See Annex 9 | Cost Benefit Analysis Summary

Document of
The World Bank

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Report No: 34092-HN

PROJECT DOCUMENT

ON A

PROPOSED GRANT FROM THE
GLOBAL ENVIRONMENT FACILITY TRUST FUND

IN THE AMOUNT OF US$2.35 MILLION

TO THE

REPUBLIC OF HONDURAS

FOR A

RURAL ELECTRIFICATION PROJECT

November 22, 2005

Finance, Private Sector and Infrastructure
Country Management Unit for Central America
Latin America and Caribbean Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective November 2, 2005)

Currency Unit	=	Lempira
18.90 Lempiras	=	US$1
US$	=	SDR 1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AMHON	Honduras Association of Municipalities
APL	Adaptable Programmatic Loan
CABEI	Central American Bank of Economic Integration
CAS	Country Assistance Strategy
CDD	Community Driven Development
CNE	National Energy Commission *(Comisión Nacional de Energía)*
CO2	Carbon dioxide
CPSC	Commission for Civil Society Participation
CQ	Consultant Qualification
CRA	Regional Environmental Council *(Consejo Regional Ambiental)*
EA	Environmental Assessment
EIRR	Economic Internal Rate of Return
ENEE	National Power Company (Empresa Nacional de Energía Eléctrica)
EU	European Union
FHIS	Honduran Social Investment Fund *(Fondo Hondureño de Inversión Social)*
FI	Financial Intermediary
FMR	Financial Monitoring Report
FONAC	National Convergence Forum *(Foro Nacional de Convergencia)*
FOSDE	External Debt Social Fund *(Fondo Social de la Deuda Externa)*
FOSODE	Social Electrification Fund *(Fondo Social de Desarrollo Eléctrico)*
GAUREE	Autonomous Generation and Rational Use of Electrical Energy (*Generación Autónoma y Uso Racional de la Energía Eléctrica)*
GEF	Global Environmental Facility
GHG	Greenhouse Gas
GOH	Government of Honduras
IBRD	International Bank of Reconstruction and Development
ICB	International Competitive Bid
IDA	International Development Association

Vice President:	Pamela Cox
Country Manager/Director:	Jane Armitage
Sector Manager:	Makhtar Diop
Task Team Leader:	Dana Rysankova

IDB	Inter-American Development Bank
IHAH	Honduran Institute of History and Anthropology *(Instituto* Hondureño de Historia y Antropología)
INE	National Statistics Institute *(Instituto Nacional de Estadística)*
IRR	Internal Rate of Return
LCS	Least Cost Selection
LM	Municipal Law *(Ley de Municipalidades)*
M&E	Monitoring and Evaluation
MFI	Microfinance Institution
MHP	Micro Hydro Power
MSE	Micro and Small Enterprises
NCB	National Competitive Bid
NGO	Non-Governmental Organization
NPV	Net Present Value
O&M	Operations & Maintenance
OES	Social Electrification Office (*Oficina de Electrificación Social)*
PAAM	Municipal Environmental Action Plan
PC	Participating Company
PCU	Project Coordination Unit
PEDM	Municipal Development Strategic Plan *(Plan Estratégico de Desarrollo Municipal)*
PERZA	Off-Grid Rural Electrification Project
PIR	Rural Infrastructure Project (*Proyecto de Infraestructura Rural*)
PLANES	Social Electrification Plan *(Plan de Electrificacion Social)*
PPA	Power Purchase Agreement
PRODDEL	National Program for Decentralization and Local Development
PRSC	Poverty Reduction Strategy Credit
PRSP	Poverty Reduction Strategy Paper
PV	Photovoltaic
QAT	Quality Assurance Team
QCBS	Quality and Cost Based Selection
RET	Renewable Energy Technology
RIAP	Rural Infrastructure Action Plan
RLM	Municipal Law Regulation (*Reglamento de Ley de Municipalidades)*
SA	Special Account
SEFIN	Ministry of Finance *(Secretaria de Finanzas*)
SERNA	Ministry of Natural Resources and the Environment *(Secretaría de Recursos Naturales y Ambiente)*
SGJ	Ministry of Governance and Justice *(Secretaría de Gobernabilidad y Justicia)*
SHS	Solar Home System
SINEIA	National Environmental Evaluation and Impact System
TA	Technical Assistance
TV	Television
UMA	Municipal Environmental Unit
UMAS	Social and Environmental Management Unit
UNA	Sectoral Environmental Unit
USAID	United Status Agency for International Development
UTI	Inter-Municipal Technical Unit
UTM	Municipal Technical Unit
VAT	Value Added Tax
WTB	Willingness to Pay

HONDURAS

HN RURAL INFRASTRUCTURE PROJECT

PROJECT APPRAISAL DOCUMENT

LATIN AMERICA AND CARIBBEAN

LCSFT

Date: November 22, 2005 Country Director: Jane Armitage Sector Manager/Director: Makhtar Diop Project ID: P086775 Lending Instrument: Specific Investment Loan	Team Leader: Dana Rysankova Sectors: Roads and highways (40%);General water, sanitation and flood protection sector (30%);Power (30%) Themes: Rural services and infrastructure (P);Infrastructure services for private sector development (S);Decentralization (S) Environmental screening category: Partial Assessment Safeguard screening category: Limited impact
Global Supplemental ID: P090113 Lending Instrument: Specific Investment Loan Focal Area: C-Climate change Supplement Fully Blended?: No	Team Leader: Dana Rysankova Sectors: Renewable energy (100%) Themes: Rural services and infrastructure (P);Infrastructure services for private sector development (S)

Project Financing Data

[ ] Loan [ ] Credit [X] Grant [ ] Guarantee [ ] Other:

For Loans/Credits/Others:
Total Bank financing (US$m.): 0.00
Proposed terms:

Financing Plan (US$m)

Source	Local	Foreign	Total
BORROWER/RECIPIENT	2.60	0.00	2.60
GLOBAL ENVIRONMENT FACILITY	0.90	1.45	2.35
EC: EUROPEAN COMMISSION	0.04	0.20	0.24
GLOBAL ENVIRONMENT - ASSOCIATED IDA FUND	12.90	3.00	15.90
Total:	16.44	4.65	21.09

Borrower:

Responsible Agency:
Honduras Social Investment Fund (FHIS)
Edificio Alto de Toncontin
(frente a la Iglesia Amor Viviente)

Tegucigalpa
Honduras
Tel: 504-233-9187
LYuWay@fhis.hn

Estimated disbursements (Bank FY/US$m)									
FY	2006	2007	2008	2009	2010	2011	0	0	0
Annual	0.10	0.25	0.50	0.50	0.50	0.50	0.00	0.00	0.00
Cumulative	0.10	0.35	0.85	1.35	1.85	2.35	2.35	2.35	2.35

GEF Estimated disbursements (Bank FY/US$m)									
FY	2006	2007	2008	2009	2010	2011	0	0	0
Annual	0.10	0.25	0.50	0.50	0.50	0.50	0.00	0.00	0.00
Cumulative	0.10	0.35	0.85	1.35	1.85	2.35	2.35	2.35	2.35

Project implementation period: Start July 8, 2005 End: December 31, 2009
Expected effectiveness date: December 30, 2005
Expected closing date: June 30, 2010

Does the project depart from the CAS in content or other significant respects? ***Ref. PAD A.3***	[ ]Yes [X] No
Does the project require any exceptions from Bank policies? ***Ref. PAD D.7***	[ ]Yes [X] No
Have these been approved by Bank management?	[ ]Yes [ ] No
Is approval for any policy exception sought from the Board?	[ ]Yes [X] No
Does the project include any critical risks rated "substantial" or "high"? ***Ref. PAD C.5***	[X]Yes [ ] No
Does the project meet the Regional criteria for readiness for implementation? ***Ref. PAD D.7***	[X]Yes [ ] No

Project development objective ***Ref. PAD B.2, Technical Annex 3***
The GEF project development objectives are: (i) improving access, quality and sustainability of electricity services through the development of offgrid electrification model projects, and (ii) developing capacities and enabling environment for offgrid electrification in a decentralized setting.

Global Environment objective ***Ref. PAD B.2, Technical Annex 3***
The project's global environmental objective is to achieve greenhouse gas (GHG) reductions through the reduction of policy, informational, financing and institutional capacity barriers that currently hinder renewable energy technology (RET) dissemination and market development in Honduras (GEF Operational Program No. 6). Consistent with GEFs new strategic priorities, the Project will result in significantly increased financing availability for selected RETs and catalyze the creation of local markets. It will demonstrate innovative and sustainable social and productive applications of RETs in rural areas.

The main GEF Performance Indicator is the amount of CO2 abated over 20 years by pilot projects, estimated at 425,000 tCO2.

Project description *[one-sentence summary of each component]* ***Ref. PAD B.3.a, Technical***

Annex 4

The Rural Infrastructure Project will be developed primarily in six *mancomunidades* (associations of municipalities.) in Honduras, starting with CRA – *Consejo Regional Ambiental* (in the department of Santa Barbara) and CHORTI[1] (in Copán).[2]

The Project is integrated with the IDA-financed Rural Infrastructure Project (PIR), approved on July 7, 2005. The projects are partially blended. Specifically, the GEF Rural Electrification Project co-finances two sub-components of the IDA project (Solar PV Program and Other potential RET pilot projects) and provides technical assistance related to all other PIR components.

Component 1 — Support to the participatory local planning for integrated infrastructure service delivery: Cost:US$0.53 million, GEF: US$0.1 million (IDA: US$0.43 million)

This component will finance the costs of consultants, workshops, training and other technical assistance to *mancomunidades,* local authorities and communities to ensure that offgrid electrification solutions, based on renewable energy technologies (RETs) are known and understood by the beneficiaries and fully integrated into the local Rural Infrastructure Action Plans (RIAPs) prepared under the PIR Project.

Component 2 — Offgrid electricity service delivery: Cost: US$7.39 million; GEF:US$1.35 million (IDA: US$5.25 million; European Commission: US$0.24million; local counterpart contribution: US$0.55 million)

The GEF grant will provide resources for investment and technical assistance for offgrid RET projects, expanding the electrification options under the PIR Project.

- ***Component B.1: Investments in village micro-grids using hydro and other renewable energy technologies:***

  Cost US$3.5 million; GEF US$0.06 million (IDA US$ 2.55 million, EC GAUREE 2 US $0.24 million, local counterpart contribution: US$0.3 million.).

  a) Micro-Hydro Power (MHP): (financed by IDA-PIR and EU-GAUREE)

All investment costs for this sub-component will be covered by the IDA Credit for the sub-projects located at the territory of the participating mancomunidades, and partially by the EC GAUREE 2 Program It is planned to finance up to 8 micro hydro power projects (MHPs) of capacity between 50-100 kW each during the 5-year Project duration. The first MHP to be financed are o a) 55 kW La Atravesada in *Mancomunidad* CHORTI, and b) 80 kW Las Champas in *Departamento* Colon.

[1] CHORTI is named after the indigenous group Chorti living at the territory of the *mancomunidad.*

[2] The project will be developed primarily in *mancomunidades* (associations of municipalities.) There are 298 municipalities in Honduras. Most of them are small (56 percent have populations of less than 10,000). To overcome the size constraint, many municipalities opted to form *mancomunidades,* which are voluntary associations of municipalities, with a separate legal entity and usually a specific purpose (local development, environmental protection etc.) There are about 50 mancomunidades in Honduras

b) Other RET Pilot Project investments (co-financed between IDA and GEF)

Aside from microhydro power, other RETs may be feasible for providing electricity to isolated remote areas of Honduras, including small windpower systems, modular biomass gasifiers and diesel/RET hybrids. The Project will finance the demonstration of at least one stand-alone windpower system or a wind diesel/hybrid installation of about 100 kW, to determine its feasibility in remote areas with good wind regimes.

Component 2.1: Village Micro-Grids using hydro and other renewable energy technologies: Cost US$3.5 million; GEF US$0.41 million (IDA US$ 2.55 million, EC GAUREE 2 US $0.24 million, local counterpart contribution: US$0. 3 million.).

GEF will finance technical assistance activities related to the micro-hydro projects, financed under IDA-PIR (in the participating mancomunidades) and EU-GAUREE/PIR (sites outside the participating mancomunidades, but with an important demonstration potential.) Although, in general, MHPs have lower lifecycle costs than equivalent isolated diesel systems, major informational, financing and institutional barriers prevent their wider use in Honduras. The component will finance several technical assistance activities directly related to the sub-projects, designed to reduce these market barriers, including: training and workshops for community organizations, MHP operators and project developers; identification and preparation of additional pilot MHPs, and definition of site-specific productive applications that could be promoted in Honduras.

Component 2.2: Solar Photovoltaic Market Development Program: Costs: US$3.88 million; GEF grant for systems: US$0.49 million; GEF grant for TA: $0.45 millions (IDA Credit US$2.7 million, expected local counterpart co-financing [optional] 0.24 million)

The solar PV program will target a total installation of about 274 kW over the 5-year duration of the Project. The aim is to establish a sustainable local PV industry structure and fill a gap in rural electrification plans. The potential rural market for PV systems in Honduras includes households, commercial users (retail stores, rural restaurants, microenterprises, etc) and institutional users (schools, clinics, community centers, etc) in dispersed offgrid areas. The GEF will finance market development subsidies (averaging about US$90 per system) to cover the "incremental costs" of shifting to this new technology from traditional practice, and related technical assistance. The GEF subsidies will be complemented by Government poverty reduction subsidies (financed under PIR) to increase affordability of the systems for the poor and mancomunidad contribution within the "market packages" approach.

Component 3 – Local Capacity Building and Policy Development TA: Costs: 1.76 million; GEF US$0.6 million (IDA US$ 1.16 million)

The GEF financing will ensure that enabling framework and capacity is built for managing and implementing offgrid RET sub-projects. The component would support a host of technical assistance and capacity building activities, to ensure that decentralized electrification options, particularly those that utilize renewable energy, are seamlessly integrated into rural electrification planning; that allocation and setting of tariffs and subsidies for offgrid service are rationalized; and that key institutions, as well as local financing institutions and private sector

participants are sufficiently strengthened.

Component 4 — Project management, monitoring and evaluation: Costs US$ 0.96 million; GEFUS$0.3 million; (IDA 0.66 million)

Although FHIS will have an overall responsibility for the project implementation, the technical aspects of the electrification component, including all activities financed under the GEF grant, will be managed by FOSODE through the Social Electrification Office of ENEE. Therefore, the GEF grant will contribute to the project management, monitoring and evaluation activities to be carried out by FOSODE.

Which safeguard policies are triggered, if any? ***Ref. PAD D.6, Technical Annex 10***
Environmental Assessment (OP/BP/GP 4.01)
Cultural Property (OPN 11.03, being revised as OP 4.11)
Natural Habitats (OP/BP 4.04)
Pest Management (OP 4.09)
Indigenous Peoples (OD 4.20, being revised as OP 4.10)

Significant, non-standard conditions, **if any**, for:
Ref. PAD C.7
Board presentation:
None

Loan/credit effectiveness:
Recipient signs Subsidiary Agreement with FHIS
IDA-financed Rural Infrastructure Project is declared effective

Covenants applicable to project implementation:
The conditions of disbursements for sub-projects for each mancomunidad are following:
(a) Framework Agreements between FHIS and participating mancomunidades are signed
(b) UTIs financial management arrangements are satisfactory and operational
(c) UTIs mancomunidades are adequately staffed.

HONDURAS
HN Rural Electrification Project

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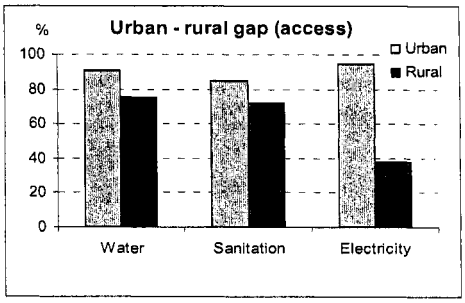
A. STRATEGIC CONTEXT AND RATIONALE

1. Country and sector issues

Honduras is the second largest country in Central America (after Nicaragua) with a land area of 112,492 square kilometers and a population of 7 million. With a GNI per capita of US$1,013 in 2003, it is the third poorest country in Latin America. Poverty and inequality are widespread and reflect the gap between city and countryside. Roughly one-half of the population resides in the rural areas, where incidence of poverty is almost 77 percent, compared to 56 percent in urban areas. Extreme poverty, while declining nationally, has actually increased in rural areas by about 10 percent over the past decade. Inequality, as measured by income per capita, has also grown in the past decade (by three percent), with rural areas accounting for the entire increase. These facts underscore the urgent need to develop programs targeted at improvement of the rural areas.

Infrastructure access. Access to basic infrastructure services in the rural areas is severely limited. The gap between the urban and rural areas is quite significant for all sectors but is particularly striking for electricity -- only 38 percent of rural population has access to electricity, compared to 95 percent in urban areas. The situation constrains the potential for economic and social development and compounds the problems of isolation and poverty of the rural population.



Poverty Reduction Strategy: The GOH completed its Poverty Reduction Strategy Paper (PRSP) in October 2001. PRSP serves as a guiding tool in development of Government programs and sector strategies. The strategy is structured around six pillars and three cross-cutting themes:

PRSP pillars					
Pillar I	Pillar II	Pillar III	Pillar IV	Pillar V	Pillar VI
Accelerating Equitable and Sustainable Growth	Reducing Rural Poverty	Reducing Urban Poverty	Investing in Human Capital	Social Protection for Vulnerable Groups	Guaranteeing Sustainability
PRSP cross-cutting themes					
Gender Equity					
Environmental Sustainability					
Decentralization					

Reducing rural poverty is one of the key PRSP pillars. The key actions in this area include provision of rural infrastructure, including rural electrification.

Environmental sustainability. The PRSP pays specific attention to environmental sustainability, one of the three cross-cutting themes, recognizing a relationship among environmental deterioration, a high incidence of poverty and increased vulnerability to natural disasters. Consequently priority is given to improving environmental management and to breaking the vicious circle between environmental degradation and poverty. Also recognized is the importance of promoting the use of economic-financial instruments such as carbon markets, sale of environmental services, incentives for promoting sustainable management of natural resources

etc. In the case of the PRSP rural electrification program, the environmental concern translates into the stated support for renewable energy technologies:

> **Honduras, Poverty Reduction Strategy Paper, 2001**
>
> Pillar 2: Poverty Reduction in Rural Areas, Objective 2.3 Improving the Competitiveness of the Small Rural Economy; **Program c iv: Rural Electrification**
>
> The objective of this program is to provide rural communities with electric power service that will support production and improve the well-being of the rural population. This program is now being implemented with foreign and Government resources, and with contributions from the communities. Among the modes of energy production, increased support will be considered for renewable sources such as solar energy.

Rural electrification history. Electrification (including rural) has traditionally been the responsibility of ENEE, the integrated state-owned power utility. Until the early 1990s, electricity access has been extremely low (35 percent nationally), one of the lowest in Latin America. Since the early 1990s, electrification was given higher priority and coverage has been increasing steadily by about two percent per year. The key milestone was the establishment of the Social Electrification Fund (FOSODE) by the 1994 Electricity Framework Law, with Government's obligation to contribute a minimum of Lps30 million a year. FOSODE is administered by ENEE, through the Social Electrification Office (OES). Having set up a solid institutional structure, FOSODE is able to attract significant donor resources, in addition to Government budgetary contributions. Between 1995 and 2003, FOSODE invested US$93.3 million in rural electrification, increasing national coverage from 45 percent in 1995 to 68 percent in 2004, with relatively low average connection cost of around $300-400 per household. However, despite some catching up, electricity coverage is still among the lowest in the region. This is mainly due to the extremely low rural coverage—38.4 percent of rural households have access to electricity, as opposed to 95.4 percent in urban areas, according to a recent INE household survey (May 2004).

Practically all past rural electrification programs of the Government have been grid extension. For many unserved communities, however, grid extension is not a feasible or economic solution. As more distant users need to be connected, the average connection costs increase rapidly and are already over $700 per household in recent ENEE projects. In some cases, offgrid technologies can provide electricity at lower cost than grid extension and can match demand in a more flexible way. However, despite the PRSP declaration about the increased focus on alternative projects using renewable resources in rural electrification, no mechanism for subsidy allocation for offgrid projects presently exists. This is due to various institutional and regulatory constraints, as well as Government's lack of knowledge and experience with offgrid technologies and business models that could be applied.

Institutional issues. The sector's structure is defined by the 1994 Framework Law, which prepared conditions for a comprehensive sector reform and private sector participation in the power sector (which, however, has never been fully implemented). The law created the Energy Cabinet as the principal entity in charge of proposing expansion plans, and the National

Commission on Electricity (CNE) as a regulator. The Energy Cabinet, however, has never functioned well. In practice, the function of sector policy has been assigned to the Secretariat of Natural Resources and the Environment (SERNA). SERNA's main role, however, is environmental regulation, and its resources for the energy sector policy issues are limited. The weak institutional structure of the power sector has undoubtedly affected the quality and efficiency of rural electrification efforts. There is no integrated rural electrification policy at the national level. While ENEE is implementing grid extension projects based on its own screening methodology, SERNA is promoting offgrid electrification but lacks the resources to scale-up its efforts. There is little coordination between the two programs and no clear policy on allocation of financing and subsidies for rural electrification. A good practice would be to establish a unified fund for all rural electrification efforts (both grid and offgrid) with clear policy, transparent rules, rational financing mechanisms, and cost efficiency as a major criteria for selecting projects. The Government is now interested in unifying these approaches and expanding the role of FOSODE to include offgrid electrification.

Support to renewable energy projects. The Government's stated objective is to increase the share of renewable energy in power generation. In 1998 Congress approved Incentive Law 85-98 for the promotion and development of small renewable energy projects (below 50 MW). This legislation contemplates tax breaks to developers and an attractive purchase price. This, however, applies only to grid connected projects. The Government is now interested in expanding the use of renewable energy also in offgrid electrification projects, developing new ways to provide electricity to poor isolated/dispersed households in rural areas.

Decentralization reforms: Like many other developing countries, Honduras has acknowledged the limits of the centrally driven service delivery model. The drive towards municipal decentralization started in 1990 with a municipal law which conferred local service delivery responsibilities and fiscal autonomy to the country's 298 local governments, and established a fiscal transfer of 5% of the annual budget to the municipalities. The trend towards decentralization was further reinforced by the PRSP, which underscored the role of the local government in the poverty reduction strategy. Infrastructure services are one of the key areas to be delegated to municipalities. For example, recent reforms in the water and sanitation sector have transferred water and sanitation systems under the municipal authority. The electricity sector so far has been less affected by the decentralization trend -- rural electrification continues to be centrally planned and implemented by the state-owned utility ENEE, but the Government's strategy, in accordance with the municipal law, calls for a greater role of the municipalities in both planning and implementing rural electrification projects.

2. Rationale for Bank involvement

Over the last decade, the Bank has accumulated substantial experience with offgrid electrification projects, and is well suited to assisting the Government in its objectives to (i) expand rural electrification interventions with offgrid solutions, and (ii) apply renewable energy technologies and innovative business models to electricity generation. In particular, successful experiences from similar projects in the region will be applied (Nicaragua, Bolivia, Argentina), as well as worldwide (Sri Lanka etc.).

The Bank is also well suited to embarking on the challenge of decentralized, multi-sector service delivery, to which the proposed project contributes. In the past few years, the Bank has developed innovative approaches to expanding access to quality infrastructure services to the poor, and applied multi-sectoral territorial approaches in several infrastructure projects (e.g. Bolivia Decentralized Infrastructure for Rural Transformation, Chile Infrastructure for Territorial Development Project).

3. Higher level objectives to which the project contributes

The proposed GEF project will support PRSP Pillar 2: Reducing Rural Poverty (fostering access to basic infrastructure services in poor rural areas). The project will also support the cross-cutting PRSP themes of Environmental Sustainability (through its focus on renewable energy technologies) and Decentralization (building capacities of the local governments for local electricity service provision). The project is consistent with the Country Assistance Strategy, discussed on June 24, 2003, which is based on the PRSP.

The proposed GEF project will support a broader US$70 million multi-sector program for Rural Infrastructure (PIR), with financing from IDA (US$ 47 million), CABEI (US$ 15 million), both approved on July 7, 2005 and GOH (counterpart funds of approximately US$ 8 million)). The development objectives of this program are: (i) to improve access, quality and sustainability of infrastructure services (roads, water & sanitation, and electricity) for rural poor in Honduras; and (ii) to develop capacities and enabling environment for locally-driven service provision and planning.

B. PROJECT DESCRIPTION

1. Lending instrument

Grant.

2. Proposed project development objective and key indicators

The GEF project development objectives are: (i) improving access, quality and sustainability of electricity services through the development of offgrid electrification model projects for the rural poor in Honduras, and (ii) developing capacities and enabling environment for offgrid electrification in a decentralized setting in Honduras.

Key Indicators. The specific GEF Project's key indicators include:

Sustainable access and services	Expected outcome Year 5
• Number of new Solar Home System users with sustainable service provision:	Minimum 4,000
• Number of village micro grids using hydro and other renewable energy technologies (financed under PIR) provide quality and sustainable electricity access to rural households, businesses and public facilities.	Minimum 5
• **Increased share of RET in** the rural electrification	30% of new connections in PIR are offgrid RET connections
Local capacity strengthening	
• UTIs (technical units of the *mancomunidades*) operating with trained technical staff, understanding offgrid electrification issues;	6 UTIs operating satisfactorily by Year 5
• Adoption of a rural electrification policy, integrating all technologies (grid and offgrid)	Complied with Year 3
• ENEE/OES staffed with trained specialists in offgrid electrification integrates offgrid electrification program	Complied with Year 3

3. Project global environment objective and key indicators

The project's global environmental objective is to achieve greenhouse gas (GHG) reductions through the reduction of policy, informational, financing and institutional capacity barriers that currently hinder renewable energy technology (RET) dissemination and market development in Honduras (GEF Operational Program No. 6). Consistent with GEF's new strategic priorities, the Project will result in significantly increased financing availability for selected RETs and catalyze the creation of local markets. It will demonstrate innovative and sustainable social and productive applications of RETs in rural areas.

The main GEF Performance Indicator is the amount of CO_2 abated over 20 years by pilot projects, estimated at 425,000 tCO2.

4. Project components

The Rural Infrastructure Project will be developed primarily in six *mancomunidades* (associations of municipalities.) in Honduras, starting with CRA – *Consejo Regional Ambiental* (in the department of Santa Barbara) and CHORTI[3] (in Copán).[4]

Municipality	Km2	Population	% in extreme poverty	% of rural popul	Water coverage (urban &rural)	Sanitation coverage (urban &rural)	Rural electrification	% of road network in good or fair condition
CHORTI	1916	161052	50.9	73	87	56	24	39.2
CRA	1421	88574	40.4	81	80.4	59.3	20	

3

4

The Project is integrated with the IDA-financed Rural Infrastructure Project (PIR), approved on July 7, 2005. The projects are partially blended. Specifically, the GEF Rural Electrification Project co-finances two sub-components of the IDA project (Solar PV Program and Other potential RET pilot projects) and provides technical assistance related to all other PIR components to ensure that (i) viable offgrid electrification models are developed and demonstrated, (ii) offgrid renewable energy technologies (RETs) are integrated in the local and national infrastructure planning processes; and (iii) the corresponding capacity to manage and implement offgrid RET projects is built in the country.

The IDA-financed PIR Project has four components, covering all stages of the locally-driven process of infrastructure services provision: (i) support to the participatory local planning for integrated infrastructure service delivery, (ii) infrastructure service delivery, (iii) local capacity building and policy development technical assistance, and (iv) project management, monitoring and evaluation. The GEF grant will contribute to the achievement of each of these components.

Component A – Support to the participatory local planning for integrated infrastructure service delivery: ***Cost: US$0.53 million, GEF: US$0.1 million*** *(IDA: US$0.43 million in parallel financing)*

This component will finance the costs of consultants, workshops, training and other technical assistance to *mancomunidades,* local authorities and communities to ensure that offgrid electrification solutions, based on renewable energy technologies (RETs) are known and understood by the beneficiaries and fully integrated into the local Rural Infrastructure Action Plans (RIAPs) prepared under the PIR Project.

The GEF financing will feed into four activities of this component financed under PIR, covering all stages of the local participatory planning process: (i) prepare rural infrastructure diagnostics in each mancomunidad, (ii) expand/complement the existing local development plans with infrastructure projects through a participatory process; (iii) establish mechanisms and procedures for approaching the infrastructure issues in an integrated manner among the sectors and localities; and (iv) provide follow up support and monitoring of the overall planning process in each *mancomunidad.* As a result of these activities; specific Rural Infrastructure Action Plans will be established, which will include a list of prioritized project for both IDA and GEF financing.

Component B – Offgrid electricity service delivery; Cost: US$7.39 million; GEF: US$1.35 million (IDA: US$5.25 million; European Union (GAUREE project): US$0.24million; local counterpart contribution: US$0.55 million)

Additionally, US$ 10.65 million from the IDA-financed Rural Infrastructure Project (PIR), and US$ 2.15 of counterpart funding from municipalities (mancomunidades) is available for rural electrification component financing the grid extension sub-projects.

The GEF grant will provide resources for investment and technical assistance for offgrid RET projects, expanding the electrification options under the PIR Project. The offgrid projects financed by the GEF will form an inherent part of the Rural Infrastructure Action Plans (RIAPs),

developed under the Component 1 of the PIR Project (see above). The GEF financing will aim primarily at the development and demonstration of viable offgrid electrification models which would be later streamlined into the rural electrification planning in Honduras. About US$7.4 million is expected to be mobilized for the offgrid electrification pilot projects and programs in a combined financing of GEF, IDA Credit, European Commission's existing GAUREE 2 project, and counterpart funding from the *mancomunidades.*

- ***Component B.1: Investments in village micro-grids using hydro and other renewable energy technologies:***
  Cost US$3.5 million; GEF US$0.06 million (IDA US$ 2.55 million, EC GAUREE 2 US $0.24 million, local counterpart contribution: US$0.3 million.).

  b) Micro-Hydro Power (MHP): (financed by IDA-PIR and EU-GAUREE)

A special challenge to the Government's rural electrification program is how to provide electricity access to very small communities that are not economically feasible to connect to the national grid and are too small to attract private sector interest. Some of these communities possess hydro resources, mainly run-of-river, that could be exploited for electricity generation though microhydro power (MHP) plants. All investment costs for this sub-component will be covered by the IDA Credit for the sub-projects located at the territory of the participating mancomunidades, and partially by the EC GAUREE 2 Program It is planned to finance up to 8 MHPs of capacity between 50-100 kW each during the 5-year Project duration. To be established in Phase 1 of the project are two pilot MHPs: a) 55 kW La Atravesada in *Mancomunidad* CHORTI, and b) 80 kW Las Champas in *Departamento* Colon. (The Las Champas MHP is not situated in priority *mancomunidades* but has been the subject of prefeasibility studies and co-financing through EC GAUREE program) In Phase 2, an effort will be made to identify at least one MHP each in 4 other priority *mancomunidades.*

GEF will finance technical assistance activities related to the micro-hydro projects, described in detail in the Component B.2

c) Other RET Pilot Project investments (co-financed between IDA and GEF)

Aside from microhydro power, other RETs may be feasible for providing electricity to isolated remote areas of Honduras, including small windpower systems, modular biomass gasifiers and diesel/RET hybrids. During project implementation, a comprehensive inventory and economic evaluation of RET's that are relevant to Honduras will be conducted. The Project will finance the demonstration of at least one stand-alone windpower system or a wind diesel/hybrid installation of about 100 kW, to determine its feasibility in remote areas with good wind regimes. A key requirement for the site of the demonstration would be the potential to use much of the scarce power for a productive application that benefits the community as a whole. A GEF grant of about $600 per KW is being sought to finance the incremental cost.

- ***Component B.2: Offgrid MHP technical assistance (GEF financed: US$0.35 million)***

GEF will finance technical assistance activities related to the micro-hydro projects, financed under IDA-PIR (in the participating mancomunidades) and EU-GAUREE/PIR (sites outside the

participating mancomunidades, but with an important demonstration potential. Although, in general, MHPs have lower lifecycle costs than equivalent isolated diesel systems, major informational, financing and institutional barriers prevent their wider use in Honduras.

The objective of this subcomponent is to demonstrate a community-based approach to provision of electricity services to small populations remote from the national grid that have hydro resources and have potential for productive applications. Best practice for social organization and financial intermediation will be piloted .GEF grants totaling $0.35 million will therefore finance several technical assistance activities directly related to the sub-projects, designed to reduce these market barriers, including: training and workshops for community organizations, MHP operators and project developers; identification and preparation of additional pilot MHPs, and definition of site-specific productive applications that could be promoted in Honduras.

- ***Component B.3: Solar Photovoltaic Market Development Program, Costs: US$3.88 million; GEF grant for systems: US$0.49 million; GEF grant for TA: $0.45 millions (IDA Credit US$2.7 million, expected local counterpart co-financing [optional] 0.24 million)***

The solar PV program will target a total installation of about 274 kW over the 5-year duration of the Project. The aim is to establish a sustainable local PV industry structure and fill a gap in rural electrification plans. The potential rural market for PV systems in Honduras includes households, commercial users (retail stores, rural restaurants, microenterprises, etc) and institutional users (schools, clinics, community centers, etc) in dispersed offgrid areas. To catalyze and demonstrate the market for productive and institutional applications, the project is allocating investment funds for up to 100 installations averaging 300 watts each. A commercial dissemination approach suitable to Honduras that combines features of successful business models used in previous Bank PV projects in other countries will be applied. The underlying framework will be the "dealer model" with its accreditation requirements for participating companies (PCs), sales with consumer financing, and ability of PCs to sell anywhere there is demand. However, due to constraints imposed by the limited total market in Honduras and the need to focus resources on priority *mancomunidades*, the open market or individual market approach will be enhanced by introduction of competitive "market packages" of customers grouped within the domains of the *mancomunidades*.

The GEF will finance market development subsidies (averaging about US$90 per system) to cover the "incremental costs" of shifting to this new technology from traditional practice. The GEF subsidies will be complemented by Government poverty reduction subsidies (financed under PIR) to increase affordability of the systems for the poor and mancomunidad contribution within the "market packages" approach. The GEF will also finance the consulting services, studies, training and other technical assistance activities aimed at market development and the reduction of existing policy, institutional, capacity and other market barriers. In addition to subsidies, IDA-financed PIR project will include a micro-finance component which will make the purchasing conditions for the PV systems more adequate for the rural poor.

Component C – Local Capacity Building and Policy Development TA: Costs: 1.76 million; GEF US$0.6 million *(IDA US$ 1.16 million in parallel financing)*

The GEF financing will ensure that enabling framework and capacity is built for managing and implementing offgrid RET sub-projects. The component would support a host of technical assistance and capacity building activities, to ensure that decentralized electrification options, particularly those that utilize renewable energy, are seamlessly integrated into rural electrification planning; that allocation and setting of tariffs and subsidies for offgrid service are rationalized; and that key sectoral institutions, particularly ENEE and its Social Electrification Office (OES), administering FOSODE fund, as well as local financing institutions and private sector participants are sufficiently strengthened. This component will pay a particular attention to the capacity building at the local level (mancomunidades, municipalities, communities) for decentralized service provision, contributing to the decentralization and local capacity building objectives of the Government.

Component D – Project management, monitoring and evaluation: ***Costs US$ 0.96 million; GEFUS$0.3 million;*** *(IDA 0.66 million in parallel financing)*

Although FHIS will have an overall responsibility for the project implementation, the technical aspects of the electrification component, including all activities financed under the GEF grant, will be managed by FOSODE through the Social Electrification Office of ENEE. Therefore, the GEF grant will contribute to the project management, monitoring and evaluation activities to be carried out by FOSODE.

5. Lessons learned and reflected in the project design

Enhancing sustainability of offgrid electrification projects. The main lessons learned from past projects of the Bank and other agencies include: a) the need to adhere to least-cost principles in designing power supply systems, b) the need to ensure that subsidies are transparent, non-distortionary, where possible, linked to specific outputs, and targeted to the poor. However, the need to reach the poorest of the poor must be balanced with the goals of sustainability, subsidy minimization, and the need to demonstrate viable solutions, and c) the need to build local capacities to manage, operate and maintain the offgrid systems and provide market development services. This is often a long and costly process but without it, the systems are bound to fail. These lessons have been incorporated in the design of the microhydropower (MHP) and PV subprojects through, among other, emphasis on identifying productive loads in all MHP projects; allocation of substantial resources for technical assistance, training and market development activities in both PV and MHP; and always conducting least cost economic comparisons of options before investing in an offgrid system.

Enabling environment/coordination. One of the challenges of decentralized service planning and provision is how to establish effective linkages with the nation-wide sector planning and strategies. The project will facilitate interaction between the local and central government levels to ensure that the local development experiences feed into the sectoral policies and successful models can be replicated and scaled up at the national level.

Local capacity building. It has been acknowledged that the lack of local capacity is one of the main risks for the reforms involving a transfer of responsibilities for infrastructure provision to local levels. Efficient and sustainable provision of infrastructure, with adequate quality, is often a task beyond the local capacity, and, without an appropriate TA, it may lead to: (i) delays in

implementation; (ii) distortions in sub-project selections (avoiding more complex projects); (iii) higher costs and/or; (iv) quality and sustainability problems. Therefore, local capacity building is one of the key project's objectives and components.

Multisectoral approach to infrastructure planning and delivery. There is evidence that development impact rises significantly with a larger number of infrastructure services provided. Therefore the GEF activities will be fully integrated with the broader Rural Infrastructure Program, providing transport, water and sanitation and electricity services in rural areas. Where possible, the sub-projects co-financed by the GEF will be located in the six participating mancomunidades and integrated with the other sectors. Also for the solar PV program, despite its national coverage and commercial nature, special incentives will be provided to participating companies to focus in the priority *mancomunidades* (market package approach) and complement other PIR investments.

6. Alternatives considered and reasons for rejection

In the process of formulating the project, the following alternative development interventions and approaches were considered:

Targeting individual municipalities rather than mancomunidades. GOH requested that the Project contributes to the ongoing municipal decentralization reforms. The project initially considered targeting individual municipalities, but eventually the *mancomunidades,* being voluntary associations of municipalities, were selected as the key implementation partners, given that:

- The *mancomunidades* constitute larger territorial units (as opposed to the individual municipalities), more suitable for territorial development approach for infrastructure service delivery;
- There is an opportunity to create adequate capacity in the Inter-Municipal Technical Units (UTIs) for infrastructure service provision, including offgrid electrification in a more efficient manner (it would not be feasible or economic to create the same capacity at each municipality).

Financing demonstration minihydro power projects rather than microhydro. Minihydro power plants have much larger scale (200 kW to about 1.5 MW) and therefore more attractive for private sector investments. However, such investments are already occurring for the sole purpose of selling power to the ENEE grid and private developers have expressed unwillingness to take on the additional tasks involved in service provision, even if financial assistance is provided. On the other hand, there are many very small but concentrated unserved communities that are near hydro resources and unlikely to be served with grid extension in the foreseeable future. Financing pilot microhydropower (MHP) systems (typically 100 kW or less) that demonstrate community-based operation and maintenance would fill a real gap in the rural electrification program.

C. IMPLEMENTATION

1. Partnership arrangements

The GEF project is partially blended with IDA Rural Infrastructure Project, financing expansion of infrastructure services in rural areas. When the electrification sub-component, IDA Project will finance the grid extension and part of the renewable energy-based investments. GEF financing is sought for incremental costs associated with the solar PV program and the demonstration RET subproject, and for technical assistance and capacity building activities designed to reduce market barriers to the commercialization of renewable energy technologies for electrification. The European Union has agreed to co-finance two microhydro power plants of US$0.24 million through its program GAUREE, currently in implementation in Honduras.

The Central American Bank for Economic Integration (CABEI) will provide a parallel financing for the Rural Infrastructure Project of about US$15 million, of which about US$5 million will be available for electricity sub-projects, following the same implementation procedures as IDA credit.

Cooperation has been established with other donors working on the similar issues (rural electrification, renewable energy, and decentralized service provision), particularly, KfW, GtZ and IDB.

2. Institutional and implementation arrangements

The GEF grant will be implemented within the overall implementation framework of the IDA-financed PIR project, however, with some adjustments to account for the specific features of the electricity sector.

The Project's implementation structure has five key building blocks: (i) FHIS, (ii) *mancomunidades*; (iii) communities; (iv) infrastructure services providers; and (v) sectoral agencies. *Mancomunidades* will be in charge of developing their Rural Infrastructure Action Plans (RIAPs), in which they will prioritize their sub-projects, and contract out the implementation of these subprojects up to a certain ceiling (US$250,000 per subproject). For this task, they will receive substantial technical assistance from FHIS, consultants contracted under the project, and sectoral agencies, particularly ENEE in this case. *Mancomunidades* will also contract infrastructure service providers to operate and maintain the constructed systems. In many cases, these operators will be local small and micro-enterprises or communities themselves, which will also require substantial training in technical, commercial and other relevant aspects of their enterprise. The training will be provided by UTIs of *the mancomunidades* and specialized consultants. Sector agencies (ENEE and SERNA) will accompany the project on both a strategic and implementation level to ensure consistency of policies and approaches and to provide technical inputs and advisory services on sector specific issues where needed.

Although FHIS will be the overall implementation agency for the GEF project, the technical aspects of the electricity component will be managed by ENEE through its Social Electrification Office (OES), administering the Social Electrification Fund (FOSODE). This structure was

adopted, given that (i) FHIS has no experience in rural electrification projects; (ii) ENEE has successfully managed all Government's grid extension programs; (iii) ENEE has recently also acquired some expertise in the renewable energy field, through execution of bilateral programs for renewable energy development such as GAUREE 2, (iv) ENEE has highly qualified staff and successful track record in project management; (v) ENEE has recently acquired the Government's mandate to integrate offgrid electrification in its program in order to comply with the PRSP targets. The other agency with expertise in renewable energy is SERNA but has far less staff and resources. SERNA will, however, coordinate with and provide assistance to ENEE/FOSODE, as needed, in specific technical areas. Adequate resources are earmarked in the Component for strengthening the technical capacity of ENEE/FOSODE not only for the purpose of executing PIR project subcomponents but also to effectively accomplish its broader planning and management role for socially-oriented rural electrification. Specific focus will be on building a new capacity in the area of offgrid electrification and renewable energy technologies. Resources will also be provided to ENEE/FOSODE to enable it to obtain short-term services of consultants.

FHIS will administer all special accounts for GEF grants and government subsidies for the electrification component subprojects. Depending on the specific subproject, FHIS may carry out the bidding and contracting work itself or may do it jointly with the *mancomunidades*. For the solar PV program, FHIS will release subsidy funds directly to participating companies upon request and certification by FOSODE.

FHIS and ENEE will sign a participation agreement which will specify in detail the roles of each agency and the coordination mechanism.

For the microhydropower (MHP) plants, FOSODE will act as the technical arm of FHIS and provide assistance to the participating *mancomunidades* and communities in all phases of subproject development: helping to identify candidate sites, confirming availability of the hydro resources, helping identify suitable productive uses, drafting consultant terms-of-reference for feasibility studies, helping in the oversight of the construction of the plant and network, organizing and training local operators, and monitoring plant operation by the community.

In both "market package" and "open market" implementation approaches of the PV program, sale and installation of PV systems will be conducted by participating companies (PCs), which shall procure equipment from their preferred suppliers, based on best commercial practices acceptable to the Bank. All equipment and components must comply with minimum technical specifications and performance standards to be set up by FOSODE. FOSODE's other tasks in this subcomponent include: accreditation of PV companies to participate in the program, providing market development support (promotions, etc), making arrangements with financing institutions, verification of eligible installations and arranging for release of applicable GEF grants and government subsidies by FHIS to the participating companies. Aside from capacity building and promotional activities, FOSODE will have little to do with the solicitation of customers in the open market or individual purchase approach. That is the task of the PCs.

In the market package approach, FOSODE will have a more active role, along with the *mancomunidades*, in identifying and screening potential PV customers, developing the packages and preparing the financing plan for each package FOSODE will prepare tender documents for

the packages. FHIS will manage the bidding process and will contract the winning bidder or bidders.

Implementation flowcharts for the microhydro and solar PV subprojects are shown in Annex 6.

3. Monitoring and evaluation of outcomes/results

The GEF grant will be integrated into the M&E system of the PIR Project. A detailed monitoring and evaluation (M&E) plan was established to measure: (i) progress towards the achievement of project's physical outputs; (ii) progress towards the achievement of intermediary and final outcomes; and (iii) compliance with the established procurement, financial management and social and environmental safeguards procedures, including an assessment of the extent and effectiveness of community participation in the sub-project selection, design and implementation. Impact assessment will be carried out. The PIR Project has been selected among the M&E pilot projects, which will include a more comprehensive impact evaluation.

The M&E system will be managed by FHIS through its M&E unit. Implementation will rely on FHIS M&E specialists, with technical support provided by FOSODE. Key inputs for M&E will be provided by the UTIs of the participating mancomunidades, complemented by statistical data and surveys as needed. The information will be analyzed and evaluated by FHIS in coordination with sectoral agencies and the *mancomunidades*. The results will serve as input for fine-tuning implementation procedures. FOSODE will be integrated in the M&E process (both data collection and analysis) for the electricity component, using its comprehensive information systems.

4. Sustainability

Sustainability is a cornerstone of PIR's overall project strategy. For all sectors, this implies putting in place the appropriate policy/regulatory/institutional frameworks; strengthening local capacity; choosing suitable service delivery models, and ensuring social acceptance of the models.

Within the offgrid electrification sub-sector, sustainability of the different investments will be maximized by applying some basic principles in subproject selection and design. For MHP, the principles include (i) applying least-cost analysis, to ensure that the MHP plant is not economically more costly than grid-extension, diesel or individual SHS; (ii) identifying productive applications to go with domestic lighting, to increase the plant load factor and introduce income-generating activities, (iii) providing substantial assistance for organization of the community and providing training in operation and maintenance, and business development, and (iv) requiring that, as a minimum, the full cost of operation and maintenance is borne by the community. For the PV program, sustainability is maximized by using a demand-driven, market-based dissemination approach. To enhance technical sustainability, participating PV companies are required to comply with minimum standards for equipment and installations, and must provide after-sales maintenance for at least 2 years. Finally, even if system costs are not reduced sufficiently by the end of the Project and GEF grants are terminated, the Government has agreed to fill the gap to be left by GEF, if needed. The reason is that on a per connection basis, the PV

program requires far less subsidy than the grid extension program. All offgrid solutions developed by the project will be mainstreamed into FOSODE's electrification program.

5. Critical risks and possible controversial aspects

Risks	Risk Mitigation Measures	Risk Rating with Mitigation
Country risks		
Political transition after the election affects Project's continuity	Intensive dialogue will be held with the new authorities at the central and decentralized levels to minimize disruptions. At the local level, it is unlikely that all municipal authorities within the *mancomunidades* would change, facilitating transition.	M
Impact of the implementation of the IDA PIR project		
The complexity of the parent PIR project, coupled with a weak institutional capacity may affect the speed of the implementation.	The main mitigation measures include: Clear responsibility division among all key stakeholders, specified in framework and participation agreements Capacity building at all levels of project implementation Monitoring and evaluation to detect early warning signals Focus on improved coordination among the three sectors and between the local and national level.	S
Lack of counterpart funds will slow down or paralyze project execution	A fiscal assessment of the two participating mancomunidades CRA and CHORTI was carried out under the PIR project, confirming their fiscal capacity to undertake the proposed projects. Same assessment will be carried out for other participating mancomunidades. The bottom-up project prioritization increases ownership and commitment of the mancomunidades to implement these projects. However, counterpart problems might arise due to delayed or cancelled transfers from the national budget. Participation of the Ministry of Interior and Justice in the Advisory Committee overseeing the Rural Infrastructure Project will help to mitigate these problems.	S
Policy / institutional		
Sector reforms, implying structural changes, complicate project implementation	The policy and institutional structure for infrastructure sectors is not constant. The reform in the electricity sector is being considered and might even lead to private sector participation in distribution. While it is possible that broader sector reforms would affect the project, close involvement of the key sector planning agencies provides an opportunity for incorporating the elements for the improved rural service provision to the broader sector framework, enhancing long-term sustainability of the project.	M
Execution of subprojects may suffer from poor coordination between FOSODE, FHIS/PCU and UTIs.	ENEE/FOSODE will sign formal agreement with FHIS on operational procedures at the start of implementation. Procedures for execution of subprojects and the responsibility of each agency for every step will be developed in detail and included in the Operational Manual. FHIS has substantial experience with coordination with municipalities and	M

	mancomunidades.	
ENEE/OES unable to handle highly specialized needs of PV subproject	Adequate resources to obtain short-term local and international consultant services will be provided	N
Technical		
Lack of sustainability—productive applications for MHP do not materialize; communities might not have sufficient technical capacity to operate systems	Intensive efforts will be made at subproject preparation to identify existing productive uses that could be expanded and potential productive uses that could be initiated. TA will be provided to develop technical and business development details. Extensive capacity building activities for the communities operating MHP are integrated in the design.	M
Consumer financing plan found inconsistent with market realities (Lower willingness to pay for certain wattages, different market shares than expected, etc)	Financing and subsidy schedule will be reviewed every six months and adjustments made, as needed. Target number of units, budget allocation among different capacities and between residential and institutional/productive uses are all flexible.	M

6. Grant conditions and covenants

Loan/credit effectiveness:
Recipient signs Subsidiary Agreement with FHIS
IDA-financed Rural Infrastructure Project is declared effective

The conditions of disbursements for sub-projects for each mancomunidad are following:
(a) Framework Agreements between FHIS and participating mancomunidades are signed
(b) UTI's financial management arrangements are satisfactory and operational
(c) UTI's mancomunidades are adequately staffed.

D. APPRAISAL SUMMARY

1. Economic and financial analyses

Economic analysis has been performed separately for the first subprojects that will be financed under the GEF: (i) isolated village microhydro power system La Atravesada; and (ii) SHS market package for the *mancomunidad* CRA. The economic analysis draws on real demand data and cost data from Honduras where possible (the Project has financed a comprehensive demand study of the first two participating *mancomunidades* CRA and CHORTI), and uses data from similar remote area subprojects in Nicaragua and Bolivia where no Honduras data are available. The economic analysis yields positive results for all technologies that have been analyzed: NPV of Minimum Total Net Benefits is positive, the economic IRRs for the first sub-projects analyzed ranges from 27 percent to 36 percent, above the hurdle discount rate of 12 percent. The Project's selection procedures for subprojects will not allow those with EIRR lower than the hurdle rate. The estimation of benefits is conservative, as many of the additional benefits from rural electrification are difficult to estimate. Only those benefits readily quantifiable with standard World Bank methods have been counted towards EIRR in the analysis.

2. Technical

No significant technical issues are foreseen during implementation as all of the electrification technologies to be employed are mature. The largest investments will be on grid extension subprojects on which FOSODE has extensive experience. The technical design of microhydropower plants is based on specific characteristics of the sites but is a fairly straightforward process. What is more critical is the choice of source of supply for the MHP turbine: there is need to carefully balance cost with performance and durability track record. Solar home systems have now been used in many Bank-financed projects in several countries and technical standards for every SHS component have been developed. The Project will adopt most of these Bank approved standards and certification procedures, while taking into account factors unique to Honduras.

3. Fiduciary

The GEF grant will be implemented under the ***financial management framework*** developed for the Rural Infrastructure Project (PIR). Assessment of financial management capacity has been carried out by the Bank on the central implementing agency FHIS and on the *mancomunidades* CRA and CHORTI that are effectively the decentralized implementing agencies for the Project.

FHIS will open two Special Accounts (SA): one for the IDA credit and one for the GEF grant. In some cases, funds will be transferred by FHIS to the account of the *mancomunidades* to finance local subprojects in the approved Rural Infrastructure Action Plans. For electrification, the subprojects financed in this manner are grid–extension and microhydro power plants. FHIS will receive monthly reports on budget execution and project implementation from each participating *mancomunidad.*

In the solar PV subproject, which consists of residential, institutional and productive applications, installations will require both a Government "poverty reduction" subsidy portion that will come from the IDA-SA and a GEF "market development" grant portion that will come from the GEF-SA. The schedule of grants and subsidies will be developed by FOSODE based on the results of preparatory studies. At the request of FOSODE, FHIS will disburse the subsidies and grants directly to the participating PV companies (PC) for sales/installations verified by FOSODE as eligible (see details in the Annex 4 and 6).

FHIS will also be responsible for the preparation of quarterly reports (Financial Monitoring Reports, FMRs) and for submitting quarterly disbursement reports to the Bank

Procurement for the proposed project would be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated May 2004; and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004, and the provision stipulated in the Legal Agreement. For each contract to be financed by the Credit, the different procurement methods or consultant selection methods, estimated costs, prior review requirements, and time frame are agreed between the Recipient and the Bank project team in the Procurement Plan. In the case of PV equipment, procurement shall be done independently by each accredited PC following established commercial practices acceptable to the Bank. PV components and systems are essentially off-the shelf items and commodities.

Assessment of the procurement capacity of FHIS and *mancomunidad* CRA and CHORTI has been done. The assessment reviewed the organizational structure for implementing the project and the interaction between FHIS and the *Mancomunidades*. Procurement of works for sub-projects in RIAPs with a value of up to US$250,000 will be carried out by the UTIs of the participating *mancomunidades*, starting with CRA and CHORTI. FHIS will be in charge of the procurement and contract activities for sub-project works exceeding US$250,000, as well as contracting of consulting services (except for individual consultants, related to UTI's work, which may be procured by UTIs), goods, and PCs under the Solar PV Program.

4. Social

A social strategy has been built into the project design to ensure full participation of key stakeholders, including municipal governments, civil society organizations, and community members throughout the preparation, design, implementation and monitoring and evaluation of the project. As part of project preparation, a social assessment was carried out, which examines local demographic and socio-economic conditions, current levels of infrastructure and access to services, and the status of implementation of local municipal development plans (PEDMs).

The project's social impact is low as the project focuses mostly on small-scale interventions for access expansion. Given their limited scale, none of these interventions will cause family displacement. Some communities have a small percentage of indigenous people, and consequently an ***indigenous policy framework*** was designed in order to ensure early participation from these communities, in accordance with their social and cultural characteristics, and aiming to maximize their benefits. Given the high archeological potential of the country, the Honduran Institute for Anthropology and History was consulted and a ***safeguard policy on cultural property*** has also been included as required by recent Bank policies, in the event of finding sites that might appear of cultural significance during project implementation. Both safeguard documents were developed for the IDA-financed Rural Infrastructure Project (PIR) and will be also applied for the present GEF project. These requirements and those related to environmental policies will be incorporated into the Project Operational Manual.

5. Environment

GEF grant will finance the following activities:

(i) subsidies and technical assistance for PV solar home systems;
(ii) investments in one small windpower demonstration project (about 100kW);
(iii) technical assistance related to the village-based isolated micro-hydro power plants (expected to range 50-200kW) (funds for investments will be provided by the IDA-financed PIR project);
(iv) technical assistance for improved planning and capacity building for offgrid electrification projects, using renewable technologies.

In general, the activities financed by the GEF grant are expected to have positive environmental benefits through the increased share of use of renewable energy resources in the electricity generation and corresponding reductions in CO2 emissions and other local pollutants.

Nevertheless, the sub-projects may have limited negative environmental impacts, which will be mitigated by the project.

With a view to ensuring the social and environmental sustainability of the project and to comply with the Environmental Safeguard Policy [OP. 4.01], a Conceptual Framework for Social and Environmental Management was prepared. This Framework was developed for the IDA-financed Rural Infrastructure Project (PIR) and will be also applied for the present GEF project. The content of the Conceptual Framework and is summarized in Annex 10.

The Framework was designed to be applied at three levels depending on the level of socio-environmental risk of the subprojects. FHIS will be responsible for the application of the Framework for all types of sub-projects. In addition, the Category 3, high risk projects, will also have to be reviewed and approved by The National Secretariat for Natural Resources and Environment (SERNA) and the Bank; for Category 2, moderate risk projects, the Environmental Management Department of FHIS will be responsible for the review and approval of the subproject; and Category 1 subprojects will be handled by municipal environmental units (UMAs), under the supervision of FHIS. The Framework will form a part of the project's Operational Manual

The Framework will also include the "negative list" of activities that will not be eligible for IDA – PIR and GEF financing, including Category A – type works, hydro and wind projects larger than 300kW, hydro projects requiring dams, and projects that could lead to significant impacts to critical natural habitats, as well as the list of pesticides not permissible under the GEF and IDA projects

One of the most important issues faced by municipalities is the insufficient capacity and scarce resources to manage natural resources and to apply a consistent environmental framework to socio-economic activities, which fall under their jurisdiction. Specific guidelines to develop a plan for strengthening environmental management were, therefore, included in the Framework

6. Safeguard Policies

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP/GP 4.01)	[x]	[ ]
Natural Habitats (OP/BP 4.04)	[x]	[ ]
Pest Management (OP 4.09)	[x]	[ ]
Cultural Property (OPN 11.03, being revised as OP 4.11)	[x]	[ ]
Involuntary Resettlement (OP/BP 4.12)	[ ]	[x]
Indigenous Peoples (OD 4.20, being revised as OP 4.10)	[x]	[ ]
Forests (OP/BP 4.36)	[ ]	[x]
Safety of Dams (OP/BP 4.37)	[ ]	[x]
Projects in Disputed Areas (OP/BP/GP 7.60)*	[ ]	[x]
Projects on International Waterways (OP/BP/GP 7.50)	[ ]	[x]

* *By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas*

7. Policy exceptions and readiness

There are no policy exceptions and the project is ready to be implemented.

Annex 1: Country and Sector Background
HONDURAS: Rural Electrification Project

1. Country and sector issues

Honduras is the second largest county in Central America (after Nicaragua) with a territorial extension of 112,492 square kilometers. It has a population of about 7 million (second after Guatemala), with an annual population growth rate of approximately 2.7 percent. With a gross national income per capita of US$1,013 in 2003, it is the third poorest country in Latin America.

Poverty and inequality are widespread. According to the National Statistical Institute (INE), an estimated 70.5 percent of the population lives below the poverty line, while 52 percent lives in extreme poverty. Roughly one-half of the population resides in rural areas, where the incidence of poverty is almost 77 percent, versus 56 percent in urban areas. It is also a country with high inequality, as measured by income per capita. During the last decade, inequality increased by three percent nationally, with rural areas accounting for all of the increase, which further widens the income gap between urban and rural population. It is especially worrisome that incidence of extreme poverty, while declining nationally, have actually increased in rural areas by about 10 percent (even though this is mainly attributable to the devastating effects of the hurricane Mitch in 1998). These facts underscore the urgent need to develop programs targeted to the improvement of the rural areas.

Table No 1.1
Poverty in Honduras, 1992, 2002 (%)

	1992	2002
National		
Extreme poor	47.4	45.2
All poor	69.9	63.3
Urban		
Extreme poor	39.9	27.2
All poor	61.6	55.5
Rural		
Extreme poor	53.9	62.7
All poor	76.5	70.8

The GOH completed its Poverty Reduction Strategy Paper (PRSP) in October 2001. PRSP serves as a guiding tool in development of Government programs and sector strategies. Reducing Rural Poverty is one of the six pillars identified by the PRSP.

Infrastructure access

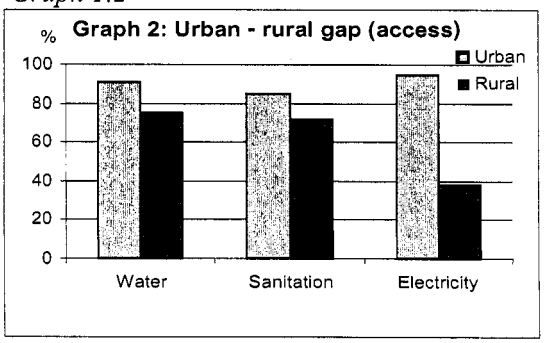
Improving access to infrastructure services has been one of the Government's priorities during the past decade, but the steady progress was temporarily reversed by the hurricane Mitch, affecting particularly water and sanitation and road sectors. Still, considerable progress has been achieved in the past 15 years, as Table 2 shows.

Table No. 1.2
Water, Sanitation, Electricity

	1990 (%)	1997 (%)	2004 (%)
Water coverage	73	92	83
Sanitation coverage	66	83	78
Electricity coverage	35	50	68

Nevertheless, access in rural areas remains inadequate. Graph 1.2. indicates highly uneven access to services between urban and rural areas, with the most noticeable gap in electricity coverage (95 percent versus 38 percent). The absence and low quality of these infrastructure services in rural areas seriously constrains the potential for economic and social development and compounds the problems of isolation and poverty of the rural population.

Graph 1.2



Electricity sector background

Sector development. Honduras has very limited energy resources, excluding some hydroelectric potential, and some very limited quantities of coal. It has no oil or natural gas reserves. As in most of the other Latin American countries, until recently (1994), all power generation was the responsibility of a state-owned, vertically integrated utility ENEE. During that time, power generation was primarily based on hydro resources. The model started to change in 1994, when a new Electricity Framework Law (158-94) was adopted, aimed at ENEE's unbundling and eventual privatization. The law provided a possibility for private generation -- with power purchase agreements (PPAs) signed with ENEE. The 1994 law opened the door to private investment in power generation, and installed capacity grew impressively between 1993 and 2002 – from 535MW to 1,162.3 MW in 2003. The reform of ENEE, however, has never been completed. ENEE remains an unbundled, state-owned enterprise.

In terms of the generation mix, practically, all new additions were thermal units. While, in 1993, hydro plants produced 80 percent of the annual generation output, in 2002 their share fell to 45 percent. While the objective of a secure, reliable power supply was met, this development had two negative impacts. It has augmented Honduran reliance on imported fuels, with increased vulnerability to oil price fluctuations, and it contributed to negative environmental effects – increases in GHG emissions and release of local pollutants

Institutional structure. The Electricity Framework Law created the Energy Cabinet as the principal entity in charge of proposing expansion plans, and the National Commission on Electricity (CNE) as a regulator. The Energy Cabinet, however, has never functioned well. In practice, the function of sector policy has been assigned to the Secretariat of Natural Resources and the Environment (SERNA). SERNA's main role, however, is environmental regulation, and its resources for the energy sector policy issues are limited.

Environmental Sustainability and Renewable Energy

The Poverty Reduction Strategy Paper (PRSP) pays a specific attention to the environmental sustainability, which is one of the three PRSP cross-cutting themes, recognizing relationship among environmental deterioration, a high incidence of poverty and increased vulnerability to natural disasters.

Consequently priority is given to improving environmental management and to breaking the vicious circle between environmental degradation and poverty. Also recognized is the importance of promoting the use of economic-financial instruments such as carbon markets, sale of environmental services, incentives and disincentives for promoting sustainable management of natural resources etc.

In the electricity sector, these objectives have translated in the increased interest in promoting renewable energy projects. in 1998 the Congress approved legislation for the promotion and development of renewable energy generating plants up to 50 MW of installed capacity (Decrees No. 85-98 and 267-98), complementing the Framework Law of the Electrical Sub-sector of 1994. This legislation contemplates tax breaks to developers and a secure buyer for energy at attractive prices (ENEE is the default buyer at prices with a premium.) Under this umbrella, private sponsors have negotiated about 30 Power Purchase Agreements (PPAs) with ENEE for small renewable energy plants. The PRSP also calls for the integration of renewable energy technologies into rural electrification program. This objective, however, has not been yet implemented. As described below, practically all rural electrification activities continue to be grid extensions.

Honduras, Poverty Reduction Strategy Paper, 2001

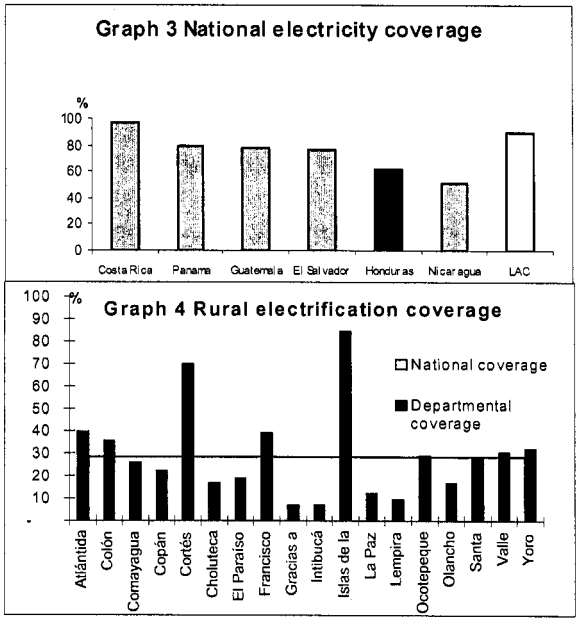
Pillar 2: Poverty Reduction in Rural Areas, Objective 2.3 Improving the Competitiveness of the Small Rural Economy Program ***c iv: Rural Electrification***

The objective of this program is to provide rural communities with electric power service that will support production and improve the well-being of the rural population. This program is now being implemented with foreign and Government resources, and with contributions from the communities. Among the modes of energy production, increased support will be considered for renewable sources such as solar energy.

Rural electricity access

Until the early 1990s, electricity access had been extremely low (35% nationally), one of the lowest in the LAC region. Since early 1990s, however, electrification was given higher priority and coverage has been increasing steadily by about 2% per year. The key milestone was the establishment of the Social Electrification Fund (FOSODE) by the 1994 Electricity Framework Law to which the Government is obligated to contribute a minimum of Lps. 30 Million a year. Having set up a relatively well-functioning institutional structure, FOSODE has been able to attract significant donor resources, in addition to the Government's budgetary contributions. Between 1995 and 2003, FOSODE invested US$ 93.3 million in rural electrification; national coverage increased from 45% in 1995 to 68% in 2004, with relatively low average connection cost of around $300-400 per household. However, despite some catching up effect, national electricity coverage is still among the lowest in the region (see Graph 1.3). This is mainly due to the extremely low rural coverage – 38.4% of rural households have access to electricity, as opposed to 95.4% in urban areas, according to the INE household survey (May 2004). In addition, the distribution of access is very uneven, both across the

Graphs 1.3 and 1.4



regions and income quintiles (In the poorest quintile, only 30% of households have access to electricity, compared to practically universal coverage in the highest quintile – Graph 1.4).

Offgrid electrification

Electricity access becomes more difficult as more distant, isolated and dispersed communities need to be connected. These are the most difficult users to serve, as they represent a twin challenge of low capacity to pay and high service provision costs due to the remoteness and dispersion. In many cases, this will require a use of more adequate technologies and business models. Unfortunately, up to date, there has been a very limited experience with offgrid electrification in Honduras, limited to a few donor-funded very small pilot projects and commercially marketed solar home systems (SHS).

The commercial operation of solar home systems has in fact been quite successful in Honduras, considering that no Government subsidies have been provided for household use. This confirms a high unmet electricity demand in rural areas. Further progress, however, is constrained by the low capacity to pay of the majority of rural population. There are 8 dealers of PV systems in Honduras of varying scale of business today. Solaris is the largest local company but probably the most well-known is Soluz Honduras that used to specialize in leasing of PV systems. Since its inception in 1998, it has installed a total of over 2,000 units. Recently, however, due to cash flow problems, it decided to phase out its leasing operations and shift to cash sales. Total demand is very limited and sales have been primarily for government-related procurement (e.g., for a site-specific bilateral funded demonstration project) or one-off sales to relatively affluent private customers. Consequently, PV system prices are high compared to other developing countries. The combination of high unit prices, absence of financing assistance and lack of government support has hampered the growth of a wider market for PV in Honduras.

Decentralization reforms

As in many other developing countries, Honduras has acknowledged the limits of the centrally driven infrastructure service delivery model. The drive towards municipal decentralization started in 1990 with a municipal law which conferred key service delivery responsibilities and fiscal autonomy to the country's 298 local governments. The trend was further reinforced by the Poverty Reduction Strategy (PRSP) in 2001, which underscored the role of the local governments in poverty reduction. The Government's framework for local development, as stated in the National Program for Decentralization and Local Development (PRODDEL), includes decentralization of public services as one of the key strategic areas. The decentralization trend presents both opportunities and challenges for rural infrastructure service delivery. On the one hand, local governments are better aware of local infrastructure needs and priorities and more likely to distribute scarce resources efficiently, responding to the local demand. Their accountability to rural populations also tends to be higher than that of the central government. On the other hand, local governments often lack capacity, which may lead to: (i) implementation delays; (ii) implementation inefficiencies (higher costs) and lack of attention to sustainability; and (iii) distortions in resource allocation (preference for simpler projects). It is, therefore, essential to pay adequate attention to the local capacity building during the decentralization process.

Although decentralization is a general trend, different sectors are affected to varying degree, with the electricity sector affected the least, while the provision of local water and sanitation services, as well as maintenance of local road network are now fully in hands of municipalities. Rural electrification so far continues to be seen primarily as a responsibility of the central government, but it is expected that in the future also in this sector, in accordance with the municipal law, the municipalities will have greater role in planning and implementing rural electrification projects. To comply with that role, considerable capacity building will be needed.

2. Issues to be addressed by the Project

Sustainable access to electricity by rural poor. For many rural households, grid extension is not the least cost solution. Some offgrid technologies could provide electricity service to such communities at lower cost than grid extension, by matching demand in a flexible way. Notwithstanding, FOSODE's current expansion plans are all based on grid extension.

In line with its poverty reduction objectives established in the PRSP, the Government is now interested to expand the menu of the options eligible for financing from FOSODE to include offgrid technologies, in order to reach poor rural population, which tends to be more isolated and dispersed. Nevertheless, given that there is no experience with this type of projects in Honduras, there is a need to develop and demonstrate viable models. The GEF project will therefore assist in the development and demonstration of these model projects and their mainstreaming into the Government's electrification program and subsidy scheme. Particular potential was identified for community-based micro hydro projects and solar home systems.

Integration of offgrid electrification in sector planning and subsidy schemes. The weak institutional structure of the power sector affects the quality and efficiency of rural electrification efforts. There is no integrated rural electrification policy. While FOSODE is implementing grid extension projects based on its own screening methodology, SERNA is promoting offgrid electrification but lacks the resources to scale-up its efforts. FOSODE's grid extension model, PLANES, has been effective in guiding its traditional rural electrification program but has not adequately integrated consideration of decentralized options. A good practice would be to establish a unified fund for all rural electrification efforts (both grid and offgrid) with a clear policy, transparent rules and rational financing mechanisms so that projects are selected on the basis of cost efficiency. Given FOSODE's successful record as an implementation agency within ENEE, its conversion into an autonomous agency to manage such a fund is being considered by the Government.

The Project will therefore assist in the development of an integrated rural electrification policy and will strengthen FOSODE not only for the purpose of executing PIR project subcomponents but also to effectively accomplish its broader planning and management role for socially-oriented rural electrification. Specific focus will be on building a new capacity in the area of offgrid electrification and renewable energy technologies. Resources will also be provided to FOSODE to enable it to obtain short-term consulting services.

Tariff and subsidies. One of the issues that impacts the efficiency and sustainability of the country's rural electrification program is the inadequacy of ENEE's current tariff system. In the case of the subsidized lifeline tariff, the consumption threshold has been set at 300kWh a month whereas the typical consumption of poor households is actually well below 100kWh. The high threshold level thus covers about 90% of the residential population and, effectively, majority of the subsidy goes to the middle class instead of the poor. In addition, the overall tariff level is inadequate and does not cover the total costs of power generation, transmission and distribution. The situation is exacerbated by ENEE's high transmission and distribution losses and the recent oil price increases, all of which increase generation costs. These issues clearly affect implementation of the electrification component but their full resolution is beyond the scope of the PIR project. They are simultaneously being addressed by various ongoing World Bank and IDB operations on sector reform, with which the project's activities will be closely coordinated. These include:

- Tariff adjustment and subsidy rationalization (agreed in PRSC)
- Support to sector reform, starting with ENEE's vertical unbundling and increasing accounting transparency (Public Sector Management Project)

- Loss reduction program (IDB-financed).

The Project will, however, assist with technical assistance to the rationalization of electricity subsidies and tariffs.

Local capacity issues: Sustainable implementation of the electrification activities under the PIR and GEF Rural Electrification Projects (particularly the new areas of offgrid electrification) hinges on the effective strengthening of local capacity, a task that will be addressed at a multisectoral level by the broader PIR operation. Specific attention will be given to:

- Support to the local development planning and prioritization processes.
- Strengthening of UTIs and municipal authorities
- TA to local service providers and communities.

In addition, specific TA activities about offgrid electrification and renewable energy technologies will be carried out with the objective to ensure that (i) viable offgrid electrification models are developed and demonstrated, (ii) offgrid renewable energy technologies (RETs) are integrated in the local and national infrastructure planning processes; and (iii) the corresponding capacity to manage and implement offgrid RET projects is built in the country.

Coordination and synergies: Each of the three infrastructure sectors has its own particular institutional framework for rural investments, with no coordination mechanism. The focus on local integrated service provision offers an opportunity to bridge these different approaches, and improve development impact in exploiting synergies from a joint delivery of several services at the same time. It also provides an opportunity to match local knowledge and a bottoms-up prioritization approach with nation-wide sector strategies and policies. Therefore the GEF activities will be fully integrated with the broader Rural Infrastructure Program, providing transport, water and sanitation and electricity services in rural areas. Where possible, the sub-projects co-financed by the GEF will be located in the six participating mancomunidades and integrated with the other sectors. Also for the solar PV program, despite its national coverage and commercial nature, special incentives will be provided to participating companies to focus in the priority *mancomunidades* (market package approach) and complement other PIR investments.

Offgrid electrification sustainability lessons:

- The need to adhere to least-cost principles in designing power supply systems, and to ensure that the best suited technologies are applied.
- The need to aim for operational sustainability, which comprises both financial and technical aspects of the operation.
- The need for subsidies to reach the poor; the subsidies should be efficient, transparent, non-distortionary, targeted and where possible, linked to the specific outputs. However, the need to reach the poorest of the poor must be balanced with the goals of sustainability, subsidy minimization, and the need to demonstrate viable solutions.
- The need to design locally adopted service delivery mechanisms, and support different business models and contractual arrangements (private operators, local cooperatives, NGOs...) in offgrid projects where the attractiveness of markets may fluctuate according to the remoteness and income level of the communities. Setting up adequate business-type arrangements to service provision tends to be more important than the issue of ownership.
- Offgrid regulation has to reflect the specific offgrid renewable energy technologies (limited capacity), service models (covering dispersed and isolated areas) and users (low capacity to pay).
- The proposed solutions have to be socially acceptable by the rural users and within their capacity to pay.
- The importance of providing market development services and timely assistance to local providers. Local capacities to manage, operate and maintain the offgrid systems are a necessary condition for success and resources will need to be devoted to building this capacity. This is particularly important for micro-hydro: the process is often long and costly, but without such capacities, micro-hydro programs are likely to fail.

Annex 2: Major Related Projects Financed by the Bank and/or other Agencies
HONDURAS: Rural Electrification Project

Project	Amount	Financier	IP/DO Ratings	Sector Issues
Road Reconstruction and Improvement Project		IDA	IP-S DO-S	Road reconstruction and improvement post-Mitch
Emergency Disaster Management (P064913)	$10.8 M	IDA	IP – S DO – S	Vulnerability and risk maps, municipal capacity building, and risk mitigation works in various cities
FHIS V (P064895) Nuestras Raices	$60 M	IDA	IP – S DO – S	Local infrastructure subprojects and municipal capacity building in various cities
National Urban Integrated Development Project	$15 M	IDA	NA	Capacity building in municipalities and central Government agencies (mancomunidades) for the provision of urban services and infrastructure.
Other Agencies				
Poverty Reduction and Local Development Program, Phase II (1478/SF-HO)	$35 M	IDB	Local infrastructure subprojects (FHIS), municipal capacity building, strengthening institutional framework for decentralization and local development	
Support to PPP-Energy	$0.149 M	IDB		
San Pedro Sula Municipal Development Program, Phase II (1104/SF-HO)	$9 M	IDB	Improve urban service delivery in San Pedro Sula through restructuring financial management and modernizing service delivery arrangements	
Road Projects: Program for Sustainable Institutional Strengthening of the Road Sector	$8.5 M	IDB	Improvement of institutional arrangements for the road sector	
Potable Water and Sanitation Investment Program (1048/SF-HO)	$26 M	IDB	Municipal loans for water and sanitation systems in intermediate-size cities (> 10,000 pop.)	

Tegucigalpa and San Pedro Sula Municipal Development Program, Phase I (1024/SF-HO)	$63 M ($27 M for San Pedro Sula, $36 M for Tegucigalpa)	IDB	Improve urban services in Tegucigalpa and San Pedro Sula through modernization of financial management and service delivery systems and financing of urban services and infrastructure
Tegucigalpa Municipal Development Program, Phase II (Pipeline, projected end 2004)	$22.5 M	IDB	Improve urban service delivery & finance urban services and infrastructure in Tegucigalpa
Program for Municipal Infrastructure (PROMUNI)	Revolving credit line?	CABEI	Rediscount fund for commercial banks to lend to municipal governments for infrastructure, urban services and other projects
FUNDEVI (Housing)	$5.8 M	SIDA	Loans to low-income families for housing construction / improvements & loans to municipalities for service installation and improvements
Housing (FUNDEVI) and social infrastructure (FHIS)	??	KFW	Loans to low-income families for housing construction through FUNDEVI and grant-financed local infrastructure projects through FHIS
Waste management and sanitation in secondary cities	€12.8 M	EU	Municipal capacity building in secondary cities for waste management & sanitation
Decentralization (in pipeline)	€34 M	EU	Budget support for decentralization and municipal fiscal transfers
Autonomous Generation and rational use of electricity	$6.015	EU	Strengthen ENEEs system to reduce losses
Greater Transparency and Accountability of Government	$29.5 M	USAID	Technical assistance to municipal governments and local organizations for improved governance, citizen participation and accountability

Programa de Electrificación en el Istmo Centroamericano (PREEICA). Componente Honduras: Plan Nacional de Electrificación Sociales (PLANES). Proyecto Regional2.1	$2.133 M	CANADA	Improvements in energy delivery, by reducing losses in the system through private sector participation
Measures to improve energy use	$1.12 M	CANADA	Alternative use of energy considering climatic change and other environmental issues.
National Energy Policy	$1.64 M	UNDP	Support to SERNA to create a national energy policy with its consultation process.

Annex 3: Results Framework and Monitoring
HONDURAS: Rural Electrification Project

PDO	Project Outcome Indicators	Use of Project Outcome Information
Improved access, quality and sustainability of electricity services through the development of offgrid electrification model projects for the rural poor in Honduras Development of capacities and enabling environment for offgrid electrification in a decentralized setting in Honduras Global environment objective: Achieve GHG reductions	1. *Sustainable Access:* • At least 4,000 of dispersed households, businesses and public facilities with sustainable electricity access provided with solar home systems (SHS) • Village micro grids using hydro and other renewable energy technologies (financed under PIR) provide quality and sustainable electricity access to about 1,000 households, businesses and public facilities. 2. *Improved living conditions*: • Number of new or expanded productive/commercial establishments in the micro-hydro area. • Improved provision of public services (education and health services) through electricity access in project offgrid areas. *Local capacity strengthened:* • Offgrid technologies fully integrated in the national and local rural electrification planning *CO2 reductions* achieved by pilot projects through the reduction of policy, informational, financing and institutional capacity barriers that currently hinder RET dissemination and market development in Honduras	*Year 3:* Assess the effectiveness of applied approaches in mancomunidades CRA and CHORTI and adapt the design for other mancomunidades accordingly. Identify key requirements, challenges and constraints for integrating offgrid electrification and RET in the overall rural electrification program *Year 5:* Assess the effectiveness of applied approaches as an input for Government's long-tem strategy and a design of follow-up operations. Identify key elements necessary for a successful replication and scale-up.
Intermediate Outcomes	**Intermediate Outcome Indictors**	**Use of Intermediate Outcome Monitoring**
Outcome 1: Offgrid electrification and RET integrated in the national and local planning.	**Outcome 1 indicators:** • Rural Infrastructure Action Plans developed under PIR project include electrification solutions based on RET.	*Year 1*: Identify capacity development needs to integrate offgrid electrification and RETs in local planning by local authorities and community leaders.

	• Adoption of a rural electrification policy, integrating all technologies (grid and offgrid), and defining an efficient financing mechanism and subsidy allocation rules. • Offgrid electrification included in FOSODE's program	Asess the existing key policy and capacity barriers for integrating offgrid electrification and RETs in the national infrastructure planning. *Year 2*: Assess the experience with local planning process and integration of RETs in CRA and CHORTI *Year 3:* Determine outstanding planning/policy/regulatory issues that constrain a successful implementation of the project. *Year 5*: Determine outstanding planning/policy/regulatory issues that constrain a successful replication and scale-up. Develop a strategy for replication and scale-up
Outcome 2A: Offgrid electrification projects using RETs expanded; new service delivery model developed and tested.	**Outcome 2A Indicators:** • Number of households with electricity services in offgrid areas, provided with RETs; • Number of community-based MHP operating under sustainable conditions (financial, social and technical capacity), with the help of the technical assistance provided by the project; • Multiple solar home system providers accredited and participating in the national solar PV development program; • Implementation of other RET offgrid electrification pilot project (such as stand-alone windpower system or wind diesel/hybrid installation).	*Year 1-5:* Assess pace of project implementation, identify possible constraints – institutional, capacity, financial etc., as an input for defining corrective measures *Year 3:* Assess effectiveness of applied approaches in CRA and CHORTI and recommend changes in methodologies, service models, institutional set-up, and procurement methods etc. for other mancomunidades. *Year 1-5:* Continued monitoring of results of the demonstrative projects – applied for (i) replication of successful models, (ii) modifications of designs, where necessary, (iii) rejection of deficient models *Year 5:* Identify strategy for scale-up of successful models
Outcome 2B: Environmental benefits	**Outcome 2B indicators** • Increased share of offgrid investments, using renewable energy, in the total investment in rural electrification	

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Tons of CO2 avoided annually Yr 1-5, cumulative number of installations

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<tr><th></th><th>tCO2 per yr</th></tr>
<tr><td>Year 1</td><td>1,400</td></tr>
<tr><td>Year 2</td><td>4,300</td></tr>
<tr><td>Year 3</td><td>8,800</td></tr>
<tr><td>Year 4</td><td>12,300</td></tr>
<tr><td>Year 5</td><td>14,800</td></tr>
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<td>Outcome 3:
Improved local capacity to plan, manage and implement rural infrastructure projects.</td>
<td>Outcome 3 Indicators

FOSODE's staffed with specialists trained in offgrid electrification
UTIs operating with trained technical staff, understanding offgrid electrification issues
Number of offgrid electrification service providers operating satisfactorily

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<td>Year 1-5: Monitor UTIs performance – assessing effectiveness of training received and identifying new training/TA requirements.

Monitor performance of small-scale providers and community-based systems -- assessing effectiveness of training received and identifying new training/TA requirements.

Year 2-3: Adapt the capacity-building programs on basis of practical experiences in CRA and CHORTI.

Year 5: Assess the adequacy of the applied service delivery models in relation to the local capacity; identify successes and failures of the applied capacity-building exercises.
Identify key lessons for follow-up projects and scale-up.</td>
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<td>Outcome 4:
Monitoring and Evaluation Systems established</td>
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M&E for offgrid electrification integrated in the FHIS and FOSODE's M&E system
FOSODE and UTIs trained in M&E activities

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<td>Year 1-5: Continued monitoring of results</td>
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Arrangements for results monitoring
Key indicators

Project Outcome Indicators	Baseline	Target Values					Data Collection and Reporting		
		YR1	YR2	YR3	YR4	YR5	Frequency and Reports	Data Collection Instruments	Responsibility for Data Collection
Sustainable Access • Dispersed households, businesses and public facilities with sustainable electricity access provided with solar home systems (SHS)	0	0	500	1,600	2,000	4,000	Annual	Progress reports Field surveys	FHIS UTIs FOSODE
• Village micro-grids using hydro and other renewable energy technologies (financed under PIR) provide quality and sustainable electricity access to about 1,000 households, businesses and public facilities.	0	0	1	3	4	5			
Local capacity and enabling framework • Offgrid technologies fully integrated in the national and local rural infrastructure planning		RETs integrated in the first RIAPs		RETs integrated in all RIAPs70 Integrated rural electrificatio n policy adopted		RETs fully integrated in both national and local planning process 85			
Global environment objective of GHG reduction 425,000 tCO2 over 20 years						425,000 tCO2 over 20 years			
Intermediate Outcome Indicators									
Outcome 1 Number of RIAPs with adequate integration of RETs	-	2	4	6	6	6			
Adoption of a rural electrification policy, integrating all technologies (grid and offgrid), and defining an efficient financing mechanism and subsidy allocation rules	-	Policy adopted							

Offgrid electrification included in FOSODE's program	-	-	Complied with						
Outcome 2A Number of community-based MHP operating under sustainable conditions (financial, social and technical capacity), with help of the technical assistance of the project	0	0	1	3	4	5	Annual	Progress reports Field audits	FHIS UTIs FOSODE
Implementation of other RET offgrid electrification pilot project (stand-alone windpower system or wind diesel/hybrid installation)	0	0	0	1	1	1			
SHS providers accredited and participating in the national solar PV development program	0	0	3	4	5	5			
Outcome 2B Increase share of offgrid investments, using renewable energy in the total investment in rural electrification	0	10%	15%	20%	30%	30% of the PIR rural electrificatio n investment			
CO2 annual reductions									
Outcome 3 Number of UTIs operating with trained technical staff, understanding offgrid electrification issues	0	2	4	6	6	6	Annual	Progress reports Field audits	FHIS UTIs
FOSDE staffed with trained specialists in offgrid electrification	-	Training started	Complied with						
Number of private offgrid electrification service providers operating satisfactorily (within the project)	0	1	3	5	7	8			
Outcome 4 M&E for offgrid electrification integrated in the FHIS plan	0	Complied with					Annual	Progress report Field audits	FHIS UTIs FOSODE
FOSODE and UTIs trained in M&E	0	Complied with							

Annex 4: Detailed Project Description
HONDURAS: Rural Electrification Project

Background

The Project is integrated with the IDA-financed Rural Infrastructure Project (PIR), approved on July 7, 2005. The two projects are partially blended. Specifically, the GEF Rural Electrification Project co-finances two sub-components of the IDA project (Solar PV Program and Other potential RET pilot projects) and provides technical assistance related to all other PIR components to ensure that (i) viable offgrid electrification models are developed and demonstrated, (ii) offgrid renewable energy technologies (RETs) are integrated in the local and national infrastructure planning processes; and (iii) the corresponding capacity to manage and implement offgrid RET projects is built in the country.

The IDA-financed PIR Project has four components, covering all stages of the locally-driven process of infrastructure services provision:: (i) support to the participatory local planning for integrated infrastructure service delivery, (ii) infrastructure service delivery, (iii) local capacity building and policy development technical assistance, and (iv) project management, monitoring and evaluation. The GEF grant will contribute to the achievement of each of these components.

The project will be developed primarily in *mancomunidades* (associations of municipalities.) There are 298 municipalities in Honduras. Most of them are small (56 percent have populations of less than 10,000). To overcome the size constraint, many municipalities opted to form *mancomunidades,* which are voluntary associations of municipalities, with a separate legal entity and usually a specific purpose (local development, environmental protection etc.) There are about 50 mancomunidades in Honduras. The project will be developed primarily in six *mancomunidades*, starting with CRA (in the department of Santa Barbara) and CHORTI (in Copán). The first two *mancomunidades* were selected on basis of combined criteria of poverty, human development index, economic development potential, infrastructure gaps and degree of institutional capacity. Same criteria will be used for the selection of the remaining four *mancomunidades.*

Table 4.1: Mancomunidades CRA and CHORTI: key indicators

Municipality	Km2	Population	% in extreme poverty	% of rural popul	Water coverage (urban &rural)	Sanitation coverage (urban &rural)	Rural electrification	% of road network in good or fair condition
CHORTI	1916	161052	50.9	73	87	56	24	39.2
CRA	1421	88574	40.4	81	80.4	59.3	20	

Some of the RET investments, however, will be located outside the participating *mancomunidades* to enhance the demonstrative effect of these projects and (in the case of the solar program) to achieve better economies of scale.

Component A – Support to the participatory local planning for integrated infrastructure service delivery: ***Cost: US$0.53 million, GEF: US$0.1 million*** *(IDA: US$0.43 million in parallel financing)*

This component will finance the costs of consultants, workshops, training and other technical assistance to *mancomunidades,* local authorities and communities to ensure that offgrid electrification solutions, based on renewable energy technologies (RETs) are known and understood by the beneficiaries and fully integrated into the local Rural Infrastructure Action Plans (RIAPs) prepared under the PIR Project.

The GEF financing will feed into four activities of this component financed under PIR, covering all stages of the local participatory planning process: (i) prepare rural infrastructure diagnostics in each mancomunidad, (ii) expand/complement the existing local development plans with infrastructure projects through a participatory process; (iii) establish mechanisms and procedures for approaching the infrastructure issues in an integrated manner among the sectors and localities; and (iv) provide follow up support and monitoring of the overall planning process in each *mancomunidad.* As a result of these activities, specific Rural Infrastructure Action Plans will be established, which will include a list of prioritized project, including offgrid electrification sub-projects, for both IDA and GEF financing.

	Cost, US$ millions		
Technical Assistance Activities for Policy and Capacity Building	**Total**	**Baseline Cost***	**GEF**
Support to PIR Component 1 – Support to the participatory local planning process	0.53	0.43	0.10
Integration of Decentralized Supply Options in Local Participatory Planning (0.1 GEF)			

*The baseline costs are about a third of the total component costs in PIR for the 3 sectors and would be covered through IDA PIR parallel financing.

<u>Component B – Offgrid electricity service delivery:</u> Cost: US$7.39 million; GEF: US$1.35 million *(IDA: US$5.25 million; European Union (GAUREE 2 project): US$0.24million; local counterpart contribution: US$0.55 million)*

Additionally, US$ 10.65 million from the IDA-financed Rural Infrastructure Project (PIR), and US$ 2.15 of counterpart funding from municipalities (mancomunidades) is available for rural electrification component financing the grid extension sub-projects.

The GEF grant will provide resources for investment and technical assistance for offgrid electrification with the use of renewable energy technologies (RET), expanding the electrification options under the PIR Project. The offgrid projects financed by the GEF will form an inherent part of the Rural Infrastructure Action Plans (RIAPs), developed under the Component 1 of the PIR Project (see above), including three basic infrastructure sectors (roads, water and sanitation, and electricity). The GEF financing will aim primarily at the development and demonstration of viable offgrid electrification models which would be later streamlined into the rural electrification planning in Honduras. While the majority of financing for rural electrification in the PIR project is intended for the grid extension (US$ 9 million), about US$7.4 million is expected to be mobilized for the offgrid electrification pilot projects and programs in a combined financing of GEF, IDA Credit, European Commission's existing GAUREE 2 project, and counterpart funding from the mancomunidades.

- ***Component B.1: Investments in village micro-grids using hydro and other renewable energy technologies:***
  Cost US$3.5 million; GEF US$0.06 million (IDA US$ 2.55 million, EC GAUREE 2 US $0.24 million, local counterpart contribution: US$0.3 million.).

  a) Micro-Hydro Power (MHP): (financed by IDA-PIR and EU-GAUREE)

A special challenge to the Government's rural electrification program is how to provide electricity access to very small communities that are not economically feasible to connect to the national grid and are too small to attract private sector interest. Some of these communities possess hydro resources, mainly run-

of-river, that could be exploited for electricity generation though microhydro power (MHP) plants, normally defined as systems of 10-200 kW capacity. The challenge is twofold: a) identifying suitable productive applications that, along with the domestic lighting load, could economically justify investment in the MHP[5], and b) organizing community-based operation and maintenance of the plant.

Investments (to be financed by IDA and EC GAUREE 2 program)

All investment costs for this sub-component will be covered by the IDA Credit for the sub-projects located at the territory of the participating mancomunidades, and partially by the EC GAUREE 2 Program for two micro-hydros already pre-identified by this program located outside the participating mancomunidades. It is planned to finance up to 8 MHPs of capacity between 50-100 kW each during the 5-year Project duration. To be established in Phase 1 of the project are two pilot MHPs: a) 55 kW La Atravesada in *Mancomunidad* CHORTI, and b) 80 kW Las Champas in *Departamento* Colon. The Las Champas MHP is not situated in priority *mancomunidades* but has been the subject of prefeasibility studies by ENEE under the GAUREE program with the EEC. EEC has already committed soft loans totaling about $160,000 to this project. In Phase 2, an effort will be made to identify at least one MHP each in 4 other priority *mancomunidades* or an additional total of up to 6 MHPs averaging 100 kW each. As already mentioned, the purpose is to demonstrate a decentralized electrification solution for suitable *mancomunidades*. However, because the resource is highly site specific, it is evident that the MHP option is not a solution for *all mancomunidades.*

Table 4.2: Summary of proposed Michrohydro Power Investments (to be financed by IDA and EC GAUREE 2 program)

Phase	Location	Number of new connections, Yr1 –Yr20	New Generation (kW)	U$/kW Installed, MHP	Indicative Total Investment Cost, US$M
1	La Atravesada (CRA)	94 - 165	55	3, 600	0.25
1	Las Champas (Colon)	199-359	80	4,100	0.53
2	Up to 6 more sites TBD	TBD	~600	~3,500	~2.1
	Total		~635		~2.88

The Subcomponent will be supported by technical assistance activities co-financed by GEF, described below under the sub-component B.2. The detailed description of the first two MHPs La Atravesada and Las Champas is also provided below.

b) Other potential RET Pilot Projects

Aside from microhydro power, other RETs may be feasible for providing electricity to isolated remote areas of Honduras, including small windpower systems, modular biomass gasifiers and diesel/RET hybrids. During project implementation, a comprehensive inventory and economic evaluation of RET's that are relevant to Honduras will be conducted. The Project will finance the demonstration of at least one stand-alone windpower system or a wind diesel/hybrid installation of about 100 kW, to determine its feasibility in remote areas with good wind regimes. A key requirement for the site of the demonstration would be the potential to use much of the scarce power for a productive application that benefits the community as a whole. A GEF grant of about $600 per KW is being sought to finance the incremental cost.

[5] If the only electrical load is lighting for households, individual solar home systems are often the least-cost solution.

- ***Component B.2: Offgrid MHP technical assistance (GEF financed: US$0.35 million)***

The objective of the project's support to MHP and other offgrid technologies is to demonstrate a community-based approach to provision of electricity services to small populations remote from the national grid that have hydro resources and have potential for productive applications, such as refrigeration of milk, fish and produce; grain milling, and other agroprocessing activities. Best practice for social organization and financial intermediation will be piloted. Pilot communities will be selected that could be organized to operate and maintain the power plants and the identified productive use. As with the line extension subprojects, recipient communities will be required to contribute to the investment cost and pay the full cost of operation and maintenance. To the extent possible, tariffs will be charged that enable not only paying for the O & M cost but also an additional amount to recoup a portion of the investment cost or to put into a "development fund". The fund would go towards productive or socially oriented activities in the community. Consultant studies are being carried out to determine how best to establish this type of facility or other forms of financial intermediation.

GEF will finance technical assistance related to the IDA-financed investments in MHP. Although, in general, MHPs have lower lifecycle costs than equivalent isolated diesel systems, major informational, financing and institutional barriers prevent their wider use in Honduras. *GEF grants totaling $0.6 million will finance several technical assistance activities directly related to the sub-projects, designed to reduce these market barriers,* including: training and workshops for community organizations, MHP operators and project developers; identification and preparation of additional pilot MHPs, and definition of site-specific productive applications that could be promoted in Honduras. The technical assistance support is particularly important at this sector development stage in Honduras as there is very little experience with this type of projects in the country (just few very small village micro-hydro projects below 20kW).

La Atravesada MHP (CHORTI)

The MHP subproject will be located in the Municipality of Florida, Department of Copan and will cover the three unelectrified communities of San Marcos, La Nueva Virtud and Las Palmas. The population is about 580 persons in about 94 households. There are 4 schools, 5 churches and 5 existing retail stores (*pulperias*). There are many existing small economic activities which productivity is expected to be dramatically improved once electricity is made available. New productive uses of electricity are also planned to be initiated. These include: production and processing of the the *maracuya* fruit, coffee processing, tilapia fish farming, milk refrigeration and small household businesses such as carpentry and tailoring. These uses are estimated to be up to 5-10 KW total. An additional 5 KW could be absorbed by new commercial users, such as *pulperias*, fish refrigeration, lighting for hostels and battery charging. The opportunity to demonstrate productive uses of MHPs and improve the economic situation in these remote communities was the main reason for choosing the site.

The communities are about 11 km from the nearest grid tapping point. At this distance and at the estimated investment cost, the MHP would have a slightly lower levelized electricity generation cost than the alternative of three-phase grid extension. It is also a lesser cost option compared to establishing an equivalent capacity isolated diesel system. A feasibility study has been completed.

Energy demand growth is projected to require the installation of a second 55 kW turbine by 2014. Therefore, allowance for such expansion was incorporated in the design of the plant and its component structures, increasing the investment cost by about 10%. Total investment cost is estimated to be about U$256,000, of which $198,000 is for the plant and $58,000 is for the distribution network.

Las Champas MHP

This proposed MHP is located in the Municipality of Iriona, Department of Colon and is about 40 km distance from the national grid. Despite the much higher investment cost for an MHP, it is the economic least cost option compared to isolated diesel or solar PV installations. The remoteness of the site and bad road conditions would make the transport of diesel fuel extremely difficult.

Three unelectrified communities would benefit from the project: Las Champas, Las Celias and Cuyamel. The initial beneficiaries include 166 residential, 27 commercial and industrial, and 10 public center users. Street lighting is also planned. Total electricity demand was estimated in the prefeasibility study to start at about 108,000 kWh per year in 2007, growing to about 213,000 kWh per year in 2020. The MHP zone is economically very active, with a high potential for productive and commercial uses. Existing commercial enterprises include, among other, milk and cheese production, small retail stores, tailoring and carpentry shops. A survey has shown that residents have high capacity and willingness to pay for electricity service.

Based on analysis of the demand and the cost of plant construction in the remote site, an MHP plant of about 80 kW will be constructed. The plant is estimated in the prefeasibility study to cost about $335,000, of which $160,000 in equipment cost will be cofinanced with a soft loan from the EEC. The cost of the distribution network that extends to the three communities is about $196,000 due to the relatively long distances between them. The estimated investment costs are on the high side due to the unfavorable physical characteristics of the site. These costs, and possible measures to reduce them, are being carefully reviewed in an ongoing full feasibility study. Nevertheless, like La Atravesada, the Las Champas site is considered appropriate for demonstrating how the introduction of locally generated electricity could enable existing enterprises to be expanded and their productivity increased, through extended business hours and the use of electrical appliances (refrigerators for milk, power tools for carpentry, etc). It is also planned that new economic activities such as grain milling, night schools, public movies with videocassettes and TV, etc, will also be initiated.

Table 4.3: Microhydro Technical Assistance (to be financed by GEF)

	US$ millions
Technical Assistance Activities for Microhydro Component	**GEF**
Training/Workshops for Microhydro Operators and Community Organizations	0.10
Productive applications of Microhydro & Other Small Decentralized Power	0.10
Preparation of Phase 2 Microhydro Power Plants Subprojects in Priority *Mancomunidades*	0.15
Total	0.35

- ***Component B.3: Solar Photovoltaic Market Development Program, Costs: US$3.88 million; GEF grant for systems: US$0.49 million; GEF grant for TA: $0.45 millions (IDA Credit US$2.7 million, expected local counterpart co-financing [optional] 0.24 million)***

The majority of dispersed households need electricity only for lighting, to replace traditional lighting sources (such as kerosene lamps that provide inferior illumination) and batteries (used mainly for radio). Individual solar home systems ranging from 36 – 75 peak Watts can provide power for electric lamps at

much less cost than typical grid-extension projects. The Solar PV Program, which will target a total installation of about 244 kW or nominally about 5,000 units of 50 peak watts average each over the 4-year duration of the PIR project aims to establish a sustainable local PV industry structure and fill a gap in the rural electrification program. The basic Program strategy is to stimulate the market by making PV systems affordable to users, available where they are located and supported with long-term maintenance service. Reduced costs would be achieved through eventual economies of scale in procurement and by judicious use of GEF grants and Government subsidies that buy down the first cost to consumers.

Rural Market Profile

The potential rural market for PV systems in Honduras includes households, commercial users (retail stores, rural restaurants, microenterprises, etc) and institutional users (schools, clinics, community centers, etc) in dispersed offgrid areas. Households are expected to be served mainly with 36W-50W solar home systems (SHS) that provide power for 3-4 low-wattage lights 4-5 hours nightly, and for operating a radio or small B&W TV. Commercial and institutional users often require systems with capacity of 100W or more. These applications, while larger individually, are clearly a smaller total market for PV than households.

There are 8 dealers of PV systems in Honduras of varying scale of business today (Soluz Honduras, Solaris, CADELGA, Eco-Aldeas, Soluciones Energeticas, Vegas Electric, Global Solar-SISTELCOM and SIELSOL). In total, there are about 5,000 systems installed in the country, but future demand is limited. Sales have been primarily for government-related procurement (e.g., for a site-specific bilateral funded demonstration project) or one-off sales to relatively affluent private customers. Microfinancing assistance to buyers of PV systems is nonexistent. While grid-connected households enjoy a variety of subsidies for electricity consumption, none are presently available to PV system users. Consequently, PV system prices are high compared to other developing countries[6]

The combination of high unit prices, absence of financing assistance and lack of government support has hampered the growth of a wider market for PV in Honduras. In the medium to long terms, there are significant opportunities for cost reduction through increase in sales volumes and establishment of commercial links with lower cost suppliers in the region and elsewhere (e.g., China etc). In the short-term, however, assistance to the industry is needed to establish a rural sales and service network, and to stimulate consumer demand by reducing unit prices. The project would reduce the current high upfront cost to consumers by providing GEF grants and government subsidies to eligible systems. Additionally, the IDA-financed PIR project will finance Government poverty reduction subsidies and a micro-finance component to increase affordability of the systems for the rural poor in Honduras.

Domestic Market. The total potential rural household market was estimated (based on the estimate of unserved dispersed households in rural areas). The income level of this filtered group and their current expenditures for lighting are then compared with monthly payments for SHS. Finally, an estimate is made of the total number of units that could be feasibly sold and installed within the 5 year life of the project, recognizing that market development usually starts very slowly. These considerations led to the setting of 5,000 installations as the nominal 5 year target of the Solar PV Program[7].

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[6] The high price of PV systems in Honduras is further exacerbated by the current shortage of solar panels in the international market, induced by high demand in Europe and Japan. The situation is expected to return to normal within the next two years.

[7] Based on assumed market shares of the different capacities, 5,000 SHS installations would have an average size of about 50 Wp.

System costs and market shares. The financing plan of the program is based on the unit costs and market shares of different SHS capacities shown in Table 3.

Table 4.4: Estimated System Costs and Market Shares of SHS Capacities

Components	36 Wp	50 Wp	75 Wp	100 Wp
Solar panel	$250	$320	$390	$500
Battery, Ah	85	105	105	105
Battery Cost	$80	$90	$90	$90
Controller, Amps	5	8	12	16
Controller Cost	$35	$40	$45	$50
Lamp watts	9	11	13	15
No. of lamps	3	3	4	5
Lamps Total Cost	$58	$77	$108	$168
Cables, etc	$20	$25	$30	$35
Installation	$60	$70	$80	$90
Margin	$48	$60	$72	$91
Installed System Cost	**$551**	**$682**	**$815**	**$1,024**
Market share	**30%**	**60%**	**8%**	**2%**

The installed system costs shown are the expected costs after a year or two of program implementation. They are slightly lower than current costs in Honduras for individual or limited number sales, reflecting modest market expansion induced by the project in the short term. In the later years of the project and beyond, economies of scale in procurement, installation and maintenance will enable further reduction in unit prices and the possible significant reduction of subsidies. Since the total grants and subsidies per user are still well below current subsidies for grid extension, the Government has agreed to pick up the GEF grant portion, if still needed, at the end of the PIR project, assuring sustainability of the program at least in the medium term.

The assumed market shares are estimates based on historical sales and willingness to pay data from available surveys of unelectrified areas in Honduras. The project financing plan, including the targets and level of subsidies, will be adjusted based on actual market response during implementation.

Productive and Institutional Applications. Potential private productive applications that have been identified include lighting for remote rural hostels in eco-tourism, power for small water pumps in fish farms, electric fencing for goats and other livestock, etc. These types of applications tend to be small because as the need approaches the kW level, small gasoline and diesel engines become more cost effective, as long as fuels could be obtained. Nevertheless, the project will pro-actively seek out opportunities to promote, in unserved remote areas, economic, income generating activities assisted by PV systems. Institutional applications represent a possibly much larger market in Honduras. The constraint for this subsector is the fact that investment decisions about electrification of schools, clinics and other public facilities often lies with the central government authorities. Where such institutions, however, are implementing existing or planned programs to upgrade remote rural facilities, however, opportunities to introduce PV as a cost-effective solution will be sought.

To catalyze and demonstrate the market for productive and institutional applications, the project is allocating investment funds for up to 100 installations averaging 300 watts each. Up to 90% of an eligible public or community application may be financed by a combination of government subsidy and GEF

grants. Privately owned applications will be financed at commercial terms but will be provided substantial technical assistance in project design and development of business plans.

Willingness to Pay Considerations

Even at the assumed reduced unit prices shown in Table 4.6, very few households in the rural areas of Honduras could afford to purchase any of the systems without financing assistance. This is not a unique situation. The cost of SHS, although declining significantly worldwide in recent years, is still high in comparison with rural household incomes. The present Program will use grant financing support from the GEF, for the "incremental costs" of shifting to this new technology from traditional practice. This incremental cost is estimated to be about US$1.8 per peak watt or about 34 Lempiras (see Annex 15 for a more detailed explanation of the concept of GEF incremental cost) and is consistent with recent Bank/GEF-financed projects in the region and elsewhere. However, in Project implementation, the grant obtained will not be provided to consumers on a per peak Watt basis, but will be skewed in favor of the lower system sizes that are likely to be used by the poorest segment of the market. The objective is to bring consumer payments as close to willingness to pay levels as possible, as indicated by current expenditures on traditional energy sources for lighting and basic communication. Often, as in this case, this could only be achieved with additional subsidy from the Government, justified by equity considerations.

Table 4.5 Population distribution monthly expenditures (US$)

Monthly expenditures$ US	% of population
0 - 5	14%
6 - 10	53%
11 - 15	29%
16 or more	4%

ENEE - FOSODE. August 2005

From the above data, it was concluded that the likely users of the smallest systems (36 – 50 Wp) have a willingness to pay levels in the range of about $10-15 per month. A consumer financing plan for the various SHS capacities could thus be conceived along the lines shown in Table 4.6 below:

Table 4.6: Indicative SHS consumer financing plan

PV System Size,Wp	**36**	**50**	**75**	**100**
Unit Cost, US$	550	650	800	1,000
Downpayment,US$	55	65	80	100
GEF Grant (market development subsidy), US$	90	90	90	50
Local Subsidies (PIR poverty reduction subsidy and mancomunidades),US$	180	180	180	0
Total subsidy, US$	270	270	270	50
Microfinanced loan, L$	225	315	450	850
Monthly Payment, U$	8.4	11.7	16.7	31.6
Percent of GEF Subsidy to Capex	16%	14%	11%	5%
Percent of Local Subsidy to Capex	33%	15%	11%	0%
Total % subsidy	49%	29%	22%	5%

A flat GEF grant of $90 for all 36-75W systems preserves the intent to skew the available subsidy to the poorest users. A reduced GEF grant is provided to the 100 Wp system but no equivalent local subsidy is provided. Local subsidies consist of Government subsidies (financed under IDA PIR Project) built into the project to increase availability of the systems for the rural poor and contributions, as available, from the *mancomunidades* in the "market package" approach explained below. In the indicative plan shown above, the GEF grant, Government subsidy and *mancomunidad* contribution are equal at $90 each for sizes below 100 Wp.

Business model: a combination of open and packaged markets

Based on the results of preparatory studies, a commercial dissemination approach suitable to Honduras that combines features of successful business models used in previous Bank PV projects in other countries will be applied. The underlying framework will be the "dealer model" with its accreditation requirements for participating companies (PCs), sales with consumer financing, and ability of PCs to sell anywhere there is demand. This business model has been used successfully in past and ongoing Bank-financed projects in Sri Lanka, China, Indonesia, Bangladesh and the Philippines. The dealer model promotes competition that eventually translates to lower cost and better service to consumers. As opposed to the fee-for-service or concession model, the user will own the system after it is fully paid for and will be responsible for needed replacements later (battery, lamps, etc).

The dealer model, however, will be adapted to the conditions of Honduras. In particular, the relatively small total market to some degree constrains gains from competition otherwise achieved through open-market dealer model. There is also a need to align better the PV component with the overall approach of the PIR Project, which concentrates investments in defined territories (*mancomunidades)* to maximize its development effect. It was therefore decided to introduce a variation to the dealer model by adding competition by PCs for "market packages" of customers grouped within the domains of the *mancomunidades* The *mancomunidades* structure of Honduras communities provides a unique opportunity to feasibly group prospective users in unserved areas into "packages" that have economies of scale for procurement, installation and maintenance of systems. The *mancomunidades* not only have the needed administrative or oversight role for such packages (through their technical units – UTIs) but also have the capability to financially contribute to the transaction.

The introduction of market packages will help to increase implementation speed, as accredited companies will benefit from an already pre-identified, and informed market (reducing their marketing and other preparatory costs). Nevertheless the final selection of the users will be the responsibility of the company. Each sale will be an individual transaction between the customer and the company.

Provision of systems to the package will be bided out to the accredited PCs, which will be provided upfront with information on the maximum subsidy (total of GEF grant, GOH subsidy and *mancomunidad* contribution) available for the package. The winning bidder will be the one with the least total subsidy requirement and will be obligated to provide at least 2 years of after-sales maintenance to each customer. The relative geographical concentration of the users in the packages will also reduce installation and after-sale service costs.

Each package would have a minimum of 100 customers. Each customer will decide what SHS capacity it can afford, based on the indicative financing plan shown in Table 4.6. Microfinancing assistance will be arranged for each purchase (see below). In addition to the GEF grant and the PIR financed GOH poverty reduction subsidy, the *mancomunidad* would provide a contribution, to cover remaining gaps between system prices and capacity and willingness-to-pay levels in the subject communities. In the example shown in Table 4.6, these result in monthly payments of to $8.3 for 36 Wp systems and $13.6 for 50Wp.

In the "open market" case, only the GEF grant and Government subsidies would be available. This raises the monthly payments to about $11 for 36 Wp and $15 for 50Wp[8].

Identification and definition of solar market packages. There are a total of 6 priority *mancomunidades* to be covered by the PIR project, starting with CRA and CHORTI. The preliminary packages identified in these two *mancomunidades* include 600 systems in CRA and 1,000 systems in CHORTI. The proposal was discussed with the local authorities in both *mancomunidades* and was very well received, including the commitment of their contribution to the subsidy financing. Based on the final number and location of prospective customers, FOSODE together with *mancomunidades* will define the final size and geographical boundaries of each market package. A package may consist of customers from more than one municipality. The remaining four *mancomunidades* will be integrated in the second year of the project.

Within the first 2 years of PIR implementation, the focus will be on these packages. If the nominal target of 5,000 systems has not been met yet at that time (in terms of contracting the packages), an "open market" phase will follow in Year 3. The coverage will be anywhere in the country where there is demand. During this phase, all accredited dealers will be free to sell to anyone, including to still unserved customers in the original market packages. Eligible sales will be entitled to GEF grants and GOH subsidy.

Accreditation of dealers. As many dealers as possible will be accredited to become PCs. Eligible companies could be local or foreign. All must have demonstrated capability and a track record in PV distribution and/or the rural retail business. The PCs will be allowed to procure their systems and parts from any supplier of their choice but all systems and components, as well as the installation itself, must comply with minimum technical standards to be set up by FOSODE. For their participation, the accredited dealers would receive grant financing in full or cost-shared basis of eligible business development activities. But the main incentive is eligibility to receive a cash subsidy from the project for each qualifying unit sold and installed.

Based on experience with similar projects in other countries, much of the first year of implementation will be taken up by organizational tasks, such as developing procedures for the incentive system, establishing rural distribution networks and promoting public awareness. The pace of installation is thus expected to start slowly, the peak of installations is during the Year 3. It is expected that the packages (being generally located in poor rural areas) will especially concentrate on smaller systems (36 Wp and 50 Wp), while larger systems are more likely to be sold in the open market and for productive and institutional uses.

Table 4.7: Estimates of annual installations

Wp	Year 1	Year 2	Year 3	Year 4	Year 5	Total installations
36	150	300	450	300	300	1500
50	300	600	900	750	450	3000
75	40	80	80	100	100	400
100	5	15	20	30	30	100
	495	995	1450	1180	880	5000
300	20	30	30	20		100
Total per year	515	1025	1480	1200	880	5100

[8] For simplicity, the comparisons assume equal cost of all components, including installation. Obviously, installation costs per unit will be less in the case of the market package.

Microfinance assistance. The preparatory studies have determined the need to introduce microfinancing for the SHS users to ensure affordability of these systems for the poor rural households (the studies have shown that even after the applications of the GEF and Government subsidies, the households lack the necessary cash resources to purchase the systems upfront, even though they have adequate capacity and willingness to pay when payments can be distributed over longer time period) It was therefore decided that the PIR project will arrange for the operation of qualified microfinancing institutions (MFIs) in the priority *mancomunidades* to provide consumer financing for purchase of PV systems.

Table 4.8: Tentative Financing Plan for Solar Credit Line, US$ million

GEF grant for Hardware Incremental Cost	0.49
Govt Subsidy	1.24
Microfinanced Amount	1.55
Consumer Downpayments	0.36
Total Cost	3.65

Technical assistance. The Subcomponent will be supported by technical assistance activities

Table 4.9

Technical Assistance Activities for PV Component	**GEF: US$**
Market Support Facility for PV Companies	0.10
Standards & Certification for Renewable Energy Systems	0.05
Public Education & Promotions of PV and other offgrid options	0.10
Training/workshops for PV dealers & Microfinance Institutions	0.10
Preparation of PV Institutional Applications	0.10
Total	0.45

Component C – Local Capacity Building and Policy Development TA *Costs: **1.76 million; GEF US$0.6 million** (IDA US$ 1.16 million in parallel financing)*

The GEF financing will ensure that awareness and capacity is built on the use of renewable technologies in rural electrification. The component would support a host of technical assistance and capacity building activities, to ensure that decentralized electrification options, particularly those that utilize renewable energy, are seamlessly integrated into rural electrification planning; that allocation and setting of tariffs and subsidies for offgrid service are rationalized; and that key sectoral institutions, particularly ENEE and its Social Electrification Office (OES), administering FOSODE fund, as well as local financing institutions and private sector participants are sufficiently strengthened. This component will pay a particular attention to the capacity building at the local level (mancomunidades, municipalities, communities) for decentralized service provision, contributing to the decentralization and local capacity building objectives of the Government.

	Cost, US$ millions		
Technical Assistance Activities for Policy and Capacity Building	**Total**	**Baseline Cost***	**GEF**
Support to PIR Component 3 – Local capacity building and policy development TA	1.76	1.16	0.60
Rationalization of subsidies and tariffs for rural electrification (0.1)			
Institutional Strengthening of FOSODE, ENEE, FHIS on Renewable Energy (0.25)			
Institutional strengthening of UTIs and other local actors on renewable energy			

(0.25)			

*The baseline costs are about a third of the total component costs in PIR for the 3 sectors and would be covered through IDA PIR parallel financing.

Component D – Project management, monitoring and evaluation: ***Costs US$ 0.96 million; GEFUS$0.3 million;*** *(IDA 0.66 million in parallel financing)*

Although FHIS will have an overall responsibility for the project implementation, the technical aspects of the electrification component, including all activities financed under the GEF grant, will be managed by ENEE/OES. Therefore, the GEF grant will contribute to the project management, monitoring and evaluation activities to be carried out by ENEE/OES.

	Cost, US$ millions		
Technical Assistance Activities for Policy and Capacity Building	**Total**	**Baseline Cost***	**GEF**
Support to PIR Component 4 – Project Management, Monitoring and Evaluation	0.96	0.66	0.30
Monitoring & Evaluation Plan (0.15)			
Project management activities of FOSODE (0.15)			

*The baseline costs are about a third of the total component costs in PIR for the 3 sectors and would be covered through IDA PIR parallel financing.

Annex 5: Project Costs
HONDURAS: Rural Electrification Project

1. Project costs IDA+GEF (US$)

Project Cost By Component	**IDA PIR electrification**	**GEF**	**Other (European Commission GAUREE 2 program)**	**Local contributions**
Component A – Support to the participatory local planning for integrated infrastructure service delivery	**0.43**	**0.10**		
Component B – Offgrid electricity service delivery *	**5.25**	**1.35**	**0.24**	**0.55**
B.1 Investments in village micro-grids using hydro and other renewable energy technologies	2.55	0.06	0.24	0.3
B.1 (a) MHP				
B.1.(b) other RET				
B.2 Offgrid MHP technical assistance		0.35		
...B.3 Solar PV Program	2.70	0.94		0.25
Component C – Local capacity building and policy development TA	**1.16**	**0.60**		
Component D – Project Management, Monitoring and Evaluation	**0.66**	**0.30**		
Total Baseline Cost				
Contingencies				
Total Project Costs[1]	7.50	2.35	0.24	0.55
Front-end Fee	-	-	-	
Total Financing Required	7.50	2.35	0.24	0.55

**Additionally, US$ 10.65 million is available from the IDA-financed Rural Infrastructure Project (PIR), and US$ 2.15 of counterpart funding from municipalities (mancomunidades) is available for rural electrification component financing the grid extension sub-projects.*

2. Project Costs GEF (US$)

Project Cost By Component	Local	Foreign	Total
Component A – Support to the participatory local planning for integrated infrastructure service delivery	**0.05**	**0.05**	**0.10**
Component B – Offgrid Electrification Service Delivery	**0.70**	**0.65**	**1.35**
B.1 Investments in village micro-grids using hydro and other renewable energy technologies	0.16	0.25	0.41
B.1 (a) MHP			
B.1.(b) other RET			
B.2 Offgrid MHP technical assistance			
B.3 Solar PV Program	0.54	0.40	0.94
Component C – Local capacity building and policy development TA	**0.30**	**0.30**	**0.60**
Component D – Project Management, Monitoring and Evaluation	**0.25**	**0.05**	**0.30**
Total Baseline Cost	1.30	1.05	2.35
Contingencies			
Total Project Costs[1]	0.90	1.45	2.35
Front-end Fee			
Total Financing Required	0.90	1.45	2.35

Project Cost By Category (GEF), US$ million	Local US$ million	Foreign US$ million	Total US$ million
Offgrid electrification subprojects under Component B.1 (b)	0.10	0.00	0.10
SHS Subprogram under Component B.3 (b)	0.30	0.70	1.00
Goods under Component C and D	0.20	0.10	0.30
Consultant services under Componets A., B.2, C and D	0.30	0.20	0.50
Training under Components A, B.2, C and D	0.20	0.00	0.20
Operating costs	0.10	0.00	0.10
Unallocated	0.10	0.05	0.15
Total Project Costs	**1.30**	**1.05**	**2.35**
Front-end fee	-	-	-
Total Financing Required	**1.30**	**1.05**	**2.35**

Annex 6: Implementation Arrangements
HONDURAS: Rural Electrification Project

Overall implementation structure

The GEF grant will be implemented within the overall implementation framework of the IDA-financed PIR project, however, with some adjustments to account for the specific features of the electricity sector.

The Project's implementation structure has five key building blocks: (i) FHIS, (ii) *mancomunidades*; (iii) communities; (iv) infrastructure services providers; and (v) sectoral agencies. *Mancomunidades* will be in charge of developing their Rural Infrastructure Action Plans (RIAPs), in which they will prioritize their sub-projects, and contract out the implementation of these subprojects up to a certain ceiling (US$250,000 per subproject). For this task, they will receive substantial technical assistance from FHIS, consultants contracted under the project, and sectoral agencies. *Mancomunidades* will also contract infrastructure service providers to operate and maintain the constructed systems. In many cases, these operators will be local small and micro-enterprises or communities themselves, which will also require substantial training in technical, commercial and other relevant aspects of their enterprise. The training will be provided by UTIs of *the mancomunidades* and specialized consultants under the supervision of the sector agencies. Sector agencies will accompany the project on both a strategic and implementation level to ensure consistency of policies and approaches and to provide technical assistance on sector specific issues where needed. The overview of the key stakeholders involved in implementation is summarized in the Table 6.1 below:

Table 6.1 Roles and Responsibilities of Key Stakeholders

Entity	Roles and Responsibilities
FHIS	• Management and administration of the project, with the ultimate responsibility for compliance with project requirements, including safeguards, legal agreement, Operational Manual, procurement, FM and other administrative requirements. • Official communications with the World Bank (no objections etc.) • Monitoring of compliance with requirements and procedures established in the legal agreement and the Operational Manual, monitoring and evaluation of the implementation progress and achievement of the project development objectives. • Convenes Advisory Committee meetings • Signing off on the transfer of resources to mancomunidades for the implementation of their RIAPs • TA and supervision of procurement activities of UTIs • Procurement of works, goods, and services not in jurisdiction of UTIs • Provision of technical assistance to UTIs for planning, contracting, and supervision of infrastructure services • Approval of sub-projects based on eligibility criteria and evaluation methodology included in the Operational Manual • Signs participation agreement with the sectoral agencies. • Signs framework agreements with mancomunidades
Mancomunidades -- UTIs	• Preparation of participatory, territorial Rural Infrastructure Action Plans, according to the guidelines provided in the

	Operational Manual • Design of sub-projects with the assistance of FHIS, sectoral agencies and specialized consultants, decision on service provision models • Procurement of works and individual consultants under their authority • Signing of contracts with local infrastructure service providers (for sectors/areas of their competence) • Signing of agreements with participating communities • Provision of TA to local service providers • Supervision, monitoring and evaluation of local infrastructure service provision
Communities	• Participation in the planning process and preparation of Rural Infrastructure Action Plans • Validation of Rural Infrastructure Action Plans • Consultations on and validations of technologies, service provision standards and models at the community level • In some cases: operation and maintenance of the infrastructure systems • Participation in Monitoring and evaluation of the service provision
Infrastructure service providers	Service provision based on the contracts signed with mancomunidades
Sector agencies	Sign participation agreements with FHIS, specifying: • Coordination mechanism ensuring consistent approaches and complementarity between PIR projects and the projects implemented directly by the sectoral entities • Assistance to FHIS on sector specific technical issues, including sub-project evaluation, screening criteria, preparation of technical specifications, review of technical designs etc. • Provision of assistance to FHIS, UTIs and small-scale infrastructure service providers for design, implementation and O&M of the infrastructure systems.

Although FHIS will be the overall implementation agency for the GEF project (in order to ensure consistency with the IDA-financed PIR project, which is under the responsibility of FHIS), the technical aspects of the electricity component will be managed by ENEE through its Social Electrification Office, administering the Social Electrification Fund (FOSODE). This structure was adopted, given that (i) FHIS has no experience in rural electrification projects; (ii) ENEE/FOSODE has successfully managed all Government's grid extension programs; (iii) ENEE has recently also acquired some expertise in the renewable energy field, through execution of bilateral programs for renewable energy development such as GAUREE 2, (iv) ENEE/FOSODE has highly qualified staff and successful track record in project management; (v) ENEE/FOSODE has recently acquired the Government's mandate to integrate offgrid electrification in its program in order to comply with the PRSP targets. The other agency with expertise in renewable energy is SERNA but has far less staff and resources. SERNA will, however, coordinate with and provide assistance to ENEE/FOSODE, as needed, in specific technical areas. Adequate resources are earmarked in the Component for strengthening the technical capacity of ENEE/FOSODE not only for the purpose of executing PIR project subcomponents but also to effectively accomplish its broader planning and management role for socially-oriented rural electrification. Specific focus will be on

building a new capacity in the area of offgrid electrification and renewable energy technologies. Resources will also be provided to ENEE/FOSODE to enable it to obtain short-term consulting services.

FHIS will administer all special accounts for GEF grants and government subsidies for the electrification component subprojects. Depending on the specific subproject, FHIS or *mancomunidades* may carry out the bidding and contracting work. For the solar PV program, FHIS will release subsidy funds directly to participating companies upon request and certification by ENEE/OES.

FHIS and ENEE will sign a participation agreement which will specify in detail the roles of each agency and the coordination mechanism.

Specific arrangement for microhydropower (MHP)

For the microhydropower plants, ENEE will act as the technical arm of FHIS and the relevant *mancomunidades* or communities in all phases of subproject development: identifying candidate sites, confirming availability of the hydro resources, identifying suitable productive uses, drafting consultant terms-of-reference for feasibility studies, selecting the contractor, overseeing construction of the plant and network, organizing and training local operators, and monitoring plant operation by the community. FHIS by itself or jointly with the *mancomunidades* will conduct bidding and contracting, and will transfer funds directly to the contractor. The implementation flow chart is shown in Figure 6.1 below.

Specific arrangements for the Solar PV Program

In both "market package" and "open market" implementation approaches, sale and installation of PV systems will be conducted by participating companies, which shall procure equipment from their preferred suppliers, based on best commercial practices acceptable to the Bank. All equipment and components must comply with minimum technical specifications and performance standards to be set up by ENEE/FOSODE. FOSODE's other tasks in this subcomponent include: accreditation of PV companies to participate in the program, providing market development support (promotions, etc), making arrangements with financing institutions, verification of eligible installations and arranging for release of applicable GEF grants and government subsidies by FHIS to the participating companies. Aside from capacity building and promotional activities, ENEE/FOSODE will have little to do with the solicitation of customers in the open market or individual purchase approach. That is the task of the PCs. The flowchart for the open market approach is shown in Figure 6.2 below.

In the market package approach, FOSODE will have a more active role, along with the *mancomunidades*, in identifying and screening potential PV customers. The process starts with the *mancomunidad* identifying priority electrified communities for PV service. Using its database and information on willingness to pay levels in the identified communities, FOSODE verifies the actual number of potential PV customers in each community. It then defines the boundaries and contents of each of the several packages in the *mancomunidad*. It prepares the financing plan for each package—consisting of customer payments, GEF grants, PIR-financed GOH poverty reduction subsidy and *mancomunidad* contribution—and obtains formal commitment from the *mancomunidad* for its contribution. By actually going house to house, leaders of the selected communities then confirm willingness of the identified potential customers to purchase PV systems with microfinancing and subsidy support. After the packages are finalized, FOSODE prepares tender documents for the packages. FHIS initiates and manages the bidding process, with accredited PCs competing based on least total subsidy requirement. FHIS contracts the winning bidder or bidders. FOSODE supervises and monitors the PCs as they start installation of the systems in the communities. As an agreed upon batch of installations is completed, FOSODE verifies the installations and, if satisfactory, requests FHIS and the *mancomunidad* to release the appropriate amount of grants and subsidies to the PC. The process flowchart is shown in Figure 6.3 below.

With respect to microfinance assistance, financed under IDA PIR project[9], funds for the purpose of providing financing to individual purchasers of SHS will be transferred directly by FHIS to the competitively selected wholesale financial intermediary (FI). Normally, this is a financial institution that then lends the funds to several (eligible) microfinancing institutions (MFIs). The MFIs provides retail loans to the individual consumers that purchased SHS from the PCs. Official memoranda of agreement for implementation of this part of the PV program are executed between the MFI and PCs; between FOSODE and the PCs; and between FHIS and the wholesale financial institution.

[9] Even though this component is fully financed by the IDA PIR project, the basic implementation structure is described here for completeness, due to its relevance to the activities financed by GEF

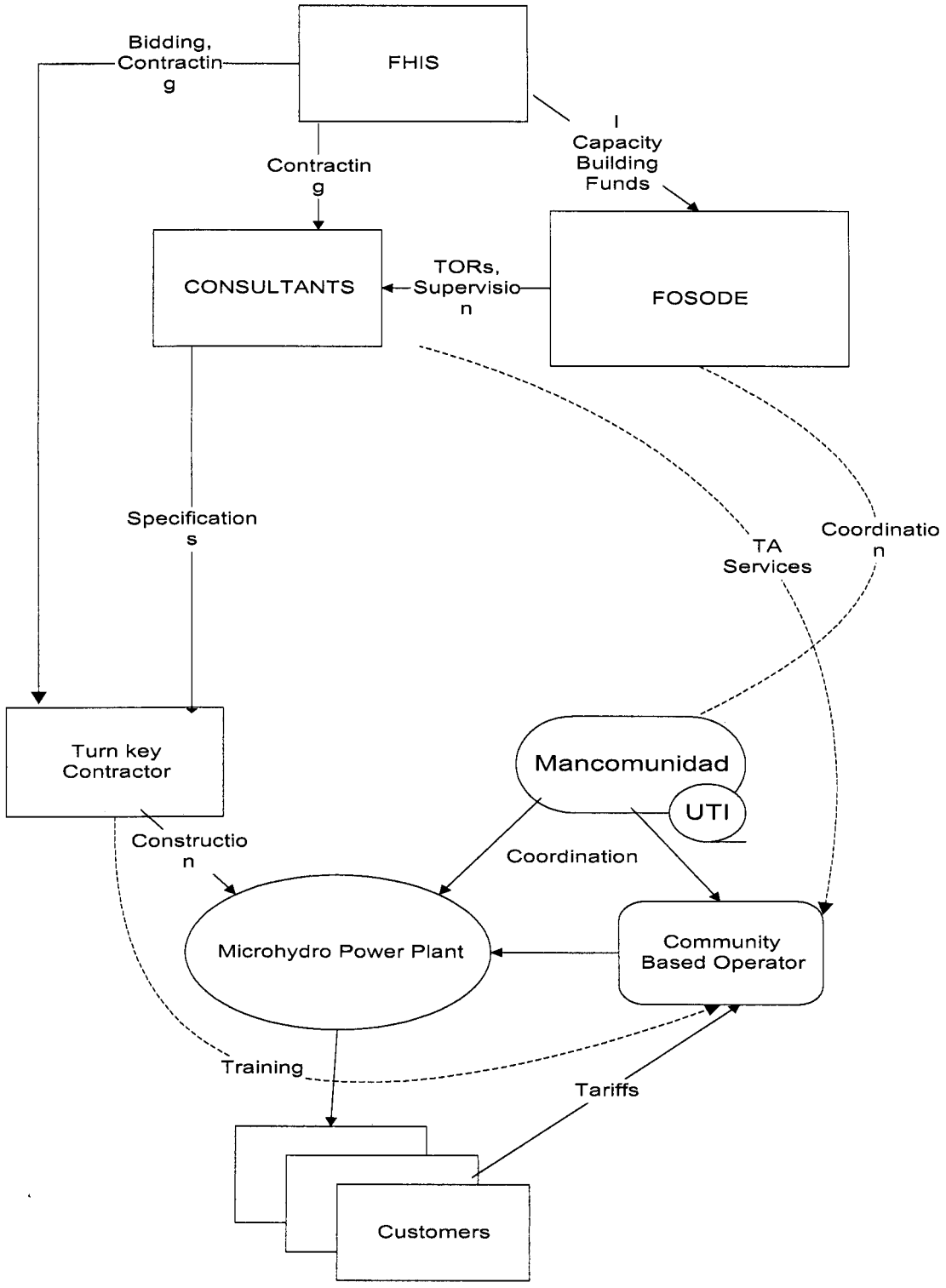


Figure 1. FLOW CHART FOR COMMUNITY-BASED MICROHYDRO POWER IMPLEMENTATION

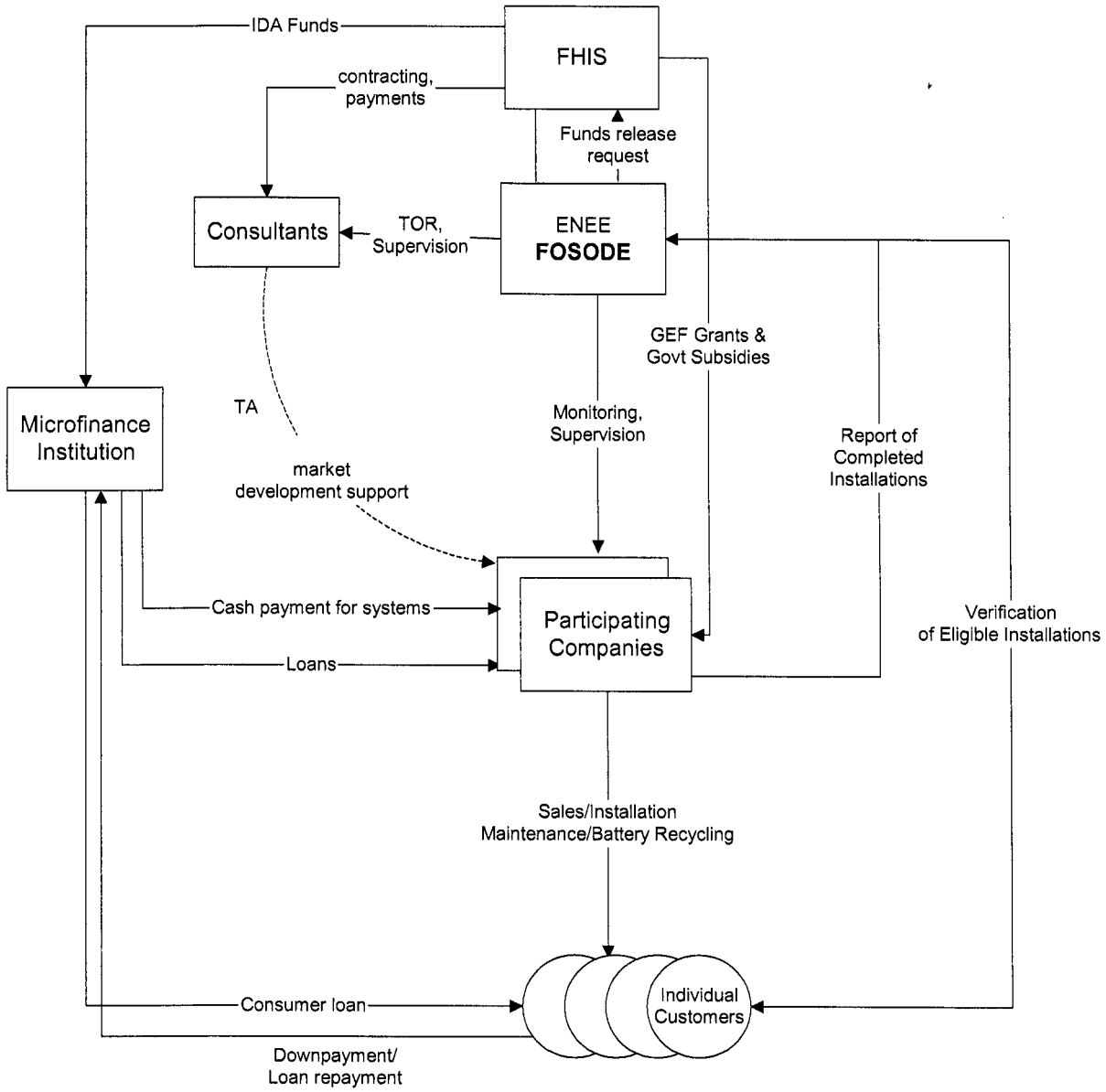


Figure 2. FLOWCHART FOR SOLAR PV SUBPROJECT IMPLEMENTATION OPEN MARKET SALES

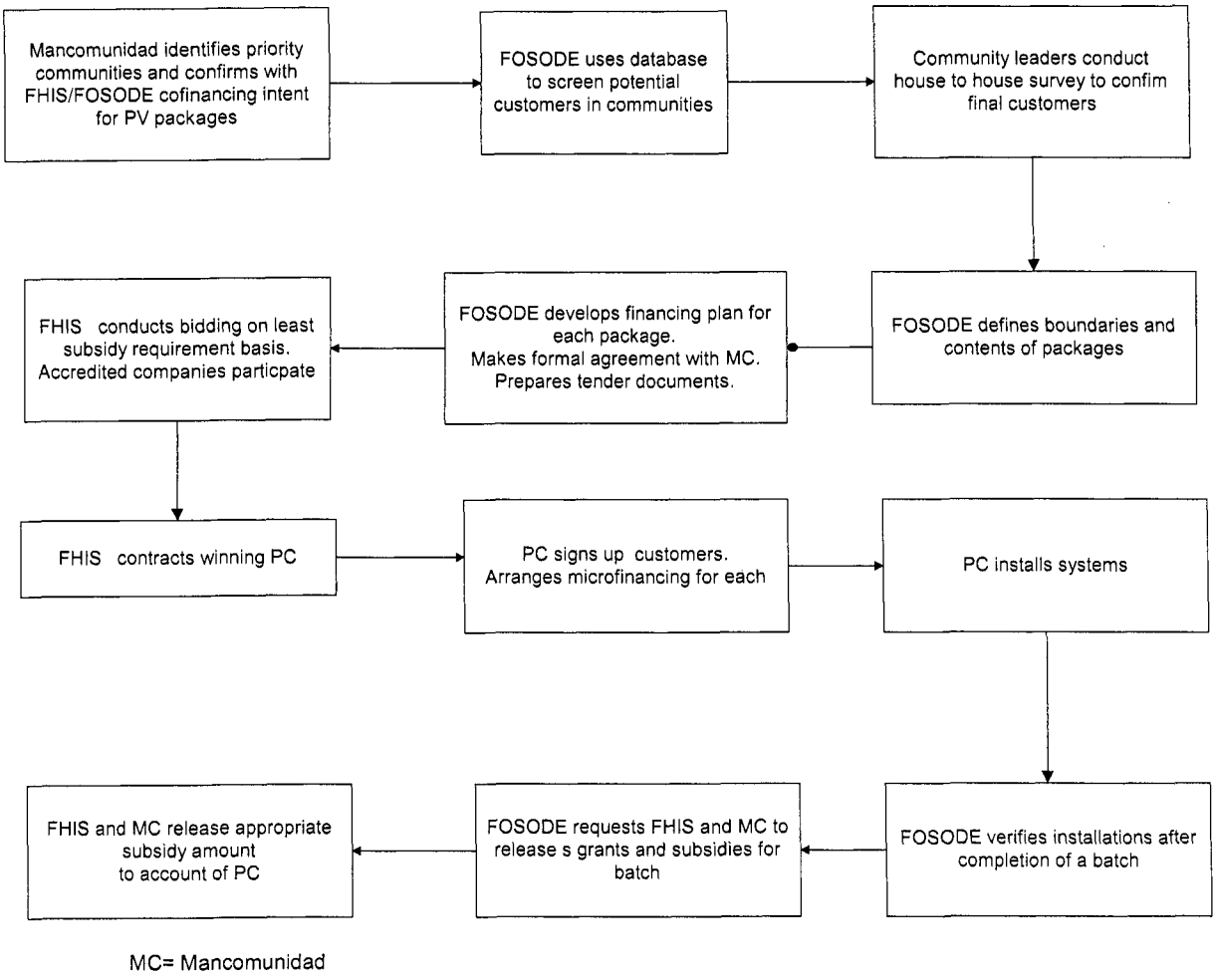


Figure 3. Process Flowchart: Implementation of PV Market Package Approach

Annex 7: Financial Management and Disbursement Arrangements
HONDURAS: Rural Electrification Project

The GEF Rural Electrification Project (PIR) will be implemented in the same Financial Management Framework developed for the parent Honduras Rural Infrastructure Project, approved on July 7, 2005. However, unlike in the case of PIR, which will transfer most of the funds to *mancomunidades*, a large number of activities of the GEF grant will be implemented directly by FHIS given that the GEF grant consists primarily of subsidies for solar home systems, and technical assistance (activities largely outside the competence of the *mancomunidades*).

Financial Management Framework for *Mancomunidades*

For the purposes of this project, and in a manner consistent with other on-going government and donor programs, the existing structure for *mancomunidad* administration will be utilized. The fiduciary requirements, among other responsibilities established by the government (*Ley de Municipalidades, LM* 1990, *and Reglamentos de la Ley de Municipalidades, RLM,* 1993)[10] and supported by the Bank include, but are not limited to: municipal council approval of the annual budget (Article 25, LM); presentation of quarterly budget reports (Article 46, LM); presentation of the monthly internal audit report on municipal expenditures (Article 54,LM); semi-annual presentation of municipal budget expenditures in *La Gaceta* (Article 115, LM); presentation of budget revenues and expenditures along economic classifications, and in a manner by which sources of revenues are identifiable and expenditures are reported along investment programs (Articles 172 and 176, RLM); submission, by January 10, of approved the municipal budget for the forthcoming year and the final budget report (including explanations for budget amendments) for the past year to the Ministry of Interior and Justice (Article 183, RLM).

The Ministry of Governance and Justice is responsible for municipal decentralization and, along with FHIS, works with government and donor programs to implement local development programs. This ministry is also responsible for establishing the legal and normative framework for municipal administration, and will play a key oversight (fiduciary) role in the enforcement of the framework. This ministry manages the five percent transfer (executed on a monthly basis) of fiscal revenues from the central government to municipalities. Municipalities are required to submit quarterly reports to the ministry. In past cases of non-compliance, the ministry has temporarily suspended transfers to negligent municipalities.[11]

Financial Management Implementation Arrangements

Each *mancomunidad* works within an established framework for administrative management, including financial management (budget management, reporting and auditing). The Bank has agreed, based on its assessment of both *mancomunidades* and the framework, to implement the project within the existing framework. The flow of funds will result in transfers from the Special Account to *mancomunidades*. Funds will be used to finance local project and investments in rural roads, electrification and water and sanitation.

Additionally, all *mancomunidades* maintain an administrative unit responsible for financial and budget management, reporting and procurement, and these units utilize a basic system (often manual) of bookkeeping for budget management and reporting. Where needed, additional technical assistance will be provided to strengthen these existing units (e.g., installation of a basic [commercial] software package

[10] Municipal Law applies to mancomunidades and is supported and enforced by the Ministry of Interior and Justice
[11] Coordination with the Ministry of Governance and Justice are ensured through the Ministry's participation in the Advisory Committee overseeing the PIR project.

to computerize financial management and records management). During project preparation, two *mancomunidades* have received technical assistance to prepare investment plans, including financial plans. The Bank has assessed the capacity of CRA and Chorti *mancomunidades,* and found that both currently possess the basic minimum requirements for financial management. During the course of project implementation, four additional *mancomunidades* will be prepared within the same framework noted above, to receive proceeds from the Bank program.

FHIS will be the central government agency responsible for project implementation. FHIS will manage the Special Account and will manage transfers, based on the financing needs of rural infrastructure action plans (RIAPs), to *mancomunidades*. FHIS will receive monthly reports on budget execution and project implementation from each *mancomunidad*. FHIS will also be responsible for the preparation of quarterly reports (Financial Monitoring Reports, FMRs) and for submitting quarterly disbursement requests to the Bank.

Risk Assessment Summary

Inherent risk. Inherent risk is the susceptibility of project funds not being used as intended, if we assume that there were no internal controls. In part because of the poor country rating of Honduras in 2003 and 2004 Transparency International's Corruption indices, and despite recent measurable improvements in the country's public financial management systems, inherent risk is still considered to be substantial to high.

Control risk. As described in the Internal Controls section, adequate financial management and internal control arrangements are in place to provide reasonable assurance that misuse of funds would be prevented or detected and corrected on a timely basis. Even so, the control risk is moderate.

Detection risk. Given the combination of inherent and control risks, acceptable levels of detection risk need to be lower, so as to reduce the overall risk level. The requirement for semi-annual external audit reports of *mancomunidades* aims to directly mitigate this risk.

Planning, budget and financial reporting, FMRs

Plans and budgets. *Mancomunidades* will prepare their own rural infrastructure development plans (RIAPs), and the project will utilize these plans, based on broader municipal strategic development plans (PEDM). [12] Approved RIAPs will serve as a basis for executing financial transfers, and for monitoring cash flow requirements during the year, and will include both Bank financing and financial contribution from the *mancomunidad.*

Mancomunidades will be required to contribute at minimum 15 percent of costs of works of their subprojects identified in RIAPs. The contribution will differ across sectors, reflecting the current practices (15% in electrification and roads, and 30% in water and sanitation). These counterpart funds would be composed of municipal and community contributions, but the responsibility to ensure these counterpart funds will rest with a *mancomunidad*. In the case of the road subprojects, the *mancomunidades* (and their municipalities) will also need to ensure that maintenance funds are adequately budgeted. (In the case of electrification, the O&M costs are integrated in the tariffs). Some contributions may be in kind.

Budget reporting is standardized, and includes reports on the use of funds against planned activities that had been approved in the RIAPs. Budget reporting will also include an update of cash flow requirements,

[12] The plans follow the normative framework established by the Ministry of Interior and Justice. New regulations for the preparation of municipal strategic development plans were issued in October 2003. RIAPs contain 3 components: Community Action Plans, Municipal Investment Plans, and Annual Operating Plan.

thereby enabling FHIS to determine the adequacy of liquidity in the Special Account. *Mancomunidades* will be responsible for submitting an additional bank reconciliation report, supported with the appropriate documentation (bank statements) to FHIS each month.

It will also be essential that *mancomunidades* regularly report on project implementation and submit a procurement summary executed by the *mancomunidades*, even though these contracts will *most probably* fall below the prior review threshold. This can include a listing of "subprojects" under implementation and Section 3 (procurement). Bank supervision and independent ex-post review (including independent audits) will be greatly facilitated by regular reports on procurement actions.

Flow of funds

FHIS has already developed a thorough Operation Manual (Manual PEC) for managing community-based and municipal development programs. The manual, which has been reviewed by the Bank, has incorporated many of the experiences from prior community and FHIS funded projects. This Manual is now being reviewed and adapted for the purpose of the IDA-financed Rural Infrastructure Project and the present GEF Rural Electrification Project to reflect their specific characteristics, such as (i): focus on infrastructure investments and services; (ii) implementation by *mancomunidades;* and (iv) involvement of sector agencies. An Updated Operational Manual is a condition of effectiveness.

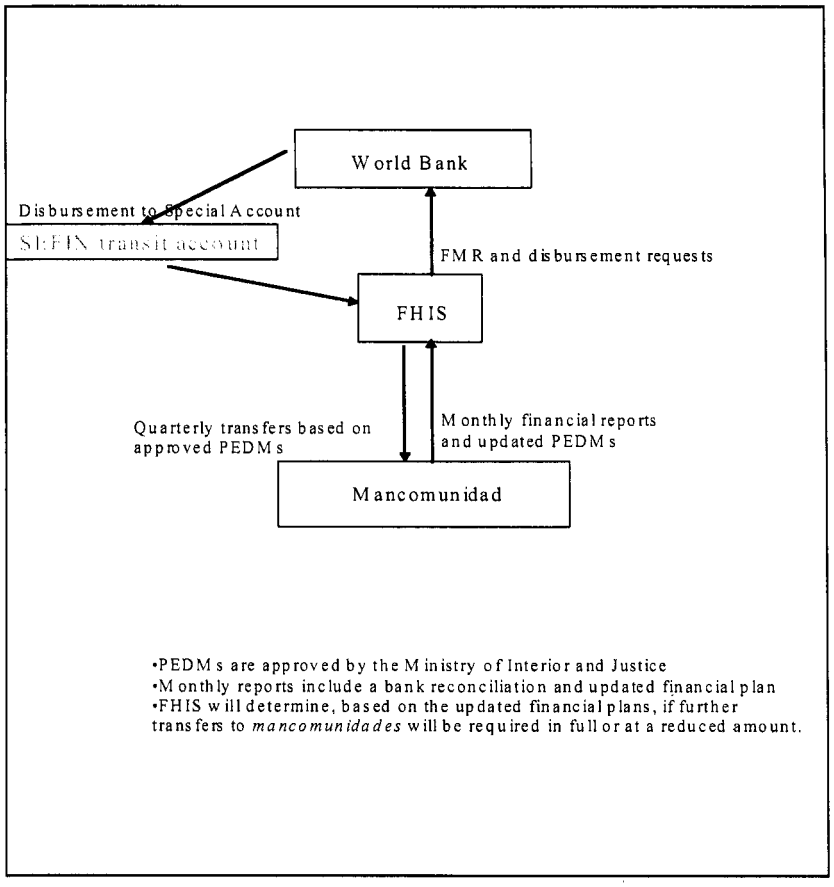
FHIS will take responsibility for the financial management (payments and expenditure management) for the centrally managed project components, including the Solar PV program and renewable offgrid electrification pilots implemented outside the mancomunidades. The subsidies under the Solar PV program will be directly distributed to the accredited companies. The subsidies will be output-based, paid against the achievement of installation, market development and service targets.

FHIS's management information system provides the basis needed for tracking project activities and financial information, including advances to *mancomunidades.* The same system links the accounting and budgeting modules to allow for preparation of the financial section of quarterly FMRs. Due to the experience that FHIS has accumulated with the two most recent Bank financed projects, the general format for FMRs will remain the same.

Bank accounts. FHIS will open two Special Accounts (SA): one for the IDA credit and one for the GEF grant. FHIS will manage both Special Accounts for funds held at the Central Bank. The Bank will first disburse funds to a transit account administered by SEFIN, which will then deposit funds in FHIS's Special Account (based on FHIS's explicit request of transfer). These transfers typically take 48 hours only). From the Special Account, FHIS will execute quarterly transfers to *the mancomunidades'* accounts held in commercial banks. The *mancomunidades* have experience in managing their own commercial bank accounts. During the preparation of the PIR project, the Bank found that *mancomunidades* manage their accounts in accordance with written internal procedures. For the purposes of the IDA PIR and this project, each *mancomunidad* will establish a separate commercial bank account for the receipt of project financing. This account will be for the exclusive use of Bank financing and will be registered with FHIS. The bank account reconciliations will be prepared on a monthly basis (as is current practice) and submitted to the local council for approval and to FHIS.

Proceeds from the Special Account will be transferred to the accounts managed by *mancomunidades.* Based on FHIS's ability to track the financial advances to *mancomunidades*, these transfers will be permitted to be claimed for disbursement. The *mancomunidades* will be responsible to submit monthly reports, including a full reconciliation and an updated financial forecast to FHIS. If *mancomunidades* fail to submit monthly reports (reconciliation and forecast) in a timely and regular manner, transfers from the Special Account may be withheld until these reports are received.

FMR-based disbursement. FHIS's financial management staff has gained sufficient experience in IDA credit disbursement procedures, and as such, FMRs will be used as the disbursement mechanism under this project. Additional training will be available for FHIS staff on the use of FMRs. FHIS will be responsible for aggregating the reports (financial, project implementation and procurement) submitted by the *mancomunidades*, and this will form the basis of the FMRs submitted to the Bank. In addition to the aggregated reports, FHIS will provide a reconciliation of the Special Account, against which the more detailed transfers to *mancomunidades* will be reported and reconciled. The FMRs will include an updated cash forecast, based on updated RIAPs submitted by the *mancomunidades,* which will determine the need for further disbursement requests and transfers to the *mancomunidades.*



Mancomunidad Accounting system

Mancomunidades also follow a standard budget/accounting framework established jointly by the Ministries of Finance and Governance and Justice. The municipal framework requires budget management (expenditure classification) in a manner consistent with central government budget classification. This framework is also embedded within the chart of accounts of FHIS, and will allow the ex-post (central) recording of local expenditures within FHIS's database and system. *Mancomunidades* are expected to prepare simple special purpose cash based financial statements–essentially budget reports with expenditure accounting consistent with the government's budget classification system.

Accounting records. At the *mancomunidad* level, transactions are recorded as incurred, and all primary supporting documentation will be maintained to facilitate ex-post reviews and the external annual audit. During the Bank's assessment, supporting documentation was found to be properly filed and maintained. Such documents are maintained for a minimum period of five years in accordance with local norms. FHIS will record transfers and ex-post transactions based on the monthly reports submitted by the *mancomunidades.*

Internal Controls. The assessment of two *mancomunidades* found that basic internal controls were in place. The basic controls consist of presentation of monthly budget, expenditure and investment update reports to the monthly assembly in addition to semi-annual presentations to the general assembly (public meetings). Moreover, basic accounting records (bank reconciliations, budget reports) are reviewed and approved by the *mancomunidad* council and are maintained for the annual audit. Additionally, the council reviews procurement processes managed by technical staff, and authorizes the awarding of contracts based on local competitive procedures.

External Audits

Since the majority of project financing will be implemented at the level of *mancomunidades,* FHIS audits will include separate sections covering the audit of the *mancomunidades.* During the preparation and appraisal of the project, the Bank found that *mancomunidades* have had ample experience with external audit requirements in the context of implementing other donor-financed programs. Under this project, and consistent with the requirements established by the Ministry of Governance and Justice, the external audit will review not only the finances provided by IDA and GEF, but will also cover the broader expenditures of the *mancomunidades.* The receipt of the semi-annual audit reports of *mancomunidades* is one requirement to continue with future transfers from the Special Account. The semi-annual audit report will be due no later than two months after the end of each six-month period. FHIS will be responsible for receiving these reports and submitting them to the Bank for review.

FHIS has taken steps to improve management and quality issues that were raised with its previous external auditor. The Bank's external audit policy allows for a single audit of an implementing agency that manages multiple Bank financed projects. The single audit of FHIS would have a single management report for the agency, and would contain separate annexes for the special purpose financial statements for each of the projects (including PPFs and grants) financed by IDA/GEF and managed by FHIS. The external audit of FHIS will be due no later than four months after the end of the fiscal year (January-December).

Action Plan

The two mancomunidades, CRA and Chorti, have been assessed by the Bank and have been found to meet the Bank's minimum requirements for financial management. As such, there are no further actions required prior to project effectiveness. Given the Bank's strong involvement with FHIS and its direct technical assistance to help FHIS modernize its administration, including financial management, there are no further actions required at this time prior to project effectiveness.

Annex 8: Procurement
HONDURAS: Rural Electrification Project

The GEF grant will follow the same procurement framework established for the parent Rural Infrastructure Project (PIR), approved on July 7, 2005.

A. General

Procurement for the proposed project would be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated May 2004; and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004, and the provisions stipulated in the Legal Agreement. The general description of various items under different expenditure categories is below. For each contract to be financed by the credit, the different procurement methods or consultant selection methods, estimated costs, prior review requirements, and time frame are agreed between the Borrower and the Bank Project team in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual Project implementation needs and improvements in institutional capacity.

Procurement of Works: Works procured under this Project would pertain to the electrification sector. Works would be small and consequently pre-qualification of contractors is not deemed necessary. ICB procedures would be followed for works costing more than US$1,500,000, though not expected. NCB procedures would be followed for contracts estimated to cost more than US$250,000 up to $1.5 million and will be procured by FHIS.

Procurement for the sub-projects would be done by the selected *Mancomunidades* through their UTIs and would follow procurement practices in accordance with FHIS operational guidelines acceptable to IDA. For contracts costing more than US$75,000 up to US$250,000 NCB procedures would apply. For works costing more than US$50,000 up to US$75,000 would follow national procedures requiring a short list of national contractors or private procurement. For works costing less than US$50,000 at least three quotations will be required. In some cases, direct contracting with communities would be permitted, if justified, following Bank's procurement guidelines for direct contracting, and detailed procedures established in the Operational Manual. These cases would, however, include primarily smaller water and sanitation and selected road rehabilitation works under US$50,000, following FHIS's successful experience in this area.). For road maintenance contracts of US$50,000 or less direct contracting will be also permitted to community micro-enterprises. In the case of electrification works, it is not recommendable to contract the communities directly, due to the relatively complex character of the works, and the relatively small component of unqualified labor. Nevertheless, to the extent possible, efforts will be made to involve communities in the works that require unqualified labor. The detailed procedures for smaller works (including shopping and direct contracting) will be included in the Operational Manual. Table A below outlines the procurement procedures and threshold to be followed.

Procurement of Goods: Goods procured under this Project would be limited to vehicles, computers and office furniture and equipment following procedures listed below. These goods would be procured by FHIS. Such procurement will be undertaken as follows: (a) shopping for packages estimated at less than US$50,000 based on comparing quotations solicited from at least three qualified suppliers; and (b) for contracts above US$50,000 and below US$ 150,000 National Competitive Bidding procedures will be used.

Selection of Consultants: Consulting Services under this Project would include services to be provided by firms and individual consultants, such as: (i) preparation of *mancomunidades* to be implemented during years 2, 3, 4 and 5 of the Project; (ii) project implementation; (iii) sub-project formulation; (iv) supervision of works; (vi) final designs; (vii) strengthening of *mancomunidades,* and central and local government agencies; (viii) establishment of sustainable service delivery models; (ix) support to establishing local management mechanisms for O&M; (x) preparation of sector strategies and policy studies; (xi) project monitoring and evaluation; and (xii) training. To strengthen procurement capacity at *mancomunidades,* the UTIs may contract services of individual consultants for subprojects formulation, final designs and supervision of works. To facilitate the work of the *mancomunidades*, FHIS would prepare a list of eligible consultants from which they would be able to contract.

Consulting firms would be selected following QCBS. Least Cost Selection (LCS) and Selection under a Fixed Budget may be followed for contracts estimated to cost $150,000 or less. Selection Based on Consultant's Qualifications (CQ) may be followed for contracts estimated to cost $50,000 or less. Short lists of consultants for services estimated to cost less than $150,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. Individual consultants may be selected following Section V of the Consultant Guidelines.

Operational Costs would be procured using the implementing agency's administrative procedures, which were reviewed and found acceptable to the Bank. This includes PCU and FOSODE staff, transportation fares, travel expenses and per diem, either related to training or supervision activities. .

Custom Duties and Taxes. All goods specifically imported for the Project will be subject to the payments of custom duties and local value added taxes. Consulting firms and individual consultants are also liable for the applicable taxes. All duties and taxes are paid from the Government contribution.

TABLE A

Expenditure Category	Contract Value Threshold (US$ thousands)	Procurement Method	FHIS Prior Review	Contracts Subject to Prior Review
1. Works				
FHIS	>1,500	ICB		All documents
	>250-1,500	NCB		First two contracts
Mancomunidades	>75-250	NCB	All	First two contracts per each Mancomunidad, and all contracts for smaller works for road rehabilitation and water & sanitation sub-projects
	50-75	Short List (Private Procurement)	All	First two contracts per each Mancomunidad
	50 or less	Three	All	Post Review

		Quotations or Direct Contracting with Communities		
2. Services				
2.1 Firms	>150	QCBS		All documents
	150 or less	As per May 2004 Guidelines	All	TOR and Short Lists only
2.2 Individuals	>50	As Above	All	All documents
	50 or less	As Above	All	TOR and Short Lists only
3. Goods	>150	ICB		All documents
	50-150	NCB		All documents
	<50	National Shopping	All	First contract

B. Assessment of the agency's capacity to implement procurement

An assessment of the capacity of FHIS was carried out. The Procurement Capacity Assessment report was produced from the mission to Tegucigalpa and the *mancomunidades* (April 19-22, 2005). The assessment reviewed the organizational structure for implementing the Project and the interaction between FHIS and the *mancomunidades.*

Procurement and contracting activities concerning contracts for sub-project works with a value of up to US$250,000 and individual consultant up to US%15,000 will be carried out by the UTIs of the selected *mancomunidades,* starting with the Project sample of CRA and CHORTI. All the procurement and contracting activities executed by *mancomunidades* will be under close supervision of FHIS until "graduation" of *mancomunidades.* FHIS will be in charge of the procurement and contract activities for contracts exceeding that amount.

Most of the issues and risks concerning the procurement component for implementation of the Project have been identified and include:

- inconsistencies between the Honduras Procurement Law and World Bank policies on: (i) registration requirements; (ii) thresholds; (iii) standard bidding documents and (iv) consulting services;
- weaknesses in the operational manual for managing subprojects by the *mancomunidades;*
- weaknesses in procurement capacity at UTIs;
- weaknesses in preparation of technical specifications, terms of reference, and contract management at UTIs; and
- need for additional qualified staff, at FHIS, to supervise and control procurement carried-out by *Mancomunidades.*

The corrective measures agreed upon will be included in the technical assistance for *Mancomunidades,* and include:

- training by FHIS to UTIs' staff on preparation and formulation of annual procurement plans and quarterly updates;
- development of a procurement and administration system at UTIs;
- development of a tool kit for procurement at UTIs;

- a capacity building plan to strengthen procurement procedures, reporting and audit, and staff skills at UTIs; and
- addition of qualified staff at FHIS. By effectiveness, FHIS would assign from its staff or have recruited two full time Procurement Expert/Advisors with five years of experience in contracting of under Bank rules. Apart from these staff dealing with procurement issues in general at FHIS, advisors would be hired per each *mancomunidad* and would be responsible for coaching the Procurement staff at the *mancomunidades* on Bank procurement methods and carrying out of post-review work.
- one UTI member assigned as procurement specialist and trained by FHIS;
- at least one ATM per *mancomunidad,* or a consulting firm, hired by FHIS, for monitoring and performance evaluation of UTIs; .
- an operational manual for UTIs completed by FHIS, by effectiveness;
- implementation of the Municipal Information System in CRA and CHORTI *mancomunidades.*

With these measures in place, the overall project risk for procurement is average.

C. Procurement Plan

At appraisal the Borrower developed a Draft Procurement Plan for project implementation that provides the basis for the procurement methods for next two years and includes the goods, works and services to procure by FHIS and by the first two *mancomunidades.* This plan has been agreed upon by the Borrower and the Project Team, and is available at FHIS and the *mancomunidades* of CRA and CHORTI. It will also be available in the Project's database and in the Bank's external website. The Procurement Plan will be updated in agreement with the Project Team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

D. Procurement Supervision by the Bank

Post-review supervision should be conducted once a year and one out of ten contracts signed should be reviewed. Additionally, the ex –post review reports produced would be reviewed by the Bank and its results considered during ex – post supervision missions. As a result of the findings of its ex – post procurement reviews, after one year of Grant Effectiveness, the Bank may agree to change the thresholds to make them consistent with the procurement experience so far. For this purpose, the Project Operational Manual would describe mechanisms for monitoring the procurement performance of FHIS and the *mancomunidades.*

Annex 9: Cost Benefit Analysis Summary
HONDURAS: Rural Electrification Project

The Project will provide access to electricity to rural population in CRA and CHORTI. All technologies will be considered, the most likely being grid extension, isolated village microgrids, and solar home systems. The least cost technology will be applied. The preliminary investment program for the first year (to be confirmed during the appraisal) includes 25 grid extension projects, benefiting 2,049 rural households (10,544 persons), and one isolated village micro-hydro, benefiting three communities (102 households). The estimated average costs per connection are about US$756 spectrum.

Table 9.1

First Year Investment Program (grid extension):				
	Households	Population	Costs (US$)	Costs per connection (US$)
CRA	819	4,432	696,671	851
CHORTI	1,230	6,112	853,020	694
TOTAL	2049	10,544	1,549,591	756

Over the five year of the project, it is estimated that the project will finance over 4,000 new connections, benefiting directly over 20,000 persons in these two *mancomunidades* (more population will benefit indirectly from electrification of schools, health centers, community centers etc.).

In addition, the Project will finance about 5,000 solar home systems for dispersed rural households. Of these, the first package of about 600 systems will be installed in CRA. The second package, estimated at 1,000 systems will be placed in CHORTI.

In total, the project is expected to finance about 10,000 new connections in 6 *mancomunidades.*

Table 9.2

Overall investment program in CRA and CHORTI (5 years)

Program	*New household connections*	*Costs (US$) (estimate)*	*Cost per connection (US$) (estimate)*
Mancomunidad Investment Programs	4,278	3,287,577	768
Solar PV	1,600	971,200	607
Total	5,878	4,258,777	718

The present economic analysis only covers technologies financed under GEF grant (micro hydro and solar).

Methodology

The economic evaluation methodology uses the consumer surplus method. Economic analysis has been performed separately for each of the main subproject technologies which will be financed under the GEF Project: (i) isolated village microgrids; and (ii) Solar Home Systems. Economic analysis draws on real demand and cost data from Honduras, based on a demand study in the project areas, where possible, and uses real data from similar remote area subprojects in Nicaragua (to derive a demand curve for micro

hydro) and Philippines (for additional benefits for TV and radio use) where no Honduras data is not yet available.

For the purpose of this PAD, the first identified projects were used for each technology (micro-hydro plant La Atravesada in CHORTI *mancomunidad*, and the first solar package to be implemented in *mancomunidad* CRA).

The economic analysis quantifies the following minimum benefits: (i) avoided costs by displacing the current expenditures on candle, kerosene, car batteries or diesel generators for lighting and other purposes; (ii) net consumer surplus by providing incremental end-user consumption valued at the average incremental consumer willingness to pay for electricity; (iii) global environmental benefits by avoiding carbon emissions from use of carbonaceous fuels. Additional benefits (e.g. improvements in education, health, communication and productivity) are commonly recognized of electrification, but are not quantified in this analysis. Thus the results shown below are conservative estimates. Economic costs consist of investment costs, replacement costs and operating and maintenance costs of the new systems in the project sites.

Results

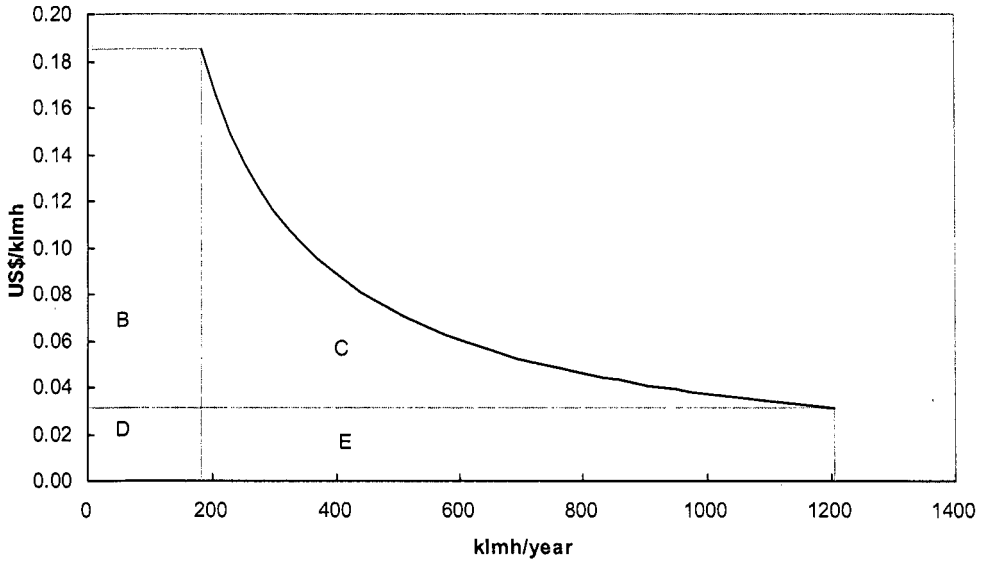
A. Sub-component: solar photovoltaic market development program

Assumptions:

- 20 years project life and PV module life
- 12% discount rate
- VAT is 12%
- Corporate tax is set zero
- 600 SHS systems installed in CRA during the first year of the project. The average size of the SHS is 50Wp
- Kerosene retail price is 50 Lps/gallon or US$ 2.7/gallon.
- 60% of the SHS capacity is used for lighting, the rest for TV and radios.
- The avoided carbon emission is 292 kg C per year per SHS, based on the incremental cost analysis.
- US$20/ton C is used to estimate global environmental benefits. US$20/ton C is derived as the amount of GEF funding (US$2.35 million) divided by the total amount of carbon emissions avoided (115,909 ton C).

The demand curve for lighting is estimated based on the household survey data on expenditures and lumen hours of candle and kerosene lighting as well as the willing to pay for PV lighting. There is no data available for deriving the demand curve for TV and radio. As a result, the demand curve developed under the Philippines Rural Power Project is used.

Figure 9.1: Lighting Demand Curve.



The economic rate of return is 17% without inclusion of global benefits and 20% with inclusion of carbon benefits. The financial rate of return is 15%.

Table 1: Economic Cost Benefit Analysis for 50Wp SHS

	Costs			Quantified benefits			
	Initial capital costs	Replacement costs	Total costs	Avoided costs	Net Consumer Surplus	Global Carbon Benefits	Total net benefits
year1	552	117	669	-660	-1017	112	-2234
year2		3	3	94	249		341
year3		3	3	94	249		341
year4		82	82	24	212		155
year5		3	3	94	249		341
year6		38	38	59	233		254
year7		82	82	24	212		155
year8		3	3	94	249		341
year9		3	3	94	249		341
year10		82	82	24	212		155
year11		38	38	59	233		254
year12		3	3	94	249		341
year13		82	82	24	212		155
year14		3	3	94	249		341
year15		3	3	94	249		341
year16		117	117	-11	196		68
year17		3	3	94	249		341
year18		3	3	94	249		341

year19		82	82	20	212		150
year20		3	3	94	249		341
NPV	493	513	1006	761	643	100	499

B. Sub-component: Mini-hydro power

Assumptions:

- 20 years project life
- 12% discount rate
- US$20/ton C is used to estimate global environmental benefits. US$20/ton C is derived as the amount of GEF funding (US$2.35 million) divided by the total amount of carbon emissions avoided (115,909 ton C)
- VAT and corporate tax are set zero
- The avoided carbon emission is 141 ton C per year substituting diesel generation, based on incremental cost analysis
- Diesel retail price is US$3.5/gallon
- The electricity tariff is assumed to be US$ 0.10/kWh, and the tariff increase rate is 1.5% per year
- The inflation rate is 9% for lempira and 2.5%for US dollar
- Minihydro capacity factor is 25%, and the availability is 95%
- Population growth rate is projected to be 3% per year and energy demand growth rate 4% per year.

Only the 55 kW system for La Atravesada is evaluated in this analysis. Due to lack of data for deriving a demand curve, for the time being, the consumer surplus of US$40 per household per year from the Nicaragua Offgrid Rural Electrification Project. Direct transfer of consumer surplus from the Nicaragua project to this one is justified given that both projects are mini-grid power and the communities in the two countries share the similar characteristics such as income level and willingness to pay (confirmed by demand study). The analysis will be updated with real data from Honduras, when this becomes available. The economic rate of return is 35% without inclusion of global benefits and 36% with inclusion of carbon benefits. The financial analysis is yet to be concluded.

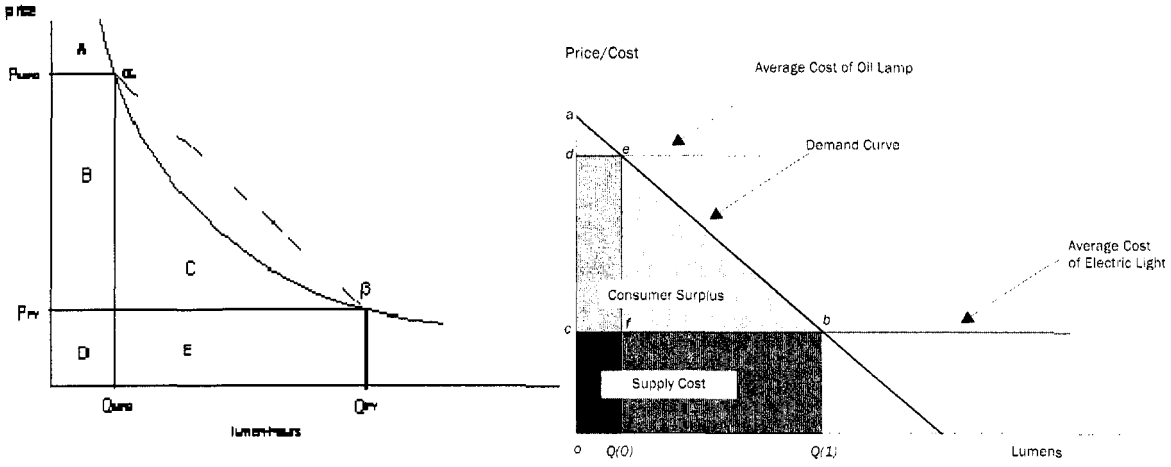
	Costs			**Quantified benefits**			
	Initial capital costs	*O&M costs*	*Total costs*	*Tariffs*	*Consumer Surplus*	*Carbon Benefits*	*Total net benefits*
year1	268506	13	268519	0	0	0	-268519
year2		13	13	38289	53748	2868	94893
year3		13	13	38864	53748	2868	95467
year4		13	13	39447	53748	2868	96050
year5		13	13	40038	53748	2868	96642
year6		13	13	40639	53748	2868	97242
year7		13	13	41249	53748	2868	97852
year8		13	13	41867	53748	2868	98470

year9		13	13	42495	53748	2868	99098
year10		13	13	43133	53748	2868	99736
year11		13	13	43780	53748	2868	100383
year12		13	13	44436	53748	2868	101040
year13		13	13	45103	53748	2868	101706
year14		13	13	45779	53748	2868	102383
year15		13	13	46466	53748	2868	103069
year16		13	13	47163	53748	2868	103766
year17		13	13	47871	53748	2868	104474
year18		13	13	48589	53748	2868	105192
year19		13	13	49318	53748	2291	105344
year20		13	13	50057	53748	2291	106083
NPV	239737	98	239835	308478	395898	20983	485524

Background for consumer surplus calculation

Example: Estimation of the benefits of improved lighting: Diagram 9.1 models the adoption of PV lighting by households using traditional lighting fuels: a shift on the lighting demand curve from α to β. Current lighting fuel expenditures (D+B) represents a minimum willingness to pay (WTP) for an improved lighting source. Real current substitutable energy expenditures have been used to estimate the likely size of market segments. The increase in consumer surplus from adopting a more efficient lighting source is represented by the additional area under the lighting demand curve (B+C). Households that change to electricity will enjoy an (minimum) increase in welfare (from lighting only) of B+C plus their revealed willingness to pay for the lighting services from the PV system (D+E). Total WTP for electricity service is higher, as it includes also the non-lighting benefits. Estimation of increases in welfare from ICT would follow the same approach, with separate demand curves. The area A+B+C+D+E is the Total Lighting User Benefit of electrification. Area A does not count towards net benefits, as it is part of consumer surplus for users both with and without the Project.

Figure 9.1: Contributions to Total Lighting Benefits



Parameter	*Value**	*Unit*	*Assumption (average)*
P(0)	$0.5	Per klm hr.	Kerosene cost/klm hr.
P(1)	$0.03-0.05	Per klm hr.	PV cost/klm hr. (20-50 Wp HH)
Q(0)	3 to 8	Klm/mo.	Consumption of non-electrified households
Q(1)	80 to 150	Klm/mo.	Consumption of SHS households (20-50Wp)

Price and Quantity of Light Used in Typical Rural Households (To be updated with better demand data from Honduras from ongoing study). Source: LAC Rural Energy Demand Surveys 2000 to 2005 (Argentina, Bolivia, Brazil, Ecuador, Chile, Mexico, Nicaragua, Peru)

Benefits from electrification, however, include a variety of effects, and have been estimated in past World Bank projects in several ways. While estimating minimum benefits via tariffs, cost savings, consumer surplus through improved lighting and global benefits is straightforward, estimating the multitude of additional direct and indirect benefits of electrification (improvements in education, health, communication and productivity) is more difficult. However, it is important not to forget the latter when judging the real net gain in benefits from rural electrification. Recent research has estimated some of the indirect benefits for the Philippines and India (Barnes 2002), with resulting Total Net Benefits from US$80 to US$150 per month per household. While a direct transfer of these results to Honduras is obviously not possible, these results give an idea of the range of additional benefits that can be derived from rural electrification.

Benefit Type	**Quantification**	**Contribution to NPV**
Savings = min WTP	**Based on <u>current substitutable energy expenditure</u> in project sites from Demand Study. Used instead of tariff as estimate for minimum WTP in sites without existing electricity tariff.**	**>0**
Global Environmental	**Based on PCF WTP for CDCF (GEF method would yield higher results).**	**>0**
Net Consumer Surplus Lighting (CSL)	**Incremental consumer surplus from reduced lumenhour costs. Based on standard Bank methodology and real data from demand surveys.**	**>0**
Net Consumer Surplus ICT (TV, radio, mobile phone, PC)	Range estimated, based on Barnes2002 methodology and data from 2002 demand surveys. Net CS (ICT) >30$ per HH and month (for 50Wp users).	>0
Education, Wage Increase, Time Savings	Ditto	>0
Health	Ditto	>0
Productivity	Ditto	>0
Reduced Fuel Imports	Not quantifiable	>0
Improved local administration	Ditto	>0
Decreased marginalization	Ditto	>0
Reduced necessity of future ongoing O&M subsidies to sites	Ditto	>0
Replication of successful offgrid models in more sites	Ditto, Multiplier effect	>0

TABLE: Types of benefits and treatment in Project economic analysis. Only the first three benefit types (bold) have been counted for economic analysis of subprojects, as all others are difficult to quantify. However, contribution of all others to NPV would be positive and hence further increase NPV and EIRR.

Annex 10: Safeguard Policy Issues
HONDURAS: Rural Electrification Project

Annex 10. A ENVIRONMENTAL ASSESSMENT

I. Introduction

The GEF grant will be implemented under the same safeguard framework as the Rural Infrastructure Project (PIR). It should be noted, however, that the GEF grant's scope will be more limited, covering only (i) subsidies for the Solar PV program, (ii) investments in one small windpower demonstration project (about 100kW) and (iii) technical assistance activities. Therefore, the environmental impact of the GEF Rural Electrification Project are expected to be limited.

II. Identification of Impacts for activities supported by the GEF grant

GEF grant will finance the following activities:

(v) subsidies and technical assistance for PV solar home systems;
(vi) investments in one small windpower demonstration project (about 100kW);
(vii) technical assistance related to the village-based isolated micro-hydro power plants (expected to range 50-200kW) (funds for investments will be provided by the IDA-financed PIR project);
(viii) technical assistance for improved planning and capacity building for offgrid electrification projects, using renewable technologies.

Activities with possible environmental impacts:

In general, the activities financed by the GEF grant are expected to have positive environmental benefits through the increased share of use of renewable energy resources in the electricity generation and corresponding reductions in CO2 emissions and other local pollutants.

Nevertheless, the sub-projects (particularly micro-hydro sub-projects) may have limited negative environmental impacts, which will be mitigated by the project.

Micro-hydro electric projects will be all small (expected to be between 50kW and 200kW) and run of the river, therefore their potential environmental impact will be limited. They are, however, generally located in inaccessible zones with extensive tree coverage and house a large number of flora and fauna, therefore attention needs to be paid to the following issues:

- Deforestation as a result of the construction of channels for the piping and access roads;
- Final disposal of accumulated sediment in the settlement ponds;
- Contamination of the ponds;
- Loss of aquatic fauna through lack of adequate ecological control;
- Impacts on the natural habitats;
- Use and final disposal of residues and combustibles;
- Impact of noise and accidents.

The potential environmental implications of the micro-hydro sub-projects, however, are not expected to be significant due to their small size. No projects larger than 300 kW will be financed, nor any projects including dams. Nevertheless, each identified micro-hydro project to be financed under the PIR project

(with technical assistance provided by the GEF grant) will be screened for potential negative impacts and corresponding mitigation measures will be developed.

The micro-hydro projects present an opportunity for important global and local benefits, due to their environmental externalities and positive local social effects, including carbon emissions reductions, improved watershed management, reduction of river contamination levels, employment generation, worker training, and productive activities for the communities and improvements in the provision of public services.

The demonstration windpower project has not been identified yet, but it is expected to be small (around 100kW). No windpower sub-projects above 300 kW will be financed under the GEF project. Once identified, the project will be screened for potential environmental impact and corresponding mitigation measures will be developed. The evaluation will follow the guidelines established in the *Simplifying Safeguards: Addressing Environmental & Social Issues in Prototype Carbon Financing Projects* Guidance Note for small wind projects,

PV Solar Program financed under the GEF project have very low potential negative environmental impact. The program will include provisions for recycling of batteries and cells, which will be included in the contracts with SHS providers implementing this program.

All projects will be screened for their potential impact on the natural habitats. Any project that could lead to significant impacts to critical natural habitats would not be eligible for GEF financing.

No works of Category-A type will be eligible for GEF financing.

III. Environmental Evaluation

No major direct or indirect environmental impacts are expected during implementation of the various components of the Project. This is due to the size of the subprojects and easily identifiable and remedied impacts. As a result the Project has been classified "Category B" based on the World Bank's Operational Policies (OP).

The GEF grant, on contrary, is expected to develop clean energy projects using small scale renewable and environmentally friendly resources.

Nevertheless, to ensure social and environmental sustainability and to comply with the Bank's Environmental Safeguard Policy (OP 4.01), a draft Environmental and Social Conceptual Framework was prepared during preparation.

IV. Conceptual Framework for Environmental and Social Management

The Conceptual Framework for Environmental and Social Management was developed in order to count with a practical tool for the identification of the social and environmental procedures during the project cycle of the proposed subprojects. The Framework was developed for the IDA-financed Rural Infrastructure Project (PIR) and it was agreed that it would be applied also for the present GEF project. This instrument will ensure social and environmental sustainability of the subprojects and compliance with the Bank's Safeguard Policies and Honduras's environment laws.
Among the specific objectives are:

- Define the Social and Environmental Management procedures during Project implementation;

- Create the necessary conditions for social and environmental sustainability of the subprojects, encouraging citizen participation for effective and equitable management of resources;
- Define the activities to be developed as part of social and environmental management;
- Identify the functions of the persons responsible to assure adequate social and environmental management and the application of the Framework;
- Ensure adequate and timely coordination of activities with local actors in the *mancomunidades to* direct conservation and protection efforts of the natural resources and environment; and
- Ensure the application of the National Environmental Laws and the World Bank's Safeguard Policies during Project development.

The Conceptual Framework will also include the "negative list" of activities that will not be eligible for IDA – PIR and GEF financing, including Category A – type works, hydro and wind projects larger than 300kW, hydro projects requiring dams, and projects that could lead to significant impacts to critical natural habitats, as well as the list of pesticides not permissible under the GEF and IDA projects.

This instrument was designed to be applied at three levels depending on the level of socio-environmental risk of the subprojects. FHIS will be responsible for the application of the Framework for all types of sub-projects. In addition, the Category 3, high risk projects, will also have to be reviewed and approved by The National Secretariat for Natural Resources and Environment (SERNA) and the Bank; for Category 2, moderate risk projects, the Environmental Management Department of FHIS will be responsible for the review and approval of the subproject; and Category 1 subprojects will be handled by municipal environmental units (UMAs), under the supervision of FHIS. The final version of the Framework will be included in the project's Operational Manual.

At the technical level, a series of promotional and training activities are planned to ensure the correct use and application of this instrument.

V. Institutional capacity

Among the most important problems the municipalities must confront is the lack of technical and logistical capacity to preserve the natural resources under their authority, to apply environmental knowledge to social and economic activities and respond adequately to the already existing environmental problems under their jurisdiction. Most of the municipalities in the country lack a specific environmental organization and the material and human resources (technical) to provide adequate management and sustainable use of the natural resources in the municipality.

In this context, during project preparation, directives were included in the conceptual framework to develop an Environmental Management Capacity Building Plan, directed mainly to municipal environmental management.

This Environmental Management Capacity Building Plan will focus principally on:

- Strengthening and consolidating local structures;
- Implementing and consolidating the National Evaluation and Environmental Impact System (SINEIA);
- Elaborating and modernizing the Municipal Environmental Action Plan (PAAM); and
- Elaborating an Environmental Projects portfolio;
- Administrative, Financial and Technical Sustainability Strategy by the UAM

The required budget for the elaboration and implementation of the Environmental Management Capacity Building Plan has been included in the IDA-financed PIR project budget for institutional strengthening. The estimated amount is US$20,000 for elaboration and US$100,000 for implementation.

VI. Compliance with Environmental Legislation

The Environmental and Natural Resources Secretariat (SERNA) is responsible for environmental management at the national level, with directives to implement environmental policies and laws. Environmental management is embodied in Decree 104-93, General Environmental Law, its related regulations, and the National Environmental Impact Evaluation System and Regulations (SINEIA), established by Decree 109-93, published in the *Diario Oficial la Gaceta* no. 27,291 on March 5, 1994.

Municipalities are responsible for the implementation of environmental management procedures through the Social and Environmental Management Units (UMAS) and other municipal-level structures.

FHIS's Environmental Management Unit would be responsible for coordination of the PIR's and GEF project's social and environmental management process in the selected mancomunidades. One of the its roles would be to establish a good level of permanent coordination of the Sectoral Environmental Units (UNAS) with the National and UAM institutions, to guarantee compliance with the Honduran normal mechanisms and procedures and the Bank's social and environmental Safeguards. The Inter-institutional Technical Units (UTI) in the *mancomunidades* will include an environmental management unit to assure adequate social and environmental management at the local level.

VII. Social and Environmental Viability

The project is deemed viable from the social and environmental point of view and complies with the Bank's Safeguard Policies once the evaluations have been finalized and actions have been taken to ensure the integration of the social and environmental dimension into the project. It is important to stress the importance of developing ongoing follow-up and monitoring of compliance during project evaluation, to assure implementation and guarantee adequate social and environmental management.

Annex 10.B: SOCIAL ASSESSMENT

Introduction

One aspect of the GEF interventions is their small size. Given this small size, none of these interventions implies removal of families, and therefore Involuntary Resettlement Framework is not applied here. No projects requiring resettlements would be eligible for GEF financing and would be included on the "Negative list" of non-eligible projects in the Operational Manual.

Some of the *mancomunidades* include indigenous populations. To maximize the benefits of the projects for the indigenous populations, a policy framework has been designed to ensure prior consultation and inclusion, according to specific social and cultural characteristics. The Indigenous Peoples Policy Framework was developed for the IDA-financed Rural Infrastructure Project (PIR) and it was agreed that the same Framework will be used for the present GEF project. Also, a framework policy for the protection of the country's physical and cultural patrimony has been designed as a guide if, during project implementation, there are important archeological finds. This includes establishing archeological potential and contacting the Honduran Institute of Anthropology and History.

The activities financed under the project contemplate the creation of community micro enterprises for sustainable operation and maintenance of village based micro grids. These activities imply the implementation of capacity building programs in the communities. The specific content of the capacity building exercises will be designed by FOSODE, in coordination with FHIS and UTIs and based on the needs of each subproject. Also, specific attention will be paid to the promotion of productive uses of the electricity services in the village-based micro grids. This would encourage participation in and commitment to the project and improve the incomes of the population during implementation.

Cultural and Socioeconomic Evaluation

General Context

Honduras has a young demographic structure, characterized by accelerating population growth and slow declines in mortality and fecundity. Net migration rates are negative, which results in growth rates that are slowly falling and producing a multiplier effect. Of the total 1,262,000 households, 63.6 percent, equivalent to 800,000 households, are poor, with incomes less than the cost of a basket of basic goods. The country's total population is 7,028,389 and will reach 8,894,975 persons by 2015, an increase of 26 percent. Growth rates will decline to less that two percent in 2015.

Local Government

Most of the municipalities have a simplified government with little delegation of functions. Some municipal governments are intermediate, with horizontal growth and some degree of authority delegation. Other municipalities have a more complex organizational structure, with marked vertical and horizontal growth. Organizational structure, administratively and technically, varies, depending on the complexity of municipal competencies. In 1962, the Municipal Association of Honduras (AMHON) was created as a dependency of the Secretariat of Governance and Justice, to strengthen municipal government. AMHON was later established as a non-profit organization, with its own budget and administration, made up of all the country's municipalities. Among it principal purposes is to represent the interests of the municipalities and maintain municipal autonomy.

Municipal Mancomunidades: A model of local and regional development

The inter-municipal association, or *mancomunidad de municipios,* is a local entity voluntarily created by various municipalities as defined in national legislation. These associations have specific, although flexible and open, goals and concrete objectives. The municipalities have used the *mancomunidad* as way to develop capacities in planning, management, service provision and land administration, among others. This type of entity offers its member municipalities the possibility of jointly solving problems that are difficult to confront individually, due to the many technical and financial limitations that most municipalities must confront.

Presently, there are around 50 *mancomunidades* that cover 91 percent of Honduran municipalities. Among these, 60 percent have achieved legal recognition. The rest are in the process of organizing. The *mancomunidades* are in the process of developing strategic development plans. They are supported by their Intermunicipal Technical Units (UTIs), most of which have one or two technical staff.

As the management units, the UTIs play an important role in the development process of the *mancomunidades*. They include a multi-disciplinary team of technical staff, which provides technical assessment to the *mancomunidad* and member municipalities to improve evaluation, design, planning and management capacities such as: municipal strengthening, environmental management, citizen participation, socioeconomic development and public services, among others.

Ethnic Communities

In the face of social, economic and political inequalities, the ethnic and black communities have been marginalized as a group in a largely mestizo society. The eventual recognition of these communities is the result of protest and mobilization, which, since 1994, demanded better treatment from the central authorities. Protests focused on problems of land, restriction on exploitation of forests, justice, new local governments in largely indigenous regions, bilingual education and cultural recognition. Infrastructure and basic services in the indigenous and black communities are limited. Priorities include construction and improvement of roadways, electrification, water and sanitation, provision of latrines, and communications.

The ethnic communities are: Garifunas, English-speaking Blacks, Misquitos, Tolupanes, Pech, Tawahkas, Chortis, Lencas and Nahua/Nahoa, all of which represent 7.2 percent of the population, according to the 2001 census.

The Tolupanes live in Yoro and Franciso Morazan, the Pech in Olancho and the Misquitos in Gracias a Dios, on the Atlantic litoral. The Garifunas are found on the coastal litoral and the English-speaking Blacks live on the Bay Islands. The Tawahkas live in Olancho and Gracias a Dios. The Chortis, originally from Copan and Ocotepeque live in the western part of the country. The Lencas, originally from the center and west of the country, live in Lempira, Intibuca and La Paz. The recently recognized Nahua/Nahoa group is the nucleus of a rural population located in Jano, Guata and Catacamas. This group has sought legal recognition.

Ethnic Socio Political Organizations	
Ethnicities	*Organization*
LENCAS	Alcaldía de la Vara Alta de Yamaranguila—traditional organization Comité de Organizaciones Populares e Indígenas de Intibucá (COPIN)
GARIFUNAS	Organización Fraternal Negra de Honduras (OFRANEH). Organización de Desarrollo Comunal Étnico (ODECO). Enlace de Mujeres Negras de Honduras (ENMUNEH) Centro Independiente de Honduras (CIDH)
MISQUITOS	Mosquitia, Asla, Takanka Masta Comité de Mujeres para el Desarrollo Integral de la Mosquitia (COMUDEIM) Organización Pro Mejoramiento de los Buzos de la Mosquitia (PROMEBUZ)
TOLUPANES	Federación de Tribus Xicaques de Yoro (FETRIXY).
CHORTIS	Consejo Nacional Indígena Maya – Chortí de Honduras (CONIMCHH)
Pech	Federación de Indígenas Pech de Honduras.
TAWAHKAS	Federación de Indígenas Tawahkas de Honduras (FITH). Fundación Raíces.
ENGLISH-SPEAKING BLACKS	Asociación de Profesionales y Trabajadores Nativos Isleños (NABIPLA).
OTHER ORGANIZATIONS	Federación de Pueblos Autóctonos de Honduras (CONPAH) Consejo Asesor Para el Desarrollo de las Etnias de Honduras (CADEAH)
Source: *Informe Sobre Desarrollo Humano de Honduras.* 1998 Table 6.2., p. 103.	

Physical and Cultural Patrimony

Honduras is a rich source of archeological artifacts. According to the Honduran Institute of Anthropology and History (IHAH), 4,465 sites have been inventoried, representing only 15 percent of extant sites. The Rio Copan valley is the most recognized archeological zone in the country. It holds the Maya de Copan city, one of the most important cities from the Late Classic period (300-900 a.c.), a period of major economic, social, and political development. The valley also has the city's tributary settlements. The city of Copan was registered as a World Heritage Site by UNESCO in 1980. In 2001, the archeological site in the Copan valley was divided in three zones, (I, II, III) to facilitate its protection and safeguarding by IHAH. Other areas of archeological interest are: El Valle del Rio Amarillo, Valle de Florida, Valle de La Venta, Valle de Sensenti, Valle de Cacaulapa, Valle del Rio Chamelecon, Valle de Naco, Valle de Sula, Valle de Tencoa, Valle de Jesús de Otoro,. Valle de Comayagua. Valle de Culmí. Llanura costera Omoa-Corinto. Región del Lago de Yojoa and Zona del Cajón.

Citizen Participation

The Constitution guarantees social and citizen participation and the exercise of civic, social, economic and judicial rights. The Municipal Law identifies a set of instruments to be used to develop citizen participation. These are: the Municipal Development Council, the *Cabildo Abierto,* Plebiscite, Public Audiences, and Municipal elections. The *patronatos* were created to work for the improvement and development of the communities. They have been the most relevant community organizations in Honduran society. They receive legal recognition from the Offices of Governance and Justice in the Secretariat of State.

Other organizations serve as direct interlocutors of sectoral institutions, such as health committees, head of household organization, water boards (*juntas*), local development counsels, sports clubs, "pastorals" and various committees to deal with the environment, security, natural disaster preparation, and patron saint celebrations, among others. Non-governmental organizations (NGOs) are important members of

civil society. They work in such diverse areas as human rights, culture, citizenship, credit, alternative medicine, technical assistance, training, education, and the like. These organizations work with internal and external assistance and encourage activities that are alternative, complimentary or substitutions of state activities. Some NGOs manages public resources assigned to them in specific projects by some state institution.

After Hurricane Mitch, in the process of reconstruction and national transformation, the government created the Commission for Civil Society Participation (CPSC) as the main consultative mechanism with different sectors to implement the Master Plan for Reconstruction and National Transformation. The creation of the CPSC recognized the importance of these sectors in the process.

Other opportunities for civil society participation include: *Gran Dialogo Nacional*; *el Foro Nacional de Convergencia* (FONAC); *Red Nacional de la Sociedad Civil*; *el Fondo Social de la Deuda Externa* (FOSDE); *la Coalición Patriótica*. They develop proposals and initiatives for national policies.

Typology of Civil Societies in Honduras by Function and Activity

Type	Basic Characteristics	Examples
OSC community and base	Basic mechanisms for participation and organization at the community level, representing specific needs. They emerge and focus on local problems and occasionally dissolve when the problem is resolved. Maintain a major presence in areas of more permanent nature (education, health).	*Patronatos, juntas de agua, comités de salud, comités de emergencia, club de amas de casa, sociedad de padres de familia, consejos de desarrollo local, otras.*
OSC tied to the church	Develop religious, community, assistance and service activities.	*Asociaciones de: pastores, de Iglesias, Comités Sociales de las Iglesias.*
OSC de defense y expansion of rights	Promote the exercise of civil and political rights, the rights and recognition of specific collective group interests.	*Organizaciones de Derechos humanos; Étnicas; de Genero y de Mujeres; de promoción de intereses difusos y colectivos, etc.*
OSC artistic, cultural and sport activities	Dedicated to recreation and use of free time. Promote culture, art and sport. Promote of autochthonous culture.	*Asociaciones culturales, grupos de teatro, grupos de promoción del deporte, etc.*
ASC de Education; Promotion Technical & Financial Assistance	NGOs and OPDs: promote following activities: research, credit management development participation, production, organization, etc.	*Asociaciones de desarrollo; fundaciones; Institutos de investigación, centros de capacitación, privadas de desarrollo y financiamiento.*
OSC Social & Humanitarian Assistance	Provide assistance and services to poor populations.	*Guarderías, albergues, comedores, club rotarios, club de caridad y de beneficencia.*
OSC. Cooperatives & Unions	Work in the interest of their membership; in terms of economic interests, professional, occupation or offices; reflect the rights and social responsibilities of the sector.	*Sindicatos, cooperativas, colegios y gremios de profesionales, cámaras empresariales, organizaciones campesinas.*

Source: *Sociedad Civil en Honduras – Caracterización y Directorio* / IDB / ASDI

Participation in the PIR

The Project will develop a limited number of *mancomunidades* whose selection will be based on such eligibility criteria as poverty, development potential, size, institutional capacity and limited investments in the potable water and sanitation, municipal roads and electrification sectors. Project preparation of the PIR included the use of a consultative methodology and active participation of the various actors with the objective of development of the *mancomunidades*. These were the municipal authorities, community leaders organized in *patronatos, juntas de agua (*water boards*)*, churches, heads of household organizations, and representatives of public and private institutions in the area. To that end, meetings, trips, and workshops were organized to present the final objectives of the PIR, to seek consensus on the responsibilities of each of the authorities in the municipalities and make the potential benefits of participation known to the beneficiaries. The experience of FHIS serves as a practical model of community participation in the execution of projects like the PIR. Popular participation begins with the identification of needs and includes planning, execution, supervision and maintenance of the works, assigning responsibilities to the communities through these organizations. The information, consultation, and consensus building process resulted in the development of the Rural Infrastructure Action Plans with long and short lists of sub-projects to be financed under the PIR and the GEF projects.

Evaluation of the Project's Expected Benefits and Social Impacts

The GEF will finance offgrid electrification model sub-projects. All of the subprojects will result in few or no negative impacts. The GEF project's positive value derives from its contribution to the socioeconomic development of the municipalities and communities and the consolidation and institutional strengthening of the mancomunidades.

Among the possible social impacts are:

Possible impacts on the Cultural and Physical Patrimony

PIR's interventions will be so small that the Honduran Institute of Anthropology and History (IHAH) is of the opinion that a monitoring agreement during implementation is all that is required to safeguard the patrimony. The executing agency and the IHAH are preparing an interinstitutional agreement for the management of the cultural and physical patrimony, based on previous experiences.

Inclusion of indigenous and ethnic communities

The small size of the PIR interventions, in addition to the consultation process with the communities suggests that there will be no negative cultural impacts. However, the PIR operations may constitute an exogenous factor in the cultural change, contributing to the transformations in the cultural systems. Threfore, potential (minor) changes and possible mitigation measures have been identified.

Social Management Plans

Community Participation

Objective: Develop a communication program of communication to assure participation of population during the entire implementation process, to aid in the development of local capacity for the sustainability of the works to be executed. Specifically: Make known the project's goals and objectives to encourage active involvement of the participant population in the entire implementation process; Facilitate processes of articulation among the local actors, municipal authorities, civil society, public and private institutions; Provide incentives to the population to identify sustainable alternatives.

Protection of the physical cultural patrimony

Objective: Avoid the loss of the cultural patrimony and support its preservation; Ensure that the cultural patrimony is identified and protected in the subprojects: Assure that the projects comply with the

country's legislation on cultural patrimony; Contribute to the development of the capacity to identify and protect cultural patrimony. Specifically: The establishment of mechanisms to coordinate with local authorities responsible for the preservation of the cultural patrimony; the possible impacts of the subproject in terms of the nature, size and importance of the patrimony. During execution, the subprojects will need monitoring to register the possible new archeological sites that have yet been identified.

Institutional Capacity

One of the most important problems confronting the municipalities is the lack of technical and logistical capacity to preserve the natural resources under their jurisdiction, application of environmental discipline to economic and social activities and how to respond adequately to the environmental problems in their jurisdiction. As in the environmental area, most of the municipalities lack a specific organization to provide adequate management of the PIR requirements for human (technical) and material resources. Therefore, the institutional strengthening program will include the development of competencies in this area. During preparation, directives to develop a Management Strengthening Plan were included in the policy frameworks for resettlement, indigenous communities and cultural and physical patrimony, along with the conceptual framework for social and environmental management.

The budget for the development of the Social and Environmental Management Strengthening Plan was formally included in the IDA-financed PIR's budget for institutional strengthening. The estimated amount is US$20,000 for plan development and US$100,000 for its implementation.

Annex 11: Project Preparation and Supervision
HONDURAS: Rural Infrastructure Project (Electrification Component)

	Planned	Actual
PCN review	November 3, 2003	November 3, 2003
Initial PID to PIC	December 12, 2004	December 12, 2004
Initial ISDS to PIC	December 12,, 2004	December 12, 2004
Appraisal	November 1, 2005	November 1, 2005
Negotiations	November 2-4, 2005	November 2-4, 2005
Board/RVP approval	December 20, 2005	
Planned date of effectiveness	June 2006	
Planned date of mid-term review	December 2007	
Planned completion date	December 30, 2009	
Planned closing date	June 30, 2010	

FHIS and FOSODE were the two key institutions responsible for preparation of the project, in cooperation with sectoral agencies, including SERNA and the Ministry of Interior and Justice.

Bank staff and consultants who worked on the project included:

Name	Title	Unit
Dana Rysankova	Task Manager, Sr. Economist	LCSFE
Rajeev Swami	Financial Management Specialist	LCOAA
Diomedes Berroa	Sr. Procurement Specialist	LCOPR
Pilar Gonzalez	Sr. Counsel	LEGLA
Katharina Gamharter	Counsel	
Morag van Praag	Sr. Finance Officer	LOAG1
Manuel Sevilla	Sector Leader	LCSFP
Ernesto Terrado	Consultant, Rural Electrification Specialist	LCSFE
Ghislaine Kieffer	Extended Term Consultant	LCSFE
Michael Goldberg	Sr. Private Sector Development Specialist	
Sergio Carmona	Consultant, Social Safeguards Specialist	
Marco Zambrano	Consultant, Environmental Specialist	LCSFT
Elena Correa	Sr. Social Scientist	LCSEO
Stig Trommer	Operations Officer	LCC2C
Fernanda Pacheco	Language Program Assistant	LCSFE
Christophe de Gouvello	Peer Reviewer, Sr. Energy Specialist	AFTEG
Malcolm Cosgrove Davies	Peer Reviewer, Sr. Energy Specialist	AFTEG

Bank funds expended to date on project preparation:

1. BB GEF
   - FY05 seed funding US $25,000
   - FY05 $49,732.38
   - FY06 Actual & committed: $48,905.61

2. Total: US$ 123,600

Estimated Approval and Supervision costs:

1. Remaining costs to approval: US$ 10,000
2. Estimated annual supervision cost: US$ 50,000

Annex 12: Documents in the Project File
HONDURAS: Rural Electrification Project

- Honduras Municipal Law (1990) and Implementing Regulations (1993)
- Plan Integral de Desarrollo de CRA y CHORTÍ
- Guías de preparación de Planes Integrales de Desarrollo
- Diagnóstico General Regional
- Lista consolida de Sub proyectos de los tres sectores
- Análisis Financiero de las Municipalidades
- Plan de Fortalecimiento de las UTIs de CRA y Chorti
- Análisis de la capacidad local de Ejecución
- Marco conceptual Socio-Ambiental
- Marco de Aplicación de la Política de Salvaguarda de Pueblos Indígenas
- Marco de Aplicación de la Política de Salvaguarda de Patrimonio Físico-Cultural
- Informe Sector eléctrico
- A Future for Social Investment Funds? Andrea Vermehren and Rodrigo Serrano-Berthet
- Honduras Local Development[13]
- Drivers of Sustainable Rural Growth and Poverty Reduction in Central America, Honduras case study
- Local Development Discussion Paper
- Private Solutions for Infrastructure in Honduras, A Country Framework Report, PPIAF
- Feasibility Study for Las Champas and La Atravesada
- Market study for the PV Program
- Implementation study for the PV Program
- FOSODE – PLANES program
- Project Appraisal Document for IDA Rural Infrastructure Project

[13] This paper was prepared by Jennifer Sara, Jennifer Fitzgerald, Mila Freire and Jonas Frank, with input and review from David Warren, Emanuela Di Gropello, Rodrigo Serrano, Andrea Verhmehren, Jorge Munoz, Jim Smyle and Franciso Pichon, and includes findings of a Honduras Country Team workshop held in May 2004.

Annex 13: Statement of Loans and Credits
HONDURAS: Rural Infrastructure Project (Electrification Sector)

			Original Amount in US$ Millions						Difference between expected and actual disbursements	
Project ID	FY	Purpose	IBRD	IDA	SF	GEF	Cancel.	Undisb.	Orig.	Frm. Rev'd
P070038	2004	HN Trade Facilitatio & Productivity Enha	0.00	28.06	0.00	0.00	0.00	30.55	0.25	0.00
P040177	2003	HN Financial Sector Technical Assistance	0.00	9.90	0.00	0.00	0.00	10.74	0.21	0.00
P081172	2003	HN Regional Dev in the Copan Valley	0.00	12.00	0.00	0.00	0.00	12.44	-0.52	0.00
P057859	2002	HN SUST COASTAL TOURISM PROJECT (LIL)	0.00	5.00	0.00	0.00	0.00	3.88	1.48	1.98
P053575	2002	HN- HEALTH SYSTEM REFORM PROJECT	0.00	27.10	0.00	0.00	0.00	28.84	7.84	0.00
P060785	2001	HN ECONOMIC & FIN.MANAGEMENT PROJECT	0.00	19.00	0.00	0.00	0.00	12.03	13.34	0.00
P064895	2001	HN FIFTH SOCIAL INVESTMENT FUND PROJECT	0.00	60.00	0.00	0.00	0.00	23.45	3.03	0.00
P073035	2001	HN Access to Land Pilot (PACTA)	0.00	8.00	0.00	0.00	0.00	5.88	3.22	0.00
P057538	2001	HN ROAD RECONSTRUCTION AND IMPROVEMENT	0.00	66.50	0.00	0.00	0.00	37.12	2.76	0.00
P007397	2001	HN COMMUNITY-BASED EDUCATION PROJECT	0.00	41.50	0.00	0.00	0.00	35.12	16.60	0.00
P064913	2000	HN EMERG DISASTER MGMT (TAL)	0.00	10.82	0.00	0.00	0.00	7.79	4.41	0.00
P057350	1999	HN PROFUTURO	0.00	8.30	0.00	0.00	0.00	3.18	-1.36	2.76
P044343	1998	GEF HN-BIODIVERSITY CONSERVATION	0.00	0.00	0.00	7.00	0.00	1.98	7.00	0.00
		Total:	0.00	296.18	0.00	7.00	0.00	213.00	58.26	4.74

HONDURAS
STATEMENT OF IFC's
Held and Disbursed Portfolio
In Millions of US Dollars

		Committed				Disbursed			
		IFC				IFC			
FY Approval	Company	Loan	Equity	Quasi	Partic.	Loan	Equity	Quasi	Partic.
1998	Camino Real Plaz	7.07	0.00	0.00	0.00	7.07	0.00	0.00	0.00
	Lechosa	0.00	0.63	0.00	0.00	0.00	0.63	0.00	0.00
0/95									
1986/99	Granjas Marinas	4.50	0.00	0.00	0.00	4.50	0.00	0.00	0.00
	Total portfolio:	11.57	0.63	0.00	0.00	11.57	0.63	0.00	0.00

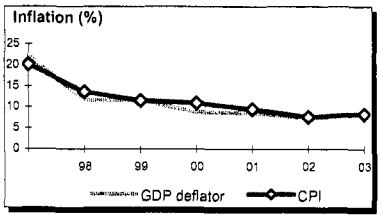
		Approvals Pending Commitment			
FY Approval	Company	Loan	Equity	Quasi	Partic.
	Total pending commitment:	0.00	0.00	0.00	0.00

Annex 14: Country at a Glance
HONDURAS: Rural Infrastructure Project (Electrification Sector)

Honduras

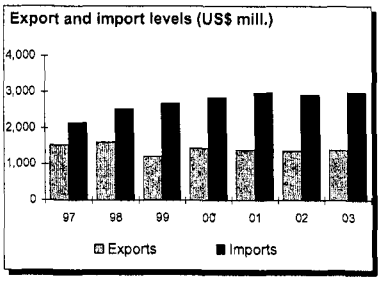
PRICES and GOVERNMENT FINANCE

	1983	1993	2002	2003
Domestic prices				
(% change)				
Consumer prices	..	10.7	7.7	8.4
Implicit GDP deflator	7.0	13.6	7.3	8.6
Government finance				
(% of GDP, includes current grants)				
Current revenue	13.0	16.6	18.3	19.9
Current budget balance	-3.1	-1.1	-0.6	1.4
Overall surplus/deficit	-10.1	-9.6	-5.5	-4.1



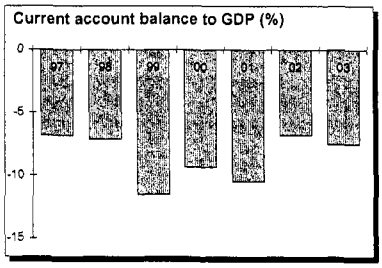
TRADE

	1983	1993	2002	2003
(US$ millions)				
Total exports (fob)	699	856	1,371	1,396
Bananas	203	225	171	..
Coffee	151	125	175	..
Manufactures	..	..	..	..
Total imports (cif)	823	1,320	2,920	2,994
Food	123	166	546	..
Fuel and energy	164	183	408	..
Capital goods	126	292	809	892
Export price index *(1995=100)*	..	80	89	..
Import price index *(1995=100)*	..	88	109	..
Terms of trade *(1995=100)*	..	91	82	..



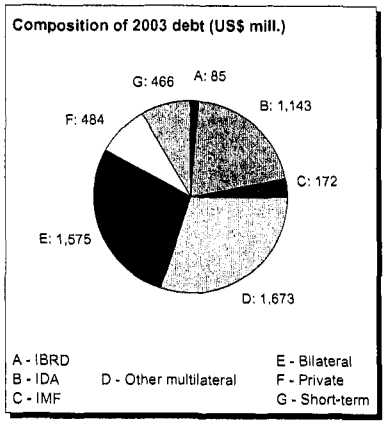
BALANCE of PAYMENTS

	1983	1993	2002	2003
(US$ millions)				
Exports of goods and services	801	1,084	2,437	2,550
Imports of goods and services	912	1,498	3,456	3,758
Resource balance	-111	-415	-1,019	-1,208
Net income	-152	-75	-177	-165
Net current transfers	18	68	748	849
Current account balance	-246	-421	-448	-524
Financing items (net)	202	327	577	524
Changes in net reserves	43	94	-129	0
Memo:				
Reserves including gold *(US$ millions)*	..	134	1,493	1,492
Conversion rate *(DEC, local/US$)*	2.0	6.5	16.4	17.4



EXTERNAL DEBT and RESOURCE FLOWS

	1983	1993	2002	2003
(US$ millions)				
Total debt outstanding and disbursed	2,127	4,360	5,395	5,598
IBRD	268	479	105	85
IDA	81	236	1,014	1,143
Total debt service	203	374	397	311
IBRD	26	85	20	28
IDA	1	3	13	17
Composition of net resource flows				
Official grants	62	93	130	..
Official creditors	165	218	82	92
Private creditors	5	150	-43	-54
Foreign direct investment	21	27	143	..
Portfolio equity	0	0	0	..
World Bank program				
Commitments	45	183	27	22
Disbursements	60	81	51	45
Principal repayments	8	47	16	29
Net flows	52	34	36	15
Interest payments	18	40	17	15
Net transfers	34	-6	19	0



Annex 15: Incremental Cost Analysis
HONDURAS: Rural Electrification Project

Broad Development Goals of Rural Electrification

Of the 63% of rural populations in Honduras that are unelectrified, most are poor and located in areas remote from the main grid. For social and equity reasons, there is strong political motivation to improve access to electricity to these unserved and poor populations but the cost of doing so has become increasingly high. The Government is looking for new mechanisms to extend electrification services to rural and remote areas in a financially and environmentally sustainable manner, as an engine for economic growth with social equity.

Baseline Scenario

The ENEE rural electrification program is almost exclusively focused on line extension. Little attention has been paid to decentralized options, new technologies and new service provision mechanisms that involve the private sector or the communities themselves. The average cost per connection for line extension has been over US$700 in the recent ENEE projects.

Although several pilot projects using renewable energy technologies (RET) have been carried out in the past in Honduras by various public and private agencies, these were generally fragmented donor-driven efforts and were not integrated into energy sector planning. The most notable RET experience in Honduras is probably the establishment and operation of Soluz Honduras, a private company spawned by Enersol, Inc., engaged in the commercial marketing of solar home systems. Soluz has struggled to continue operation and neither it nor its customers have benefited from any government incentives. Larger private RET projects of up to 50 MW are given special treatment in current electricity dispatch rules. While this has led to a recent upsurge in private small hydro projects, these plants are all grid-connected—their main motivation being power sales to ENEE rather than electrification of unserved areas.

The business-as-usual scenario for rural electrification in Honduras thus implies continued line extension projects, even in remote areas, that have high costs and result in insignificant coverage over the medium term. There will be continued use of inefficient and inadequate lighting systems in the unserved areas, limited hours for health and educational services, and absence of opportunities to initiate economically productive local activities. Environmentally, the continued heavy use of kerosene for lighting in homes will result in indoor pollution and higher incidence of respiratory diseases.

The GEF Alternative

The GEF Alternative is intended to introduce, when they are least cost, decentralized power supply options, particularly those based on RETs, into the present electrification plan for rural areas. Assistance to the GOH through the Project include: (a) support for the development of a rural electrification policy and strategy that use decentralized options and renewable energy technologies, where they are economically feasible; rationalized allocation of subsidies for ongrid and offgrid projects, and a system of incentives to maximize the involvement of private players and communities in offgrid electrification (b) financing of pilot microgrid projects that demonstrate innovative and sustainable community-based operation, and (c) expansion of the very limited current market for PV through appropriate incentives for both providers and users.

The GEF Alternative will result in higher coverage in offgrid areas within a reasonable time frame, general improvement of the quality of life in presently unserved communities, and the reduction of GHG emissions. It will also reduce overall public funding for rural electrification by not providing universal 24 hours AC service when most users have needs for domestic night lighting only.

Global Environmental Objective

The project's global environmental objective is to achieve greenhouse gas (GHG) reductions through the reduction of policy, information, institutional capacity and financing barriers that currently hinder renewable energy technology (RET) dissemination and market development internationally (GEF Operational Program No. 6). While the absolute magnitude of GHG reduction would not be high in the context of this project in a small country like Honduras, the methodologies developed for reducing market barriers to the use of RETs in offgrid electrification through innovative private sector and community based approaches could provide an important contribution to efforts of this nature in other countries of the Central America region and elsewhere.

Scope of the Analysis

The analysis compares the cost of investments and magnitude of GHG emissions associated with carrying out the business-as-usual approach to rural electrification (almost exclusively line extension) as opposed to implementing the GEF alternative plan (line extension plus decentralized systems, particularly RETs) for the project duration of about 4 years. For isolated microgrids powered by hydro or other renewables the comparator technology is a diesel system of equivalent capacity. For individual SHS for dispersed households where the main use is for lighting, the comparator is kerosene lamps. For larger stand-alone PV systems (assumed about 300 W average) for public or productive applications, the assumed baseline comparator is a small gasoline engine. These and other information enable the estimation of the GEF "incremental costs" based on lifecycle cost comparisons. The amount of GHG emissions mitigated is then calculated on a per year basis, as well as the total amount mitigated over the life of the principal RETs (assumed to be 20 years on the average).

Aside from physical investments, the type and costs of technical assistance, capacity building and other supporting activities that must be carried out to reduce market barriers to the deployment of RETs are also considered in the analysis. Finally, the analysis considers that the domestic and global benefits of the project are not only physical and environmental, but also programmatic, i.e., they extend beyond the brief project duration and beyond national boundaries. There are vital domestic benefits that accrue to the country's future situation, in the form of capacity built and markets developed. The international community likewise would benefit from the experience generated by the Project in terms of the added demand for RETs and the reduction of perceived risks of investments in these environmentally-benign technologies globally.

Incremental Cost Estimates

A. Investments

The PIR Project, with GEF co-financing, will finance investments in line extension, microhydro power (MHP), PV systems and other RET offgrid technologies. The selected line extension subprojects, totaling $ 12.7 millions and benefiting some 13,000 users, are concluded to be the least cost options (based on lifecycle economic cost comparison with decentralized systems) for the particular communities because of their proximity to the national grid. The communities where the pilot MHPs will be located are at least 10 km from the grid and are the least cost options compared to line extension or isolated diesel system. The PV systems are intended for dispersed users not economically feasible to connect to either the main grid or independent microgrids.

Investments in minihydro systems (greater than 200 kW) were initially considered in the Project as a means to demonstrate public-private power supply provision business models but this option was discarded for various reasons. Systems of these capacities are already being built by the private sector for the purpose of selling power to the grid at a premium. There was little interest from minihydro developers to add electrification of surrounding communities to their projects, given prevailing low official tariffs and perceived problems in managing a small local utility. Potential minihydro systems greater than 500

kW for decentralized rural electrification were not easy to find in Honduras due to the generally small population and power demand of surrounding communities.

Solar PV.

The combination of high unit prices and lack of government support has hampered the growth of a wider market for PV in Honduras. In the medium to long terms, there are significant opportunities for cost reduction through increase in sales volumes and establishment of commercial links with lower cost suppliers in the region and elsewhere (China, India, Indonesia, etc). In the short-term, however, assistance to the industry is needed to establish a rural sales and service network, and to stimulate consumer demand by reducing unit prices. The project would reduce the current high upfront cost to consumers by providing GEF grants and government subsidies to eligible systems, and by providing organized microfinancing assistance.

The solar PV program targets approximately 5,000 units averaging about 50 peak Watts each for households (solar home systems or SHS) and about 100 institutional and productive applications averaging 300 peak Watts each, or a total target capacity of about 274 kW. The basic Program strategy is to stimulate the market by making PV systems affordable to users, available where they are located and supported with long-term maintenance service. Reduced costs would be achieved through economies of scale in procurement and by judicious use of targeted grants and subsidies that buy down the first cost to consumers (price support). The approach ("dealer model") is patterned after the successful Bank/GEF-financed PV project in Sri Lanka that was also emulated in China, Nicaragua, Bangladesh and the Philippines. Years of implementation in Sri Lanka and others have developed and fine-tuned strategies and procedures for promotions, consumer financing, after-sales maintenance and for ensuring compliance with minimum technical standards. These strategies and procedures will be adapted to the specific context of the Honduran market. A comprehensive market characteristics and demand study, as well as a detailed implementation design study, were carried out during preparation funded by PDF-B. Application of their results along with lessons learned from past projects will ensure that implementation obstacles are minimized.

Productive and Institutional Applications. Potential private productive applications that have been identified include lighting for remote rural hostels in eco-tourism, power for small water pumps in fish farms, electric fencing for goats and other livestock, etc. These types of applications tend to be small because as the need approaches the kW level, small gasoline and diesel engines become more cost effective, as long as fuels could be obtained. Nevertheless, the project will pro-actively seek out opportunities to promote, in unserved remote areas, economic, income generating activities assisted by PV systems. Institutional applications represent a possibly much larger market in Honduras. The constraint for this subsector is the fact that schools, clinics and similar community centers are government–owned. The decision to invest in PV systems normally lie with the central education or health ministry. Where such ministries have existing or planned programs to upgrade remote rural facilities, opportunities to introduce PV as a cost-effective solution may be found

To catalyze and demonstrate the market for productive and institutional applications, the project is allocating investment funds for up to 100 installations averaging 300 watts each. Up to 90% of an eligible public or community application may be financed by a combination of government subsidy and GEF grants. Privately owned applications will be financed at commercial terms but will be provided substantial technical assistance in project design and development of business plans. However, it must be recognized that the local PV industry cannot be supported mainly by the very small market segment for institutional (schools, clinics, etc) and productive applications. The major market segment in Honduras, as it is in other countries, will continue to be the residential sector.

Willingness to pay and GEF incremental cost. If current lighting costs with traditional fuels of unserved rural households is considered as approximately their willingness to pay (WTP) for SHS, then there is a substantial gap or increment between WTP and SHS unit costs in Honduras, estimated to be between

$350 to $1,000 for 36 Wp to 100 Wp systems. The gap can range from about 20-60% of the SHS unit price, depending on the unit capacity and the WTP level of the market segment that could be served by that particular capacity. Furthermore, SHS costs can vary significantly with market location, transport and installation costs, timing and other factors. A combination of GEF grants and Government subsidies will be applied to bridge the gap or total incremental cost. Economic analysis shows that the incremental cost is offset by the benefits of "consumer surplus" – a measure of the superior output of electric lamps over kerosene lamps (more lumen-hours delivered at less cost). The key, however, is to make the systems financially affordable to users.

For Honduras, the incremental cost for SHS of different capacities was calculated by comparing the lifecycle costs over 20 years (approximate life of a modern solar panel) of using the SHS compare to using kerosene lamps, candles and batteries for equivalent lighting service. The results range from about $2 to $5 per peak Watt, depending on the capacity. For administrative simplicity, the practice in previous Bank/GEF-financed projects has been to develop a single across-the-board GEF grant amount based only on per unit of installed capacity. This is feasible because the Government subsidy portion can be adjusted to meet the gap. For the present Project the GEF grant requested is about $1.8 per peak Watt, or a total of $490,000 for the total target of 274 kW

This figure is consistent with recent Bank/GEF-financed projects in the region and elsewhere (e.g., Nicaragua PERZA obtained $2.8 per peak Watt). However, in Project implementation, the grant will not be provided to consumers on a per peak Watt basis, but will be skewed in favor of the lower system sizes that are likely to be used by the poorest segment of the market. The additional Government subsidies will also be skewed towards the smaller capacities. It is expected that the resulting product price reductions, along with microfinancing assistance to consumers and extensive promotional campaigns will considerably stimulate the market, develop the local PV industry and lead to real price reductions in the medium term.

The tentative financing plan, based on initial estimates of system costs and market shares of the different capacities, is summarized in Table 1.

Table 1. Tentative Financing Plan for Solar Credit Line, US$ million

GEF grant for Hardware Incremental Cost	0.49
Local Subsidies	0.80
Microfinanced Amount	1.99
Consumer Downpayments	0.36
Total Cost	3.65

Phase-out strategy for GEF grants: The favored strategy by GEF is to gradually phase out the GEF grants provided at the start of the program, such that it is zero at the end. This is based on the assumption that price reductions achieved through market growth and volume procurement will have reached incremental cost levels at that time. Experience in Bank projects of 4-5 years duration has not supported this expectation; significant reductions induced by the GEF intervention did occur but only a few years after the closing date of the project, in most cases. This is because, as has been documented in the case of Sri Lanka and others, market growth occurs slowly in the first 2-3 years, with rapid growth only occurring thereafter. The first year of the program is often spent developing and refining procedures and on the conduct of promotions, with only a small number of sales being made. The favored phase-out strategy is likely to be achievable only in the case of Adaptable Program Loans (APL) such as the 14 years-long Philippines Rural Power Project that has a significant PV component. A phasing out of the GEF grant for SHS over the relatively short 4 year life of the present Project is not feasible. However, the Government

has agreed to cover the GEF contribution at the end of the Project in order to maintain the needed subsidy levels and enable a later, more gradual phase out. This assures sustainability of the program[14].

Microhydro Power (MHP) and Other RETs.

The objective of this Subcomponent is to demonstrate a community-based approach to provision of electricity services to small populations remote from the national grid that have hydro resources and have potential for productive applications, such as refrigeration of milk, fish and produce; grain milling, and other agroprocessing activities. Best practice for social organization and financial intermediation will be piloted. Pilot communities will be selected that could be organized to operate and maintain the power plants and the identified productive use. To the extent possible, tariffs will be charged that enable not only paying for the O & M cost but a portion of the investment cost. Consultant studies are presently being carried out to determine how best to establish revolving funds or other forms of financial intermediation. From a technical viewpoint, the proposed pilot MHPs will enable collection of data of actual operating characteristics, validity of pre-project resource assessment methodologies, maintenance requirements and costs, and other information useful to similar projects contemplated elsewhere and valuable to GEF's decision-making process regarding support for other future MHPs.

Investments. It is planned to finance up to 8 MHPs of capacity between 50-100 kW each during the 5-year Project duration. To be established in Phase 1 of the project are two pilot MHPs: a) 55 kW La Atravesada in *Mancomunidad* CHORTI, and b) 80 kW Las Champas in *Departamento* Colon. The Las Champas MHP is not situated in priority *mancomunidades* but has been the subject of prefeasibility studies by ENEE under the GAUREE program with the EU. EU has already committed soft loans totaling about $160,000 to this project. In Phase 2, an effort will be made to identify at least one MHP each in 4 other priority *mancomunidades* or an additional total of up to 6 MHPs averaging 100 kW each. As already mentioned, the purpose is to demonstrate a decentralized electrification solution for suitable *mancomunidades*. However, because the resource is highly site specific, it is evident that the MHP option is not a solution for *all mancomunidades*

Other Potential RET Pilot Projects

Aside from microhydro power, other RETs may be feasible for providing electricity to isolated remote areas of Honduras, including small windpower systems, modular biomass gasifiers and diesel/RET hybrids. During project implementation, a comprehensive inventory and economic evaluation of RET's that are relevant to Honduras will be conducted. The Project will finance the demonstration of at least one stand-alone windpower system or a wind diesel/hybrid installation of about 100 kW capacity, to determine its feasibility in remote areas with good wind regimes. A key requirement for the site of the demonstration would be the potential to use much of the scarce power for a productive application that benefits the community as a whole. Based on the lifecycle costs of pure RET or hybrid wind systems compared to equivalent isolated diesels, an incremental cost of about $600 per KW is estimated. This is consistent with estimates made for previous Bank/GEF projects (e.g., Nicaragua)

Table 1 summarizes the rural electrification investments to be financed by the Project, totaling about $16 million, of which $6.5 million is for renewable energy systems. The hardware-related GEF grants for incremental costs totals $550,000.

[14] The consumer financing plan being finalized has a larger government subsidy per unit than the GEF grant. While the GOH has agreed in principle to fully cover all the subsidies at the end of the Project, it must first be demonstrated through successful implementation of the PV program that this RET option indeed fills a real gap in the rural electrification program and that units could be disseminated to consumers through the private sector, thus freeing the Government from an additional and difficult public service task.

Table 1. Incremental Costs of Rural Electrification Investments financed by the Project, US$ Millions

Phase	Location	Power Supply Type	Number of new connections	New Generation (kW)	Indicative Investment Cost, US$M	Incremental Cost , US$M
1	CRA Communities	Grid Extension	922	N/A	0.7	N/A
1	CHORTI Communities	Grid Extension	1,128	N/A	0.9	N/A
1	La Atravesada (CRA)	Microhydro	191	55	0.3	N/A
1	National	PV Systems, 20 Wp and up	5,100	274	3.4	0.49
1	Las Champas (Colon)	Microhydro	203	80	0.5	N/A
2	Communities in 6 other priority mancomunidades	Grid Extension	11,043	N/A	7.4	N/A
2	Up to 6 more sites TBD	Microhydro	1,500	600	2.1	N/A
2	TBD	Wind/diesel hybrid or other RET	200	100	0.3	0.06
		Totals	20,287	1,109	15.9	0.55

B. Technical Assistance

The tables below list the market barrier reduction activities for RETs considered essential to the project. Compared to incremental cost financing for hardware, GEF intervention in the Project through grant financing of technical assistance activities will not only be important to the effective implementation of the RET-based subcomponents but will have deeper and longer-term impacts, as they address crucial gaps in policy and capacity of the sector.

Policy and Strategy Assistance. These activities ensure that decentralized electrification options, particularly those that utilize renewable energy, are seamlessly integrated into rural electrification planning; that allocation and setting of tariffs and subsidies are rationalized; and that key institutions responsible for implementation, particularly ENEE/FOSODE, as well as local financing institutions and private sector participants are sufficiently strengthened. The technical assistance activities, which will be integrated into the component TAs for the main PIR project, will be co-financed with $1 million in GEF grants:

	Cost, US$ millions		
Technical Assistance Activities for Policy and Capacity Building	**Total**	**Baseline Cost***	**GEF**
Support to PIR Component 1 – Support to the participatory local planning process	0.53	0.43	0.10
Integration of Decentralized Supply Options in Local Participatory Planning (0.1 GEF)			
Support to PIR Component 3 – Local capacity building and policy development TA	1.76	1.16	0.60
Rationalization of subsidies and tariffs for rural electrification (0.1)			
Institutional Strengthening of FOSODE, ENEE, FHIS, UTIs on Renewable Energy (0.5)			
Support to PIR Component 4 – Project Management, Monitoring and Evaluation	0.96	0.66	0.30
Monitoring & Evaluation Plan (0.1)			
Prefeasibility studies of Wind Power, Hybrids and other RET Options (0.1)			
Biomass & Traditional Fuels Strategy (0.1)			
Total	3.25	2.25	1.00

*The baseline costs are about a third of the total component costs in PIR for the 3 sectors.

Microhydro Power. Although, in general, MHPs have lower lifecycle costs than equivalent isolated diesel systems, major informational, financing and institutional barriers prevent their wider use in Honduras. GEF grants totaling $0.35 million will finance several technical assistance activities designed to reduce these market barriers, including: training and workshops for community organizations, MHP operators and project developers; identification and preparation of additional pilot MHPs, and definition of site-specific productive applications that could be promoted in Honduras.

	Cost, US$ millions		
Technical Assistance Activities for Microhydro Component	**Total**	**Baseline Cost**	**GEF**
Training/Workshops for Microhydro Operators and Community Organizations	0.11	0.01	0.10
Productive applications of Microhydro & Other Small Decentralized Power	0.11	0.01	0.10
Preparation of Phase 2 Microhydro Power Plants Subprojects in Priority *Mancomunidades*	0.17	0.02	0.15
Total	0.39	0.04	0.35

Solar PV Program Of greater importance than the hardware incremental cost grant for PV systems is support for various technical assistance, capacity building and market promotion activities that maximizes long-term sustainability of the program. The total cost of these activities is estimated to be $0.63 millions, of which $0.45 would be co-financed by GEF grants.

	Cost, US$ millions		
Technical Assistance Activities for PV Component	**Total**	**Baseline Cost**	**GEF**
Market Support Facility for PV Companies	0.11	0.01	0.10
Standards & Certification for Renewable Energy Systems	0.06	0.01	0.05
Public Education & Promotions of PV and other offgrid options	0.20	0.10	0.10
Training/workshops for PV dealers & Microfinance Institutions	0.11	0.01	0.10
Preparation of PV Institutional Applications	0.15	0.05	0.10
Total	0.63	0.18	0.45

Incremental Cost Matrix

Table 2 below summarizes the preliminary results of the above analysis in a matrix that shows the costs, domestic benefits and global benefits associated with the baseline course of action and the proposed alternative course of actions. The increments are then calculated.

Table 2:
Incremental Cost Matrix
(Basis: Project duration of 5 years)

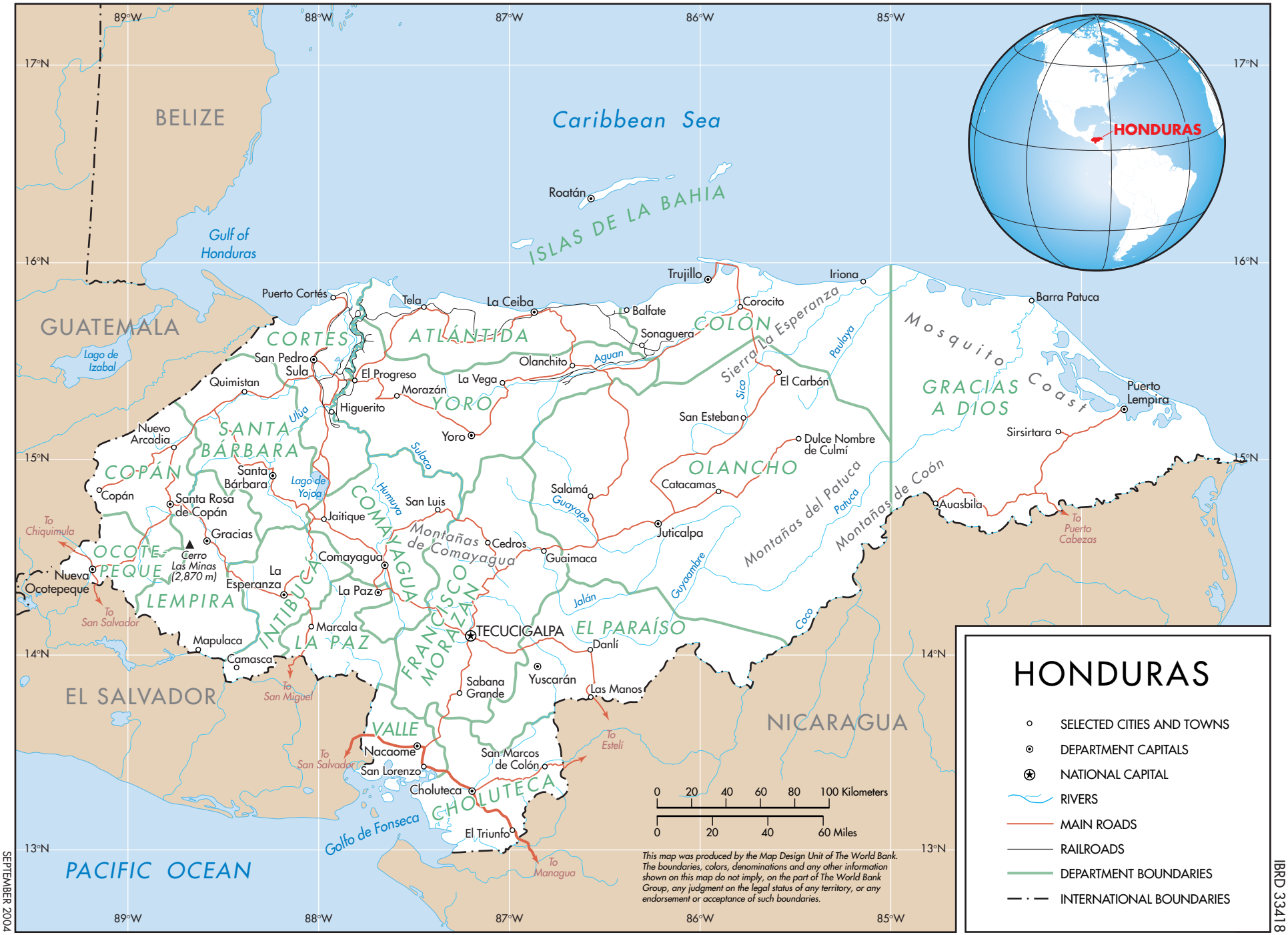
	Baseline	**Alternative**	**Increment**
Domestic Benefits			
a) physical	New line extensions to concentrated users over 4 years under Project. Continued use of kerosene lighting by offgrid populations.	New line extensions plus offgrid connections with microgrids powered by microhydro and SHS to total of 20,000 users. Other	Up to 7.000 offgrid users provided basic electricity service Reduction of perceived risks in
b) programmatic	ENEE rural electrification program focused on line extensions and fossil-fuel based generation Minimal local capacity to develop renewables-based projects for offgrid electrification	New national strategy incorporating offgrid electrification with high decentralized and renewables component Participation by GOH agencies, community organizations and private sector in planning, design and execution of offgrid renewables-based electrification projects	renewables-based offgrid electrification projects Up to 100 GOH staff at various levels, up to 100 private sector persons and up to 200 community residents trained/experienced in renewables-based offgrid electrification
Global Benefits			
a) environmental	425,000 tonnes of CO2 over 20 years from diesel and kerosene use	zero tonnes of CO2 over 20 years	425,000 tonnes CO2 abated over 20 years
b) programmatic	Limited international experience in SHS and microgrids for offgrid electrification High perceived risks by Govt/investors/communities in above systems	Over 1.1 MW additional microhydro , SHS and other RETs installed and providing demonstration effect/combining impact with similar demo plants globally	More govt programs/private investors in similar countries in Central America and elsewhere willing to consider renewables-based options for rural electrification Incremental addition

			to global knowledge on community-based and private sector-led offgrid operations
Costs (M$) a) Investment: Capital Costs	$14,950,000 (Cost of line ext component+fossil fuels-based systems assumed installed instead of renewables+ continued use of traditional lighting fuels)	$15,500,000 (Cost of line ext component + microhydro/RET and SHS installations)	$550,000
b)Technical Assistance	$2,460,000	$4,260,000	$1,800,000
Total	$17,410,000	$19,760,000	$2,350,000

Notes:

1. The 425,000 tonnes CO2 abated by installations in the GEF alternative was estimated over 20 years, the average lifetime of most of the installations. The baseline generation avoided by the construction of the microhydro in the Project is assumed to be diesel. For PV, the avoided emissions were assumed to be due to kerosene use in lamps for lighting for 100% of households and 25% of institutional applications. For the rest of institutional applications and all productive uses of PV, the avoided emissions were assumed to be from small gasoline engines. Technical figures on carbon content of diesel and kerosene, specific fuel consumption and carbon dioxide emissions per kWh of operation are all based on standard data.
2. The incremental cost of investments were estimated without counting the cost of line extensions financed outside of the Rural Infrastructure Project which would be offsetting in the two scenarios. In other words, it was assumed that the baseline RE program and the alternative RE program (PIR/GEF) would both have the same number of line extensions carried out through non-PIR projects.

MAP SECTION


HONDURAS
Caribbean Sea
BELIZE
GUATEMALA
EL SALVADOR
NICARAGUA
PACIFIC OCEAN
Gulf of Honduras
Golfo de Fonseca
ISLAS DE LA BAHIA
Roatán
Trujillo
Iriona
Barra Patuca
Puerto Cortés
Tela
La Ceiba
Balfate
Corocito
Sonaguera
Olanchito
Aguan
Sierra La Esperanza
Pauloya
Mosquito Coast
El Carbón
Puerto Lempira
Sirsirtara
San Esteban
Dulce Nombre de Culmí
Auasbila
Lago de Izabal
CORTES
ATLÁNTIDA
COLÓN
GRACIAS A DIOS
San Pedro Sula
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SANTA BÁRBARA
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COPÁN
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Jaitique
San Luis
Salamá
Guayape
Catacamas
OLANCHO
Juticalpa
Montañas del Patuca
Patuca
Montañas de Coón
To Puerto Cabezas
To Chiquimula
Gracias
Cerro Las Minas (2,870 m)
OCOTEPEQUE
Nueva Ocotepeque
To San Salvador
Comayagua
Montañas de Comayagua
Cedros
Guaimaca
COMAYAGUA
Guyambre
Jalán
Coco
La Esperanza
La Paz
LEMPIRA
INTIBUCÁ
FRANCISCO MORAZÁN
EL PARAÍSO
Marcala
TEGUCIGALPA
Danlí
Mapulaca
Camasca
LA PAZ
To San Miguel
Sabana Grande
Yuscarán
Las Manos
To Estelí
VALLE
Nacaome
San Lorenzo
San Marcos de Colón
Choluteca
CHOLUTECA
El Triunfo
To Managua
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0 20 40 60 80 100 Kilometers
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HONDURAS
SELECTED CITIES AND TOWNS
DEPARTMENT CAPITALS
NATIONAL CAPITAL
RIVERS
MAIN ROADS
RAILROADS
DEPARTMENT BOUNDARIES
INTERNATIONAL BOUNDARIES
SEPTEMBER 2004
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