							I
	<ul style="list-style-type: none"> <li>• Design and implementation by CONELEC and DEA of sustainable financial (including FERUM) and delivery mechanisms to extend electricity supply services in rural areas</li> </ul>							I, R.
	<ul style="list-style-type: none"> <li>• Specific projects (grid and off-grid) identified and evaluated, through a demand survey complemented with cost analysis and investment needs..</li> </ul>							I

<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Market barriers to the utilization of RETs to provide electricity reduced, through capacity building, public information campaign, market surveys and definition of standards for RETs equipment and installations.<b>(Indicator TBD)</b></li> </ul>							O
<ul style="list-style-type: none"> <li>• Pilot projects to provide electricity services to off-grid rural areas, and promote the use of RETs, with the option of a joint bid to also provide telecommunication services.</li> </ul>	<ul style="list-style-type: none"> <li>• X Contracts granted to qualified firms through a competitive bidding for the least subsidy and option for joint provision of telecommunications services in at least one contract to provide services in: (i)-installing SHS for lighting and communications in x rural households.; (ii)-installing PV systems to supply electricity to refrigerators in x rural clinics, and (iii)-providing electricity and communication in x rural schools.</li> </ul>							R, I.
<ul style="list-style-type: none"> <li>• Pilot projects to provide, computer and internet access and ICT-based business services to micro and small business in secondary towns and large rural communities</li> </ul>	<ul style="list-style-type: none"> <li>• One hub and 8 community ICT -based BDS centers launched by 12/31/03 in peri-urban (7), and rural areas (1) offering: (i) ICT applications adapted for local MBS; (ii) software with local content to fit needs of local businesses; (iii)computer-training courses for community members and (iv) internet access at least for the BDS in peri-urban areas..</li> </ul>			1 hub and 4 peri-urban and ICT-based BDS centers, by 12/31/02	3 peri-urban BDS centers and 1 BDS center in rural areas launched by 12/31/03			G,M

<ul style="list-style-type: none"> <li>Dissemination of best practices for rational use of electricity</li> </ul>	<ul style="list-style-type: none"> <li>Information campaign undertaken on best practices for rational use of energy.</li> </ul>							G,O,R
<ul style="list-style-type: none"> <li>Support to the development of ESCOs.</li> </ul>	<ul style="list-style-type: none"> <li>Increased number of successful ESCOs, private providers of efficient-energy equipment.</li> </ul>							G,O,R
<ul style="list-style-type: none"> <li>Implementation of demonstration projects</li> </ul>	<ul style="list-style-type: none"> <li>X number of demonstration projects for efficient use and conservation of energy designed and implemented.</li> </ul>							G,O,R
<b>IMPLEMENTATION OF EFFECTIVE PUBLIC CONSULTATIONS AND INFORMATION MECHANISMS</b>								
<ul style="list-style-type: none"> <li>Stakeholder participation in the design of the reform program</li> </ul>	<ul style="list-style-type: none"> <li>Public consultations on proposed reforms in electricity and telecommunications adopted, including the: (a) organization of workshops and focus groups to identify concerns ; and (b) design and implementation of channels for stakeholders to further express their views (Government's website; hot - line number, etc..)</li> </ul>							A,G.
<ul style="list-style-type: none"> <li>Broad public dissemination of the content and impact of sector reform programs.</li> </ul>	<ul style="list-style-type: none"> <li>(a) Public media campaign on the content and impact of sector reforms designed, (b) opinion researches completed and (c) outreach and public information activities launched.</li> </ul>							A, G
<ul style="list-style-type: none"> <li>Increased transparency in sector regulation</li> </ul>	<ul style="list-style-type: none"> <li>Action plan and staff training program adopted and implemented for strengthening CONATEL, SUPTEL and CONELEC's capacity to undertake timely public consultations, and systematically disseminate regulatory decisions and procedures. <b>(Specific actions TBD).</b></li> </ul>							B, C, I, K

**Annex 2: Detailed Project Description**  
**ECUADOR: PUBLIC ENTERPRISE REFORM & PRIVATIZATION**

(The cost items include 15% physical and price contingencies, unless otherwise noted. )

**By Component:**

**Project Component 1 - US\$2.80 million**

*Modernization of legal, regulatory and institutional frameworks in the telecommunications and electricity sectors. Cost US\$2,798,000; Loan financing US\$2,798,000*

**a. Tariff rebalancing study for telecommunications: Cost US\$175,000; Loan financing US\$175,000**

This ongoing consultancy by SPR, financed under the PPF and to be completed by end-2000, comprises the following tasks:

- Determination of the economic (long-run marginal) costs, by groups of service. On the basis of economic costs and financial requirements of service providers, standard tariffs for principal groups of services will be developed;
- Determination of (inter)connection charges payable from fixed-line to cellular and cellular to fixed-line connections;
- Based on the above, recommendation of (i) a re-balancing plan to establish tariffs at their economic cost for each service group, and (ii) corresponding tariff policies; and
- Preparation of information on internationally applied methodologies for tariff analysis and calculation, including cellular tariffs and interconnection charges.

**b. Strengthening of CONATEL and assisting it in the completion of sector legal and regulatory framework: Cost US\$230,000; Loan financing US\$230,000**

This component comprises the following activities ( **To be further specified by CONATEL** ):

- Recommendations on technical regulations for the sector consistent with the evolution of new market and technologies;
- Training of CONATEL's staff in new technologies, regulatory approaches, new initiatives (for example in e-commerce, e-government and applications).

**c. Strengthening of SUPTEL's supervisory/enforcement capacity: Cost US\$ 1,150,000; Loan financing US\$1,150,000**

This component comprises:

- the review and diagnosis of SUPTEL's performance and support for implementation of recommendations to increase its efficiency and effectiveness;
- Training and upgrading staff's skills;
- Telecommunications network to support internal communications LAN/WAN;
- call center for attention to consumers to provide information and receive and process complaints;
- automated system for monitoring quality of service of operators;
- telecommunications information system SINFOTEL; and
- Equipment and systems to measure and control mobile telephony, value added services and others.

**d. Strengthening of CONELEC's regulatory capacity: Cost US\$1,128,000; Loan financing**

**US\$1,128,000**

The following activities are included:

- Refinement of regulations and preparation of new regulations, including on third-party access to transmission and distribution, anti-monopoly, guarantees of existing contracts, environmental protection, and exports and imports of electricity.
- Operational procedures for the wholesale electricity market and operational control of the system, including quality control.
- Tariff refinement study: Based on a preceding study to define methodologies of tariff setting, this study would refine the key elements of aggregate distribution values for retail tariffs.
- Energy cost incidence study that will evaluate the impact of energy costs (electricity and petroleum products) on the cost of living of the principal strata of the population and the principal productive sectors, as well as the impact of increases of energy prices on inflation and energy demand. The study would also indicate options for economically efficient subsidization schemes for energy consumption targeted at low-income groups.
- Electricity demand forecasts and corresponding investment requirements for generation, transmission and distribution, including operation simulations and calculation of short-run marginal costs, in order to regularly update the ten-year, least-cost expansion plan.
- Acquisition of hardware and software and development of computer models for sector analysis to strengthen CONELEC's capacity to: (i) review and approve investment projects for generation, transmission, and distribution; (ii) prepare engineering-economic cost studies; (iii) undertake electricity system analysis; and (iv) maintain information on primary energy resources for electricity generation, among others.
- Establishment of sector information system for improving sector management. A modern data system for technical and commercial transactions by generation, transmission, and distribution companies (including characteristics of deliveries to main customer groups) will allow reconciliation of information between CONELEC's and CENACE's systems.
- Acquisition of monitoring equipment, (e.g., minor equipment for geographic positioning systems) that will enable enabling CONELEC to carry out its field monitoring and enforcement functions, to ensure compliance by operators with environmental regulations and norms.
- Hands-on training for managers and key professional staff of CONELEC's operating departments provided through local and international seminars and workshops, covering the principal regulatory functions including concessions, tariff analysis, and engineering/commercial analysis of the electricity system. In order to learn from best international practice, partnerships with regulatory agencies in relevant countries would be established.

**e. Strengthening of CENACE: Cost US\$ 115,000; Loan financing US\$115,000**

- International and local training to CENACE's management and key staff, for managing the wholesale electricity market in general and for applying and operating the new systems established under the Project (see under project component 2).

**Project Component 2 - US\$7.26 million**

***Increased competition and private investment in the telecommunications and electricity sectors: Cost US\$ 7,261,000; Loan financing US\$ 6,111,000 .***

**a. Diagnostic and recommendations for a Government Strategy for the Telecommunications Sector, including options for privatization: Cost US\$ 46,000; Loan financing US\$ 46,000.**

To provide a policy framework to foster the development of the sector, and to achieve a successful privatization and opening of the sector to private investors, consistent with the long term vision for the sector, the study will cover the following areas:

- performance of the sector in the different services and international benchmarking to set realistic goals for the short and medium term development of the sector;
- identification of the Government's priorities for the sector in the short and medium term and policy recommendations to achieve these;
- identification of the existing market structure, and recommendations for further changes;
- identification of innovative option(s) for privatization of Andinatel and Pacifictel, that will consider the shortcomings of previous privatization attempts and the impacts of the proposed options on the sector growth, the fair competition and maintenance of level playing field for all operators in the sectors, and the wider access to services for the poor.
- assessment of the existing legal and regulatory framework, with a list of, and recommendations on, key issues to be addressed, (including but not limited to interconnection agreements, licensing regimes, tariff regulations, spectrum management and universal service and access), and
- assessment of the institutional structures and identification of the main issues to be addressed to strengthen the entities in charge of the sector: CONATEL and SUPTEL, and to the extent that it will be relevant, CONARTEL.

**b. Privatization of ANDINATEL and PACIFICTEL: Cost US\$ 990,000; Loan financing US\$990,000**

In order to commission an internationally respected investment bank specialized in advising on privatization of telecommunications enterprises, the Project will finance the retainer fee customarily charged by investment banks for preparing and conducting privatizations. In addition, this component will finance consultancy by international legal firms and technical advisors. The following activities will be carried out:

- Diagnostic analysis of ANDINATEL and PACIFICTEL, including recommendations of corrective measures, and determination of their value as going concerns;
- Recommendations on privatization strategy; employees (including former employees who retired after 1994) will be offered about a 3% participation in the company(ies).
- Evaluation of documentation submitted by bidders to qualify for participation in the bidding process;
- Investment promotion campaigns ("road shows");
- Preparation of basic documents required for privatization; clarifications of questions/observations by bidders; and
- Organization of auctions and determination of winning bid(s).
- Design and execute a consultation process/ public information campaign that will communicate to the population in general, and the stakeholders in particular, the benefits as well as the costs of this privatization. (See component 5).

**c. Assistance to CONATEL for issuing service and network licenses: Cost US\$ 115,000; Loan financing US\$ 115,000**

- Preparation of bidding documents and auctions for issuing networks and service licenses;

**d. Wholesale market administration by CENACE: Costs US\$6,110,000; Loan financing US\$4,960,000**



To support the proper functioning of the liberalized electricity wholesale market, through assistance in the elaboration and applications of rules for its operation, the financing of relevant studies, and the partial financing of the necessary equipment and software, including:

- Completion of studies on wholesale market administration to update and improve systems for transactional circuit development, measurement of commercial operations, and preparation and exchange of information for operators.
- Development of a long/medium/short-term planning model that will provide information on system reliability, cost of dispatch, and maintenance scheduling, in order to improve load dispatch programming, ensure system security and reliability, and enhance quality of supplies. This information would also be used by CONELEC for its own medium-term system planning, and by prospective investors to decide on plant extensions.
- Set-up of a system for the settlement of commercial transactions in the wholesale market, which will allow the determination and evaluation of transactions, i.e., physical amounts of electricity traded, evaluation and closure of spot market transactions, charges to system operators for services rendered, and financial settlements (for energy and capacity) between distribution companies and generation/transmission companies.
- Development of an integrated commercial measurement system, which will allow (i) remote control of information submitted by generating companies, distributors and large-volume consumers and (ii) centralized verification and processing of this information, required to assess transactions (energy and capacity) carried out by the wholesale market operators. The component would include the acquisition of a limited amount of measuring and registration equipment.
- Upgrading of information systems that support CENACE's technical and commercial functions and provide CONELEC and the operators with information on the functioning of the different market segments. The activity includes (i) reviewing and (re)designing the principal information system, subsystems, and data modules, (ii) identifying data stores, and (iv) developing an implementation plan, including priority ranking for information technology systems and equipment acquisition (software and hardware).
- Acquisition of hardware and software for improving the real-time operation of the interconnected system. Existing sub-systems (for data acquisition, operator-equipment interface, and maintenance) were designed in the early 1990s and require updating. This entails acquisition and testing of new equipment and programs.

### **Project Component 3 - US\$ 9.53 million**

*Extension of telecommunications, electricity and ICT-based business services to low income groups in rural and peri-urban areas. Cost US\$9,531,00; Loan financing US\$5,037,000*

#### **a. Rural telecommunications and electricity demand survey and study: Cost US\$ 88,000; Loan financing US\$ 0 ; GEF financing: US\$30,000**

In order to assess the requirements for extending telecommunications and electricity services to rural areas and the approximate marginal cost of these services, a first- step survey will obtain information about the number, location, size, inhabitants, appropriate technological solutions for those localities considered to be included in the Plan. This activity will be initiated with PDF support of the GEF.

#### **b. Pilot projects to be financed through FODETEL-Cost US\$4,600,000 Loan financing US\$ 2,300,000**

This would assist the Government in overcoming initial funding constraints to extend telecommunications

services in rural areas. FODETEL will be financed through contributions from all telecommunications operators (of up to 1% of their operating revenues) to subsidize part of the investment costs needed to expand rural services. However, since funds will start flowing into FODETEL only from January 15, 2001, and will not be sufficient in the short term to finance the Government's rural telephony program, the project will provide partial financing of the subsidy needed to extend services to at least 600 communities with the participation of private providers. Concessions will be granted through competitive bidding for the least subsidy and with the option of also providing electricity services. Eligible providers will be selected according to FODETEL's Operational Manual and based on international competitive bidding as per section 3.13 (a) of the Bank Group's "Guidelines for Procurement under IBRD Loans". Goods, works, and services will be procured in accordance with World Bank Guidelines.

The pilot program to provide telecommunications to around 600 communities through public phones and in some instances telecenters for business services. This pilot program will be implemented in two phases of roughly equal cost, with the first phase covering the northern and southern border regions and the province of Santa Elena.

**c. Development of rural electrification program: Cost US\$1,551,000; Loan financing US\$552,000; GEF financing US\$775,000**

This activity, primarily funded through GEF, seeks to (i) establish the legal/regulatory/institutional framework and the technical and financial mechanisms to promote the extension of electricity services to under- and unserved areas, and (iii) lay the basis for a sustainable electricity expansion program by private providers, including through decentralized RET. The activity would identify policy, institutional, and technical requirements and specific options to overcome barriers, identify options for the use of alternative sources for electricity generation, with focus on low-/no-emission energy renewable, and outline a strategy and prepare a dissemination plan in consultation with, and participation by, principal stakeholders. Specific components comprise:

- Design and implementation of a plan for rural electrification over the next 10 years by CONELEC; identification and evaluation of rural electrification projects (grid-extension and off-grid) through a demand survey complemented with cost analysis and investment needs.
- Identification of barriers to extending electricity supplies (especially lack of appropriate commercial financing; low capacity to pay; weak investor interest; lack of information), through market assessments and economic/financial evaluations;
- Strategies and policies to remove barriers, including (i) tariff incentives and subsidization schemes to extend electricity supplies, (ii) creation of technical and financial mechanisms for promoting electrification systems, including RET systems, (iii) linkages of electricity delivery systems with other services (e.g., rural telephony, water supply, and social services) to reduce costs and create synergies; (iv) definition of standards for RET equipment and installation; and (v) public information and training of management and operational staff, including staff from the power sector regulator CONELEC, on best practices, related technologies, and project preparation and implementation;
- Monitoring and evaluation of the entire program and of the pilot projects under (d).

See detailed description in Annex 4a.

**d. Pilot Projects for decentralized off-grid electrification: Cost US\$ 2,292,000; Loan financing US\$ 1,185,000; GEF financing US\$515,000 (see detailed description in Annex 4a )**

- Pilot projects for decentralized RET systems, installed and operated by private providers, with the option for joint provision of telecommunications services. These projects will cover: (i) the

installation of SHS for lighting and communications (TV, radio) in xx rural households, (ii) the installation of photovoltaic (PV) systems to supply electricity for refrigeration and lighting in yy rural clinics; and (iii) the installation of electricity (PV) and communication systems in zz rural schools.

- Review and address constraints to the development of small hydropower private supply, including support to existing private developers.
- Options to finance non-renewable energy systems (diesel power plants) for decentralized mini-grids in small villages, with the necessary environmental safeguards, would also be explored. The financing systems of these systems will not involve GEF financing.

**e. Pilot projects to develop business centers for MSB in peri-urban and large rural communities: Cost US\$ 1,000,000; Loan financing US\$1,000,000.**

This component will assist the MICIP to develop a program to bring IT and ICT based business services to MSB, and to design and implement a series of pilot projects that will test the impact of these services on low-income entrepreneurs. Specific activities include:

- E-readiness assessment, to provide the framework for the design and implementation of the program, including: (i) an overview of regulations affecting internet provision and use, and the identification of major barriers to internet and e-commerce development with recommendations for specific actions in regulatory and policy areas; (ii) an inventory of the existing IT infrastructure and businesses (access, prices, web-sites, ISPs etc.),
- Business development centers (BDS) for MSB, designed and implemented in two phases . The first phase will consist of one hub and 4 community ICT-based BDS designed and implemented by 12/31/02 in peri-urban areas, and the second phase of another 3 BDS in peri-urban areas and 1 BDS in rural areas launched by 12/31/03. These BDS will offer: (i) packages such as phone/fax/mail (ii) ICT applications adapted for local MSB (iii) software with local content to fit needs of local businesses and iv) computer-training courses for community members to foster the use of facilities; and (v) internet access at least for the BDS in peri-urban areas.

**Project Component 4 - US\$1.89 million**

***Enhancement of electricity end-use efficiency: Cost US\$1,894,000; Loan financing US\$431,000; GEF financing US\$1,175,000***

This activity, primarily funded through GEF seeks to (i) establish the legal/regulatory/institutional framework and the technical and financial mechanisms needed to promote the efficiency of electricity end-use, (ii) remove barriers to efficiency enhancement, and (iii) lay the basis for a sustainable and economy-wide energy conservation and efficiency program. The activity would identify policy, institutional, and technical requirements and specific options to overcome barriers to enhancing the efficiency of electricity end-use, and outline a strategy and prepare a dissemination plan, in consultation with, and participation by, principal stakeholders. Specific components comprise:

- Identification of barriers to efficiency enhancement, through surveys on electricity demand and efficiency enhancement options;
- Strategies and policies to remove barriers, including (i) tariff incentives to enhance end-use efficiency; (ii) standards for efficient design and use of electrical appliances including equipment and appliance labeling, and buildings; (iii) public information and training of management and operational staff, including staff from the power sector regulator CONELEC, on best efficiency enhancement practices, related technologies, financial analysis, and project preparation and implementation; and (iv) support to the formation of local ESCOs, through relevant market

assessment and training.

- Demonstration projects, including: (i) compact fluorescent lighting in a residential or commercial building; (ii) a joint venture between an electric distribution utility and a financial entity to identify and implement energy efficiency investments; and (iii) an ESCO shared-saving operation;
- Monitoring and evaluation of the entire program and main demonstration projects.

**Project Component 5 - US\$1.96 million**

***Effective Communications and Information Campaign: Cost US\$1,958,000; Loan financing US\$1,409,000***

**a. CONAM communication and consultation campaign: Cost US\$1,785,000 Loan financing US\$1,236,000**

This will provide assistance, by national and international specialists, to CONAM in carrying out a communications and consultation process with stakeholders and relevant civil society organizations on the Government's aims and policies in regard to the reform and privatization program. Specific targets are to: (i) communicate with stakeholders on the importance, requirements, and implications of the Government's program, through eliciting their concerns and fostering their appreciation of the benefits of reforms; (ii) build consensus around reforms among the population at large; (iii) develop communications capacity among institutions instrumental to reforms, including through systematic feedback on the public's perceptions on reforms; (iv) design internal communications mechanisms directed at staffs of enterprises slated for privatization; (v) improve media understanding of reform and privatization issues; and (vi) improve perceptions by international investors about Ecuador. Results will allow CONAM and the Government at large to better assess concerns by the affected populations and consequent requirements for policy modifications, and thus, provide feedback for policy decisions.

The component would be undertaken in three phases, i.e., through (i) immediate action to prepare a communications strategy and implementation plan, including public opinion research (until June 2001); (ii) launching outreach activities, putting public information actions on a strategic footing, and strengthening CONAM's communications capacity (until mid-2002); and (iii) follow-on actions to put the activity on a permanent and sustainable basis (after mid-2002).

**b. Action plan and staff training program to strengthen CONATEL's and SUPTEL's communication capacity: Cost US\$116,000; Loan financing US\$116,000 (to be discussed).**

This component will support assistance, by national and international specialists, to CONATEL and SUPTEL in developing/strengthening a communication unit that will in charge of (a) timely public consultations on major regulatory decisions, through focus groups, public hearings and web-site discussions, and (b) systematic dissemination of sector programs (i.e. rural telephony programs), regulatory decisions and procedures through newspapers and website. **[to be specified by CONATEL and SUPTEL].**

**c. Action plan and staff training program to strengthen CONELEC's communication capacity: Cost US\$ 58,000; Loan financing US\$ 58,000 (to be discussed).**

This component will support assistance, by national and international specialists, to CONELEC in developing/strengthening a communication unit that will in charge of (a) timely public consultations on major regulatory decisions, through focus groups, public hearings and web-site discussions, and (b) systematic dissemination of sector programs (i.e. rural electrification programs), regulatory decisions and procedures through newspapers and website. **[to be specified by CONELEC].**

**Project Component 6 - US\$3.61 million**

*Project coordination and management. Cost US\$3,605,000 ; Loan financing US\$1,688,000*

**a. CONAM project coordination and monitoring : Cost US\$1,936,000; Loan financing US\$1,499,000**

CONAM's Public Enterprise Unit has contracted eight local specialists, including for telecommunications, electricity, private enterprise development, utility pricing, and financial administration, to coordinate project implementation by the sector entities, as well as supervise various consultancies for which the sector entities do not yet have the required analytical capabilities. CONAM will also manage project procurement, administration, disbursement, accounting and reporting. The Project will finance these consultants, to provide legal, economic and technical advice and carry out necessary financial and administrative procedures. This component will also fund local transportation, expenses for office space, equipment and supplies. The project will also finance several preparatory studies supervised by CONAM, including: energy cost incidence study, environment analysis in the power and telecommunications sectors, etc.

**b. Telecommunications: Project management by CONATEL and SUPTEL. Cost US\$575,000; Loan financing US\$0**

CONATEL and SUPTEL will designate staff to manage the execution of their respective project components, in particular for the drafting of terms of reference, the orientation and support to consulting firms and the review and implementation of measures, regulations and policies as defined by the studies.

**c. Electricity: Project Management by CONELEC, CENACE and MEM. Cost US\$805,000; Loan financing US\$0**

CONELEC, CENACE and MEM will designate staff to manage the execution of their respective project components, in particular for the drafting of terms of reference, the orientation and support to consulting firms and the review and implementation of measures, regulations and policies as defined by the studies.

**d. ICT-based business services: Project Management by MICIP . Cost US\$ 100,000; Loan financing US\$0**

MICIP will designate staff to manage its project component, in particular for coordination with other related World Bank projects, drafting terms of reference, orientation and support to consulting firms, and review and implementation of measures, regulations and policies as defined by the studies.

**e. Project Monitoring and Evaluation. Cost US\$115,000; Loan financing US\$115,000**

This will finance monitoring and evaluation of the project's progress, results and outputs, based on the Project Implementation Plan and the performance indicators for project outputs and the executing agencies (see Annex 1a, TO BE DEVELOPED DURING APPRAISAL). Evaluation will be through annual reviews by independent consultants, based on monitoring by CONAM and the other executing agencies.

**f. Audits. Cost US\$74,000; Loan financing US\$74,000**

This will finance the yearly audits of PPF and Loan accounts.



**Annex 3: Estimated Project Costs**  
**ECUADOR: PUBLIC ENTERPRISE REFORM & PRIVATIZATION**

<b>Project Cost By Component</b>	<b>Local US \$million</b>	<b>Foreign US \$million</b>	<b>Total US \$million</b>
1 - Legal/Regulatory/Institutional Framework	0.16	2.30	2.46
2 - Competition and Private Investment	0.00	6.40	6.40
3 - Service extension in rural and peri-urban areas	2.43	6.04	8.47
4 - Enhancement of energy efficiency	0.40	1.40	1.80
5 - Communications and Information Campaign	1.14	0.60	1.74
6 - Project Coordination and Management	2.84	0.30	3.14
<b>Total Baseline Cost</b>	6.97	17.04	24.01
<b>Physical Contingencies</b>	0.33	0.68	1.01
<b>Price Contingencies</b>	0.67	1.36	2.03
<b>Total Project Costs</b>	7.97	19.08	27.05
Front-end fee		0.18	0.18
<b>Total Financing Required</b>	7.97	19.26	27.23

<b>Project Cost By Category</b>	<b>Local US \$million</b>	<b>Foreign US \$million</b>	<b>Total US \$million</b>
<b>Goods</b>	2.30	12.75	15.05
<b>Works</b>	0.00	0.00	0.00
<b>Services</b>	4.96	5.85	10.81
<b>Training</b>	0.17	0.81	0.98
<b>Operational Costs</b>	0.21	0.00	0.21
<b>Total Project Costs</b>	7.64	19.41	27.05
Front-end fee		0.18	0.18
<b>Total Financing Required</b>	7.64	19.59	27.23

<sup>1</sup> Identifiable taxes and duties are 0 (US\$m) and the total project cost, net of taxes, is 23.9 (US\$m). Therefore, the project cost sharing ratio is 73.81% of total project cost net of taxes.

## **Annex 4: Cost Effectiveness Analysis Summary**

### **ECUADOR: PUBLIC ENTERPRISE REFORM & PRIVATIZATION**

#### **Summary of benefits and costs:**

As result of the Government's program to modernize and privatize the telecommunications and electricity sectors, supported by this Project, the economy at large will benefit from improved and expanded access to a wider range of modern telecommunications and electricity services, increased efficiency, and improved quality of delivery. Opening up these sectors to private investment would stimulate private enterprise in other infrastructure sectors as well, leading to enhanced efficiency and transparency in the provision of these services. In addition, strengthening the regulatory entities and promoting competition in the sectors will benefit customers through improvements in quality of service and reduction of its cost.

While increasing government revenues is not a primary project objective, the Project is expected to have a substantial positive impact on government finances, for both telecommunications and electricity, due to (i) additional revenues from income taxes, licenses, and fees from privatized enterprises, (ii) payment of dividends, to the extent that the Government maintains partial ownership in these enterprises; (iii) financing of the regulatory entities through contributions from the sector enterprises instead of allocations from the central government budget, and (iv) reduction of subsidies to telecommunications and electricity users, as well as to government owned companies, in particular in the power sector. This impact would be permanent and would more than compensate the Government's contribution to financing the Project, estimated at US\$5mn over the project life (of approximately four years), as well as servicing the Loan later on (approximately US\$1.5mn/year). Administrative expenditures incurred by the regulatory, enforcement, and market management entities would be covered by these entities' own revenues to be generated as result of the project-supported reforms and thus, would not constitute a charge against the government budget.

The new telecommunications legislation permits a special levy on end-user services and net international settlements, which is to be earmarked for FODETEL to subsidize the expansion of telecommunications services in rural and other under-served areas, without creating a charge against the government budget. Similar developments are foreseen for the electricity sector. The revenues and expenditures involved will be analyzed in detail during project implementation.

The proceeds from asset sales and/or concessioning - to be generated through sale or capitalization of ANDINATEL and PACIFICTEL and in the electricity sector, through establishing a majority participation in the distribution, transmission, and generation companies - would be used for social investment, in line with the Government's poverty alleviation objectives. The availability of these funds would put the Government in a stronger position to provide counterpart funds for social projects financed by international donors, including the Bank, and correspondingly reduce its borrowing and subsequent debt servicing requirements. If capitalization was the retained option for privatizing telecommunication and/or electricity companies, the corresponding equity that would be injected in the companies would allow quick investments for significant improvements in service coverage and quality.

At this stage, there has not been a market-based valuation of the companies slated for privatization, i.e., an estimate of what investors would pay given these companies' economic and financial prospects, taking into account the legal/regulatory/ institutional framework, the intensity of competition, and the state of the companies' physical assets and human resources. Although privatization of telecommunications and electricity companies in other countries in the Region can give an indication of the proceeds to be expected,



these may not be readily applicable to Ecuador: tariffs are not yet cost-covering in either sector, and in telecommunications, the companies are going to be privatized without any transitory statutory monopoly ("exclusivity"), whereas most privatizations elsewhere in Latin America included such a monopoly. Also, investors may discount the sales price for all companies on account of their appreciation of high political risk associated with operations in Ecuador.

In order to make a first-round estimate of the market value of the companies involved, it should be considered that, for telecommunications companies, the price paid per line installed has been around US\$2,500 in recent privatizations. But in the case of ANDINATEL and PACIFICTEL, a more conservative estimate is called for, given the above-listed constraints. Assuming a value of US\$1,500/line, and given that there are xxx lines, the market value for both companies may total US\$mn. A similar calculation would indicate privatization proceeds from the electricity sector in the order of US\$xxxxmn.

In regard to liabilities, as part of the privatization and concessioning program, some reduction in the work force would be required in the case of electricity companies. However, the costs of severance packages for the companies to be affected under the proposed Project (for which estimates will be provided by the Borrower) would be minor relative to the privatization revenues. The cash lay-outs for severance payments also would be reduced to the extent that staff made redundant accept shares of privatized companies in lieu of such payments.

Finally, dividend payments from the companies to the Government would be reduced in relative terms as government shareholdings in these companies are being scaled back. However, only ANDINATEL currently is profitable, and dividend payments in absolute terms to the Government would increase in line with the financial strengthening of the companies involved.

The expected fiscal impact of the Project as well as the cost-effectiveness of GEF components will be analyzed in detail during project appraisal.

#### **Main Assumptions:**

It is assumed that during the period of project implementation (2001-05), (i) GDP growth will average 4%/year and the growth of telecommunications and electricity services, 10%/year and 6%/year, respectively; (ii) the privatized enterprises will generate profits in the order of US\$100mn/year; (iii) fees from concessions, authorizations, and licenses will average US\$10mn/year; and (iv) privatization revenues will total US\$1.5bn, based on the assumptions above, and will be used entirely to fund social investments.

#### **Cost-effectiveness indicators:**<sup>2</sup>

These include: (i) operating and administrative costs of the privatized companies per unit of sales; and (ii) operating and administrative costs of the regulatory and enforcement agencies relative to sector activities, as measured by total sales. In regard to the latter, operating and administrative costs for electricity generated, transmitted, and distributed currently amount to USc.../kwh. In regard to telecommunications, these costs amount to US\$.../line for ANDINATEL and US\$.../line for PACIFICTEL, respectively. Considerable declines in costs per unit of sales are expected as result of efficiency enhancement associated with privatization and volume growth of underlying activities. Administrative and operating costs of sector regulation/ supervision and management currently amount to USc.../kWh for CONELEC and USc.../kWh for CENACE, and USc.../line for CONATEL and USc.../line for SUPTEL, respectively. **Numbers to be established during appraisal mission.**

## **Annex 4a: GEF ALTERNATIVE: PROJECT JUSTIFICATION, INCREMENTAL COSTS AND COST-BENEFIT ANALYSIS**

### **I. Introduction**

This annex summarizes the (i) current electric sector policy environment, and status and plans for rural electrification via grid extension and other means, (ii) barriers to improvement in electricity load management and end-use efficiency and to rural electrification in dispersed and isolated areas, (iii) expected benefits of the GEF Alternative Project, (iv) benefit cost and risk analysis for the project, and (v) detailed GEF incremental cost analysis.

The GEF Alternative is designed to help address several deficiencies which are usually not incorporated directly into power sector reform programs: *Off-grid electrification*: lack of i) an off-grid rural electrification strategy including market information and proven models for implementation, ii) an institutional responsibility and private participation for implementing off-grid power supply, iii) a dedicated funding source, and iv) capacity to address technical and O&M needs for off-grid renewable power supply. *Energy Efficiency*: i) absence of an energy efficiency policy and integration of efficiency concerns into reform strategy, ii) insufficient distribution utility and end user incentives and motivation, iii) lack of technical capacity, and iv) inadequate appliance and equipment standards.

The GEF Alternative will be developed in the framework of the power reform and privatization program, in order to ensure that the above issues are not left out from the reform agenda. It will be implemented by the Department of Alternative Energy (DEA) of the Ministry of Energy and Mines (MEM), in close collaboration with the power sector regulator (CONELEC). The GEF Alternative will pursue private involvement and financing - including distribution utilities, energy service companies, equipment manufacturers and dealers, financial institutions, NGOs, and consumers, and will be based on thorough market assessments and beneficiary consultation and participation.

### **II. Overview**

#### **Energy and Electricity System Characteristics in Ecuador**

Ecuador still depends heavily on traditional fuels including wood, charcoal and agricultural residues (49% of end use consumption), in addition to its use of oil products (fuel oil, LPG and gasoline -- 34%), and electricity (16%). In urban areas and rural areas, these shares differ greatly due to both much higher average incomes and fuel availability. For urban vs rural areas, respectively, these fuel shares are: oil products 57% vs 20%, for electricity 35% vs 5%, and for biomass fuels 8% vs 75%. Furthermore, the average use of electricity per customer in rural areas is also much lower, averaging 96 kWh/month (in 1993) vs 193 kWh/month in urban areas. (Source: ESMAP, "Ecuador-Energy Pricing, Poverty and Social Mitigation", August 1994).

*Poverty and Rural Electrification* The degree of poverty in Ecuador has important implications for the rural electrification effort. Rural cash incomes are very low, unemployment high and access to basic public and social services inadequate. Malnutrition (39%), infant mortality and maternal mortality are very high for the lowest income groups. Economic problems in 1998 - 1999 significantly increased the general problems of the poor, such as poverty, deferred medical attention, medical coverage, etc.

Energy prices subsidies have been an important part of the GOE's safety net, but given the extremely high

cost (estimated at US\$400 million in 1998), the Government cut these sharply in 1998, to an estimated US\$34 million, only to have them increase again in 1999 due to rising oil prices and exchange-rate depreciation (Source: World Bank, "Ecuador: Crisis, Poverty and Social Services," June 2000, pg. 82). The Bono Solidario became the backbone of the GOE's social protection system in 1998, when it was initiated to alleviate hardship when the GOE eliminated the subsidy on cooking gas, electricity and other fuels. In 1999, some 1.3 million households received this support, at a cost of about US\$190 million, with household payments varying from \$8-\$15 per month (depending on period in question and impacts of inflation the value of the Bono may have dropped by half). Coverage is much higher in urban than in rural areas. Rural electrification while a policy priority of the GOE, clearly should not be allowed to begin a large new round of energy sector subsidization without careful evaluation the costs and benefits, and means to minimize this impact.

**Electrification Plans** Ecuador's population was estimated at 12.4 million in 1999, and is projected to grow to about 15.20 million in 2010. Electricity reaches some 96% of the urban population but only 55% of the rural population (80% of the total population). CONELEC has prepared a 2000-09 National Electrification Plan to extend coverage through grid extension to an additional 750,000 households, at a cost of about \$537 million of which the GOE contribution through FERUM is estimated at \$400 million. The average cost per household connection was estimated at \$361 in 2001 (latest approvals for 2001 average only \$77 per household), growing to \$824 in 2009. (Source: Anexo 7.06, "Planes de Electricación Rural y Urbano Marginal", Plan de Electrificación 2000-2009, CONELEC). This increase is due to higher average costs per household given location and load density. These plans would increase coverage to 98% of the urban population and 65% of the rural population (or about 85% of the total population).

The Fund for Electrification of Rural/Urban Marginal population (FERUM) is the primary source of GOE financing for expanded electrification. CONELEC is responsible for reviewing and approving the applications to this fund, which are submitted by "Consejos Provinciales" in coordination with municipalities and local electric distribution companies. Weighting criteria reflect both performance and social objectives. (See: CONELEC, "Normas Legales Relacionadas con El Ferum", Oct. 2000). The source of these funds is primarily the 10% charge on commercial and industrial electricity consumers, and 5% of the profits (not reinvested) earned by the GOE from the state-owned electricity enterprises.

Distribution companies (which are in the process of being privatized) would have the primary responsibility for grid extension electrification. It is unclear specifically how concession contracts establish the obligation to participate in such social electrification. Even under these plans, however, most of the population in remote areas would remain unserved. This population historically has used low quality but still relatively expensive alternatives to electricity, for example, kerosene, candles and batteries, for lighting. Data from 1992-93 (ESMAP, "Ecuador: Precios de la Energía", 1994) indicated kerosene for lighting in 64% to 73% of households in rural areas; however kerosene is largely reportedly unavailable today. It is uncertain what types of fuels are currently most common, how much fuel costs for the poorest segment of the population, or how much they are willing to pay for improved lighting. Qualitative information does indicate the likelihood that: a) in addition to capital subsidies for electrification, a significant part of the market may require operating cost subsidies, and/or would potentially be served more cost-effectively by very small-scale low cost systems (e.g. portable PV/lamp systems) suitable for remote locations; and b) the GOE will need a diverse and flexible strategy to deliver and sustain rural off-grid electricity services, for example, by relying on some form of concession approach in higher potential areas and local (community, non-governmental organization, private) and public sector collaboration (e.g. poverty programs). The cost-effectiveness and feasibility of a distribution utility concession model similar to Argentina or a smaller-scale concession for a designated area will be evaluated under this project, before the structure of

the privatized distribution concessions is finalized.

**Energy Efficiency --- Electricity Prices and Economic Conditions** Historically, electricity and certain fuel prices in Ecuador have been highly subsidized, and attitudes engendered by this experience appear engrained and politically very sensitive. The GOE has made major changes in electricity pricing policies, recently as part of the electricity sector reform process. Nonetheless, certain fuels remain highly subsidized. For example, LPG prices are roughly at 20% of actual cost - e.g. \$0.35 per kg vs a reference of \$1.02 in Argentina. (Source: Ministerio de Energia y Minas, "Sector Energetico Ecuatoriano", June 2000). This price differential may be resulting in a shift from electric water heat in residential applications to LPG. These subsidies could also cause LPG to be used for lighting (where electricity is not available).

The most important factors affecting the electricity consumer recently have been:

- Economic Factors: very high rates of inflation, leading to devaluation followed by dollarization; negative growth in the gross national product (-7.3%) for 1998-2000.
- Electricity Price Adjustments: increasing from an average nationally of \$0.0249 per kWh (after devaluation \$0.0428) to the current \$0.05 per kWh, with an additional increase of currently 4% per month, toward economic cost of \$0.08 and \$0.10 per kWh, depending on fuel prices. (Source: CONELEC, Various Tables "Analysis de Los Precios Medios", Dec. 2000; and "Situación del Sector Eléctrico del Ecuador," Octubre, 2000).

**Electricity System Generation Characteristics** The principal fuels used and operating characteristics of the power system in Ecuador can be seen in the table below. Hydroelectric generation capacity installed, 54.3% of the total, and is able to generate on a seasonal basis at high levels, producing in 2000, an estimated 75% of total gross energy. However, a substantial portion of this capacity has no storage, and therefore is unavailable during the dry season, and dependence on thermal generation during droughts increases. With such a large hydroelectric component, much of which is non-storage or run-of-the-river, the environmental impacts of electricity use is significantly diminished. Nonetheless, on the margin, there is still a high degree of dependence on diesel generation, primarily for peaking needs. Many of the old thermal plants have poor operating efficiency and high levels of technical and commercial losses in distribution, 22%. Furthermore, a large part of additional generating capacity in the 10-year indicative expansion plan is thermal-based .

**Table 1. Ecuador Power System Characteristics (2000)**

Category/ Plant Type	Hydroelectric	Thermal (Diesel)	Thermal (Fuel Oil)	Total
<b>Production Gwh (gross)</b>	3,975	853.5	474.5	5,303
<b>%</b>	75%	16.1%	8.9%	
<b>Installed MWs</b>	1,693	984	440	3,117
<b>%</b>	54.3%	31.6%	14.1%	
<b>Fuel Used</b>		Diesel	Bunker	
<b>Gallons (000)</b>		26,521	69,493	
<b>Maximum Demand (MWs)</b>				1,840.9
<b>System Losses (%)</b>				22%

Source: CONELEC, "Estadística del Sector Eléctrico Ecuatoriano", Jan.-June 2000.

**Electricity Demand** CONELEC' s growth projections ("Plan de Electrificación Rural 2000-2009, Oct. 2000")

for electricity consumption are subject to high degree of uncertainty due to both the recent downturn in economic activity and higher electricity prices (neither of which is incorporated in the projection). Gross Domestic Product (GDP) is forecast to grow 4.9% per year. The projection does incorporate the effects of population growth and urbanization, increased average consumption as income grows, and increased rates of electrification. This projection is used as a basis for sensitivity analyses in this annex. The average national electricity growth rate in this case is 5.7%, with 6.7% growth in household use and 10.5% in industry. Also important for energy efficiency considerations, is regional diversity. For example, using 1993 data to disaggregate the forecasts, industry use accounted for 58.5% on the Coast vs 41.5% in the Sierra, and commercial use 63% on the Coast vs 37% in the Sierra.

**Future Electrification** A majority of the rural consumers to be connected in grid extension are in the 3 distributor concession areas of Ambato (Area: 40,969 sq.km.: Provinces Tungurahua, Pastaza, Napo, Morona Santiago), Sucumbios (Area: 37,959 sq.km.: Provinces Sucumbios, Napo, Francisco de Orellana) and Centro Sur (Area: 30,364 sq.km.: Provinces Azuay, Canar, Morona Santiago). The primary responsibility for expansion of electrification in these areas is with the distribution utilities, who generally must connect any consumer requesting service of less than 10 kW at a distance not to exceed 200 meters. Otherwise connections are made only for "projects" where FERUM or a project sponsor subsidizes construction costs sufficiently to permit the local distribution company to earn its normal rate of return on this project. Assets subsidized by FERUM are converted into shares in the distribution entity under the national solidarity fund.

The cost/benefit analysis of electrification and selection of projects is accomplished under FERUM guidelines by CONELEC. These guidelines are heavily weighted to favor frontier areas, amazon and the Galápagos (20 of 100 pts), and also financial efficiency and equity. Some weight (5 pts.) is given to renewable resources uses. The absolute financial limitation of FERUM is \$590 maximum per household. It is unclear if isolated household projects such as PV projects will be of sufficient priority or low enough in cost to qualify for FERUM financing. CONELEC furthermore, has a large inventory of projects which involve grid connection of rural areas at relatively low costs, which will compete for available funds. No other regular funding is currently available from GOE sources for electrification. Other social funds from the national solidarity fund (those not derived from fees on the electricity sector), are dedicated to non-energy social infrastructure investments.

Table 3 below provides the basic overall market estimates for off-grid rural electrification for households. The market has been subdivided into those low and high density provinces, respectively, which are likely to present more uniform characteristics for electrification planning. That is, the higher density and more electrified areas such as the Coast and some of the Sierra are likely to be logistically less difficult to reach and may have higher ability to pay given access to commercial markets and employment opportunity.

**Table 3. Ecuador Off-Grid Electrification Market by Province**

Low-Density Unelectrified	Estimated Households		Off-grid Electrification Market				
			Electrified %	Unelectrified	Electrified %	Unelectrified	
<b>Amazon &amp; Sierra</b>	1,999	2,009	1999	1999	2009	2009	2015
Bolivar	37,825	45,704	0.57	16,265	0.6	18,281	19,053
Orellana	26,778	32,356	0.46	14,460	0.5	16,178	16,901
Napo	16,513	19,952	0.45	9,082	0.48	10,375	10,724
Orellana	13,147	15,885	0.35	8,546	0.4	9,531	9,973
Sucumbios	25,375	30,661	0.37	15,986	0.42	17,783	18,633
Zamora Chinchipe	19,065	23,036	0.52	9,151	0.53	10,827	10,995

Pastaza	12,260	14,814	0.61	4,782	0.64	5,333	5,580
Subtotals	150,965	182,408		78,272		88,309	91,859

### Higher-Density

Sierra & Coast	Estimated Households		Electrified %	Unelectrified	Electrified %	Unelectrified	
Unelectrified							
	1,999	2,009	1999	1999	2009	2009	2015
Azuay	124,738	150,718	0.85	18,711	0.9	15,072	16,705
Canar	44,400	53,647	0.74	11,544	0.8	10,729	11,892
Carchi	33,826	40,871	0.81	6,427	0.84	6,539	7,181
Chimboraza	63,965	77,288	0.75	15,991	0.8	15,458	17,133
Cotopaxi	86,341	104,324	0.88	10,361	0.95	5,216	5,782
El Oro	108,014	130,512	0.9	10,801	0.92	10,441	11,573
Guayas	659,797	797,220	0.9	65,980	0.93	55,805	61,854
Imbabura	66,453	80,294	0.78	14,620	0.82	14,453	16,020
Esmeraldas	83,442	100,821	0.64	30,039	0.68	32,263	34,426
Loja	88,664	107,132	0.67	29,259	0.71	31,068	33,350
Manabi	253,003	305,699	0.68	80,961	0.72	85,596	92,093
Pinchincha	470,589	568,604	0.91	42,353	0.93	39,802	44,117
Tungurahua	89,606	108,269	0.94	5,376	0.96	4,331	4,800
Subtotals	2,172,839	2,625,400		342,423		326,774	356,926

## III. Barriers to Overcome

### Energy Efficiency Barriers

Due to a history of subsidies in the energy sector, the efficiency of both electricity and fuels use energy use in Ecuador is very poor. This is exhibited in both the inefficient consumption habits of end users and in the existing lighting, appliances and equipment in homes, buildings and factories. These characteristics continue in the technology and equipment available in the marketplace and the lack of institutional infrastructure in government and private sector institutions which could address this issue. A few studies and program proposals over the years such as the 1994 INECCEL study of energy efficiency opportunities in the electricity sector, and energy audit program supported by USAID (and others), have had minimal impact, due largely to low domestic energy prices, lack of institutional commitment and lack of supportive policy.

With recent changes in Ecuador's electric sector policy leading to reforms in the power sector and associated rationalization of electricity prices, an appropriate cost structure is being put in place, which should gradually motivate energy users to change attitudes regarding electricity and associated equipment purchase. Nonetheless, there remain important constraints to substantial changes in energy consumption and end use equipment decisions. These constraints include:

- long-engrained habits and attitudes,
- high first-cost of energy efficient equipment
- absence of specific tariff incentives such as time of use tariffs for industry,
- lack of a general understanding in all end use sectors of energy costs and how these can be cost-effectively reduced,
- lack of availability of more efficient major electricity using appliances such as refrigerators and air conditioners, and lack of standards and efficiency labeling for these equipment,
- lack of institutional capacity to develop a strategy to address efficiency needs including critical stakeholder involvement in manufacturing, the electricity industry, equipment suppliers, and consumer groups;

- lack of technical understanding and capacity in those designing and operating more efficient major energy consuming systems in commerce/buildings and industry; and finally,
- continuing subsidies in some fuels such as LPG, the primary commercial fuel used for household cooking and increasingly for water heating.

### **Rural Electrification Barriers**

The needs for rural electrification in Ecuador are very large, and a large segment of the rural population with dispersed settlement patterns are infeasible to economically connect via the traditional means of grid extension. The financial motivation of distribution utilities to serve this rural population by alternative means is further reduced by the very low-income of this population. Furthermore, this group often does not enjoy other complementary infrastructure such as roads and communication, potable water and easy access to health and education. Institutional capacity for implementing electrification for dispersed and isolated populations is also very weak at both the national and local levels.

The Government of Ecuador (GOE) through its MEM has begun to address some of the electricity needs for this rural population through initiatives aimed at public services such as health clinics, schools and community centers. Some \$1.3 million in funding has recently been made available for initial efforts to install PV systems in public services in remote frontier and Amazonian regions (\$1.0 million from Corporación Andina de Fomento (CAF), and \$300,000 from the Government of Ecuador). ODEPLAN reported a prospective rural electrification initiative under the management of the Ministry of Defense which involves plans for the provision of electrification through PV installations in the frontier areas of Peru.

Several key constraints appear likely to impede the electrification initiatives which MEM has envisioned. These include:

- low income of the rural population and dispersed settlement over a large geographic area,
- high first-cost of renewable energy systems such as photovoltaic systems for rural electricity supply,
- lack of established commercial enterprises addressing such markets, and lack of associated technical capacity at the rural level,
- lack of financing and credit systems to facilitate purchase of such systems,
- lack of financial motivation and regulatory obligations for distribution utilities to serve dispersed populations,
- inappropriate scale and cost-structure for distribution utilities to cost-effectively implement small-scale dispersed electricity supply,
- poor understanding of the rural market and willingness to pay ,
- weak technical capacity for defining appropriate renewable systems for the diverse and very low income markets, and
- weak institutional capacity for development and implementation of an overall electrification strategy for isolated (non-grid connected) areas,

Pilot projects and demonstrations are important mechanisms, along with the development of an overall electrification plan and administrative structure, through which the MEM can develop experience with delivery mechanisms, financial administration and maintenance, and private vendor and distribution utility participation. The GEF/WB project will help to define and fund pilots to meet these goals.

### **Strategy to Remove Barriers**

**Energy Efficiency** In order to address the barriers above, the GEF/WB project will proceed on several fronts: (a) assist the GOE/MEM efforts to develop an effective public information and motivational effort regarding reducing energy cost via improved energy efficiency, and support improvement in institutional capacity to undertake this overall effort, (b) review the case for financial incentives through improved tariff design for load management, development of innovative utility and/or other financing mechanisms for DSM investments, and/or regulation by CONELEC; (c) support technical capacity development through training and information transfer in the commercial and industrial sectors, and among energy service firms, as well as support commercialization of advisory services and expansion of associated efficiency financing alternatives (such as ESCOs); (d) develop an implementation strategy which assists and motivates "strategic partners" among key end user groups (e.g. industry, commerce, architects, consumer groups), and service and financial delivery vehicles mechanisms such as distribution utilities, ESCOs and equipment suppliers; (e) address equipment and appliance standards issues through informational (e.g. labeling) and advocacy programs (e.g. norms) to upgrade the efficiency of new equipment, and (f) support key demonstration projects that would test innovative delivery mechanisms for energy efficiency and load management (in particular for compact fluorescent lighting), as well as new energy efficiency technology not currently available in Ecuador; the demonstration projects will verify results to motivate replication, and develop key relationships for sustaining and expanding these initiatives.

**Rural Electrification** The barriers to rural electrification cited above are difficult to overcome, and require that this project must necessarily be part of a long-term commitment within Ecuador to provide rural isolated electricity services. An implementation and operational strategy is also required which is not only compatible with the low income and dispersed characteristics of the target population, but also with the capacities and financial motivation of distribution utilities, equipment vendors and potential concessionaires. The strategy must be flexible to adapt to circumstances and sustainable within the expected capacity of both current project supporters such as the MEM and end users and participating local groups.

The project intends to address these barriers through support for: (a) a diagnosis of the status rural electrification, evaluation of institutional requirements for electrification and potential models for implementation, and evaluation of appropriate technology solutions (e.g. size, cost and level of technology); (b) determine the potential market for electricity supply in dispersed areas particularly current energy use patterns and the ability to pay, and related subsidy and financing requirements, (c) determine policy and market constraints which effect availability and cost of rural electrification equipment, the quality and reliability of equipment, and through technical assistance, develop remedial proposals; (d) develop appropriate institutional and dissemination approaches as part of an overall strategy, for example:

- (i) developing delivery options including subconcessions and other approaches tailored to local markets,
- (ii) means to support initial stakeholder involvement to enhance market development, and participation and support to ensure sustainability,
- (iii) development of a sound subsidy policy, along with adequate user payments and financing activities to not only ensure electrification but also sustainability,
- (iv) coordination with other development initiatives and infrastructure programs, and
- (v) promotion of income producing activities.

And finally, (e) implementation of demonstration projects tailored to market conditions, efficiency and replication, and which ensure sustainability. It is recognized that the diversity of the rural market make it necessary to examine a variety of models. For example, the subconcession model is likely to be



well-adapted to higher potential areas where markets are expected to expand and O&M cost recovery is relatively high. For other areas where extreme poverty requires high levels of subsidies for capital and O&M costs, and which are less compatible with commercial vehicles, the project will enlist participation of local organizations such as NGOs, churches, community groups to lower costs and create a sustainable implementation framework. The project will also support policy and technical barrier removal for certain renewable energy options such as small hydro and wind to accelerate and expand their market penetration.

#### **IV. Benefits**

##### **Energy Efficiency**

The EE program will result in significant reductions in electricity end use and associated reductions in GHG emissions. This will occur initially at small levels through the project's demonstration activities, and expand substantially through project implementation throughout the residential, commercial and industrial sectors. These savings should be sustainable as a result of market based electricity prices for all consumers except the lowest consumption class in the residential sector, and sustainable for this latter sector as the more efficient technology, particularly for lighting, is introduced and demonstrated, and possibly supported through gradually decreasing financial incentives. The project will substantially contribute to the dissemination of energy efficiency knowledge throughout the economy, and creation of energy efficiency service capacity. The project will also review the case for the stimulation of substantial direct distribution utility participation in this effort through incentives including rate of return and tariff incentives, and financing institution involvement. The project will also assist the commercial and industrial sectors in reducing their costs of production and achieving a more competitive cost structure vs international competitors. Industrial production and energy efficiency investments go hand in hand, and the project will help to stimulate both. A complementary benefit of electricity efficiency efforts will be improved efficiency in the use of other fuels such as fuel oil and diesel in industry.

Projected electricity savings, fuel savings, and reduced need for associated generation and distribution investments are described below. Reduction in CO<sub>2</sub> emission contributions for the first 10 years of the project vary depending on the assumption of market penetration for efficiency measures, non-project electricity prices impacts, and hydro availability. For the base efficiency case, 1.6 million tons per year would be saved if each year was wet (\$0.73/ton CO<sub>2</sub>), 1.7 million tons for a medium hydro assumption (US\$0.69) and 2.4 million tons if all years are dry, with a cost of less than US\$0.50 per ton of CO<sub>2</sub> reduced. Future expansion plans and economic dispatch of the system will determine what plants are actually used and to what degree. Similarly if we reduce the penetration of efficiency measures due to such factors as slower or less effective implementation, or reduce the portion of savings due to the project, we would likewise produce changes in CO<sub>2</sub> emission. These would be directly proportional to the reduced penetration or reduced savings. For example, for a reduction in penetration of 25% in the medium hydro year case, 1.28 million tons of CO<sub>2</sub> are saved vs 1.7 million before. During appraisal a more detailed review of these factors and the potential energy and demand impacts of the respective efficiency options will be considered.

##### **Rural Electrification**

The direct benefit of the project will be support for electrification for an estimated 2,222 households and 351 public service installations in rural dispersed and isolated areas. This will be accomplished through rural electrification strategy development, assistance to the MEM in mobilization of other funding sources, pilot projects, technical assistance and GEF subsidy for capital expenditures and technical assistance. The

most important benefit of the project will be development of an overall implementation strategy. This will include institutional strengthening and technical capacity development in the private sector, in government and non-governmental and government entities at the local level. The project will support essential market assessment and associated analyses to ensure that project design including dissemination approaches, technology and equipment, and subsidy and financing policy are compatible.

These project inputs will ensure replicability beyond the direct support targets of the project and sustainability of the institutional structures and program developed. The project will directly contribute to improved living conditions in rural remote areas. It will encourage reduced migration which might occur due to lack of high quality lighting, not only for households but also for public services such as schools and health clinics. It will directly support some income producing activities associated with electricity supply and O&M and financing support, and other small-scale end uses (e.g. communications, commerce) and indirectly support in income enhance through contributions to education, health and agricultural productivity.

During appraisal when market data is available several cases will be analyzed to estimate the overall economic and financial returns of the project. It should be noted that the very low income of many rural residents will limit the ability to pay and require a substantial government contribution to capital costs. This will vary by area and the respective economic potential. The project analysis during appraisal will be structured to evaluate these different situations. That is, first, a more conventional cost-benefit analysis will be done where willingness and ability to pay are relatively high, and capital subsidies lower and user payments higher. Second, for low income areas where actual user payments are likely to be very low, the cost-benefit analysis at appraisal will present estimates of consumer surplus and/or utilize government payments for capital as a proxy for social benefit of electrification. In this later situation as well, the types of household systems will be lower-cost and smaller capacity, and greater reliance will be placed on public service systems.

In the case shown below we have presented a hypothetical single case where we have high and lower potential areas combined, and where a mix of public systems is installed. In this case, we assume installation of an amount three times the directly project funded component, for a total installation of 8,887 households and 1,404 public service installations. In this case the CO<sub>2</sub> reduction grows to 64,450 tons over the project life, and cost/GEF \$ invested is \$20/ton.

Other benefits from support for other renewable technology such as small hydro and wind are expected to support both rural isolated and grid connected electricity supply. These economic benefits of this supply are equivalent to electricity supply in general. The environmental benefits are expected to be substantial, as the potential opportunities for both technologies is significant.

**Table 4. GEF Alternative Benefits**

<b>Project Components</b>	<b>Benefit Measure</b>	<b>CO2 Reduction in tons (a) (b)</b>
<b>Energy Efficiency</b>	Energy Savings  \$13,590,000 (annual cost savings in 5th yr)	Range from 3.6 to 5.5 million

<b>Rural Electrification</b>	Electrified Households 2,222 (with induced impact 8,887)	21,713  (with induced impact 64,450)
	Public Infrastructure 351 (with induced impact 1,404)	

(a) For energy efficiency, carbon dioxide conversion based on avoided thermal generation including transmission losses of 10%; a factor of 3.06 kg CO<sub>2</sub> /kg diesel is used to calculate basic emissions impacts. For rural electrification, the calculation is based on avoided small diesel generators and household kerosene for lighting as a proxy; better estimates, based on current energy use, will be produced during project appraisal.

(b) In the rural electrification base case, tons of CO<sub>2</sub> are also modified in different hydro scenarios, and range from 16,848 tons in the wet case to 25,882 in the dry case.

**V. Benefit Cost and Risk Analysis**

**Benefit-cost Results** Benefit- cost analysis has been carried out for subprojects and the overall project by component (detailed calculations are in project files). For the energy efficiency component the full implementation of the programs described is estimated to result in NPV's in the base case ranging from \$23.7 million (base penetration reduced 75% due to reduced project effectiveness and/or greater impact of non-project price impacts) to \$108.6 million. The high IRRs indicate excellent prospects for project replicability, once existing barriers are overcome through the GEF Alternative. For the rural electrification component the NPV's in the base case range from -\$2.2 million (if user payment is equal to O&M cost only) to break-even for the cases where payments were assumed to be equal to lifecycle O&M costs. Since no market information on ability to pay or willingness to pay (WTP) is available we have instead concentrated on parametric analysis to highlight the variables which are most important to the viability of this investment. We have analyzed the impacts of capital costs, project lifetime, discount rates, project costs and market demand levels. The tables below summarize the information on NPVs.

**Table 5. Economic and Financial - Energy Efficiency**

	<b>Net Present Value of Flows (000 US\$'s)</b>			
	<b>Economic Analysis</b>		<b>Financial Analysis</b>	
	<b>Low</b>	<b>High</b>	<b>Low</b>	<b>High</b>

<b>Gross Benefits</b>	36,890	147,560	37,546	150,185
<b>Total Costs</b>	13,115	38,993	11,683	35,342
<b>NPV of Net Benefits</b>	23,774	108,563	25,864	114,843
<b>IRR (%)</b>	81%	159%	104%	204%

**Table 6. Economic and Financial - Rural Electrification  
(Break-even cases - Benefits = User payments)**

	<b>Value (Undiscounted) of Cash Flows (000 US\$'s)</b>			
	<b>Economic Analysis</b>		<b>Financial Analysis</b>	
	<b>(Incl. Cap Cost)</b>	<b>(Excl. Cap. Cost)</b>	<b>(Incl. Cap Cost)</b>	<b>(Excl. Cap. Cost)</b>
<b>Gross Benefits</b>	12,269	6,489	13,543	6,265
<b>Total Costs</b>	10,541	7,328	10,927	7,328
<b>Net Benefits</b>	1,728	-839	2,616	-1,063
<b>Amount times system O&amp;M costs to produce break-even.</b>	2.38	1.245	2.65	1.21

Note: Benefits are taken equal to user payments. Break-even is calculated for economic and financial discount rates of 12% and 15% respectively. A user payment of approximately twice O&M cost alone is equivalent to required payment to pay full life-cycle cost for the 50 W and 100 W PV systems.

### **Risk Analysis**

(a) Subproject or Benefit Failure. This is defined as any situation that reduces the benefits of the project, such as lower than expected energy savings or reduced number of households electrified. For substantial reductions the overall efficiency measure penetration rates, -50% to -75% the benefits remained positive with EIRR's of 119% and 81% respectively. The greatest uncertainties are degree of market penetration and unknown project-independent impact of higher prices.

(b) Higher measure or system costs. Higher costs for efficiency measures had a major impact on the economic benefits of the project. However, given the highly positive rates of return for this component, increasing costs by 50% to 100% while reducing NPV, still resulted in large and positive returns of \$87.5 and \$66.5 million, respectively. For off-grid electrification the most important consideration is the potential impact of cost reductions which may occur as the volume of PV sales and service increases. For a capital cost reduction of 25%, the NPV improves by \$900,000 in the financial case, and in the economic case by \$803,000.

(c) Discount rate. The efficiency case proved to be sensitive to the discount rate used in analysis. However, here again given the large positive benefits of this case, the impacts did not change the order of magnitude nor positive NPV. For an increase in discount rate in the economic case from 12% to 20% the NPV dropped from \$108.6 million to \$55.6 million. In the off-grid electrification case an increase in the discount rate from 12% to 20% decreased NPV by roughly \$264,000 (economic case, and for the financial case by about \$192,000).

(d) Induced demand. In the off-grid case we substantially improve the overall economic return of the project if we include potential growth impact benefits of the project. In the case where we triple the assumed saturation by project end (5 years from 2,222 households to 8,887 households) we increase gross benefits to \$48 million from \$12 million. In the GEF case where all project costs are included, GEF cost/ ton CO<sub>2</sub> decreases from about \$59 to \$20 where this same increased penetration is assumed. While these values are hypothetical, they clearly do reflect the intention of the project. The project appraisal process will need to consider carefully the sources of funds for any such expansion, including the degree subsidy likely to be required and its financing.

## **VI. GEF - Incremental Cost Analysis**

Implementing the electrical energy efficiency and rural electrification strategies described above requires incremental costs, defined as the difference in the economic cost of the Baseline Situation and the GEF Alternative, that produce global environmental benefits. This difference is proposed to be supported by a GEF grant. Presented below are the Baseline Scenario for the energy efficiency and rural electrification cases, respectively, and the associated GEF Alternative and respective Incremental Costs.

### **Baseline Scenario**

**Energy Efficiency** In the absence of the GEF Alternative, Ecuador's electrical sector efficiency is anticipated to improve slowly and only moderately even in the long-term. Power sector reform is leading to introduction of market based electricity pricing, however many historical patterns, structure and technical constraints will limit efficiency improvements. New appliances, equipment and buildings being constructed will not incorporate cost-effective potential due to higher first cost and lack of tariff incentives for load management, public information and technical knowledge. Recent efforts on the part of the MEM to seek funding for publicity oriented efficiency programs indicate a willingness on the part of GOE to enter this area, but even these efforts have not been funded. Past efforts DSM and promotional efforts of distribution utilities, such as Empresa Electrica Quito, have languished and been disbanded due to lack of management interest and overall poor financial performance on the part of the company. Impending privatization should change these attitudes toward system efficiency, but will require assistance to develop well-crafted regulatory incentives and associated tariffs to promote utility investments and to assist end users to realize efficiency potential. The baseline recognizes very limited energy service (ESCO-type) activities at this time, but anticipates not significant growth in these without additional technical assistance, innovation financing and contracting support, and development of markets by promoting both utility, industrial and commercial sector initiatives. The baseline introduces improvement in efficiency from largely price induced actions, both in reducing the level of energy service by reduced household lighting (for example), and in a modest shift to fluorescent vs incandescent lamps. However, it is anticipated that the substantially higher first cost of both more efficient fluorescent and compact fluorescent lamps will substantially impede

their introduction in the baseline.

Under the Baseline Scenario: (a) public and technical information dissemination will remain very limited, (b) financial incentives and financing for energy efficiency investment will be minimal except for revised electricity pricing, (c) labeling and testing of appliances and equipment for energy efficiency will not be introduced, (d) industry and commercial energy efficiency efforts will remain fragmented and implemented only by the most effective firms, and (e) no utility industry end use efficiency programs will be developed and implemented.

### **GEF Energy Efficiency Alternative**

The following outlines the major elements of a more comprehensive efficiency strategy for Ecuador, to be implemented by MEM/DEA.

1. *Constraints and Opportunities Assessment, Market and Load Studies, and Support for Strategic Partnerships \$350,000* (See end of section for summary of components and respective budgets) Institutional capacity will be greatly strengthened through the project by first, *improving the planning and analytical basis for the efficiency strategy, and supporting capacity development in government, private firms and end users*; and second, *by incorporating and supporting activities of strong strategic partners*. Planning and analysis are needed to substantially strengthen the basic understanding of the nature and extent of efficiency opportunities, to build a related data base, to develop systems to assess the cost/benefits and constraints and strategy necessary to address opportunities, to identify constraints and effective initiative to address these, and finally, to monitor and evaluate initiatives to address these. This support will start with a brief market assessment during the PAD final design process, and continue during the project with support for more in-depth assessment of efficiency opportunity markets and end user and end use efficiency constraints, and constraint resolution options.

*Strategic partners.* The motivation, technical support and consultation on implementation strategy with strategic partners in their individual areas of interest is the most critical element of the efficiency strategy. Such partnerships would be found primarily, but not exclusively in the private sector. For example, with “gremios” or sectoral industry trade groups, including the electricity industry, manufacturers, vendors of efficient equipment (even not so efficient equipment which can be improved), architects and commercial developers, the financial sector and public interest/consumer groups. Involvement and support to these groups to help address project goals runs through most of the individual activities discussed in this section.

2. *Motivation and Public Outreach \$400,000* Support will be provided for initial stakeholder involvement through one or more workshops, which may include participation of other regional entities with efficiency lessons to share. Project support will be provided to cost-share proposed but currently unfunded MEM public information and education initiatives. The project will incorporate OLADE as a facilitator for regional workshops to both share experiences of other countries to advance work in the project (e.g. on labeling and appliance standards and DSM), and for promoting regional replication objectives of the GEF Alternative among OLADE's 26 member countries.

3. *Analyze Alternative Methods for Encouraging Utility End Use Efficiency Activities, and Review End User Tariff and Financing Alternatives. \$100,000* The GEF Alternative will analyze and support implementation of mechanisms for promoting distribution utility efficiency activities. These would include review of utility program cost recovery and tariff and other mechanisms to provide utility incentives, for example, to implement public information activities, technical assistance, rebates, and financing of end use

efficiency. Tariff mechanisms and design alternatives to encourage and support end user efficiency actions and investments would be examined and recommendations provided. The project will also review regulatory mechanisms and issues associated with utility efficiency activities to minimize cost, support market mechanisms, and minimize adverse impacts. Options will be reviewed for fostering development of efficiency financing cooperation with private sector institutions. .

4. *Technical Capacity Building including Seed Funding for Energy Service Firms \$200,000* . The project will support strengthening of technical capacity for personnel that design, operate and advise on energy using equipment and infrastructure. This includes both creating a base of knowledge, as proposed by GOE/MEM, but also carries this farther by establishing a means for applying this knowledge through support for energy audits, pre-feasibility studies for major efficiency opportunities, and using these activities and seed monies/programs (through partial financing of demonstration projects) to stimulate energy service suppliers and ESCO-type efforts to stimulate market and implement energy efficiency. Training will be provided to the electricity regulator, CONELEC, regarding incentives and regulation for electricity efficiency. Support will also be provided to local private efficiency service entities through both technical assistance expand their analytical capacity, ability to prepare effective ESCO-type contracts and agreements, and facilitate interaction with potential international partners in this field.

5. *Efficient Appliance and Equipment – Standards and Labeling, Supply Development and Financial Incentives for End Users \$250,000* An important complement to other initiatives is a project effort to improve end use equipment purchase and replacement decisions. This requires GEF/WB support in several key areas (e.g. air conditioners, refrigerators, lights and motors) including labeling to inform consumers of the life-cycle cost of new equipment, upgrading the efficiency of products available in the local market either through cooperative activities with local manufacturers or importers, and improving new construction standards. The motivations and perspective of local appliance manufacturers will be carefully considered and incorporated in the design of this subcomponent. This subcomponent will be coordinated with the review of the case for financial incentives and innovative financing approaches (subcomponent 3) such as efficient appliance or lighting rebates, distribution utility financing (e.g. through joint ventures with financing partners such noted in the pilot below) and specific ESCO financing support, that could be used to stimulate the investment in higher first-cost/lower operating cost equipment.

6. *Pilot Projects and Demonstrations \$300,000* The GOE/MEM program includes suggestions for a variety of public demonstrations to exhibit the operation and characteristics of efficient lighting and appliance (for example). The GEF Alternative adds a strong complementary element to the (unfunded) MEM initiative, by undertaking several key pilot projects with important end users. These will differ in nature from MEM activities which are oriented toward demonstration of technical potential and economic results at a public demonstration site. The project approach will involve demonstration technical, financial and program results in actual operating practice, and will test and demonstrate various implementation strategies to support replication. Tentative pilot project opportunities will be identified and validated and further defined during the project appraisal mission.

7. *Monitoring and Evaluation \$50,000* Development of a monitoring and evaluation plan including establishing baseline, defining parameters to be monitored, criteria for evaluation, data base requirements and post-project survey requirements and schedule.

8. *Component Management \$150,000* Development of plan for management and control by the Project Coordination Unit (PCU), including staffing requirements and acquisition of office equipment for the PCU.

## **Baseline Scenario Rural Electrification**

CONELEC has prepared a 2000-2009 National Electrification Plan which intends to extend coverage to an additional 750,000 households, at a cost of about \$537 million of which the GOE contribution through FERUM is estimated at \$400 million (according to CONELEC's recent National Electrification Plan). The average cost per household connection was estimated at \$361 in 2001 (latest approvals for 2001 average only \$77 per household), growing to \$824 in 2009. (Source: Anexo 7.06, "Planes de Electrificación Rural y Urbano Marginal", Plan de Electrificación 2000-2009, CONELEC. These plans would increase coverage to 98% of the urban population and 65% of the rural population (or about 85% of the total population).

Distribution companies that are in the process of being privatized would have the primary responsibility for grid extension electrification under this program, with the GOE through FERUM providing about 80% of the financing required for electrification of the rural and marginal population. Under these plans most of the rural population in dispersed and/or remote areas is expected to remain unserved with conventional electric power supply.

The large majority of the rural consumers to be connected through GOE and distribution utility efforts in grid extension are in the 3 distributor concession areas of Ambato (Area: 40,969 sq.km.: Provinces Tungurahua, Pastaza, Napo, Morona Santiago), Sucumbios (Area: 37,959 sq.km.: Provinces Sucumbios, Napo, Francisco de Orellana) and Centro Sur (Area: 30,364 sq.km.: Provinces Azuay, Canar, Morona Santiago). The primary responsibility for expansion of electrification in these areas is with the distribution utilities, who generally must connect any consumer requesting service of less than 10 kW at a distance not to exceed 200 meters. Otherwise connections are made only for "projects" where FERUM or a project sponsor subsidizes construction costs sufficiently to permit the local distribution company to earn its normal rate of return on this project. Assets subsidized by FERUM are converted into shares in the distribution under the national solidarity fund.

The cost/benefit analysis of electrification and selection of projects is accomplished under FERUM guidelines by CONELEC. These guidelines are heavily weighted to favor frontier areas, amazon and the Galápagos (20 of 100 pts), and also financial efficiency and equity. Some weight (5 pts.) is given to renewable resources uses. The absolute financial limitation of FERUM is \$590 maximum per household. It is unclear if isolated household projects such as PV projects will be of sufficient priority or low enough in cost to qualify for FERUM financing. CONELEC furthermore, has a large inventory of projects which involve grid connection of rural areas at relatively low costs, which will compete for available funds. No other regular funding is currently available from GOE sources for electrification. Other social funds from the national solidarity fund (those not derived from fees on the electricity sector), are dedicated to non-energy social infrastructure investments.

## **GEF Rural Electrification Alternative**

The GEF Alternative is complementary and logical extension to the existing rural electrification program based on grid extension and managed by CONELEC with FERUM funding. The GEF focus will be on dispersed and remote households, commercial and public service electrification, areas excluded from the CONELEC program. The GEF Alternative furthermore will be closely coordinated with other rural development infrastructure and poverty reduction programs, including rural telephony and the PROLOCAL program funded by the World Bank which will work in 50 of the most poor cantons over a 5 year period beginning in January 2001. This coordination should produce substantial synergy in capacity building, effectiveness of dissemination and sustainability. Financing vehicles developed within



PROLOCAL may also be useful for financing and/or collecting O&M contributions of electrified households.

Some \$1.3 million in funding has recently been made available for initial efforts to install PV systems in public services in remote frontier and Amazonian regions (\$1.0 million from Corporación Andina de Fomento (CAF), and \$300,000 from the Government of Ecuador). Several proposals exist for additional PV/renewables efforts, a proposed program for diesel conversion in the Galapagos has been prepared, and MEM is working hard to keep up with the needs being identified. ODEPLAN reported a potential rural electrification initiative under the management of the Ministry of Defense which involves plans for the provision of electrification through PV installations in the frontier areas of Peru. Any such plan would need to be designed and implemented in a manner consistent with, and complementary to, the GEF Alternative in order not to risk a making both inefficient and potentially degrading the effectiveness of the GEF approach. Contacts are now being pursued with CAF to ensure this coordination.

Rural and dispersed/isolated households in Ecuador currently use low quality and/or in some cases relatively expensive alternatives to electricity. In addition to wood or residues, families may be using kerosene, candles, batteries and possibly LPG. It is currently uncertain what types of fuels are most common and level of fuel costs for the poorest segment of the population, nor is willingness to pay known for improved lighting. Qualitative information available does indicate the likelihood that in addition to capital subsidies for electrification, that a significant part of the market may require substantial operating cost subsidies, and/or alternative lower cost systems such as very small-scale low cost systems (e.g. portable PV/lamp systems).

*Strategic Program Design Considerations* Extreme poverty in Ecuador argues for an approach to electrification carefully targeted to local priorities, essential public services and sustainability. Key characteristics of the program should be:

- Local development and community priorities (beneficiary consultation) should determine whether to electrify and the type and cost of systems chosen, and community participation should be maximized to foster direct and indirect income and employment generation.
- End uses should be targeted which contribute the most to critical development needs, for example: potable water supply, improved education, health care, employment and income generation and social communication.
- Target area selection should be based on objective criteria (number of population served, community interest, user willingness to support, availability of complementary social infrastructure -schools, clinics, water sources..).
- Socially oriented projects where initial "connection" charges and O&M are likely to be highly subsidized should only be undertaken where these are clearly a high community and development priority.
- Support for initiating concessions should be based on market information indicating a substantial likelihood of sufficient demand and willingness to pay to ensure sustainability, that is, with a potential for post-GEF project market expansion and smaller and declining O&M subsidies.
- Subsidy allocation needs to be optimized, for example, by selecting appropriate systems (size, cost) for different market segments, set at levels based on current costs, targeted only to those requiring subsidies and minimized through competitive "concessionaire" selection (where appropriate).
- Household systems if supported, should be sized and designed to fit the capacity of the users to pay O&M costs to avoid open-ended GOE commitment to subsidization.

*Service Delivery Models for Off-Grid Electrification* A considerable body of experience now exists with different service models, including concession (e.g. distribution utility), subconcession (e.g. delated

responsibility to community or NGO within utility concession area), cooperative or community based electrification (e.g. may be in a concession or subconcession arrangement), decentralized market approaches (e.g. direct sales by dealers usually limited to high value uses and higher income households), direct government or donor led projects (e.g. grants and donations without clear plan for sustaining systems) or integrated rural development electrification (e.g. often subsidized grid extension). There is no clear best approach. The appropriate mechanisms require thorough assessment of local conditions and tailoring to the local situation. The pilot projects proposed are intended to assess likely alternatives which may be appropriate in Ecuador. These will be refined during the appraisal mission based on market studies and site assessments, prior to their being undertaken.

The proposed pilot projects describe two main complementary approaches for off-grid electrification. In higher potential areas, a concession approach based either on the distribution utility or an alternative private sector concessionaire is potentially viable and administratively feasible. This would be implemented in a manner designed to minimize subsidies and create a sufficient flow of funds and potential for expansion to make this an attractive market for the concessionaire. The project would also foster development of complementary business activities to support productive uses and sales of electricity using appliance to augment the concessionaires return. The pilot design will be carefully tailored to recognize the following strengths and weaknesses of the concession approach.

The other off-grid pilot will be specifically designed to address the limitations of the concession approach. That is, it will incorporate the local NGO, community and/or private sector entities from the site area itself as the implementing vehicle for the pilot. It will also attempt to design the project compatibly with local infrastructure priorities given limited funds. In particular, given the potentially very low ability of the population to pay in many rural areas, the project will emphasis support to public service facilities such as schools and hospitals, as well as community centers. This support could be the most cost-effective to improve the standard of living for the most rural residents, and at the same time achieve financial sustainability in O&M terms. Costs will be reduced by choosing the most appropriate and least cost technology. Local benefits will be maximized by recognizing and adopting local priorities for supporting productive activities and providing technical support and training to make equipment and administrative systems self-sustaining.

A complementary strategy which the project will explore is to pursue electrification for poor rural areas by direct linkage to the rural poverty programs benefits.

### **GEF Off-Grid Electrification Alternative**

The following provides a general overview of the GEF Alternative:

1. *Constraints and Opportunities Assessment, Review of Institutional and Technological Options and Program Strategy: \$150,000* Assistance is needed by MEM to diagnose the status and potential solutions for meeting rural energy needs. This assistance will help create a base of market, technical and strategy knowledge as the foundation for the project. Support will consist of: a review of the status of rural electrification, including past experience in Ecuador and similar countries, identification and evaluation of a variety of institutional models for RE, review of the potential synergy between RE and other infrastructure programs (such as Ministry of Defense), identify and review technical and economic characteristics of the main technology options.

2. *Market Studies, Review of Implementing Capacity, Subproject Design, Site Selection and Financing Requirements Assessment \$350,000* Market studies are the essential starting point in

subproject design, site selection and determining financial requirements including subsidies. These will provide information on current average energy consumption, cost, type of fuel and source of supply including equipment and appliance cost and use, financial capacity, and socio-economic characteristics for households, commercial, agricultural and public service and other potential consumers. The studies will also evaluate productive and public service requirements and opportunities including those which might require or support small-scale isolated systems. Renewable resources availability and estimated costs given resource quality will also be assessed. Finally, regional and local institutional systems and mechanisms including public, commercial and non-governmental which might be utilized to implement electrification will be identified and assessed.

3. *Constraints Removal - Policy and Economic Analysis, Establishment of Policy, Legal & Regulatory Framework \$150,000* . Policy and economic analysis are also required to identify constraints and remove these. The GEF/WB program will support policy analysis of energy pricing (e.g. considering subsidies, externalities..), electrification subsidy allocation policy and administration, availability of private sector financing, domestic availability of RD and RES technology options, and related constraints including import tariffs and other taxes issues regarding renewable equipment; conflicts between public procurement and effective and sustainable electrification with renewable sources; need for standards and certification requirements for renewables systems participating in the project or market in general, and financing sources, terms and conditions, and compatibility with RES system expansion through the private sector (e.g. as associated with the energy service model of dissemination).

4. *Rural Electrification Program Implementation Support \$250,000* Identification and assessment of alternative dissemination strategy options and assistance to MEM in evaluating and testing these, including support for appropriate pilot project demonstrations, will be critical outputs of the GEF/WB program. For example, the current CAF financed rural public service electricity project will be reviewed and enhanced to improve project selection criteria, develop sustainable maintenance and administrative structures, and assess surrounding market needs and characteristics. Specifically, the project will assist: (i) defining and comparing electrification options (e.g. relative to replicability, sustainability, mobilization of private sector initiative..) including concessions, vendors/dealers, leasing, cooperatives, communities, anti-poverty programs, among others; (ii) criteria for selection of projects and determining user payment requirement, defining community involvement and outreach activities; (iii) establishing operating standards, requirements and regulatory procedures including training requirements for addressing new rural electric systems (e.g. through support to CONELEC and MEM) and support creation of linkages with other rural service and infrastructure delivery investments and programs such as roads, telephones, health and education.

5. *Institutional and Other Capacity Development \$350,000* Training and technical assistance with regard to: (i) need assessment, project design and implementation; (ii) renewable resource assessment technology choice, installation, and O&M; (iii) productive use applications, (iv) rural electrification regulation by CONELEC, and (v) project financial administration and management, among other topics (MEM, institutional partners including energy service firms, vendors, community groups, NGOs and aid organizations, public entities obtaining RE systems, distribution utility participants, contractors, and others with role in implementing)

6. *Demonstration Projects - Design, Implementation, Evaluation and Replication \$2,060,000* The project will assist the MEM not only in defining initial pilot projects but also in development of objective criteria for the review of pilot and demonstration project proposals, and for clarifying goals for demonstration projects relative to overall rural electrification strategy. Pilots should not simply be designed to address a local market need, but should also clearly contribute to the overall effectiveness,

sustainability and replicability of the overall project. In this context, it is essential that pilots incorporate market mechanisms and private sector, non-governmental, community and other interested stakeholders for their implementation.

Pilot projects will be further prepared/refined based on Mission results and by PAD design consultants. The following initial pilot options are intended to be used for budgeting and cost-benefit analysis, with the expectation that they be substantially refined later.

- a) *Rural Dispersed Population -- SubConcession Pilot.* The pilot would be designed to test the feasibility and effectiveness of a moderate size rural concession established on a competitive basis. This would involve PV installation in public service and household end uses in medium to high potential zone in coast or sierra (possible in other frontier area depending results of our review of economic data available). The objective would be full O&M cost recovery, with capital subsidized up to 100% depending on competitive bids by concessionaires. The concession would provide electric energy services with the operator to assume operating and maintenance responsibility.
- b) *Baseline: Public Sector Infrastructure Pilot.* The MEM has initiated a pilot of PV applications for social infrastructure energy supply in frontier and amazonian regions. This project funded at \$1.3 million, with \$1.0 million from CAF and \$300,000 from the GOE. The project is about to begin but needs technical support to further define project selection criteria, a sustainable dissemination and O&M support strategy, build-in market assessment elements, and develop socio-economic information to support associated (later) household electrification component, etc. MEM is interested in obtaining this support from the GEF/WB project. Given the imminent start-up of this pilot, it would be appropriate to provide as much of this support as possible through the PAD design consultancy to take place in January and February.
- c) *Decentralized Market Off-grid Electrification Pilot:* This pilot seeks to develop a replicable model for electrification in very low-income settings. In such areas an electrification program approach (e.g. see PROLOCAL poverty reduction program description) as opposed to concession or commercial approach will be required. Households in such areas would have a capacity to pay on average less than that necessary to support a nominal initial payment for electricity service and a monthly (or seasonal) payment equal to estimated O&M costs. Electricity supply in this case is likely to be via PV with either minimum sized fixed location PV system and subsidy of capital and O&M up to the point of willingness to pay; or alternatively, small-scale portable systems priced at WTP. In this case the normal financial incentives would be minimal for a concessionaire or private distributor/vendor and all costs would be highly subsidized. The project will utilize an alternative strategy which will ensure both effective implementation, sustainability and a means to replicate and expand beyond the pilot sites and timeframe of the project:

The general structure of the pilot will require both a central coordination effort (e.g. for technical assistance, training, subsidy allocation and procurement) and a site-specific administrative structure for implementation. At the project site the pilot team will: (i) formulate plans, assess needs and priorities in a consultative basis (e.g. through consultative workshops) with local stakeholders including individuals and groups; (ii) work closely with local entities including NGOs Iglesias, other community groups and development projects, and small-business where feasible for implementation; (iii) define appropriate electrification technology solutions (e.g. size and type of system, portable vs fixed, battery charging vs in-home PV systems) for local conditions; (iv) define O&M systems including providing information for households on sound use and limitations of systems, training of local technicians, and create local employment opportunities; and (v) define a local financial and

administrative structure for sustainable funding of O&M costs (e.g. micro-credit could be extended to families for payment of O&M costs) and expansion of program.

Replication will require that the GEF project execution unit provide coordination at the national level, with regional/local technical teams that carry out the planning, consultative, organizational, training, supervision of installation and monitoring of maintenance.

d) *Small-hydro Private Power Supply.* This pilot will involve policy constraint resolution assistance for small-hydro development based on private developer model, either with sales to grid or mini-grid establishment. The private sector in Ecuador is seriously exploring development of 10 or more small projects but has noted several key constraints which the GEF/WB project can help to address. These include: developing economic tariff agreements, addressing financial guarantee requirements, determining economic value of new hydro in the SIN and negotiating with regards this valuation (due to drought, seasonality and related considerations). Local developers appear to have both the technical capacity and financial resources (and available foreign developer/financial relationships) to develop these projects when these constraints are addressed.

7. *Monitoring and Evaluation \$50,000* Consultant Development of a monitoring and evaluation plan including establishing baseline, defining parameters to be monitored, criteria for evaluation, data base requirements and post-project survey requirements and schedule.

8. *Component Administration \$150,000* Development of plan for management and control by the Project Coordination Unit (PCU), including staffing requirements and acquisition of office equipment for the PCU.

**Table 7a. Incremental Costs and Benefits Matrix - Energy Efficiency**

	<b>Baseline</b>	<b>Alternative</b>	<b>Increment</b>
<b>Global Environmental Benefit</b>		Barriers reduced or eliminated Reduced CO <sub>2</sub> emissions compared with forecast Creation of sustainable EE programs in private sector (end users) , distribution utilities and ESCOs.	Reduced or eliminated barriers Reduced CO <sub>2</sub> emissions ( 625,000 tons) / year at project end Additional viable EE measures which can be replicated in region
<b>Domestic Benefit</b>	Use of electricity and fuels as forecasted Current level of electricity services	Reduction in the use of energy and corresponding costs savings compared to forecast Improved level of productivity, competitiveness & improved energy services Development of energy services companies	\$48.0 million / year saved at project end. Increased productivity and expanded sales.
<b>Energy Efficiency</b>	US\$ 000	US\$ 000	US\$ 000
1. Constraints and Opportunities	50	350	300
2. Motivation and Public Outreach	100	400	300
3. Financial Incentives and Financing		100	100
4. Technical and Implementation Capacity Building		200	200
5. Efficient Appliance and Equipment –		250	250
6. Pilot Projects and Demonstrations		300	300
7. Monitoring and Evaluation		50	50
8. Component Administration	100	150	50
Total	250	1,800	1,550
<b>GOE financing</b>	250		375 *
<b>GEF financing</b>			1,175

\* Financing obtained through World Bank loan; actual allocation of costs between WB, GEF, GOE and private actors is to be determined during project appraisal.

**Table 7b. Incremental Costs and Benefits Matrix - Rural Electrification**

	<b>Baseline</b>	<b>Alternative</b>	<b>Increment</b>
<b>Global Environmental Benefit</b>		Barriers reduced or eliminated Reduced CO <sub>2</sub> emissions compared with forecast Creation of sustainable RE with renewable energy	Reduced or eliminated barriers Reduced CO <sub>2</sub> emissions (108,005 tons) cumulatively at project end
<b>Domestic Benefit</b>	Electrification through grid connection as forecast only.	Expansion of electrification to isolated and dispersed households Increased use of renewable resources at lower cost Development of local enterprises and employment	Electrification of 12,621 households, and 1,459 public services. Increased quality of lighting and quality of life, improved educational opportunity, health services and increased productivity of commercial activities.
<b>Costs *</b>	US\$ 000	US\$ 000	US\$ 000
1. Rural electrification constraints		150	150
2. Market studies	85	350	265
3. Constraints removal	15	150	135
4. Rural electrification program design		250	250
5. Institutional and capacity development		350	350
6. Demonstration projects.	515	2,060	1,545
7. Monitoring & evaluation		50	50
8. Administration			
Subtotal	100 715	150 3,510	50 2,795
<b>GOE financing</b>	715		1,505 **
<b>GEF financing</b>			1,290

\* CAF-financed \$1.3 million program for PV-based electrification of public services is not shown in table.

\*\* Financing obtained through World Bank loan; actual allocation of costs between WB, GEF, GOE and private actors is to be determined during project appraisal.

## **Attachment 1: GEF Alternative Characteristics and Assumptions**

**Energy Efficiency Alternative** The economic costs and benefits for this alternative are based on the implementation of 5 major efficiency measures which are a subset of the actions which the alternative should stimulate. We recognize that it is infeasible to separate these impacts from the impacts of higher energy prices. However, it is clear from an evaluation of current institutional conditions, technical capacity, lack of efficient equipment and equipment efficiency standards in the market, past practices and information availability, as well as general attitudes toward energy use, that a substantial intervention will be necessary to realize the potential for energy efficiency in the Ecuador. Therefore, while it is clear that there will be significant baseline price induced reduction in energy use, the GEF Alternative is a necessary supplement to realize the potential which exists.

The strategy and task details of this program are discussed above. The specific efficiency measures whose impacts produce project benefits in the analysis above are:

1. Household compact fluorescent lighting program  
Lighting is estimated to account for 21% of end use electricity consumption in the residential sector (weighted average for coast and sierra). An average total consumption of 1,622 kWh/yr in year 1 grows to 2,064 in year 15. Penetration of CFLs starts at 2.5% in year 1, reaches 15% in year 5, and ends at 35% in year 15. The average savings per household is estimated at 138.6 kWh/year.
2. Domestic refrigeration efficiency improvement program  
This end use is estimated to account for 43.8% of electricity use, or about 710 kWh/year per household. Savings are estimated at 220 kWh/year. Penetration starts at 1%, reaches 5% in year 5, and ends at 20% in year 15.
3. Commercial compact fluorescent lighting program  
Commercial lighting is estimated to account for 40% of total consumption of the commercial sector. Average use per consumer is 5,911 kWh/year. Savings are 277 kWh/year per user, and penetration starts at 2.5% and grows to 25% in year 15.
4. Commercial refrigeration efficiency improvement program  
This end use is estimated to account for 23.5% of electricity use, or 2,555 kWh/year. Unit savings are 440 kWh/year. Penetration begins at 1%, reaches 5% in year 5 and grows to 20% in year 15.
5. Industrial efficiency motor program  
Motors are estimated to account for 80% of end use in this sector. Electricity use totals 75,450 kWh/year per user. Unit savings would be 16,400 kWh/year from introduction of efficient motor systems. Penetration starts at 0.5% of this end use, and reaches 20% in year 15. No other savings in this sector are estimated. A field visit to a textile factory in Quito known for undertaking a substantial program to improve energy efficiency indicated that other significant savings are feasible. This including lighting, boiler and steam system improvements and most importantly introduction of improvement process equipment which contributes to both productivity improvement and major electricity savings. Other measures to reflect this example will be addressed at appraisal.

The principal reference for the energy efficiency estimates in this annex is the 1994 study, "Programa de Administración de la Demanda y Uso Racional de Energía Eléctrica en el Ecuador,"



done for INECEL in Ecuador in 1994. This study was based on specific information on the energy use and load characteristics for electricity end users in Ecuador, as well as impact information from various international studies and experiences. The study provided end use specific savings estimates and cost information. Experience in North American utilities, for example, in 1992 surveys of 2,067 programs indicated utility investments of from 1-5% of income on efficiency/demand management with an anticipated average reduction of 11% (9 utilities estimated from 6-13.5% savings in energy and 6-14% in demand within 7-10 years -- maximum estimates for the residential sector reached 46%) in total consumption in 8-10 years. In one actual case for which information was available at the time of the study, Florida Power and Light, reported peak demand reductions from efficiency programs of 2,000 MW out of 16,000 MW in 1993. More up to date information on international experience as well as improved Ecuadorian information on current energy use practices and opportunities for efficiency improvement with current technology will be incorporated at appraisal.

A 1984-1986 energy efficiency program of INE in Ecuador supported energy audits and limited training and technical assistance. A later survey of 33 companies receiving assistance under the program indicated that some 53% of projects with costs less than \$50,000 and paybacks of less than 1 year were implemented, 46% for projects with costs over \$50,000. The projects with highest rates of implementation were maintenance, combustion control, insulation, power factor correction and lighting improvement. Electricity efficiency improvements were the smallest share of projects implemented due primarily to low prices for electricity. (Source: RCG/Hagler, Bailly, Inc., "Energy Conservation Investment Decisionmaking in Developing Countries," December 1989, pg. 3.17-3.20).

**Demand-side Management** Demand-side management (DSM) is another specific programmatic option for introducing both general efficiency improvements and for optimizing the utilization and operation of the power generation system through load management. This option will be defined and opportunities quantified, and necessary tariff and other incentives delineated during project appraisal. Incorporating a DSM program within the utility system at this time is particularly important given the impending privatization of the distribution utilities as part of power sector reform. DSM incentives in a vertically disaggregated utility system requires careful consideration to ensure that incentives and regulations both permit and encourage this practice. The current electricity law, Article 5, specifically envisions this type of activity in authorizing "establishment of tariff systems which stimulate conservation and rational use of energy". DSM will be addressed at appraisal in terms of technical opportunities and the potential tariff and incentive options (both for end users and distribution utilities for participation in promotion, technical assistance and investment) which would be developed to stimulate its introduction. The DSM program should also address development of the necessary end use data base regarding load patterns and impacts on utility generation and utilization requirements. While not specifically addressed in this document, DSM program planning should also introduce and incorporate the concept of "integrated resource planning" (IRP). Integrated resource planning in essence is a system-wide cost-benefit analysis that allows efficiency and environmental benefits to be more effectively compared with supply alternatives in a planning sense. In order to both design and justify DSM it is important to recognize not only the end user and distribution direct benefits, but also the system-wide benefits in terms of reduced capacity needs, reduced emissions of CO<sub>2</sub> and other contaminants, and lowered generation costs. In order to make estimates of these benefits and to incorporate these in the cost-benefit analysis, and corresponding levels of incentives, IRP-type analysis should be performed.

Examples of DSM opportunities are the following:

- a. Households: Compact fluorescent lighting, electric heater cycling and solar hot water, energy efficiency refrigeration, and consumer education
- b. Commercial/buildings: Tariff incentives/design and energy efficient lighting, efficient A/C-A/C cycling, building design practices (passive lighting, ventilations, etc.); and associated training and information.
- c. Industrial: DSM - Tariff incentives/design coupled with, e.g. process control, power factor correction, efficient motors - variable speed, drive belts..., interruptible loads, process or A/C cycling. Efficiency improvements in pumps, fans, compressor selection; motor replacement, sizing and selection, belt drive; refrigeration efficiency; compressed air system management and efficiency, process efficiency improvement (boilers, kilns, furnaces, dryers, steam not primarily electrical efficiency technology but may be more effective to combine]; and associated industrial training and information.
- d. Public sector: Street lighting, buildings (as in commercial above), water treatment and pumping.
- e. Agricultural: Pumping and irrigation

**ESCOs** Ecuador has at least 3 companies which are pursuing energy service business opportunities. Two of these firms were interviewed for this report. One is strictly a service company, staffed on a part-time basis, and the other is involved in both energy service consulting and sales of efficiency equipment. The small size of the current market, small size of these firms, limited technical capacity, concentration on only electricity efficiency, and lack of shared-savings experience, will require substantial support and market enhancement to allow these firms to grow. Particularly important will be support regarding shared savings contracting, financing, partnering with international ESCOs for business and technical support or joint ventures. There are substantial opportunities for developing linkages between such firms and the distribution utilities as these develop programs for DSM and efficiency, and for financing entities with involvement in such activities. These topics will be addressed further at appraisal.

### **Off-grid Electrification**

For cost and benefit analysis we have made estimates of the potential market for off-grid electrification, segregating markets into more and less densely populated provincial areas, respectively. These appear to be generally reflective of their characteristics in terms of access to grid electricity, rates of poverty and rates of out migration. ODEPLAN ("Atlas para el Desarrollo Local) information by province and canton was used in interpreting this information (derived from the 1990 Census and other sources). We also utilized the World Bank report, "Ecuador: Crisis, Poverty and Social Services," June 2000, to evaluate the economic potential of households, and the availability of infrastructure in general. Further refinement of this review and pilot site selection we be undertaken during appraisal. Next we selected a number of potential systems believed to be appropriate for the general nature of these respective market areas. An important qualification to all this analysis is the fact that market information on current energy use is very poor, not allowing any estimate of the ability or willingness to pay. The mission identified a telecom survey activity to be undertaken shortly, and during its country visit worked with CONAM and others to introduce an energy consumption element into this activity to assist during appraisal

Given the prospectively very low income of the off-grid population, we have chosen to utilize 4 types of domestic off-grid electricity systems, a small portable lantern, 20 W PV system, 50 W PV system, 100 W PV system, and for public services a 240 W PV school system and 480 W PV health clinic system. The first three domestic systems are used for areas which we expect to be unable to support even modest O&M costs for larger systems, and the 20 W, 50 W and 100 W systems for higher density and higher potential areas. The penetrations assumed are based on review of the total available market and assuming a very

modest penetration due directly to the GEF Alternative. No induced impacts are assumed, nor are price reductions for PV equipment for this market. These estimated market penetrations give a total of 12,621 residential systems total (of which 2,349 are in lower density and lower potential areas; and 10,272 in higher potential areas plus 1,459 public systems. The specific strategy and programmatic task characteristics of this alternative are described in detail in the programmatic discussions above.

Key assumptions affecting cost benefit analyses are:

1. Life-cycle costs: MEM estimates are used for 100 W systems and for schools and health clinics with some adjustment of O&M to provide more realistic (higher) values. Lantern and 20 W costs are from international literature. 50 W system costs are taken from the PERMER Argentina Rural Electrification project analysis.
2. Penetration rates: Mission assumptions based on potential market and general budget parameters of the GEF Alternative. We have included an induced growth case which produces some 8,887 total households electrified, and 1,404 public services.
3. Benefits assumed: Given the lack of information on ability and willingness to pay, end use benefits are generated by the analysis. Benefits in the base case can be thought of as the payments by households, which are based on the O&M costs for PV systems in the first instance (where program costs are excluded). We vary the payment per month in order to determine the required month amount which is needed for the project to break even. Any amount over the households ability to pay, of course, would be a required project subsidy reflecting externalities and society benefits. The tables below show the required user monthly payments for the different PV systems which are required to fully amortize these respective costs over their life-cycles (excluding program TA and other costs). Benefits are essentially equivalent to these amounts in the base case (where program costs are excluded). Sensitivity analysis was performed to test the project economic and financial returns to assumptions on user payment assumptions. When market data is available the appraisal process will require that incremental costs for each of the systems be determined and a more realistic estimate of project returns be made. It is expected that capital subsidies and a significant contribution to O&M charges will be necessary for many markets. Pilot projects and GEF Alternative program implementation strategy have been designed with these characteristics in mind.

PV systems monthly O&M Costs used for analysis purposes are as follows:

Lantern	\$1.76
20 W	\$3.90
50 W	\$6.50
100 W	\$8.43
School	\$25.30
Clinic	\$50.60

**Table 9. Economic Lifecycle Costs of Solar Home and Public Systems - Ecuador**

<b>Solar Electric System</b>	<b>Installed Cost (\$)</b>	<b>O&amp;M &amp; Replacement (\$)</b>	<b>Total (\$)</b>	<b>Net Payment (\$/month)</b>

Portable lantern SHS	148	167	300	3.60
20 W SHS*	390	371	719	8.64
50 W SHS**	616	619	1,169	14.03
100 W SHS	883	803	1,591	19.10
School (3x80W)	1,716	2,409	3,940	47.29
Health Center (6x80W)	4,928	4818	9,218	110.63

Discount rate: 12%, Lifetime 15 years; no IVA.

**Table 10. Financial Lifecycle Costs of Solar Home and Public Systems - Ecuador**

<b>Solar Electric System</b>	<b>Installed Cost (\$)</b>	<b>O&amp;M &amp; Replacement (\$)</b>	<b>Total (\$)</b>	<b>Net Payment (\$/month)</b>
Portable lantern SHS	166	138	282	3.95
20 W SHS*	437	305	685	9.59
50 W SHS**	690	509	1,109	15.52
100 W SHS	988	668	1,528	21.38
School (3x80W)	1,922	2,004	3,675	51.42
Health Center (6x80W)	5,519	4,008	8,807	123.26

Discount rate: 15%, Lifetime 15 years; IVA at 12%, electricity taxes at average 30%.

\* Preliminary, retail price \$290 (plus 12% IVA) plus \$100 installation; Source: PV for Rural Electrification in China.,," Wallace and Ysuo, NREL 1997.

\*\*Data from Argentina PERMER Project, 1997.

\*\*\*Data for 100W system and School and Health Center from MEM document "COSTOS FOTOVOLTAICO.xls" 12/19/2000. O&M Adjusted to 7.5% of capital costs.

\*\*\*\* Portable lantern , Solaris Solar Lantern, (jademountain.com lighting products 12/22/00); battery & CFL assumed 3 years life; panel 5 years.

No Import Duties

## **Other Renewable Energy Alternatives**

It was not possible to discuss the impacts of the promotion of small-hydro and/or wind systems in this document. These effects will be introduced at appraisal. The impacts of small-hydro in particular appear to be potentially significant due to a large number of run-of-the-river sites with substantial power potential and low-cost to develop. Local developers have expressed substantial interest in developing this potential, as well as in rehabilitating previous projects. The constraints and issues which should be addressed to assist in realizing this potential are incorporated in the program plans described in this document. These initiatives should be equally as beneficial to potential wind electric development.

**CO<sub>2</sub> Emission Reduction Calculations** In the efficiency improvement cases we have calculated emission reductions on the basis of kWhs saved and decreased generation by a marginal diesel generation plant including transmission losses of 10%. We used 3 different plant efficiencies to reflect the differences between wet, medium and dry hydro situations. In all cases the marginal plant is always diesel. In fact in each of these situations marginal diesel plants are still used. In the wet case, some 80% of generation is by hydro, 20% thermal, of which 1.6% is diesel (fuel oil efficiency in this case is about 14 kWh/gal). In the medium case, 68.6% of generation is by hydro, 31.4% thermal of which 6.1% is diesel, and in the dry case, hydro accounts for 48% of generation and thermal 52% of which diesel is 21.9%. The plant efficiency varies due to the plants which are employed being increasing less efficient (using year 2000 data) basis is used, that is, respectively, 15.5 kWh/gallon, 14.7 kWh/gal, and 10.1 kWh/gal of diesel. No adjustments were possible at this stage for load characteristics of end uses and end use efficiency measures. Estimated peak load demand reductions were calculated by measure, but these values and corresponding potential decreased capacity requirement benefit were not incorporated in this analysis.

For rural electrification, due to a complete lack of information on the fuel mix and consumption levels for rural households, schools and clinics, and apparent major elimination of kerosene available historically for rural lighting, we chose to use a simplifying assumption which at least is consistent for all cases. These assumptions can be modifying during appraisal based on estimated end use fuel mix. Emission reductions calculations are based on CO<sub>2</sub> emissions reductions for the household sector are based on an assumed use of kerosene of 2.37 gallons/month/household for a rural household, which results in 316 kg CO<sub>2</sub> per year per household. World Bank, "Ecuador: Energy Pricing, Poverty and Social Mitigation," 1994, pg. 12; Conversion: 3.78 gallons per household per month converted to CO<sub>2</sub> using 3.78 lt/gallon and 0.95 kg/lt; and 3.1 kg CO<sub>2</sub>/kg of kerosene. For school and clinic systems we have used as a basis the emissions from a small diesel generator. It should be noted however, that it is likely that due to extreme economic hardship in many areas, commercial fuel use may be very low by international standards. Based on anecdotal information from Ecuador, lighting may be from candles, batteries, wood, LPG or even diesel. Most importantly however may be the fact that the availability and quality of lighting may be very low by international standards, and a major benefit of PV may be in providing a high quality lighting source rather than offsetting either expenditures or commercial fuels currently used.

**Annex 5: Financial Summary**  
**ECUADOR: PUBLIC ENTERPRISE REFORM & PRIVATIZATION**  
**Years Ending**

	IMPLEMENTATION PERIOD						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<b>Total Financing Required</b>							
<b>Project Costs</b>							
<b>Investment Costs</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Recurrent Costs</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total Project Costs</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Front-end fee</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total Financing</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Financing</b>							
<b>IBRD/IDA</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Government</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Central</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Provincial</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Co-financiers</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>User Fees/Beneficiaries</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Others</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total Project Financing</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Main assumptions:**

**TABLE TO BE PREPARED DURING PROJECT  
APPRAISAL**

**Annex 6: Procurement and Disbursement Arrangements  
ECUADOR: PUBLIC ENTERPRISE REFORM & PRIVATIZATION**

**Procurement**

**ANNEX TO BE PREPARED PRIOR TO PROJECT  
APPRAISAL**

**Procurement methods (Table A)**

**Table A: Project Costs by Procurement Arrangements**  
(US\$ million equivalent)

Expenditure Category	Procurement Method <sup>1</sup>				Total Cost
	ICB	NCB	Other <sup>2</sup>	N.B.F.	
<b>1. Works</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>2. Goods</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>3. Services</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>4. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>5. Front-end fee</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>Total</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)

<sup>1/</sup> Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies

<sup>2/</sup> Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

**Table A1: Consultant Selection Arrangements (optional)**  
(US\$ million equivalent)

Consultant Services Expenditure Category	Selection Method							Total Cost <sup>1</sup>
	QCBS	QBS	SFB	LCS	CQ	Other	N.B.F.	
<b>A. Firms</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>B. Individuals</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>Total</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)

1\ Including contingencies

Note: QCBS = Quality- and Cost-Based Selection  
 QBS = Quality-based Selection  
 SFB = Selection under a Fixed Budget  
 LCS = Least-Cost Selection  
 CQ = Selection Based on Consultants' Qualifications  
 Other = Selection of individual consultants (per Section V of Consultants Guidelines), Commercial Practices, etc.

N.B.F. = Not Bank-financed

Figures in parenthesis are the amounts to be financed by the Bank Loan.



Prior review thresholds (Table B)

**Table B: Thresholds for Procurement Methods and Prior Review** <sup>1</sup>

<b>Expenditure Category</b>	<b>Contract Value Threshold (US\$ thousands)</b>	<b>Procurement Method</b>	<b>Contracts Subject to Prior Review (US\$ millions)</b>
<b>1. Works</b>			
<b>2. Goods</b>			
<b>3. Services</b>			
<b>4. Miscellaneous</b>			
<b>5. Miscellaneous</b>			
<b>6. Miscellaneous</b>			

**Total value of contracts subject to prior review:**

**Overall Procurement Risk Assessment**

**Frequency of procurement supervision missions proposed:** One every months (includes special procurement supervision for post-review/audits)

<sup>1</sup> Thresholds generally differ by country and project. Consult OD 11.04 "Review of Procurement Documentation" and contact the Regional Procurement Adviser for guidance.

**Disbursement**

**Allocation of loan proceeds (Table C)**

**Table C: Allocation of Loan Proceeds**

<b>Expenditure Category</b>	<b>Amount in US\$million</b>	<b>Financing Percentage</b>
Goods	0.00	
Works	0.00	
Services	0.00	
Training	0.00	
Operational Costs	0.00	
PPF Refinancing	0.00	
<b>Total Project Costs</b>	0.00	
<b>Front-end fee</b>	0.00	
<b>Total</b>	0.00	

**Table C1: Allocation of GEF Grant Loan Proceeds**

<b>Expenditure Category</b>	<b>Amount in SDRmillion</b>	<b>Amount in US\$million</b>	<b>Financing Percentage</b>
Goods		0.00	
Works		0.00	
Services		0.00	
Training		0.00	
Operational Costs		0.00	
<b>Total Project Costs</b>		0.00	
<b>Front-end fee</b>		0.00	
<b>Total</b>		0.00	

**Table D: Consultant Services -- Selection Method**

<b>Description</b>	<b>Total Amount US\$ thousand</b>	<b>Selection Method</b>

<b>Legal, Regulatory and Institutional Framework</b>		
a. Telecom Tariffs Re-balancing study b. CONATEL strengthening c. SUPTEL strengthening d. CONELEC strengthening e. CENACE strengthening		
<b>Competition and Private Investment</b>		
a. Telec. Sector & Privatization Strategy b. Privatization: ANDINATEL & PACIFICTEL c. CONATEL issuing licenses d. Wholesale Market Administrator		
<b>Service extension in rural and peri-urban areas</b>		
a. Rural Telecom&electricity demand survey& study b. FODETEL – Pilot case c. Rural Elec. Program Development d. Off-Grid electrification Pilot Projects e. IT-related services pilot		
<b>Enhancement of energy efficiency</b>		
a. Studies and TA b. Demonstration Projects		
<b>Communications and Information Campaign</b>		
a. CONAM Communication & Consultation Campaign b. Staff training (CONATEL, SUPTEL, CONELEC)		
<b>Project Coordination and Management</b>		
a. CONAM Project Coordination b. CONATEL & SUPTEL Project Management c. CONELEC, CENACE & MEM Proj. Management d. MICIP Project Management e. Project Monitoring and Evaluation f. Audits		

Key to Selection Method

QCBS = Quality and Cost-Based Selection  
CQ =  
I = Individual  
ICB =

Shop. =

**Use of statements of expenditures (SOEs):**

**Special account:**

**Annex 7: Project Processing Schedule**  
**ECUADOR: PUBLIC ENTERPRISE REFORM & PRIVATIZATION**

<b>Project Schedule</b>	<b>Planned</b>	<b>Actual</b>
<b>Time taken to prepare the project (months)</b>	8	
<b>First Bank mission (identification)</b>		11/25/98
<b>Appraisal mission departure</b>	09/18/2000	
<b>Negotiations</b>	11/06/2000	
<b>Planned Date of Effectiveness</b>	03/01/2001	

**Prepared by:**

CONAM

**Preparation assistance:**

PPF-360-EC

**Bank staff who worked on the project included:**

<b>Name</b>	<b>Speciality</b>
Joerg-Uwe Richter	Sr. Economist, Task Manager (until 11/30/2000)
Philippe Durand	Sr. Energy Specialist, Task Manager (from 12/01/2000)
Eloy E. Vidal	Pr. Telecommunications Specialist
Alberto Cruzat	Sr. Telecommunications Specialist
Luis Carlos Guerrero	Financial Management Specialist
Livio Pino	Sr. Financial Administration Specialist
Juan David Quintero	Sr. Environmentalist
Pilar Larreamendy	Specialist in Social Affairs
Susan Goldmark	Sector Management
Kathy Bain	Sr. Social Scientist
Clemencia Torres	Regulatory Specialist
José Manuel Bassat	Communications Officer
Luiz Gazoni	Sr. Procurement Specialist

**Annex 8: Documents in the Project File\***  
**ECUADOR: PUBLIC ENTERPRISE REFORM & PRIVATIZATION**

**A. Project Implementation Plan**

CONAM official communications dated march 17, 2000

**B. Bank Staff Assessments**

**C. Other**

- Law 184 RO/996, enacted on 10 Aug. 1992, which separated operating (EMETEL) and regulatory and control functions (SUPTEL);
- Law 94 RO/770, enacted on 30 Aug. 1995, which created new regulatory entities: CONATEL and SENATEL; and allowed privatization of EMETEL, which was split into ANDINATEL & PACIFICTEL;
- Electricity market Law of September, 1996 as amended through Law of , 1998, and attendant regulations
- Economic Transformation Law of 13 March 2000 ("Ley Trole-1") which eliminated the exclusivity concept and increased the allowable private shareholdings in ANDINATEL and PACIFICTEL from 35% to 51%
- Economic Transformation Law of August 17, 2000 ("Ley Trole-2") which increased the allowable private shareholdings in all electricity enterprises from 39% to 51%.

\*Including electronic files

**Annex 9: Statement of Loans and Credits**  
**ECUADOR: PUBLIC ENTERPRISE REFORM & PRIVATIZATION**  
Jan-2001

Project ID	FY	Purpose	Original Amount in US\$ Millions		Cancel.	Undisb.	Difference between expected and actual disbursements <sup>a</sup>	
			IBRD	IDA			Orig	Frm Revd
P049924	2001	Rural Water Supply & Sanitation	32.00	0.00	0.00	32.00	0.00	0.00
P064045	2000	Fin Sctr TA Ln	10.00	0.00	0.00	10.00	2.00	0.00
P070337	2000	EC-SAL	151.52	0.00	0.00	151.52	71.52	0.00
P055571	1998	EL NINO	60.00	0.00	0.00	2.24	2.24	0.00
P039084	1998	EC- HEALTH SERVICES MODERNIZATION PROJ.	45.00	0.00	0.00	40.20	11.90	0.00
P007135	1998	AGRIC CENSUS & INFO	20.00	0.00	0.00	7.56	-1.54	0.00
P040086	1998	INDIGENOUS PEOPLES	25.00	0.00	0.00	13.06	4.86	0.00
P040106	1998	INTL TRDE/INTEGRATIO	21.00	0.00	0.00	14.26	4.76	0.00
P036056	1997	EC JUDICIAL REFORM	10.70	0.00	0.00	3.84	1.46	0.00
P007131	1997	AG RESEARCH	21.00	0.00	0.00	17.00	4.10	2.90
P007128	1996	ENV MANAGEMENT PROJ	15.00	0.00	4.99	2.85	7.84	2.96
P007136	1995	EC TA MDRN OF STATE	20.00	0.00	0.00	2.26	0.46	0.00
P007105	1994	IRRIG TA	20.00	0.00	0.00	3.60	3.60	0.60
P007087	1993	EC- SOCIAL DEV. II: HEALTH & NUTRITION	70.00	0.00	0.00	19.40	-0.80	0.00
P007115	1992	RURAL DEV	84.00	0.00	0.00	6.69	6.69	6.69
<b>Total:</b>			605.22	0.00	4.99	326.47	119.08	13.15

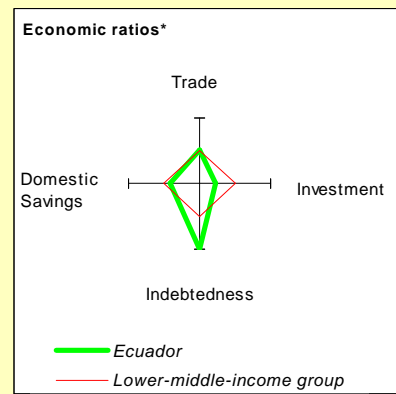
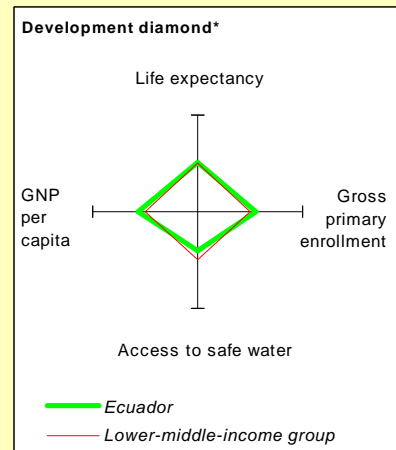
ECUADOR  
STATEMENT OF IFC's  
Held and Disbursed Portfolio  
Jan-2001  
In Millions US Dollars

FY Approval	Company	Committed				Disbursed			
		IFC				IFC			
		Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic
1997	Agrocapital	3.50	0.00	0.00	0.00	3.50	0.00	0.00	0.00
1969/73/77/81/82/87	COFIEC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1998	Concessionaria	11.50	1.30	0.00	15.00	2.93	0.33	0.00	3.82
1999	FV Ecuacobre	9.00	0.00	0.00	0.00	9.00	0.00	0.00	0.00
1998	Favorita Fruit	10.00	5.00	0.00	0.00	10.00	5.00	0.00	0.00
1999	La Universal	8.20	5.00	0.00	0.00	8.20	5.00	0.00	0.00
1993	REYBANPAC	5.18	0.00	0.00	0.00	5.18	0.00	0.00	0.00
	<b>Total Portfolio:</b>	<b>47.38</b>	<b>11.30</b>	<b>0.00</b>	<b>15.00</b>	<b>38.81</b>	<b>10.33</b>	<b>0.00</b>	<b>3.82</b>
		<b>Approvals Pending Commitment</b>							
FY Approval	Company	Loan	Equity	Quasi	Partic				
2000	ERSA	8000.00	4000.00	0.00	0.00				
	<b>Total Pending Commitment:</b>	<b>8000.00</b>	<b>4000.00</b>	<b>0.00</b>	<b>0.00</b>				

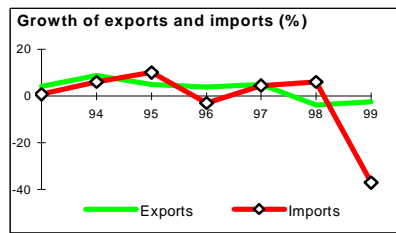
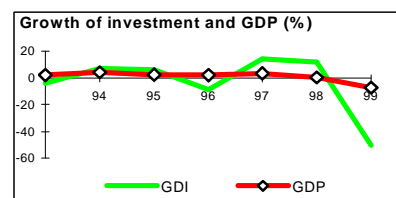


**Annex 10: Country at a Glance**  
**ECUADOR: PUBLIC ENTERPRISE REFORM & PRIVATIZATION**

POVERTY and SOCIAL	Ecuador	Latin America & Carib.	Lower-middle-income		
<b>1999</b>					
Population, mid-year (millions)	12.4	509	2,094		
GNP per capita (Atlas method, US\$)	1,360	3,840	1,200		
GNP (Atlas method, US\$ billions)	16.9	1,955	2,513		
<b>Average annual growth, 1993-99</b>					
Population (%)	2.0	1.6	1.1		
Labor force (%)	3.4	2.5	1.2		
<b>Most recent estimate (latest year available, 1993-99)</b>					
Poverty (% of population below national poverty line)	35	..	..		
Urban population (% of total population)	64	75	43		
Life expectancy at birth (years)	70	70	69		
Infant mortality (per 1,000 live births)	32	31	33		
Child malnutrition (% of children under 5)	45	8	15		
Access to improved water source (% of population)	70	75	86		
Illiteracy (% of population age 15+)	9	12	16		
Gross primary enrollment (% of school-age population)	127	113	114		
Male	134	..	114		
Female	119	..	116		
<b>KEY ECONOMIC RATIOS and LONG-TERM TRENDS</b>					
	<b>1979</b>	<b>1989</b>	<b>1998</b>	<b>1999</b>	
GDP (US\$ billions)	9.4	9.8	19.7	19.1	
Gross domestic investment/GDP	25.3	20.7	24.7	12.2	
Exports of goods and services/GDP	25.9	29.4	25.3	37.3	
Gross domestic savings/GDP	25.9	18.9	18.0	24.9	
Gross national savings/GDP	22.0	12.5	17.7	24.8	
Current account balance/GDP	-4.8	-5.2	-11.0	5.0	
Interest payments/GDP	2.9	4.2	3.8	3.6	
Total debt/GDP	48.4	115.2	76.8	80.2	
Total debt service/exports	60.1	35.6	28.8	22.8	
Present value of debt/GDP	..	..	72.2	..	
Present value of debt/exports	..	..	240.0	..	
	<b>1979-89</b>	<b>1989-99</b>	<b>1998</b>	<b>1999</b>	<b>1999-03</b>
<i>(average annual growth)</i>					
GDP	2.0	2.4	0.4	-7.3	..
GNP per capita	-0.8	0.2	2.1	-14.4	..
Exports of goods and services	4.5	5.2	-3.8	-2.6	..



STRUCTURE of the ECONOMY	1979	1989	1998	1999
<i>(% of GDP)</i>				
Agriculture	13.5	14.0	12.0	12.4
Industry	38.6	37.4	32.7	37.4
Manufacturing	19.2	21.1	21.9	21.3
Services	47.9	48.6	55.2	50.3
Private consumption	61.2	71.7	70.4	65.0
General government consumption	12.9	9.4	11.7	10.1
Imports of goods and services	25.4	31.2	32.0	24.7
<i>(average annual growth)</i>				
Agriculture	4.1	2.7	-1.4	1.8
Industry	1.6	2.8	-0.6	-6.0
Manufacturing	0.5	2.4	0.4	-7.1
Services	1.6	2.0	1.8	-11.3
Private consumption	2.1	1.8	2.1	-9.5
General government consumption	-1.2	-1.2	-1.1	-12.9
Gross domestic investment	-3.5	0.4	11.8	-50.5
Imports of goods and services	-1.7	1.8	5.9	-37.0
Gross national product	1.8	2.3	4.1	-12.8

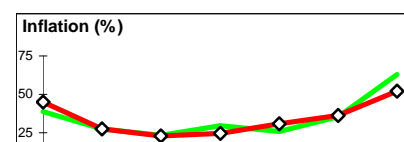


Note: 1999 data are preliminary estimates.

\* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

Ecuador

PRICES and GOVERNMENT FINANCE	1979	1989	1998	1999
<b>Domestic prices</b>				
<i>(% change)</i>				
Consumer prices	10.3	75.6	86.1	52.3
Implicit GDP deflator	16.1	70.8	35.4	62.9
<b>Government finance</b>				



**Additional  
Annex 11**





## STAP Review and IA Response

### *Bernard Devin Consultant*

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#### *ECUADOR*

#### *PERTAL -- PUBLIC ENTREPRISE REFORM & PRIVATISATION*

PROJECT ID: P063644

Latin America and Caribbean Regional Office – LCSFE

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Review Paper – 9 January 2001

The response to the STAP Reviewer's comments is presented below in italics and is organized according to numbering in the Reviewer's submission. The corresponding relevant changes in the Project Appraisal Document (PAD) will be effected before and during the project appraisal mission.

#### **A. -- INTRODUCTION -- BACKGROUND**

The present review covers the issues related to the two GEF components only: Rural Electrification and Energy Efficiency. It considers the elements contained in the main **PERPTAL Project Appraisal Document** as well as in the **Concept Paper for a GEF PDF B**

The specific comments on each of these papers if given in the following sections **B** and **C** respectively, with some cross references as to avoid repetitions.

The very short notice given for studying the documents has not permitted to deal in more details with some very constructive features proposed by the project -- namely the expected impact on development of a joint energy/telecommunication development. This interesting and may be academic feature -- in the semi illiterate world of very low income area -- would deserve extended ex post analysis with an open minded attitude.

#### REVIEWING METHOD

We have based the review on the two following main statements given in the paper itself -- these two statements are given in direct relation with the *Rural Electrification Issues*, but some of them are of a far more general nature :

- the *Strategic Program Design Considerations* ('SPC')-- given in, the Annex 4a, as per page 97 of the version of P063644 that we have in hand- We do consider it as the quasi perfect formulation of what should be accomplished

- and the very clear statements given in page: "Summary of lessons learned for Off-Grid and Renewable Based Rural Electrification an extract from H. Mike Jones January 2000 - ESMAP Report Renewable Energies for Rural Electrification Assessing Opportunities for Investments in the LAC Region". -- as the "best practices" to be applied ('LL').

These two set of guidelines are also in excellent agreement with the 19 Recommendations established during the Marrakech Workshop in 1995 by a set of 20 field working teams on "Changing the scale and pace of decentralized electrification processes in rural areas". These recommendations have been endorsed by the 1996 session of the UN Commission for Sustainable Development. This is to say that a consensus has been built internationally on the appropriate ways to proceed in such matters.

The present "review" will criticize how these excellent principles -- and their implied consequences -- are, or are not, finally taken into account in the project description, in its present status of formulation, and what issues should receive a more special treatment in the course of final formulation of the project.

As reference for the review of *Energy Efficiency Issues*, personal experience gained in ruling ADEME International Department and cooperation with developing countries on such matters (1981 - 1996), as well as subsequent expertise as consultant on European Union actions and French Ministry of Foreign Affairs/ Cooperation and Development, will be used.

Furthermore, the writer of the present review has been involved closely **in a previous study carried out in Ecuador for Decentralized Rural Electrification in April 1998**. The study was an European Union Thermie B Action -- "Development of Decentralized Rural Electrification -- APPLIMAR Project" undertaken with a larger set of stakeholders than quoted in the P063644 document. The results of this study are in hand of the Ministry of Energy and Mines of Ecuador, they have highlighted several sensible issues, most of them well identified in the P063644 document, but some of them still pending, which will be put forward in due place in the present review.

As a whole, the APPLIMAR Project study and the Project Appraisal Document are in good -- and favorable -- accordance about the Decentralized Rural Electrification issues and options, both relying upon a strong commitment of existing Ecuadorian institutions. The local context has been enriched since 1998 by the new dispositions concerning the energy sector reform, and an increased role of the private sector in the "decision to invest". In 1998, the private sector was already very present, even in remote places, in the implementation steps decided by the provincial authorities building upon a dialogue between the CONELEC, the CONCOPE (Consortio de Consejos Provinciales) the FERUM and the various Compañías Electricas whose undergoing privatization may hopefully boost ahead local initiative and pro-active attitude.

It would have been helpful to be able to read some of the GOE (Government of Ecuador) positions expressed in relation with this project and in its ongoing negotiating process with the World Bank in particular -- and this would have been important for Risk Evaluation -- whether this project is a true request from the GOE -- and in what terms? --, or a merely a World Bank initiative? It is understandable that such letters of intent are not copied in the P053544 document, but they may help to substantiate some of the opinions expressed.

The Project Concept Note presented for GEF Pipeline Entry is the result of a detailed request received from the project implementing agency, CONAM, through its letter dated August 25, 2000.

## B -- PERPTAL DOCUMENT REVIEW ON GEF RELATED ISSUES

### 1. -- GENERAL APPRECIATION

The project is a good project.

The document submitted to the present review is a very impressive compendium of data and its structure favors several different readings for considering the data. It is clear that the authors have been careful as to not overlook any significant issue and to be as comprehensive as possible in a very rich context which is characterized by a strong commitment of the Ecuadorian Authorities and also a deep rooted organization scheme in this dynamic country.

However, in such a redundant form of expression, with subtle nuances depending upon the difficult issues are considered as barriers, or strategic options, or in the list of tasks covered under each "project component", its not always clear to view what is finally kept for practical implementation by the project itself.

It is understood that all decisions are centralized in CONAM to ensure appropriate management of this multi-sectoral/ multidimensional transaction -- thus keeping the door open to any necessary changes to be considered in the other agencies: CONELEC, CENACE, MEM, etc.

*Main questions and issues considered :*

1.1.--PRIVATIZATION AND ORGANIZATION OF THE ELECTRICITY SECTOR: (as it intervenes directly in the context of the two GEF components; Decentralized Rural Electrification and Energy Efficiency)

1.1.1. it appears that a large part of this job is covered by a loan from the Interamerican Development Bank (IDB) and that no formal coordination between IBRD and IDB has taken place. The harmonization of policies and procedures rests in the hand of CONAM, which is in charge of coordination with COMOSEL, the entity responsible for privatization in the electricity sector and the IDB finance project.

*B- 1.1.1 The Bank maintains coordination with IDB (which we agree is important for ensuring consistency and implementation of respective supports to the power sector reform and privatization in Ecuador), through meetings with headquarters and field office staff. Project documentation and mission aide memoire will be shared with IDB. It should also be noted that the same agency, CONAM, is managing support received from both institutions and oversees modernization efforts in the sector.*

1.1.2. one understands that IBRD loan will cover strengthening of CONELEC and CENACE institutional capacities, but no reference is given to any reviewing or reconsidering the formulation of the Electric Law of 1996 (and its subsequent additions ?) in defining the field open and obligations applying to the private sector investors in the energy field. **The Project Component 1 / d** seems to address only regulation and operational procedures, not basic attitude with respect of the private investors. In case this is considered as already settled, the knowledge of the said

dispositions would have been needed in order to judge for the appropriateness of arrangements proposed by the GEF segment of the Project P063644.

- 1.1.3. it is said that GEF financing "is designed to help address several deficiencies which are not incorporated in power sector reform programs in Ecuador" This appears under **Project Component 3 / c** with a list of tasks which will be discussed hereunder. It is not clear, however, on what steps of the power reform itself these deficiencies might be covered. This question raises the same interrogations as above, i.e.: to understand whether the power sector reform fundamental dispositions (Electric Law of 1996 and its subsequent additions) are open for constructive alterations or whether cards are already dealt. We shall assume that pre-eminence of CONAM as responsible agency for this project provides an open ended attitude.

*B– 1.1.2 and 1.1.3:*

*Modification of legal and/or regulatory dispositions is indeed very likely to be required in order to provide adequate incentives for development of off-grid electrification and energy efficiency. These modifications will be spelled out in the overall strategy for rural electrification and energy efficiency to be prepared through the project and will be thereafter enacted.*

- 1.1.4. the **Project Component 4** (Energy Efficiency) does not have less relation with the Power Sector Reform, since its concept introduces a fundamental competition in the energy sector, which has to be monitored by law, between

*B– 1.1.4 :It should be noted the private distributors would also have an interest in electricity load management (reduction of capacity purchased to generators) depending on their contractual arrangements. The case for providing distribution utilities with regulatory incentives for end-use energy efficiency will also be reviewed through the project.*

- 1.1.5. the *pro-consuming actors* of the game (energy producers and distributors), whose performance -- hence profit, for the private actors -- is measured in amount of kWh traded and sold.

- 1.1.6. the *energy efficiency actors* of the game (consumers at large, sustainability actors, ESCO's investors), whose performance and profit is measured in amount of kWh not purchased, i.e.: money savings.

## 1.2. -- GEF ALTERNATIVE -- ANNEX 4A. RURAL ELECTRIFICATION AND ENERGY EFFICIENCY

**Three different issues** (and not two) are actually faced under the GEF component,

- 1.2.1. *the Energy Efficiency issue*, which is a classic undertaking for the developed segments of the national economy and deserves both

- a short term proactive attitude of the public authorities -- in setting up a policy and a regulation for the actors invited to implement such a policy . This point has been properly sketched in the document
- a long term 'planning' attitude from the Ecuadorian authorities' -- in all energy consuming sectors where infrastructures are in the stage of being established



through the economic development process. This applies mainly to long lived infrastructures which would set up a compulsory energy demand over the long term and may be significantly curbed down by appropriate strategic choices made today in, for instance, building construction code, urbanization and housing, modal transportation schemes, etc. This point will be reminded.

### 1.2.2. *two distinct Rural Electrification issues*

The P063644 Document shows progressively that there are finally **two** distinct areas where the objectives, the solutions and the appropriate means will be basically different

- i) the 'commercial' decentralized rural electrification sector (**higher potential areas**)-- where momentum gained by the privatization of the power sector might be put at work for speeding up the deployment of new facilities for unserved end-users. (namely coastal and frontier zones where economic wealth is no longer at the subsistence level only),
- ii) the 'poverty reduction' decentralized rural electrification sector, concerning the poorest areas (**very low income settings**)-- where the absence of any economic wealth precludes finding motivated investors, unless totally secured by government subsidies, both at capital level and at O&M level. Areas where direct intervention of provincial authorities, NGO assisted, seems to be the only way to proceed, at least for some time to come.

It is important to keep this distinction in mind, from the start, in order to avoid confusion in attempting to promote the same rules to so different a context.

B- 1.2.2

*Agreed as a general perspective, although the two approaches could be addressed together under the concession model, if and where this model was found feasible.*

## 2. COMMENTS ON APPROACHES RELATED TO THE POWER SECTOR REFORM

In the Annex 4 **GEF ALTERNATIVE**, the listed deficiencies to be corrected are quite severe and belong to several main basic issues. Let us comment them:

### 2.1. Rural Electrification

#### 2.1.1. Lack of *Off Grid Electrification Strategy etc.*

The CONELEC electrification plan 2000-2009 (as quoted in page 75) is indeed a very comprehensive mechanism designed to work with grid extensions and applications made by the municipalities to FERUM, with local distributions companies.

With the paradigm of privatization of initiative and investment, what is lacking in, the **Off Grid** context is twofold:

- i) -- **the business context** in which the private sector would operate for decentralized rural electrification:
  - what sort of local concession and/or license would be granted to such operators -- **and for how long** to permit amortization of the investment -- who will guarantee

the private investor that no "grid extension" will reach their operating area before the end of their DRE amortization period ?

- by what mechanism could they claim for the benefit of FERUM subsidies to the end users, so as to play on a level field with grid extension ?

These two key issues , up to my opinion, can be processed only in the Electric Law (or its subsequent additions) since they respond to the obligation of the Government to set up clear operating rules for the private sector. *This point is unfortunately not mentioned anywhere in the proposed documents.*

*B – 2.1.1 i)*

*The business context of private operators for decentralized rural electrification will be reviewed during project appraisal, particularly concerning regulatory aspects of concessions and access to FERUM.*

**ii) -- the size of the market open to DRE in *higher potential areas*.**

It is of the responsibility of the ruler (CONELEC) to state clearly for a given period of time, (i.e.; the next two decades), what areas or the country will be eligible ~~for~~ *grid extension* private investment with FERUM Assistance and what areas *will not be covered by grid*, -- and consequently will be opened, in size and time, for private DRE initiative. The size of the potential market is a key element for decision making for a private investor.

This issue, is relevant to CONELEC planning, subject to approval by CONAM, but it seems appropriate to consider that, in defining 'zonal' distribution areas for grid or decentralized electrification, others stakeholders may have a strong interest to participating in the discussion, owing to the political implications of deciding a zone inside or outside of the (magic) grid connection scheme. (e.g.: CONCOPE)

Outside clarification of these two points, it is difficult to imagine that private investors would take a risk of any sort. The documents describes quite well that market studies will have to be carried out to know whether the zones may be attractive for private investment, but prior to this, the rules of the game for investment in the energy production and distribution in these areas has to be made clear (including access to soft loans, ~~is~~ *fiscality*, standards & quality control, etc.)

*B – 2.1.1 ii)*

*Other stakeholders such as local government, NGOs, users' associations, MEM/DEA, etc., should indeed be involved in the definition of the (evolving) border for electrification through grid-extension, as well as in the implementation of decentralized electrification in the remaining areas. And indeed, private sector involvement requires clear rules of the land.*

2.1.2. Lack of institutional responsibility for implementing off-grid power supply

This point is closely tied up with the preceding remarks, but we may understand that it applies principally to the **very low income settings**, since in other areas, the new paradigm has been laid that the private sector would take the initiative.

This, in turn, raises attention on a specific feature of these areas where 'poverty reduction' is the motive force, not energy 'per se', and -- in consequence -- any operation in these areas involves many **more stakeholders** that quoted in the document.

It appears, from the quoted previous E.U. APPLIMAR study, and from reference given in the document itself (pag. 102) that major stakeholders as ECORAE (Instituto para el Desarrollo Regional Amazonico) and the Ecuadorian counterpart of the World Bank Project PROLOCAL , should be part of the *Institutional responsibility* for implementing off grid power supply, with local community representatives included from the start.

What is at stake in these low income areas is the improvement of living conditions *together with triggering some income generating activities* -- the only way to fight against poverty on a sustainable manner. In such circumstances, one is inclined to believe that the best technical and financing choices can be made only by integrating all the components of the local development for their energy demand. It is far from proven that Photovoltaic is the solution when water supply, mechanical power and lighting are required together in a given place.

All this advocates for **local implementing institutional arrangements**, with possible capacity building and advice from a central *Rural energy services development agency*. The document does not exclude such a possibility but does not indicate it either.

#### *B – 2.1.2*

*Agreed, local implementing institutional arrangements, through local private operators, NGOs, associations, or even regional distribution utilities, will be key to success of decentralized electrification.*

#### 2.1.3. Lack of dedicated funding source

We addressed this question earlier, (Cf. 2.1.1)) this advocates for building upon well understood FERUM mechanism and extending its (or an equivalent) attribution to regional private sector initiative, upon approval by the implementing institutional arrangement quoted above. In the same manner, contribution to financing FERUM by private distribution companies of the electric sector is an issue which has been quoted in the proposed document.

In **very low income areas**, it seems appropriate to consider that *development funds* not belonging to the energy sector, should be called upon. This can only be achievable by enlarging the set of stakeholders participating to a specific pilot or development project in a selected area. (Cf: 2.1.2 above)

Decision on such dispositions appear to belong to a more transversal institution than CONELEC, more likely CONAM.

#### *B – 2.1.3*

*The suggestion of not relying only on FERUM for financing decentralized electrification, but to also try and mobilize transversal development funds, is totally sound. Prospects in that respect will be assessed during the appraisal mission.*

#### 2.1.4. Lack of capacity to address technical and O&M needs etc.

This seems somehow in contradiction with the scope of "private investors initiative" in DRE, unless the investor is purely a 'stock exchange company'. The operator will need to be

quite strongly present in the area, as well as it will not operate without having secured its rights and obligations under the (extended) Electric Law, and obtained approval -- and subsidization mechanisms -- from the required (provincial, local) implementing institution (see above).

#### *B – 2.1.4*

*The Project Concept Note presented for GEF Pipeline Entry is the result of a detailed request received from the project implementing agency, CONAM, through its letter dated August 25, 2000.*

What seems more important to consider is the **minimal size of local DRE program** so as to permit amortization of the O&M -- by necessity: local -- infrastructure over the duration of the investment and the number of customers (intervening teams, spare parts deposit, augmentation of service, etc.). The situation is the same *higher potential or low income areas*.

In this respect, the two 'pilot' realizations proposed under GEF financing may be much too small. This point cannot be solved from the reading of the proposed document and should be closely studied in the preparation phase. Common after sales services may be more easily -- and more cheaply -- organized in a multi stakeholder environment (in low income areas) than in a higher potential area unless local stores can be involved in multi-servicing tasks, on a commercial basis.

#### *B – 2.1.4*

*We believe that the size of decentralized electrification pilots should allow sufficient business volume for the operators, but we will revisit this issue during the appraisal mission (which could mean an increase in GEF cofinancing for the corresponding pilot projects – currently at US\$0.5 million)*

#### **2.1.5. A major missing issue: "tarification rules" in decentralized rural electrification**

The proposed documents appear very discreet on this point. They quote only the 'Electricity Law' in stating that *specific regulations need to be elaborated and applied, especially in regard of tariff setting ...*". All this can be declined along known rules and experiences as long as grid connection is in effect.

A real burden comes when photovoltaic lighting systems are at stake, where very few kWh are used, each kWh very costly, in connection with a high efficiency lighting appliance, thus delivering a **lighting service** at a final whole cost affordable to the end user (according to usual estimates on WTP figures).

When addressing the question of "barriers" and WTP, quoting that there is a poor understanding of the rural market, the authors of the project P063644 omit to specify what is to be paid for.

Should the user pay for the kWh ? should it pay for the 'service' delivered ?

Should the grid connected user have a different basis for tarification than the decentralized used ? The question is not trivial and must be addressed in the Electric Law since it deals with equity principles. Unless modified, the Electric Law did guarantee the same

tariffs for users connected to grid and to not interconnected systems. As far as we know, there is no written disposition concerning PV kit systems.

We can see on this point a quite tricky juridical issue whose consequences may have a major impact on cost-effectiveness evaluation of projects and programs.

It could be appropriate that "captive PV" applications, at least, -- such as lighting -- escape the tariff system based on long run marginal cost and sales based on metered kWh, but this would need to be legally stated somewhere.

*B – 2.1.5*

*It would indeed be a problem if the user of individual systems was charged per kWh because of possible correlation with the price for grid electricity. But the business model that will likely be used is the fee-for-service, for a better quality and equivalent cost compared to systems currently used for lighting, radio, TV.*

#### **2.1.6. Another missing issue: acceptability of PV systems / dispositions to keep up with demand growth**

It may be irrelevant to introduce the questions of acceptability of PV systems when they are part of a "grant" brought by an institution, even on a cost sharing basis with the end-user. However, experience in north African country has shown that villagers did refuse DRE with photovoltaic, for the reason of not trusting the investors in its ability to cope up with next year demand growth (for income generating activities, for instance). Alternative with diesel and mini-grid were more favorably considered. (and sometimes spontaneously realized).

This will be more a suggestion than a critic the project, aimed at poverty reduction and development should pay utmost attention to this component *keeping up with demand growth* when working on organizational, legislative and concessional issues. Taking into account the dynamic dimension of rural electrification seems to be an ethical necessity, i.e.: not to deny -- by a fixed once through supply -- that economic development will occur and be prepared to face the new demand which will result.

*B – 2.1.6*

*One of the criteria for participation of providers/operators of individual PV systems should indeed be their demonstrated capacity to respond to demand. And reluctance to acceptability of systems and providers by the users is a potential barrier that will be examined during project implementation.*

## **2.2. Energy Efficiency**

### **2.2.1. Lack of energy efficiency policy**

It is a reality, but it is uncomfortable to face this statement, as it implies that an "energy efficiency policy" should be something apart from a national energy policy, something added as a corrective factor to a deficient concept of policy making. We have made comments on the short and long term components of the efficiency policy. (Cf. 1.2.1 ii)

In fact, the proposed document delivers a strong invitation to the Government of Ecuador to formulate a long term "sustainable energy policy for sustainable development". The redundant formulation we use intentionally here is emerging from the preparatory work undertaken by a United Nations Intergovernmental Panel of Experts in view of the next session of the Commission for Sustainable Development 2001.

The authors of the PERPTAL document are very right in underlining the necessity for the GOE to express a comprehensive energy strategy. One could here quote some "guiding principles" which have been proposed by the 15 Member states of the European Union to this end :

**Table : E.U. Guiding Principles for a Sustainable Energy Policy**

- |  |
|--|
| <p><i>A. Governments, in the context of the evolving role of the State in the energy sector, continue to have the responsibility to conceive and apply national energy policies to achieve sustainable development of energy producing, distributing and consuming activities.</i></p> <p><i>B. Policy should aim to combine achievement of public goals and efficient functioning of markets.</i></p> <p><i>C. Sustainable energy considerations must be integrated into sectoral policy and decision making in areas such as transportation, industry, agriculture, urban planning, construction, etc.</i></p> <p><i>D. Given the increasing importance of the private sector, consumers and civil society at large, governments should facilitate participation of the multiple stakeholders in the preparation and implementation of energy strategies and policies.</i></p> <p><i>E. Co-operation at the regional level between countries in similar situations should be encouraged to build on shared goals and experience.</i></p> <p><i>F. Given the long life of energy production, distribution and consumption infrastructure, sustainable energy strategies should cover many decades and the implementation of renewable energy production and energy efficient infrastructure should begin without delay.</i></p> <p><i>G. As per Agenda 21 resolutions, sectoral strategies should take into account the necessity to intensify energy conservation, achieve optimal energy efficiency and encourage increased use of renewable energy in all sectors of activity. Development of energy services, and construction of energy production facilities, should be undertaken on the basis of projected energy demand in each major economic sector: transport, buildings, industry, agriculture, etc.</i></p> |
|--|

Belonging to long term policy planning, this issue is largely cross-sectoral and is consequently relevant to the highest level of the Government, responsible for national development sustainability. The concept of Energy Efficiency should not be considered as belonging to the electricity sector only, the major trends in consumption growth and unsustainability reside more likely in the transport sector and urban development.

#### *B – 2.2.1*

*Point well taken. The project will look at enhancement of energy efficiency as part of GOE's overall energy sector strategy, that would consider the impact of energy inputs in other sectors and the economy at large.*

One should take note that Brazil has recently created an Energy Strategy Council at the level of the Presidency.

#### 2.2.2. Lack of adequate distribution utility and end-user incentives and motivation

We have already quoted the basic conflict of interest between supply side and demand side in addressing the issue of energy efficiency. This can be helped partly by clever regulating dispositions of the electric sector. The example of California in the 80's has shown, this possibility.

The proposed development of ESCO's is appropriate, and also the establishment of minimum performance standards for manufactures products and appliances. The tariffs structure could be modulated in such a way as to discourage excess consumption, but, nevertheless, the conflict situation between supply and demand may be understood as a motivation, since Ecuador has reformed the basic prices in order to better reflect costs. Integration of externalities could provide a further step ahead in favor of energy efficiency.

#### *B – 2.2.2*

*Development of standards/regulations and involvement/interest of equipment manufacturers (specially national manufacturers) is truly a condition of success.*

In addition to the proposed ESCO's, it may appear useful that a public opinion momentum be also created by information campaigns, not only on behalf of the GOE, but also building on professional unions of appliances manufacturers, or an association of the stakeholders of the energy efficiency challenge, as proposed hereunder. (CC.7.2)

#### 2.2.3. Lack of technical capacity

The list of tasks in the GEF Concept paper deals quite exhaustively on the capacity building necessities, and, properly, employs the Academia to this tasks, which is a supplemental excellent approach for sustainability.

As far as a "governing body" is required for implementing a given set of targets in the Energy Efficiency field, the report as also considered positively this issue. We can only support it strongly, by experience gained in the European countries, where all states have their own entity "in charge", and with very diverse and equally operative forms : public, private under contract, semi private, etc. Furthermore, these "in charge entities" have their own international Club. The European club ER has disseminated a Mediterranean Club (MEDENER), but failed in eastern European countries which, at first , wanted to get rid of the ancient 'brotherhood' imposed by the former regime.

WE suggest in Part B, to consider the possibility to put "in charge" of Energy Efficiency a Club or Association of the stakeholders of the energy efficiency policy, and they are many concerned in all segments of the civil society.

*B – 2.2.3 The suggestion of a stakeholder association to drive energy efficiency activities will be reviewed during project implementation and could be incorporated as part of institutional arrangements of the energy efficiency strategy to be prepared during project implementation. Of course, a right balance will have to be found between benefits of cross-sector participation*

*(knowledge sharing, consistence between programs, etc.) and the inefficiencies inherent to large meetings/groups (difficult consensus, delays in actual implementation of measures, etc.).*

#### 2.2.4. Lack of adequate appliances and standards

The GEF Concept paper addresses very well this question, with implication of the Academia. One should not forget that it is not easy to impose standards, which may endanger some vested interests. If the technical definition and control of the quality of the equipment and appliances may be institutionally entrusted to a public (or private) body, it remains that the path to changing habits requires a lot of human resistance.

In such an issue, the role, again, of a large stakeholders association may prove decisive.

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## C. REVIEW OF GEF PROJECT CONCEPT DOCUMENT

The GEF concept document constitutes a sub component of the main project PERPTAL where it addresses several specific issues, not covered by the main project,.

Constructive interference with the main component is a critical path for the successful development of PERPTAL as a whole. We consider that CONAM is in an appropriate decision making situation, above other implementing agencies, so as to provide for required coordination and synergy.

The list of specific deficiencies of the power sector reform programs in Ecuador has been considered and commented in the first part of this review (Cf. B. 2 above)

The review will focus here primarily on GEF related issues, keeping in mind the status of Block B Grant, i.e.: still a preparation phase serving to clarify and choose final implementation schemes.

### 1. SCIENTIFIC AND TECHNICAL SOUNDNESS OF THE PROJECT

The value added of the GEF component to the baseline scenario (PERPTAL without GEF) is clearly stated in the para. *Gaps of the baseline scenario* (page 5) it is an ambitious attempt to introduce long term sustainability issues in the national Ecuadorian energy policy -- namely for the component 'Energy Efficiency'. The organizational matters and the set of institutional partners involved in Ecuador for program implementation are not newcomers and all have a quite long experience of working on the subjects addressed by the project.

The technical activities listed in *Table 3 Incremental activities of the GEF alternative* are sound and appropriate for both domains of application, **however** they do address only the downstream components for implementing such programs, with only a very minimal effort devoted to the *legal and regulatory framework* which needs -- as in all countries -- a very close attention for creating an "enabling environment" for private entrepreneurs and investors.

*C 1 Tasks #3 for both the rural electrification and energy efficiency components focus on the identification of changes in existing legal and regulatory frameworks and dispositions, that will be necessary to provide adequate incentives for private firms to undertake energy efficiency and rural electrification. During appraisal we will review whether funding for these tasks is adequate or needs to be increased.*

#### 1.1 ENERGY EFFICIENCY

In the *Energy Efficiency domain*, the effort is limited to 200 000 US\$, with a dominant contribution of GEF for 125 000 US\$ and covers only the survey of energy demand and Energy Efficiency (EE) potential. This seems very limited, owing to the major importance of EE policy on climate change issues during the next decades, in all countries.

In true terms, as Ecuador is a developing country, with a final energy consumption in 1995 in the range 0.5 to 0.6 Toe (ton of oil equivalent per capita) -- its progress along the development path should lead the country to a mere 2 to 2.5 Toe per capita within two decades. Owing to the time required for energy efficiency measures to produce effective results, the targeted energy savings should be based on the future energy demand rather than on the present one.

*C1.1 We have already taken into account estimated future energy demand in the quantification of expected energy efficiency improvements to be obtained through the GEF component.*

Of course, it is needed to start as soon as possible an Energy Efficiency policy at country level, since creating an *energy efficient attitude* is a prerequisite for sustainability, and the actions listed in the Project Concept Document are very sound and very appropriate in this respect. In our opinion, a GEF intervention should not be kept limited to support *correcting measures* to remedy to deficiencies in energy planning. These measures are not sufficient.

The Government of Ecuador might also be interested in considering the policy and measures which would address the *fast coming energy demand* which is **five times more important than the present one**. Addressing this five times larger target deserves more than a *corrective attitude*, well served by ESCO's, capacity building, public information campaigns, etc, it deserves a change of attitude also at energy policy making level. Under such challenge, it would have been fine that the item *Survey of energy demand and energy efficiency options* be extended to a work on energy planning and regulatory disposition addressing the future energy demand. Up to what extent this future demand can be curbed by proper land management dispositions (energy efficiency in urbanization, transports, industry) and up to what measure this demand can be satisfied by renewable energy is a true challenge for the 21<sup>st</sup> century that GEF should consider.

More consideration on this is given in the review of *PERPTAL Document*, when commenting the "list of deficiencies" observed in the legislative and regulatory context. It is not clear on what funding these steps may be undertaken.

Also, the PERPTAL document considers Demand Side Management and Integrated Resource Planning as valid options, this does partly deal with the questions raised above, but this is unfortunately not yet part of PERPTAL. Our remark goes significantly beyond these two options, since it suggests to address energy efficiency issues in all energy consuming sectors and not in the electric sector only, which is the generally accepted significance of DSM.

### *C.1.1*

*The energy efficiency component focuses mostly on electricity end-use efficiency and electricity load management, because ( i) previous programs were already developed in Ecuador in the 80s/90s regarding other energy sources and efficiency in supply and petroleum products; (ii) including other energy sources and sectors might make the component too large and ambitious. However energy efficiency measures implemented by energy services companies, professional associations and other entities in the industrial sector would consider overall use of all energy sources. Reduction in CO2 emissions presented in the PAD include only those reductions resulting from electricity efficiency measures..*

## 1.2 RURAL ELECTRIFICATION

More remarks are needed on this domain.

**First, there is a legal and regulatory component** which is also addressed, *Evaluation and improvement of the legal/regulatory framework for rural electrification* which is of prime importance. Remarks made on this subject have been detailed in the review of the *PERPTAL document* and, basically, cover 3 crucial items:

- i) the status of investors in decentralized rural electrification (DRE) schemes : they should benefit from a recognized status (temporary monopoly, concession) in order to have a defined time span for the amortization of their investment;
- ii) the access of private investors to the FERUM subsidy (or an equivalent system) must be well defined

*Establishing the legal/regulatory position of these operators vs. privatized distribution companies (that could themselves be operators for decentralized electrification) as well as their access to a dedicated mechanism to provide adequate subsidy for decentralized rural electrification, is necessary and will be defined during project implementation.*

- iii) there is a juridical point concerning tariffs which is likely not clear in the electricity law: is it legal for DRE companies to sell a "final service" (e.g.: so many hours of lighting per day) or should they, for equity reasons, continue to sell metered kilowatt-hours ? in such case, photovoltaic electricity is dead for this purpose.

*The operators involved in decentralized rural electrification will indeed sell a service that is a different from grid-connected electricity and will be considered as such in legal and regulatory dispositions. In addition, in principle there will be no metering in decentralized systems.*

**Second, there is a need to segment more clearly the market :** reading the proposed documents leads to the clear understanding that there are, in fact , two distinct zones for DRE: market zones, labeled as *higher potential*, and *poverty reduction zones*, not eligible for private investors for lack of true market, but where *development responsibility* of the public authorities is concerned by priority actions -- together with many other institutions and NGO working in these areas.

The pro-active attitude brought by the GEF component for electrification of the rural areas would gain in clarity if these two very different contexts were recognized (may be from the proceed of the item *Market survey in rural and marginal urban areas* ) and DRE approaches tailored in consequence (not the same barriers, not the same set of stakeholders, not the same financial environment).

*We agree that the barriers, stakeholders, market and financial environment will be different between the two types of markets that were identified for decentralized rural electrification (i.e. high potential and poverty reduction), but it should also be noted that these markets are likely to overlap to some extent in most zones.*

**Third, the size of the demonstration projects is too small.** This a critical element, for their survival. It is difficult to criticize the soundness of the demonstration proposed, unless from the point of vue of their access to O&M services, which need to be created and should last several years on a much too narrow servicing base. This component is maybe the weakest of the project, even if it is the most dramatically useful on the short term.

*The size, nature and number of demonstration projects to allow defining sound and sustainable delivery mechanisms adapted to different markets, will be reviewed and determined during the appraisal mission. It is possible that the size of this subcomponent has to be increased (see comment under B.2.1.4 above).*

In the GEF Block B study, the meagerly funded most critical item is probably **Design and Evaluation of sustainable and organizational mechanisms ..etc.** The suggestion to link it with telephony services is probably to be considered, but linking with other **pre-existing** services in the considered areas is also envisage, since these structures (mechanic repair shops, radio dealers, hardware, garages ?) already survive from a commercial activity.

*We welcome the excellent suggestion of assessing the use of existing commercial activities in rural areas (including distributors of household appliances and hardware, mechanical shops, etc.) to deliver individual energy services or commercialize the corresponding systems. This will be reviewed during project implementation.*

The study might aim at selecting the demo projects in priority areas where the intentions of the GOE to pursue a generalized rural electrification program are clearly established.

*Government commitment to conduct a decentralized electrification program is indeed a must for replicability, not only central government but also local governments; and it will be nurtured during project implementation. Such commitment already exists at the central government level, as evidenced by government intended counterpart funding for GEF components and their mobilization of additional financing (e.g. CAF funding for PV-powered public service installations in border areas)*

## 2. IDENTIFICATION OF GLOBAL ENVIRONMENT BENEFITS

Not addressed in the GEF Concept Document which I have in hands, but in the main PERPTAL document, this issue is not likely to receive quantified answers, but only qualitative answers.

### ENERGY EFFICIENCY

Assumptions made for energy savings in the electric sector in the PERPTAL document are coherent with the hypothesis made on penetration of new appliances, but appear quite conservative. One could hope a higher and faster penetration rate of high efficiency lighting in commercial sector, owing to the readjusted tariff for electricity and stimulation processes. One difficulty could arise from the situation of unbundling, since the possibility to defer the construction of new generation capacity by the electricity producer -- by disseminating compact fluorescent lighting -- will be screened by the distribution company whose primary profit is not in consumption reduction (unless distribution capacity is saturated).

A very crude cross evaluation can be made on the basis of an gross annual electric generation of 10 000 GWh among which 1% (100GWh) would be annually saved by project year+5, with a commercial value of 10 US cent per kWh. This leads to an annual saving on electricity of 10 million US\$. This figure compares with the value given in *Table 4 GEF alternative benefits /PERPTAL document* 13.5 million US\$. The order of magnitude is correct, since it is not unrealistic to imagine curbing electricity demand growth by 1% in project year 5, with respect to *laissez faire* situation. It will however be difficult to discriminate between the savings obtained by specific EE measures and those simply due to the price tag.

Corresponding figures for avoided CO<sub>2</sub> should take into account the mix of electricity production which was in Ecuador in 1995 38 % thermal and 72 % hydro. Then, 100 GWh saved from thermal production corresponds to 8.4Ktoe saved on the basis of 0.222 Toe per 1000 kWh --- this, in turn results **25 000 tons of CO<sub>2</sub> annually** avoided on the basis of 3.06 kg CO<sub>2</sub> per koe. The figure given in Table 4 appears *overestimated on an annual basis* (5 195 000 in the DRAFT version of the document), *but not overestimated* if the figure refers to the *cumulated* CO<sub>2</sub> emissions avoided on the 20 years assumed life time of energy efficient equipment installed at project year+5.

This should be compared to the total CO<sub>2</sub> annual emissions for Ecuador reported in the World Development report as 22.6 million tons CO<sub>2</sub> for the year 1995. Precision must be given on

the method of calculation and assumptions made with respect to the period on which the savings are cumulated. With the data contained in the document to review, it is not possible to make a sound critic of the figures proposed.

#### RURAL ELECTRIFICATION

The potential is not minor, since the rural population is estimated to be 35 % still in 2010. Present emissions tied up with the electric sector are negligible today, and the "avoided emissions" by DRE with renewable energies will be minimal too.

However, the challenge is significant in the hypothesis of a sustained development and renewable energy electrification in rural areas, large development of mini-hydro resource for productive activities, and, in due time, biomass gasifier generator systems in amazon provinces.

The figures given in the report have been calculated, not on an annual basis, but over the project life (not specified but some indications suggest that this period is 15 years for PV systems).

The quoted figures of 24250 Tons of CO<sup>2</sup> (79 000 with induced impact on 8 887 household and 1404 public units) may be compared with estimates given in *the E.U. APPLIMAR Study April 1998* bearing on 42 000 household and 10 hydro scheme of 300 kW for small industries. In this study, CO<sup>2</sup> avoided was estimated to 58 742 Tons on an annual basis.

It is necessary to specify again here the assumptions made, in particular concerning the "baseline" scenario which, if equipped with diesel units. For practical reasons, a diesel based system will use units of larger capacity than required at the onset of rural electrification, utilized very often under capacity and with a very poor efficiency. Fuel used to transport the diesel fuel on site should be added to the baseline consumption. These systems are, of course, dissuasive from a climate change point of view, if not from economics only, but they have the capacity to cope more easily with an increase of the demand for electricity services. Biofuel operated diesel and mini-grids should not be excluded from the technical choices.

C2

*Calculation of benefits, costs, and underlying assumptions, in particular penetration rates and respective efficiency impacts of price adjustment and GEF-financed activities, will be revisited during appraisal mission, on the basis of experience in other countries and results from consultancies conducted under PDF financing.*

*We have revised in PAD's Annex 4a the estimates for CO<sub>2</sub> emission reductions from decentralized rural electrification, considering substitution of small diesel plants for public services and kerosene lighting in households, as a proxy. The corresponding assumptions will be revised during appraisal, if needed.*

### 3. HOW DOES THE PROJECT FIT WITHIN THE CONTEXT OF THE GOALS OF GEF

The combination of a *basic action on the main components* of energy consumption in Ecuador (energy planning, energy efficiency, potential action through Integrated Resource Planning) -- and a *sustainable development action* in unserved areas, seems to fit well with the Goals of GEF program, namely by its "additive" nature. This project relies deeply on GEF funding for triggering actions and development which would likely not be easily undertaken otherwise, mainly by lack of awareness and lack of capacities to address these difficult issues through *business as usual* approaches.

In that sense, it is truly an incremental approach.

#### 4. REGIONAL CONTEXT

Ecuador is fortunately located in a world area where many rural electrification programs have been undertaken with success in the past years (Argentina, Brazil, Mexico..), with a strong commitment of the governments to create an enabling environment for the private sector initiative.

The rules may be different for the incentives brought to the programs and for the manner to redistribute funding to help the poorest in the country, but there is a very active concern and context for sustainable rural development in this part of the world. The Ecuador-Peru bilateral Committee is a proof of an actual regional dimension to this approach.

The project proposal is aware of this situation and has taken references from such ongoing programs (Argentina). OLADE is an appropriate institution to provide exchange of expertise between countries of Latin America on these crucial matters.

#### 5. REPLICABILITY OF THE PROJECT

The question applies principally to the Rural Electrification component. As the project only encompasses *Demonstration or Pilot phases* it is obviously required that the local partner Ecuador/CONAM has a commitment to use the GEF phase as the initial step of a larger decentralized rural electrification program.

*Government and other stakeholder commitment to a decentralized electrification program of sufficient size will indeed be the key to project replicability. This commitment will be established/strengthened during project implementation (see also C1.2 above)*

The *Commitment of the Government* quoted in detail in the GEF Concept Paper (page 5) seems to bring sufficient insurance on this matter.

As for Energy Efficiency policy, one may hope that Ecuador, by its strong institutional set up, be a source for disseminating a sound example of DSM and IRP in the region, if it may address some of the recommendations made above.

#### 6. SUSTAINABILITY OF THE PROJECT

The dispositions and tasks summarized in Table 3 appear to cover most of the basic requirements for sustainability of such program, once the assistance provided by GEF has terminated. It is however to include in the requirements for sustainability the specific suggestions made above in the *Review of the PERPTAL document* concerning the legal and regulatory dispositions , apparently untreated in the project.

Owing to the narrowness of Pilot and Demo project, there sustainability is granted only on the condition that they are located in an area where the GOE undertakes, in continuity, a large scale DRE project, in order to secure a sufficient revenue to O&M operators to survive -- and serve (at cost) the GEF pilot and demo.

*See above comments C5 and C1.2. Ensuring project replicability is one of the conditions to ensure sustainability, other ones being: private involvement, appropriate legal and regulatory framework, efficient subsidy mechanisms, consumer/supplier information and adequate institutional capacity.*

## **7. SECONDARY ISSUES**

### 7.1. Linkages to other programs at regional level

The Concept Paper for GEF enumerates a quite large number of on-going activities, mainly in the area of rural electrification/rural development, undertaken by various entities, aid institutions and NGO. It is the task of the recipient country to manage a proper synergy and cooperation between these initiatives, and it is to its own benefit.

In many cases, the 'partner' national institution has no reach upon activities carried out in other ministerial departments, other provinces, or with other donors. In the present project, all documents show evidence that CONAM the responsible entity for PERPTAL, is in such a high position in Ecuador as to be able to ignore the traditional administrative barriers. This should guarantee the required linkages between programs, especially for those responding fundamentally to energy, environment and development.

### 7.2. Degree of involvement of Stakeholders in the project

This is a critical issue, namely for questions of sustainability. Each specific domain has its own set of stakeholders -- or should have.

The set of stakeholders for **energy efficiency** should include energy consumers, energy distributors, energy producers, lending institutions, commercial banks, but also professional unions of industries (as major consumers), city managers, household associations, equipment manufacturers, and also again representative of ministerial departments outside of the energy sector (such as transport, commerce, small enterprises development, finance and customs, etc.)

In a previous study for the Asian Development Bank in Malaysia, the author had recommended that an Association of the Stakeholders be installed as an advisory committee for energy efficiency, with some delegation of initiative to be defined. This is probably a practical manner to build on public/private partnership, if sufficient motivated leaders can be discovered.

For **rural electrification**, the set of stakeholders will be somewhat different *for higher potential areas* and for *low income areas*. The latter will include "development partners" since the complex situation of poverty areas invites to consider an integrated approach of development services, where energy plays a transversal role and cannot be treated as an item separated from the other. From this project, it is straight forward that it should include telecommunication partners, but it should also invite from the start, partners able to deal with the income generating activities in the rural areas. Out of this key element, the sustainability of any rural electrification program might remain a pure wishful thinking.

In short, we invite the responsible of the GEF component of the project to pay a more detailed and formal attention to the question of stakeholders, and even to set up reflection clubs

with a selected list of them. This would greatly participate in the awareness raising on the project, and, furthermore, gather very valuable information and support from sometimes unexpected sources.

*Appropriate involvement of stakeholder in designing and implementing the project components, as well as in replication and follow-up projects is one of the keys to success of the GEF components. Stakeholder assessment will be developed with PDF financing and the issue of stakeholder information, consultation and participation will be carefully reviewed during project appraisal, with support from Bank staff from the resident mission specialized in these aspects.*

*See above comment B2.2.3 regarding the idea of an association of stakeholders.*

### 7.3. Capacity building aspects

The list of capacity building requirements and tasks decided to fulfill them is very impressive in the project document and nothing seems to be added.

### 7.4. Innovativeness of the project

The most crucial innovation seen in this project is to address the necessary updating of the legal and regulatory aspects of the decentralized rural electrification, in order to create an enabling environment for the entrepreneurs, the communities and the financiers.

It should help at improving the situation observed in past reforms of the energy sector of the Bank, where no appropriate disposition were taken --- namely for rural electrification and energy efficiency -- outside the rules governing the principal utility, overlooking the specific situation to be addressed in the less profitable areas of the country.

*Excellent suggestion: we will document the experience of Bolivia's power sector reform as a case in point.*

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