Global Environment Facility

June 30th 2003

THE NATURE AND ROLE OF LOCAL BENEFITS IN GEF PROGRAM AREAS

GEF OFFICE OF MONITORING AND EVALUATION

STUDY COMPONENT: DESK REVIEW OF GEF PROJECTS

Climate Change

Study Document Number Five

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ACRONYMS

Bank World Bank

CBO Community-based Organization

CC Climate Change

GEF Global Environment Facility

GHG Green House Gases

IAs Implementing Agencies

ICR Implementation Completion Report

MTE Mid-term Evaluation

NGO Non-Governmental Organization

OED Operations Evaluation Department

PIR Project Implementation Report

PRA Participatory Rural Appraisal

PSR Project Status Report

PV Photovoltaic

RE Renewable Energy

SHS Solar Home Systems

TE Terminal Evaluation

UNDP United Nations Development Program

UNEP United Nations Environment Program

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The objectives of this review are to: (a) describe types of local benefits projects are designed to deliver; (b) describe type of local benefits that have actually occurred under implementation; (c) describe and analyze methodologies which have been used to measure and assess local benefits and impacts. As this is the preliminary stage the study only attempts to illustrate the types of local livelihood benefits (intended and recorded). Presentation of lessons and recommendations are not made because of lack of data relating to local livelihood benefits.

1. CLIMATE CHANGE AND LOCAL LIVELIHOODS[1]

1.1 This paper is based on a sample of thirty GEF Climate Change projects and aims to describe their local livelihood benefits[2], as well as the monitoring and evaluation of those benefits provided by GEF Climate Change (CC) projects. Sampling procedures have been described in a previous document[3].

A. Introduction

"The Bank's attention to global issues – such as … climate change – is appropriate but tends to understate the importance of environmental concerns to local interests and welfare."[4]

"Access to clean energy is essential to poverty alleviation and sustainable development goals. Energy is an engine of development and a source of many of the problems we face today … biomass in the form of wood and agricultural waste continues to be used in inefficient cook-stoves in rural areas. This is a major source of health problems that affect mainly poor women and children. Provision of alternatives that substitute for wood fuels and support new income opportunities would address the needs of more than half a billion poor people…"[5]

"The projects under this program have demonstrated the viability of using renewable energy sources in meeting rural electrification objectives. Challenges for these projects are (a) addressing issues of affordability and sustainability; (b) systematically incorporating in project design linkages between rural electrification strategies and rural development needs associated with health,

[1] "A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base." (Carney, 1998).

[2] 'Local livelihood benefits are interpreted as being elements of project outcomes that directly or indirectly have positive impacts upon people and ecosystems within or adjacent to project areas, and provide tangible gains in the livelihoods of communities and the integrity of ecosystems. This may include for example, local communities who live around a wetland and who a dependent upon it for livelihood activities; or people downstream of an intervention in the upper reaches of a river basin where the quantity and / or quality of water flowing down is enhanced.' (Soussan et al, 2003).

[3] Risby, L.A. (2003)

[4] Liebenthal (2002: xix)

[5] GEF (2002c)

> *education, water, sanitation, and employment; and (c) documenting income generation and other social benefits known to have resulted from the projects."*[6]

> *"If people can see the opportunity for job generation adding value to local products by means of natural renewable sources of energy, projects tend to move quicker."*[7]

> *"At this stage the project has not sufficiently addressed the needs of the rural poor in general and women in particular. Solar Photovoltaic needs to be factored into rural development strategies and not addressed in isolation."*[8]

1.2 GEF-financed CC programs "support sustainable measures that minimize climate change damage by reducing the risk, or the adverse effects of climate change."[9] The GEF will finance agreed enabling, mitigation[10] and adaptation[11] activities in eligible countries. Projects encompass interventions which encourage more efficient use of energy, sustainable transport technologies, reduce deforestation and sequester carbon or substitute fossil fuel energy generation with renewable energy technologies and adaptation, based on guidance received from the Conference of Parties of the UNFCCC. GEF undertakes projects via four Operational Programs (OPs):

- OP5 Removal of Barriers to Energy Efficiency and Energy Conservation seeks to remove barriers to the large-scale application, implementation and dissemination of least-cost energy efficient technologies.

- OP6 Promoting the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs, is focused on: (a) removing barriers to commercial or near commercial renewable energy technologies; and (b) reducing any additional implementation costs for renewable energy technologies that result

[6] GEF (2001: 9)
[7] Guatemala Renewable Energies Promoting Small Enterprize Development in Department of El Quiche, Guatemala. PIR 2001.
[8] Zimbabwe Photo-voltaics for Household and Community Use. Terminal Evaluation (1997)
[9] GEF (1996: 31)
[10] Mitigation measures reduce or lead to the reduction of GHGs from anthropogenic sources or protect or enhance removal of such gases by sinks.
[11] Adaptation activities minimize adverse effects and / or risks of climate change. Initially GEF has met the agreed full costs of relevant adaptation activities undertaken in the context of the formulation of national communications (Stage I activities as outlined by the COP of UNFCCC)

from a lack of practical experience, initially low-volume markets or scattered applications, so that economically profitable 'win-win' transactions and activities will increase the deployment of renewable energy technologies.

- OP7 Reducing the Long-term Cost of Low Greenhouse Gas-Emitting Energy Technologies, aims to reduce greenhouse gas emissions from anthropogenic sources by increasing market share of low greenhouse gas emitting technologies that have not yet become widespread.

- OP11, Promoting Environmentally Sustainable Transport, supports a long-term shift towards low emission forms of transport.

- Short-term Measures (STRM), are projects that reduce greenhouse gases in the short-term. Such projects may not be part of an OP. They are funded if they are priorities of a country, cost-effective in the short-term and likely to succeed[12].

1.3 CC mitigation projects, especially those that cater to rural energy development needs (e.g. off-grid solar photo-voltaic) are reported to provide substantial local livelihood benefits for the rural poor[13]. For example, projects have stated intentions to provide income and employment benefits through productive uses in agriculture (e.g. water pumping for irrigation, post-harvest processing); small and medium sized businesses (e.g. carpentry and welding); social service benefits through provision of home, school and community lighting, water pumps for boreholes, medical refrigeration in health centers and telecommunications[14] which may strengthen incentives to secure global environmental benefits. Puri (2003) suggests that 'popular belief within the international organization community is that GEF-financed clean climate projects reduce poverty while mitigating climate change.'[15] However, so far there has been little investigation[16] of local livelihood benefits or linkages to global environmental benefits of the GEF CC project portfolio.

[12] Ibid.
[13] See GEF (2000: 2 – 3) and GEF (2001: 9, 14)
[14] GEF (2001); GEF-FAO (2002)
[15] Puri (2003: 3)
[16] Ibid. This paper reviews UNDP-GEF CC projects and assesses poverty reduction impacts.

1.4 The following sections will review and compare the 'intended' and 'actual reported' local livelihood benefits of CC projects. The analysis will focus on income and employment, empowerment in governance and control over technologies, health and education[17]. This analysis is based on data drawn from project design documents, project implementation reports (PIRs) and project status reports (PSR), mid-term evaluations (MTE) and terminal evaluations (TE) / implementation completion reports (ICRs)[18]. This study recognizes that project reporting, such as the PIR and ICR are not specifically designed to report on local livelihood benefits and impacts. Therefore, there are significant 'gaps' in the data, and although tentative conclusions are provided to serve as entry points for fieldwork stages of the study (see 1.61 – 1.68) and they should be considered not *definitive*.

[17] Based on the sustainable livelihoods framework. See www.livelihoods.org
[18] For ease of understanding annual PIR and PSRs will be referred to as 'PIR' through the report. ICRs and TE will be referred to as 'TE'.

B. Projects Reviewed

1.5 This section outlines the key characteristics of the sample[19] of thirty CC projects that have either been completed or are under implementation from the GEF pilot phase through GEF-2 replenishment period. The projects selected are from Africa, Asia-Pacific, Europe, Middle East and Latin America regions. These projects were selected out of forty-two CC projects scoped, because of their stated intention or high potential to generate local livelihood benefits. Table 1.1 summarizes the sample's characteristics (pages 7 – 8).

[19] Details of the sampling procedures have been described in detail in Risby, L.A. (2003)

Table 1.1 List of GEF CC Projects Reviewed by Study

Project	Country / Region	Start year of Implementation / Size of Project	Status (As of July 2002)	Implementing Agency	GEF Financing / Total Cost of Project
OP5					
Tehran Transport Emissions Reduction Project (OP5)	Iran / Asia	1993 / Full Size	Completed	World Bank	**2 / 4M**
High Efficiency Lighting Pilot Project (OP5)	Mexico / LAC	1994 / Full Size	Completed	World Bank	**10 / 23M**
Improved Household Stoves in Mongolian Urban Centers (OP5)	Mongolia / Asia	2000 / MSP	Under Implementation	World Bank	**0.75 / 1.57M**
Fuel Efficiency in Road Transport Sector (OP5)	Pakistan / Asia	1997 / Full Size	Under Implementation	UNDP	**7 / 17.35M**
OP6					
Renewable Energy in Rural Markets Project (OP6)	Argentina / LAC	1999 / Full Size	Under Implementation	World Bank	**13.5 / 225M**
A Program for Rural Electrification with Renewable Energy Using the Popular Participation Law (OP6)	Bolivia / LAC	1999 / Full Size	Under Implementation	UNDP	**4.2 / 8.5M**
Energy and Water Sector Reform and Development (OP6)	Cape Verde / Africa	1999 / Full Size	Under Implementation	World Bank	**4.7 / 64.7M**
Promoting Sustainability of Renewable Energy Technologies and Rural Renewable Energy Service Companies (0p6)	Fiji / Asia – Pacific	2000 / MSP	Under Implementation	UNDP	**0.75 / 1.4M**
Renewable Energy-Based Electricity for Rural, Social and Economic Development in Ghana (OP6)	Ghana / Africa	1998 / Full Size	Under Implementation	UNDP	**2.47 / 3.13M**
Renewable Energy based Small Enterprise Development in the Quiche Region (OP6)	Guatemala / LAC	1999 / MSP	Completed	UNDP	**0.4 / 0.78M**
Optimizing Development of Small Hydel Resources in the Hilly Regions (OP6)	India / Asia	1993 / Full Size	Under Implementation	UNDP	**7.5 / 14.6M**
Solar-Home Systems (OP6)	Indonesia / Asia	1996 / Full Size	Completed (Project Cancelled)	World Bank	**24.3 / 44M**
Off grid Renewable Energy Electrification Pilot Demonstration (OP6)	Lao / Asia	1999 / MSP	Under Implementation	World Bank	**0.75 / 1.55M**
Household Energy Project (OP6)	Mali / Africa	1995 / Full Size	Completed	World Bank	**2.5 / 11.2M**
Renewable Energy for Agriculture (OP6)	Mexico / LAC	2000 / Full Size	Under Implementation	World Bank	**8.7 / 26.2M**
Photovoltaic-Based Rural Electrification in Peru (Op6)	Peru / LAC	1999 / Full Size	Under Implementation	UNDP	**3.93 / 9.18M**
Renewable Energy Systems in the Peruvian Amazon Region (RESPAR) (OP6)	Peru / LAC	2000 / MSP	Under Implementation	UNDP	**0.75 / 2.67M**
Palawan New and Renewable Energy and Livelihood Support Project (OP6)	Philippines / Asia	2000 / MSP	Under Implementation	UNDP	**0.75 / 1.5M**
Barrier Removal to Secure PV Market Penetration in Semi-Urban Sudan (OP6)	Sudan / Africa	1998 / MSP	Under Implementation	UNDP	**0.75 / 1.71M**
Electricity, Fuel and Fertilizer from Municipal and Industrial Organic waste: Demonstration Biogas Plant for Africa (OP6)	Tanzania / Africa	1994 / Full Size	Completed (Project Cancelled)	UNDP	**2.5 / 2.58M**
Solar Water Heating (OP6)	Tunisia / MENA	1995 / Full Size	Completed	World Bank	**4 / 20.9M**
Uganda photovoltaic pilot project for rural electrification (OP6)	Uganda / Africa	1995 / Full Size	Under Implementation	UNDP	**1.8 / 3.6M**
Photo-voltaic for Household and Community Use (OP6)	Zimbabwe / Africa	1992 / Full Size	Completed	UNDP	**7 / 7M**

Project	Country / Region	Start year of Implementation / Size of Project	Status (As of July 2002)	Implementing Agency	GEF Financing / Total Cost of Project
OP7					
Biomass Integrated Gasification (OP7)	Brazil / LAC	1992 / Full Size	Completed	UNDP	**7.7 / 7.7M**
OP11					
Introduction of viable Electric and Hybrid-Electric Bus Technology (0P11)	Egypt / MENA	2000 / MSP	Under Implementation	UNDP	**0.75 / 1.7M**
STRM					
Alternatives to Slash and Burn (STRM)	Global	1993 / Full Size	Completed	UNDP	**3 / 6M**
Mini-Hydropower Project (STRM)	Macedonia / ECA	2000 / MSP	Under Implementation	World Bank	**0.75 / 3.29M**
Decentralized Wind Electric Power for Social and Economic Development (STRM)	Mauritania / Africa	1994 / Full Size	Completed	UNDP	**2 / 2.07M**
Sustainable and Participatory Energy Management (STRM)	Senegal / Africa	1997 / Full Size	Under Implementation	World Bank	**4.7 / 19.97M**
Community-based Rangeland Rehabilitation for Carbon Sequestration and Biodiversity (STRM)	Sudan / Africa	1994 / Full Size	Completed	UNDP	**1.5 / 1.5M**

C. Intended and Recorded Income and Employment Benefits[20]

> *"Specific objectives are to: increase access to basic energy services to a greater number of inhabitants in the region; increase the development of Renewable Energy services aimed at productive uses of electricity in the area with relevance to industrial processing; promote innovative financing and social organization schemes for renewable energy based on small enterprises."*[21]

Intended Benefits

1.6 Twenty-nine out of the thirty GEF CC projects sampled intended to generate some income and/or employment opportunities/benefits for local populations. As with the intended benefits in the IW portfolio, the projects deliver these benefits mostly through pilot demonstration activities and are in some cases coupled with wider sectoral reforms at a national level to catalyze replication[22]. Benefits of the projects are discussed below and are illustrated with examples[23] (see Table 1.2 pages 15 – 17 and Appendix I).

1.7 **Productive Uses**[24]: Productive uses cut across OP5 – OP7, OP11 and STRM. Twenty of the projects reviewed aim to link a range of GHG mitigation activities to 'productive uses', which can generate income and/or employment for local beneficiaries. The majority of these benefits are associated with OP6 projects, which intend to generate them via the promotion of renewable energy (RE) technologies, such as mini-hydro, wind, solar-home-systems (SHS). For example, the OP6 Guatemala RE and Small Enterprise Development project mainly aims to increase the development of RE services for productive uses of electricity in industrial processing. The project will establish four RE service enterprises in solar and micro-hydro and six RE-driven micro-enterprise activities. The micro-enterprise activities are focused on post-harvest processing to add value, improve efficiency and product quality in the agricultural sector. In OP11, the Egypt Electric and Hybrid-electric Bus Technology project aims to demonstrate zero and

[20] Appendix I presents a brief summary of the CC project objectives, activities and benefits.
[21] Guatemala Renewable Energy based Small Enterprise Development in the Quiche Region Project design document.
[22] See Cape Verde Energy and Water Reform and Development Project design document.
[23] Due to the large number of projects only a few examples are highlighted.
[24] The term 'productive use' refers broadly to activities that aim at enhance income and employment opportunities in rural and urban areas in sectors such as agriculture, industry and creating markets for small and medium-sized enterprises to supply renewable energy technologies.

low GHG emitting transport alternatives (with low air pollution benefits: see section E). The project intends to build capacity for local maintenance and production by creating one hundred and fifty jobs by 2005 (based on target of 22 buses in operation)[25].

1.8 **Reduction in Energy Costs**[26]: Twenty-one projects explicitly or implicitly aim to increase income through the introduction of new RE technologies or increasing efficiency of existing technologies to lower energy costs (e.g. OP5 Pakistan Fuel Efficiency project). For example, the OP6 Mali Household Energy project aims to implement a manufacturing and marketing program for sale of more efficient biomass and kerosene stoves. This includes the importation of 17,000 kerosene stoves and local manufacture and sale of 65,000 charcoal stoves and 60,000 fuelwood and combined version charcoal – fuelwood stoves. The project also has a component, which aims to improve efficiency in fuelwood, and charcoal production, through processes, which allow the use of carbonized and compressed cotton, stalks instead of 'traditional' tree species. Activities will reduce household cooking costs and provide time savings for low-income families, in addition to creating employment through development of new markets for fuel-efficient stoves. The STRM, Macedonia Mini-hydro project will install hydro plants in Debar and Kavadarci, which will provide water and electricity at a low cost to consumers[27].

1.9 **Time Savings**: Nine projects propose activities that will result in household time savings and thereby potentially provide individuals with opportunities to engage in income and/or employment activities. The OP6, India Small Hydel project estimates that supply of electricity to villages will free up women's time, currently used for wood collection and presenting opportunities for them to use their time for income generation.

1.10 **Negative Impacts**: Only two projects cite possible negative impacts caused by project interventions. The OP6 Cape Verde Energy and Water Reform project estimates

[25] Guatemala RE based Small Enterprise Development in the Quiche Region and Egypt Introduction of viable Electric and Hybrid-Electric Bus Technology Project design documents.
[26] We recognize that energy costs are a poor indicator of project success specially if there was no 'marketed' source of energy before the project was initiated.
[27] Pakistan Fuel Efficiency in Road Transport Sector, Mali Household Energy, Macedonia Mini-Hydropower Project design documents.

that national reforms may result in short 'price shocks' in water and electricity costs. The OP5, Mongolia Fuel-efficient stove project predicts that introduction of stoves could result in decline in incomes for coal and fuelwood suppliers[28].

1.11 **Monitoring and Evaluation**: Based on the data available to the study monitoring and evaluation of income and employment benefits is not intended by eighteen of the thirty projects sampled. Projects tend to focus on monitoring of outputs rather than outcomes / impacts. For example, solar PV indicators tend to focus on 'sales' of units rather than their impact on local populations[29]. These are 'rough' indicators of income and employment, but they can say little about important equity concerns within communities, in terms of *who* benefits. For six other projects, there is no available information to make a definitive judgment (e.g. *n.a.v.* ratings). Five projects out of twenty-eight projects that linked activities to 'claim' benefits propose indicators to measure income and employment benefits arising from activities. In other cases, such as the Ghana Renewable Energy project no indicators were developed during project design, as these were "'to be developed'" during initial stages of implementation[30]. None of the project designs reviewed provides explicit details of estimated local income and employment benefits or detail plans to establish 'socio-economic' baselines against which such improvements in incomes and employment could be measured[31].

1.12 Based on available data projects seem to provide little substantive information on any social assessments[32] carried out during project preparation. There are exceptions, such as the Ghana Renewable Energy project which indicates that five hundred and seventeen households were interviewed during project preparation for income, social and

[28] Cape Verde Energy and Water Reform and Development, Mongolia Improved Household Stoves in Urban Centers Project design document.
[29] See Argentina Renewable Energy in Rural Markets project and Indonesia Solar Homes Project design documents.
[30] Ghana RE based Small Enterprise Development in the Quiche Region Project design document.
[31] This statement recognizes that within relatively short project time-frames local livelihood benefits and impacts may be difficult to measure (particularly for MSP projects) in a cost-effective manner. Moreover, balance is needed between implementation, and subsequent monitoring and evaluation processes.
[32] Social assessment is the systematic investigation of demographic factors, socio-economic determinants, social organization, socio-political context, needs and values and institutional capacity in order to account for social differences, assess impacts and risks, mitigate adverse impacts and build capacity of institutions and individuals (see Narayan & Rietbergen-McCracken, 1997).

energy use data and; the Senegal Participatory Energy Management project states that a cultural survey and energy use survey were conducted during project preparation[33]. Available information on other projects reveals superficial profiles of local target beneficiaries or an apparent absence of relevant information, disguised in some cases by vague public relations statements of 'good intentions' such as the following:

> *"Social Assessment: The project will have significant positive social implications. The renewable technology being promoted will greatly reduce Fiji's oil imports, mitigate health and environmental hazards … Thus this project can improve the livelihoods and living conditions of people in rural communities."*[34]

> *"Social Assessment: The project will have significant positive social implications. This project will utilize indigenous and environmentally friendly energy resources to … promote livelihood support activities from the renewable energy services. In additional, renewable energy mitigate the health and environmental hazards posed by the consumption of petroleum products. Thus, this project can improve people's livelihoods and living conditions."*[35]

1.13 Based on limited data available to the review of GEF projects, across a range of OPs and levels of maturity, very few projects[36] seem to provide information that explicitly demonstrates adherence to established principles of social analysis[37] with regard to their intended local livelihood benefits. However, this is an expected result given the emphasis on global environmental benefits in accordance with the GEF Mandate. Earlier GEF-1 and 2 projects during their design and submission phase were expressly cautioned against underscoring local benefits precisely because they contradicted GEF's mandate during the time[38].

[33] See Ghana RE based Small Enterprise Development in the Quiche Region and Senegal Sustainable and Participatory Energy Management Project design documents.
[34] Fiji: Promoting Sustainability of Renewable Energy Technologies and Rural Renewable Energy Service Companies Project design document
[35] Philippines: Palawan New and Renewable Energy and Livelihood Support Project design document.
[36] There are exceptions such as the and Senegal Sustainable and Participatory Energy Management, Cape Verde Energy and Water Sector Reform and Development Project design documents.
[37] See for example, Rietbergen-McCracken, J & Narayan, D. (1997)
[38] Comments by UNDP-GEF 3rd June 2003.

Table 1.2 Income and Employment Opportunities Enabled by GEF CC Projects

Projects	Country / Region	Loci	Total Potential Benefic's[39]	Income and Employment benefits[40]						Negative income and employment impacts	Monitoring and Evaluation[41]
				Productive Uses		Reduction in Energy Costs		Time Savings			
				Int[42]	Rec[43]	Int	Rec	Int	Rec		
OP5											
Tehran Transport Emissions Reduction Project	Iran / MENA	Urban	6M+	✗[44]	✗	✗	✗	✗	✗	✗	✗
High Efficiency Lighting Pilot Project	Mexico / LAC	Urban	n.a.v[45].	✗	✗	✓	n.a.v.	✗	✗	✗	✗
Improved Household Stoves in Mongolian Urban Centers	Mongolia / Asia	Urban	400,000+	✓[46]	n.a.v.	✓	✔	✗	✗	✓	n.a.v.
Fuel Efficiency in Road Transport Sector	Pakistan / Asia	Urban	20M+	✗	✔	✓	✔	✗	✗	✗	✔
OP6											
Renewable Energy in Rural Markets Project	Argentina / LAC	Rural	400,000+	✓	n.a.v.	✗	✗	✗	✗	✗	✗
A Program for Rural Electrification with Renewable Energy Using the Popular Participation Law	Bolivia / LAC	Rural	n.a.v.	✓	n.a.v.	✗	✗	✗	✗	✗	✗
Energy and Water Sector Reform and Development	Cape Verde / Africa	Urban / Rural	50,000+	✓	n.a.v.	✓	n.a.v.	✗	✗	✓	n.a.v.
Promoting Sustainability of Renewable Energy Technologies and Rural Renewable Energy Service Companies	Fiji / Asia – Pacific	Rural	n.a.v.	✗	✗	✓	n.a.v.	✗	✗	✗	✗

[39] Source: Project design documents and approximate estimates
[40] In project design brief (benefits / objectives and activities) including evidence of implementation in PIRs, MTE, TE and ICR.
[41] ME = Monitoring and Evaluation
[42] Int = Intended benefit
[43] Rec = recorded or actual benefit
[44] ✗ = No – project did not intend benefit / No monitoring intended
[45] n.a.v. = not available
[46] ✓ = Yes – intended benefit / M&E (direct and indirect); ✔ = Yes – recorded implementation of 'intended' benefit / ME of components related to local benefits.

Projects	Country / Region	Loci	Total Potential Benefic's	Income and Employment benefits						Negative income and employment impacts	Monitoring and Evaluation
				Productive Uses		Reduction in Energy Costs		Time Savings			
				Int	Rec	Int	Rec	Int	Rec		
OP6											
Renewable Energy-Based Electricity for Rural, Social and Economic Development	Ghana / Africa	Rural	n.a.v.	✓	n.a.v.	✓	n.a.v.	✗	✗	✗	✗
Renewable Energy based Small Enterprize Development in the Quiche Region	Guatemala / LAC	Rural	2000	✓	✗[47]	✓	✔	✓	✔	✗	✔
Optimizing Development of Small Hydel Resources in the Hilly Regions	India / Asia	Rural	1M+	✓	n.a.v.	✓	✔	✓	✔	✗	n.a.v.
Solar-Home Systems	Indonesia / Asia	Rural	880,000	✗	✗	✗	✗	✓	n.a.v.	✗	✗
Off grid Renewable Energy Electrification Pilot Demonstration	Lao / Asia	Rural	n.a.v.	✓	n.a.v.	✓	n.a.v.	✗	✗	✗	✗
Household Energy Project	Mali / Africa	Rural	n.a.v.	✓	n.a.v.	✓	n.a.v.	✓	n.a.v.	✗	✗
Renewable Energy for Agriculture	Mexico / LAC	Rural	n.a.v.	✓	n.a.v.	✓	n.a.v.	✗	✗	✗	✔
Photovoltaic-Based Rural Electrification in Peru	Peru / LAC	Rural	60,000	✗	✗	✓	n.a.v.	✗	✗	✗	✗
Renewable Energy Systems in the Peruvian Amazon Region (RESPAR)	Peru / LAC	Rural	4000+	✓	n.a.v.	✓	n.a.v.	✗	✗	✗	n.a.v.
Palawan New and Renewable Energy and Livelihood Support Project	Philippines / Asia	Rural	55,000+	✓	✔	✓	n.a.v.	✗	✗	✗	✔
Barrier Removal to Secure PV Market Penetration in Semi-Urban Sudan	Sudan / Africa	Urban	n.a.v.	✗	✗	✓	n.a.v.	✗	✗	✗	✗
Electricity, Fuel and Fertilizer from Municipal and Industrial Organic waste: Demonstration Biogas Plant for Africa	Tanzania / Africa	Urban	n.a.v.	✓	n.a.v.	✗	✗	✗	✗	✗	✗

[47] ✗ = No – project did not produce intended benefit.

Projects *(including project start-up date)*	**Country / Region**	**Loci**	**Total Potential Benefic's**	**Income and Employment benefits**						**Negative income and employment impacts**	**Monitoring and Evaluation**
				Productive Uses		**Reduction in Energy Costs**		**Time Savings**			
				Int	**Rec**	**Int**	**Rec**	**Int**	**Rec**		
OP6											
Solar Water Heating	Tunisa / MENA	Urban	n.a.v.	✗	✗	✗	✗	✗	✗	✗	✗
Uganda photovoltaic pilot project for rural electrification	Uganda / Africa	Rural	12,000+	✓	✔	✓	n.a.v.	✓	n.a.v.	✗	n.a.v.
Photovoltaics for Household and Community Use	Zimbabwe / Africa	Rural	n.a.v.	✗	✗	✓	n.a.v.	✗	✗	✗	✗
OP7											
Biomass Integrated Gasification	Brazil / LAC	Rural / Urban	n.a.v.	✓	n.a.v.	✗	✗	✗	✗	✗	✗
OP11											
Introduction of viable Electric and Hybrid-Electric Bus Technology	Egypt / MENA	Urban	n.a.v	✓	n.a.v.	✗	✗	✗	✗	✗	✗
STRM											
Alternatives to Slash and Burn	Global (Brazil / Indonesia / Kenya)	Rural	n.a.v	✓	n.a.v.	✗	✗	✗	✗	✗	✗
Mini-Hydropower Project	Macedonia / ECA	Urban	62,000+	✓	n.a.v.	✓	n.a.v.	✗	✗	✗	✗
Decentralized Wind Electric Power for Social and Economic Development	Mauritania / Africa	Rural	n.a.v.	✗	✗	✓	n.a.v.	✓	n.a.v.	✗	✗
Sustainable and Participatory Energy Management	Senegal / Africa	Rural / Urban	n.a.v.	✓	✔	✓	n.a.v.	✓	n.a.v.	✗	✔
Community-based Rangeland Rehabilitation for Carbon Sequestration and Biodiversity	Sudan / Africa	Rural	5,500+	✓	✔	✓	✔	✗	✗	✗	n.a.v.
Total				20	5	21	5	7	2	2	5

Recorded Benefits

1.14 Four projects (see Table 1.2) out of thirty recorded increases in income and/or employment through productive activities, of which only three (Pakistan, Philippines and Senegal) provided quantitative estimates of income increases. For example, the OP5 Pakistan Fuel Efficiency project reported:

> *"Increased income for auto-motive mechanics (1436) of Rs. 12,000 (246 USD/month). Increased business for workshop / station owners since tune-ups are being provided at a higher speed. Workshop owners have an increased income of Rs. 210,000 (3621 USD)"*[48]

1.15 The Pakistan project did not originally intend to monitor income and employment improvements, but has now developed poverty alleviation/livelihoods indicators to track such benefits. The Senegal Participatory Energy Management project includes indicators for 'annual development impacts' and tracks changes in women's income. The project documents indicate that:

> *"Gardening activities conducted by sixty women's groups generated income of more than $36,000; the introduction of modern hives has contributed in the production of more than one ton of high quality honey; 700 roosters have been introduced to upgrade the local poultry population, 400 guinea fowls have been raised for market production; project has increased income of participating villages with attention to women by $600,000 per year."*[49]

1.16 The Guatemala Renewable Energy-based Small Enterprise project reported that it was unable to contribute to the development of small enterprises in the region and possibilities for this to occur in the short to medium term are problematic. This is because the mini-hydro electric plant has yet to be completed and the solar PV systems can only produce enough power for household lighting and 12V radios and TV sets. The TE reports that this situation has demoralized the local population, who were expecting to have enough power for agricultural processing of coffee, grain and garlic[50].

[48] See Puri, 2003 and see also Pakistan Energy Efficiency project PIR (2001, 2002)
[49] Senegal Participatory Energy Management project PIR (2001, 2002)
[50] Guatemala Renewable Energy-based Small Enterprise in the Quiche Region project. Terminal Evaluation (2002).

1.17 The Mexico RE for Agriculture also intends to report local income and employment benefits. Results can be expected once the project reaches a more advanced level of maturity[51].

1.18 Five projects of the thirty reviewed provide specific evidence of reduction in energy costs. The OP5 Pakistan Fuel Efficiency project PIRs state that customers have saved an annual average of Pak Rs. 210,000 through improvements in engine efficiency and consequent fuel savings. The project also reported a customer satisfaction rate of sixty-seven percent[52] after receiving engine 'tune-ups' on their vehicles. The Guatemala Renewable Energy-based Small Enterprise Development in the Quiche Region project TE indicates that activities contributed to a reduction in the use of fuelwood, candles and kerosene which decreased household expenses by (Quetzal) Q10 for candles and Q15 for kerosene per week. This represented a forty percent saving on fuel costs[53]. Reports of similar savings are made by the India Small Hydel and Mongolia Improved Household Stoves projects, which cite reductions in energy costs on the basis of data from attitudinal/satisfaction surveys, carried out during implementation.

1.19 Two projects, Guatemala Renewable Energy-based Small Enterprise Development and India Small Hydel projects provide data on time savings, based on attitudinal/satisfaction surveys. For example, the Guatemala project has reported that ninety-seven percent of women surveyed reported time savings associated with the use of solar PV. Similarly, the India Small Hydel project reports that women now have four to five hours more time, due to the reduced need to collect firewood. This time can be used for other activities, including income generation made possible by the provision of electricity[54].

1.20 Five out of thirty projects (see Table 1.2) have developed monitoring and evaluation indicators to track the achievement of income and employment benefits. For example, the

[51] See Mexico RE for Agriculture PIR (2001 / 2002)
[52] See Pakistan Energy Efficiency project PIR (2001 / 2002) and Puri (2003)
[53] See Guatemala: Renewable Energy-based Small Enterprise Development in the Quiche Region. Terminal Evaluation (2002).
[54] Puri (2003).

Mexico RE for Agriculture Project and the Philippines Palawan RE and Livelihood Support project include an indicator for monitoring changes in local incomes resulting from project activities to support productive uses. In OP6, the completed STRM, Sudan Community-based Rangeland Rehabilitation for Carbon Sequestration and Biodiversity project did not develop socio-economic monitoring until late in the project cycle and no specific indictors are detailed, but the TE reports that the project provided income benefits to local communities[55].

1.21 With the exception of the five projects that have developed indicators measuring one or more income and employment activities, all others have a stated expectation of local income and employment benefits, but do not track their achievement, as evidenced by the 'n.a.v' and 'x' ratings (see Table 1.2). Monitoring activities in these projects mainly focus on technical and process / output issues with little attention paid to economic benefits / impact aspect of project implementation. Indeed, in some mature projects, monitoring and evaluation of inputs and outputs, including social dimensions are lacking. The Zimbabwe Photo-voltaic project TE asserts:

> *"the locations of inputs, outputs and monitoring activities were not formally specified on any timeline. There does not seem to have been any explicit time scheduling of any activities, including monitoring activities, at the project formulation stage. Monitoring is not even clear in the various term reviews and evaluations."*[56] *(Emphasis added)*

1.22 Based on the data reviewed tentative findings indicate that projects[57] may be lacking monitoring and evaluation procedures to enable them to specify income and employment benefits, including the contribution of these towards the sustainability and replication of overall project benefits. The Indonesia Solar Homes TE implicitly supports this view:

> *"Although improvement in quality of life was mentioned in the Staff Appraisal Report as an outcome, it was not a performance indicator and the monitoring and*

[55] Mexico RE for Agriculture, Philippines Palawan New and RE and Livelihood Support PIRs (2001 / 2002), Sudan Community-based Rangeland Rehabilitation for Carbon Sequestration and Biodiversity Terminal Evaluation (2002)
[56] Zimbabwe PV for Household and Community Use. Terminal Evaluation (1997).
[57] These are predominantly more mature pilot phase and GEF-1 projects.

> *evaluation system was not designed to collect data for this purpose. However, beginning 2001 the Project Support Group will conduct baseline and impact surveys to improve the understanding of changes resulting from the use of SHS. These surveys are expected to generate insights into economic and social benefits of SHS."*[58]

Similarly the OED report with respect to the Mali Household Energy project:

> *"The ambitious project design was not grounded in reality and quality at entry was unrealistic. The … project was expected to improve living standards of rural populations in affected areas and stabilize employment opportunities in the fuelwood trade. Low-income consumers were also expected to benefit from the increased and proper use of kerosene and charcoal stoves. However it was not possible to assess how far it was successful in improving rural living standards as there were no monitoring indicators established to do so."* [59]

[58] Indonesia Solar Homes Project. Implementation Completion Report (2001)
[59] Mali Household Energy Project Performance Assessment Report (2003) OED.

D. Intended and Recorded Local Empowerment in Governance

> *"Focus on people's organization and democratic participatory methods and not on technology – hardware transference. The social, cultural, ethnic and gender aspects of rural energy services are central to overall project design and implementation. Technology innovation / introduction to isolated communities must follow a well established social engineering map. The emphasis is thus on 'know-why', rather than 'know-how'. Taking people's considerations, needs and aspirations into account from the very beginning pays off in terms of technology transfer."*[60]

Intended Benefits

1.23 All projects in the sample were assessed for components that increased local empowerment in governance in the energy sector. The components are discussed below and illustrated with examples (see Table 1.3 pages 28 – 29).

1.24 **National Policy & Legal frameworks facilitate increased local control/access to energy**: The review indicates that twelve projects aim to support and/or facilitate government frameworks, legislation and policies to promote improved local access to energy sources, particularly in relation to rural electrification. All the projects are either OP6 or STRM, with the majority promoting RE technologies such as mini-hydro and solar PV through public – private and private sector delivery mechanisms. For example, the OP6, Bolivia Rural Electrification with Renewable Energy Using the Popular Participation Law Project aims to remove policy and institutional barriers to RE by building public–private sector partnerships to extend local rural electrification. The project draws on the public participation law to determine options for public – private financing for RE through the development of standardized 'rules of association'. The Senegal Participatory Energy Management project aims to improve efficiency and charcoal market access through promotion of trade liberalization. The project is supporting the Government of Senegal effort to liberalize the charcoal trade and also decentralize management of forest resources to local communities[61].

[60] Guatemala Renewable Energy based Small Enterprise Development in the Quiche Region (PIR, 2001).
[61] Bolivia A Program for Rural Electrification with RE Using the Popular Participation Law, Senegal Sustainable and Participatory Energy Management Project design documents.

1.25 **Creating/strengthening the capacity of local institutions:** Fourteen of the projects sampled propose activities that will create and/or strengthen the capacity of local institutions through training (e.g. NGOs and CBOs) to manage and control energy and other resources, such as forest resources for fuelwood. The majority of projects that contain local capacity building components are OP6 and STRM, with one OP5 project. In two, the OP6 Philippines Palawan RE and Livelihood Support and the Guatemala RE for Small Enterprise project, a local NGO is the executing agency involved in building capacity of the local government and of rural electricity cooperatives. Similarly, the OP5 Mongolia Improved Household Stoves project is partially executed by a local NGO (The Mongolian Women's Federation). This project also proposes to build capacity through training and skills transfer among *'aimag'* (rural) centers and small businesses. The STRM, Sudan Community-based Rangeland Rehabilitation for Carbon Sequestration project aims to work through local village institutions (sub-committees) to ensure full participation of local people in project activities, which aim to develop effective land management strategies to address rangeland degradation and provide carbon sequestration benefits[62].

1.26 **Increased local stakeholder participation and inclusion**: Stakeholder participation is difficult to accurately assess on the basis of descriptions in project design documents. Often the projects refer to stakeholder participation without providing sufficient detail as to who, why, how and to what extent local community stakeholders have influenced project design and their roles in project implementation. Furthermore, there is strong tendency for projects to treat local communities as homogeneous entities which belies ethnic, gender, age, religious, political, power and socio-economic differences that pattern livelihood strategies. Within the projects reviewed, the Senegal Participatory Energy Management project is the only example of detailed stakeholder assessment and analysis[63]. Other projects remain at the level of general intentions. For example, in the OP5 Mongolian Improved Household Stoves project, the 'public involvement plan' states:

[62] Philippines Palawan New and RE and Livelihood Support, Sudan Community-based Rangeland Rehabilitation for Carbon Sequestration and Biodiversity Project design documents.
[63] Senegal Sustainable and Participatory Energy Management Project design document.

> *"Stakeholder participation: Just as stakeholder participation has been central to design of the project, that will continue to be the case through execution of the project itself, with the primary forum of action being the steering committee."*[64]

1.27 However, the project design does not appear to provide for local community representation on the project steering committee, which consists of government agencies and one NGO (Mongolian Women's Federation). Furthermore, there seems to be a lack of consistent terminology, meaning and reporting of participation between agencies, which makes assessment problematic and prone to inaccuracies because of weak data sources[65]. Local community involvement in project design mostly takes place at the level of consultation and information dissemination. Based on the review of project documents, the most prominent stakeholders in CC projects during the design stage, who may thereby assert influence on project design, are government agencies and technical experts rather than the recipients of the technology.

1.28 Twelve projects of those sampled propose to include local communities in stakeholder participation in their implementation. However, most of these provide little information to specify or justify 'stakeholder participation' in terms of what mechanisms they will use, how activities will be monitored and evaluated – and how participation will be linked to project outcomes (particularly sustainability and replication). Two projects, which do provide comprehensive descriptions of stakeholder participation and involvement of local communities in project design and / or implementation, are now examined. The STRM, Senegal Participatory Energy Management project, in its design phase, organized two hundred and fifty PRAs with communities to provide relevant inputs. During implementation, the project intends to work very closely with communities to develop community forestry initiatives and reforms in the charcoal markets, since it regards stakeholder participation as a necessary prerequisite for change. The project design states:

> *"Because of the nature of the proposed project, its participation and beneficiary consultation aspects are of critical importance. The participation activities that*

[64] Mongolia: Improved Household Stoves in Mongolian Urban Centers Project design document.
[65] See also GEF (2002a)

> *would be undertaken within the project have a main objective assuring that the implementation of the project will be based on beneficiary representative participation."*[66]

1.29 Secondly, the India Small Hydel project plans for stakeholder participation of local communities in the management, financial investment and operation of small hydroelectric plants. The project design states:

> *"… the participation of local people in the ownership, management, maintenance, revenue collection, and expenditure related to small hydel projects would be sign that the project has achieved its objectives"*[67]

1.30 Local community involvement is tied closely to project activities particularly improvement in human capital, income and employment activities. However, the project design did not clearly describe indicators and intended monitoring of participation[68].

1.31 **Improved access to information / knowledge and awareness**: This component was the most common empowerment focused activity across all projects reviewed and is integral to the core dissemination and replication aims of GEF CC OPs. Twenty-nine projects propose activities that will improve access to information, knowledge and awareness of energy efficiency and RE technologies among local communities. They propose to employ a range of mechanisms including workshops, seminars, local drama groups, newspaper adverts, TV and radio broadcasts. The OP6, Sudan Barrier Removal to Secure PV Market Penetration project is typical of these interventions. The project plans to 'create demand' for PV systems, through extensive awareness and promotion campaigns to educate various stakeholder groups on PV systems. Information will be disseminated on market potential as well as financing possibilities and options. The project plans to implement the activity through public and private institutions and the state media. Emphasis will be placed on potential private sector investors and also consumers[69].

[66] GEF CC Senegal: Participatory Energy Management project design document.
[67] India Optimizing Development of Small hydel Resources in Hilly Regions project design document.
[68] Although we recognize that para-project documents held at the field level may provide this information.
[69] Sudan Barrier Removal to Secure PV Market Penetration in Semi-Urban Sudan Project design document.

1.32 **Inclusion of vulnerable stakeholders**: Ten reviewed projects cite inclusion of vulnerable groups, in all cases referring to women. For example, the OP6 Tanzania Electricity, Fuel and Fertilizer project asserts:

> *"The project will have a positive impact on the life of women at many levels of society in Tanzania. The increased availability of electricity will help low income families to gain access to electricity for heating and lighting. The disposal of waste has often been the job of women and project includes creation of accessible and hygienic waste disposal sites around Dar es Salaam making waste disposal safer and easier - therefore improving health."*[70]

The project does not link the assumed benefit for women to a monitoring and evaluation framework. Indeed out of ten projects that assert benefits for women only the Senegal Participatory Energy Management project formally tracks women's participation[71].

1.33 **Monitoring and Evaluation**: Twelve out of thirty projects reviewed include monitoring and evaluation indicators to track changes in national frameworks, policy and legislation. The Cape Verde Water and Energy Reform project is a good example. It has output indicators for privatization of Electra (state electricity company) and energy / water regulatory frameworks. Seven projects have developed performance indicators to monitor creation and interaction with local institutions[72]. For example, the Lao Off-grid Rural Electrification project proposes to monitor 'participatory' components including the number of village electricity associations. If we move from the institutional level, to consider the monitoring and evaluation of stakeholder participation this is generally weak. Only two projects provide for monitoring of local stakeholder participation, although precise detail on the 'depth' of monitoring is not available. These are the Peru (RESPAR) project and Senegal Participatory Energy Management. The Senegal project

[70] Tanzania. Electricity, Fuel and Fertilizer from Municipal and Industrial Organic Waste: A Demonstration Biogas Plant for Africa Project design document.
[71] Senegal Sustainable and Participatory Energy Management Project design document.
[72] See Fiji Promoting Sustainability of Renewable Energy Technologies and Rural Renewable Energy Service Companies Lao Off-grid RE Electrification Pilot demonstration, Peru Photo-voltaic based Rural Electrification, Peru RE systems in the Peruvian Amazon Region (RESPAR), Sudan Barrier Removal to Secure PV Market Penetration in Semi-Urban Sudan, Senegal Sustainable and Participatory Energy Management Project design documents.

intends to evaluate participation on an annual basis. Monitoring of information dissemination and awareness components is proposed by sixteen projects. The Philippines Palawan RE and Livelihood Support project is typical, in that it intends to monitor changes in awareness of RE among target beneficiaries including communities, private sector and public sector institutions[73]. Monitoring of involvement of vulnerable groups such as women is explicitly outlined in the Senegal Participatory Energy Management project, which has an indicator measure 'increases in income of participating village with attention to women'.

[73] See Philippines Palawan New and RE and Livelihood Support Project design document. However, there is no attention given to evaluation of impact of such programs on attitudes and behavior.

Table 1.3 Local Empowerment benefits enabled by GEF Financed CC Projects

Projects	National Policy & Legal frameworks facilitate increased local control / access to energy		Creating / strengthening capacity of local institutions[74]		Increased local stakeholder participation and inclusion		Improved access to information / knowledge and awareness		Inclusion of vulnerable stakeholders: Indigenous and / or women / youth		Monitoring and Evaluation
	Int	Rec	Int	Rec	Int	Rec	Int	Rec	Int	Rec	
OP5											
Tehran Transport Emissions Reduction Project	✗	✗	✗	✗	✗	✗	✓	n.a.v	✗	✗	n.a.v.
High Efficiency Lighting Pilot Project	✗	✗	✗	✗	✗	✗	✓	✓	✗	✗	✗
Improved Household Stoves in Mongolian Urban Centers	✗	✗	✓	n.a.v.	✗	✗	✓	✓	✓	n.a.v.	✗
Fuel Efficiency in Road Transport Sector	✗	✗	✗	✗	✗	✗	✓	✓	✗	✓	✓
OP6											
Renewable Energy in Rural Markets Project	✓	✓	✗	✗	✓	n.a.v.	✓	n.a.v.	✗	✗	✗
A Program for Rural Electrification with Renewable Energy Using the Popular Participation Law	✓	✓	✓	n.a.v.	✓	n.a.v.	✓	n.a.v.	✗	✗	✓
Energy and Water Sector Reform and Development	✗	✗	✗	✗	✗	✗	✓	n.a.v.	✗	✗	✗
Promoting Sustainability of Renewable Energy Technologies and Rural Renewable Energy Service Companies	✓	n.a.v.	✗	✗	✓	n.a.v.	✓	n.a.v.	✓	n.a.v.	✓
Renewable Energy-Based Electricity for Rural, Social and Economic Development	✗	✗	✗	✗	✗	✗	✓	✓	✓	n.a.v.	✓
Renewable Energy based Small Enterprise Development in the Quiche Region	✗	✓	✓	n.a.v	✗	✓	✓	✓	✓	n.a.v.	✓
Optimizing Development of Small Hydel Resources in the Hilly Regions	✓	n.a.v.	✓	n.a.v.	✓	✓	✓	✓	✓	✓	✓
Solar-Home Systems	✓	✗	✓	n.a.v.	✗	✗	✓	n.a.v.	✗	✗	✓
Off grid Renewable Energy Electrification Pilot Demonstration	✗	✗	✓	✓	✓	n.a.v.	✓	n.a.v.	✗	✗	✗
Household Energy Project	✓	n.a.v.	✓	✓	✓	n.a.v.	✓	✓	✗	✗	✓
Renewable Energy for Agriculture	✗	✗	✗	✗	✓	n.a.v.	✓	n.a.v.	✗	✗	✗
Photovoltaic-Based Rural Electrification in Peru	✓	✓	✓	n.a..v	✗	✗	✓	n.a.v.	✗	✗	✓
Renewable Energy Systems in the Peruvian Amazon Region (RESPAR)	✗	✗	✓	n.a.v	✓	n.a.v.	✓	n.a.v.	✗	✗	✓
Palawan New and Renewable Energy and Livelihood Support Project	✓	✓	✓	✓	✗	✗	✓	✓	✗	✗	✓

[74] Local institutions does not include private sector.

Projects	National Policy & Legal frameworks facilitate increased local control / access to energy		Creating / strengthening capacity of local institutions		Increased local stakeholder participation and inclusion		Improved access to information / knowledge and awareness		Inclusion of vulnerable stakeholders		Monitoring and Evaluation
									Indigenous and / or women / youth		
	Int	Rec	Int	Rec	Int	Rec	Int	Rec	Int	Rec	
OP6											
Barrier Removal to Secure PV Market Penetration in Semi-Urban Sudan	✓	✓	✓	✓	✗	✗	✓	✓	✗	✗	✓
Electricity, Fuel and Fertilizer from Municipal and Industrial Organic waste: Demonstration Biogas Plant for Africa	✗	✗	✗	✗	✗	✗	✓	n.a.v.	✓	n.a.v.	✗
Solar Water Heating	✗	✗	✗	✗	✗	✗	✓	n.a.v.	✗	✗	✗
Uganda photovoltaic pilot project for rural electrification	✓	✓	✗	✗	✗	✗	✓	✓	✓	n.a.v.	✓
Photovoltaics for Household and Community Use	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗
OP7											
Biomass Integrated Gasification	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
OP11											
Introduction of viable Electric and Hybrid-Electric Bus Technology	✗	✗	✗	✗	✗	✗	✓	n.a.v.	✗	✗	✗
STRM											
Alternatives to Slash and Burn	✗	✗	✗	✗	✓	n.a.v.	✓	n.a.v.	✗	✗	✗
Mini-Hydropower Project	✗	✗	✗	✗	✗	✗	✓	n.a.v.	✗	✗	✓
Decentralized Wind Electric Power for Social and Economic Development	✓	n.a.v.	✓	n.a.v.	✓	n.a.v.	✓	n.a.v.	✓	n.a.v.	n.a.v.
Sustainable and Participatory Energy Management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Community-based Rangeland Rehabilitation for Carbon Sequestration and Biodiversity	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
Total	12	7	14	6	12	4	29	10	10	4	16

Recorded Benefits

1.34 Review of available documentation relating to implementation experience showed that seven projects (out of twelve with stated policy objectives) indicated progress regarding the implementation of frameworks, policy and legislation to facilitate local access and control over energy resources (see Table 1.3). An OP6 project, for Argentina Rural RE Markets reported that the Government and Provincial Government met commitments to expand private sector participation in the electricity sector and to serve

rural areas with electricity based on RE technologies. The Bolivia Program for Rural Electrification with Renewable Energy project reported the completion of draft 'rules of association' and contracts for local institutions and submissions of proposals to municipalities and central government so that resources of the Popular Participation Law can be channeled to PV owners[75]. In contrast the OP6, Mali Household Energy project TE highlighted that, despite the project's success, policy reforms to decentralize control over forest resources still had to be completed. Furthermore, the TE reports resistance from the Forestry Department, which has made it difficult for Government to enforce forest management and taxation of fuelwood supplies, resulting in lower than estimated revenues. Furthermore, another OP6 project for Indonesia Solar Homes was unable to support planned decentralization of rural electrification due to Government delays connected to reform of the power sector. The project was further hampered by the Asian financial crisis and fluctuations in export crop prices that prevented rural families in investing in SHS[76].

1.35 Six projects reported the creation and / or strengthening of institutions (see Table 1.3). For example, the OP6 Lao Off-grid Electrification project reported in accordance with formal monitoring indicators:

> *"Eight community based solar and village hydro projects have been installed where in the villages carry the responsibility of operating, maintaining and financial management of systems. All of these village-based organizations have been effective and operated in a disciplined financial way. It could be an organizational design for future replication."*[77]

1.36 The completed OP6 Mali Household Energy and the STRM, Sudan Community-based Range Management projects both involved community-based institutions in the formulation of local community resource management plans to empower them[78]. In

[75] See Argentina Renewable Energy in Rural Markets Project PIR (2001 / 2002); Bolivia Rural Electrification with Renewable Energy through the Popular Participation Law PIR (2001 / 2002).
[76] See Mali Household Energy Project TE; Indonesia Solar Homes Project TE.
[77] Lao Off-grid RE Electrification Pilot Demonstration PIR (2001 / 2002).
[78] However, OED (2003) assessment of the Mali Household Energy project asserted that substantial challenges still remained on demand and supply fronts due to weak monitoring / control and poor

contrast, eight projects that proposed components to support local institutions did not report any results as detailed by their 'n.a.v.' rating (see Table 1.3).

1.37 Three out of twelve projects that proposed inclusion of local communities in stakeholder participation reported specific activities toward this end. The Senegal Participatory Energy Management project reported:

> *"Participatory sustainable forest management systems have been implemented in 130 villages covering 100,000ha and resulting in reduction of deforestation in the project zones by approximately 6,500ha."*[79]

This project has conducted PRAs in over twenty villages (exceeding project targets) and will be undertaking PRAs in an additional one hundred and thirty villages, to support project activities in community forest management, charcoal production and trade, and dissemination of fuel-efficient technologies[80]. Project reporting of participatory activities is detailed, and linked to performance indicators and monitoring systems.

1.38 The India Small Hydel project reported that project activities had 'contributed to social cohesion and community participation in maintenance of small hydel technologies'[81]. However, the project has so far been unable to encourage communities to invest (financial participation) in project activities. The PIR states:

> *"One of the major challenges faced by the project is involvement of local community / people's participation in setting up of small hydro power projects. While all efforts have been made to involve local people in the construction of small hydel demonstration projects, the financial contribution from local communities could not become feasible … In order to involve local communities for actual financial participation in the development of small hydel projects, it is necessary that a social team may work in the area for 6 – 8 months, convincing the local people and telling them about the possible benefits of such projects. An*

institutional / technical capacities of local government to control, inappropriate tax incentives and decentralization regulations relating to the fuelwood trade.

[79] Senegal Participatory Energy Management Project PIR (2002).

[80] This project can be considered as a 'best practice' example of community participation across the GEF project portfolio.

[81] See Puri (2003).

> *integrated approach towards overall development of the entire area may be more effective."*[82]

1.39 The Guatemala Renewable Energies and Small Enterprise Development project did not propose local community stakeholder participation in project activities. However, the project reported its activities led to 'integration and social cohesion'[83]. Interestingly, the project observed that social organization and participatory methods were even more central to project implementation than were the purely technical aspects of 'technology transfer'[84].

1.40 Based on the review of available documents relating to the sample of thirty projects it is clear that there appears to be very little systematic reporting on local community inclusion in stakeholder participation components of empowerment. Many projects across the range of OPs and levels of maturity tend to focus on reporting technical issues of 'know how' rather than on social, community and participatory factors that are relevant to the sustainability of project impacts. This indicates that projects could be underestimating the social factors that pattern the reception of new technologies within target communities.

1.41 Ten projects reported (see Table 1.3) the implementation of information dissemination and awareness activities. For many projects, these activities present opportunities for partnering with local NGOs, believed to have closer links with local community beneficiaries and greater effectiveness in delivering information. For example, the OP5 Pakistan Fuel Efficiency project reports that overall awareness and knowledge of local citizens towards vehicular pollution-related diseases has improved, because of the awareness campaign. These included mass media campaigns and holding 'free tune-up' camps in major cities[85]. One project, the OP6 Zimbabwe Solar PV

[82] India Optimizing Development of Small Hydel Resources in the Hilly Regions of India PIR (2002).
[83] See Puri (2003)
[84] Guatemala Renewable Energies Promoting Small Enterprise Development in the Department of El Quiche PIR (2002).
[85] Pakistan Fuel Efficiency in Road Transport Sector PIR (2002).

Household and Community Use project reported problems with its awareness campaign and lack of monitoring. The project TE asserts:

> *"Public awareness was targeted by the project in terms of awareness of technology and financing arrangements. However, project did not measure awareness hence it is impossible to gauge effectiveness. As it is it would difficult to assess how effective the campaign would be and what could have been done to improve it. Five installations in Chishawasha about 20km outside Harare were visited. The system owners were vaguely aware of the project."*[86]

1.42 Four projects reported implementation activities with involvement of vulnerable groups. The OP5 Pakistan Fuel Efficiency project did not specify a 'gender' component in its original design but during implementation developed a gender 'strategy'. The project offered subsidized engine tune-ups to female drivers over a limited period, and was well received. To further implement the strategy all tune-up centers were 'gender sensitized'[87]. The Senegal Participatory Energy Management project reported involvement of one hundred and forty women in training and capacity building activities such as forest cutting, charcoal production, beekeeping and food processing. The project states that 'women's groups are significantly involved in income generating activities particularly honey and livestock production[88].

1.43 Sixteen projects have monitoring and evaluation indicators for one or more of the identified empowerment components. Project monitoring tends to be focused on technical issues rather than monitoring empowerment components that play a critical role in project sustainability. For example, monitoring of changes to policy and legislation frameworks for local control, strengthening of local institutions, increased information dissemination and awareness activities are evident, but this is contrasted with the monitoring of local community involvement in stakeholder participation which is very weak across the sampled projects. Only the STRM, Senegal Participatory Energy Management project developed indicators and planned evaluation for local community participation, providing

[86] Zimbabwe Photovoltaic Project for Household and Community Use. TE (1997)
[87] Pakistan Fuel Efficiency in the Transport Sector project PIR (2002).
[88] Senegal Participatory Energy Management project PIR (2002).

precise details of PRA exercises and participating groups[89]. Other projects tend to report local community inclusion in stakeholder participation in an unsubstantiated manner (see 1.29). Although all IAs prescribe to the view that community inclusion in stakeholder participation is critical for project success[90], the results of this review seem to question IA commitment to this position and show that there are opportunities for improvement in project reporting, particularly with regard to monitoring and evaluation of empowerment components.

[89] Ibid.
[90] See GEF (2002a: 71)

E. Intended and Recorded Improvements in Health

> *"The project will benefit women in that it will reduce the need to collect and carry fuelwood, reduce indoor smoke pollution and improve the health of women and children."*[91]

> *"The project is expected to benefit women and children in several ways: the availability of abundant, clean water within the village can substantially reduce the incidence of death and disease among children, as well as the time and physical effort required to fetch water from more distant sources."*[92]

Intended Benefits

1.44 **Provision of electricity in health centers and / or hospitals**: Five projects propose activities that will increase the provision of electricity in health centers and / or hospitals (see Table 1.4 pages 39 – 40). Typical uses include lighting and refrigeration of vaccines and other medicines that can produce considerable livelihood benefits in terms of maintaining infant and adult health, thereby allowing people to possibly carry out other income and employment activities or to attend school. The OP6, Ghana RE Electricity for Rural, Social and Economic Development project intends to work with health NGOs to install solar PV systems in health centers[93]. However, the numerous 'x's' in Table 5.4 indicates that many projects seem to understate possible applications of RE to improve health center service provision, particularly in the rural locations which are often most in need of health services.

1.45 **Reduced indoor and / or outdoor air pollution**: Eleven projects propose activities that will decrease indoor and / or outdoor air pollution exposure, thereby reducing the risk of respiratory diseases. The OP5, Mongolia Improved Household Stoves project proposes to introduce fuel-efficient household cooking stoves in place of traditional cooking stoves using coal and firewood, thereby lowering indoor and outdoor air pollution and the incidence of respiratory disease in Ulaanbaatar[94]. The OP6, Philippines

[91] India Optimizing Development of Small Hydel Resources in Hilly Areas project design document.
[92] Mauritania Decentralized Wind Electric Power for Social and Economic Development Project design document.
[93] Ghana RE-based Electricity for Rural, Social and Economic Development Project design document.
[94] Mongolia Improved Household Stoves in Urban Centers project design document.

New and RE Livelihood Support Project propose to promote solar PV technologies to reduce household dependence on fuelwood and petroleum based products such as kerosene, thereby decreasing indoor air pollution. The project states that:

> *"… babies and children will benefit from convenient forms of energy - reduced local air pollution from fossil fuels; and also the sick and elderly; women will spend less time going to market to buy kerosene and less time collecting wood."*[95]

1.46 However, many projects do not make an explicit connection between project activities and reduction in air pollution and health benefits. For example, the Iran Transport Emissions Reduction project does not specifically link reductions in vehicle pollution to local health benefits[96].

1.47 **Improved access to clean water**: Six projects propose to improve access to clean water (see Table 1.4). Activities range from demonstration of RE solar and wind powered water pumps to integrated energy and water sectoral reforms. The OP6 Cape Verde Energy and Water Sector Reform project proposes major reform (privatization and decentralization) in the energy and water sectors to improve service delivery to communities in urban and rural areas. The project expects to catalyze improvement in the 'quality of life and health' of communities through improved access to water and sanitation. The project includes a baseline and indicators of household access to water / sanitation and electricity (non-RE and RE). The STRM, Sudan Community-based Rangeland Management project includes a proposal to develop and rehabilitate shallow wells to improve community access to water. The OP6, Ghana RE Electricity for Rural, Social and Economic Development project proposes to install demonstration solar PV powered water pumps and provide training to 'bore-hole committees' to maintain the pump systems[97].

[95] Philippines Palawan New and Renewable Energy and Livelihood Support project design document.
[96] Iran Tehran Transport Emissions Reduction project design document.
[97] Cape Verde Energy and Water Sector Reform, Sudan Community-based Rangeland Rehabilitation for Carbon Sequestration and Biodiversity and Ghana RE-based Electricity for Rural, Social and Economic Development Project design documents.

1.48 **Monitoring and Evaluation**: No project in the sample states any intention to monitor human health benefits such as 'reduction in respiratory or waterborne disease' and / or 'levels of pollutants in blood'. Projects that do propose monitoring tend to focus on the development of air pollution monitoring[98] and / or access to water and / or installed solar systems in health centers or hospitals. These can be considered proxy indicators of the health benefits that these projects aim to provide and with the exception of air pollution monitoring, focus on 'cause' rather than 'impact'.

Recorded Benefits

1.49 Three projects reported provision of RE electricity supply to health centers and hospitals. The Ghana RE for Rural, Social and Economic Development reported that five solar PV systems had been installed at health centers. Similarly, the Guatemala RE for Small Enterprise Development reported that six solar PV vaccine refrigeration systems had been installed in health centers. The Uganda PV for Rural Electrification project also reported 'unintended' benefit, in that the solar PV was used to provide refrigeration of vaccines and lighting in maternity clinics[99]. No project has developed specific indicators for health related RE use. Reporting is unsystematic, general, and not linked directly to project log frames.

1.50 Three projects reported improvements in air quality promoting health benefits. The OP6, Guatemala RE for Small Enterprise Development provides the most comprehensive assessment. Based on a survey of local beneficiaries the project found that the households with PV systems reported a decreased incidence of red eyes (20% decrease), respiratory problems such as cough and flu-like symptoms (9% decrease), and skin irritations (17% decrease), compared with those with traditional forms of energy (e.g., firewood, kerosene and candles). Other project reporting seemed to be unsystematic. For example, the Uganda PV Rural Electrification projects states that 'cleaner indoor air' due to reduced use of candles and kerosene promoted improved health, but gives no quantifiable

[98] For example see, Pakistan Fuel Efficiency in Transport Sector project design document; Iran Tehran Transport Emissions Reduction project design document; Mongolia Improved Household Stoves in Urban Areas project design document

[99] See Puri (2003).

measures. Survey data similar to that provided by the Guatemala RE project would be a useful approximate measure of air pollution benefits in the case of solar PV systems for household use across much of the OP5 – 6 portfolio.

1.51 Three projects report on improvements in access to clean water. The STRM, Sudan Community-based Rangeland Management projects TE states that the project provided seventeen deep bore-holes (one per project village) with pumping and fencing facilities. Six wells were equipped with diesel pumps and the remainder with hand pumps. The water was used for household and agricultural uses[100]. Other projects such as the Cape Verde Energy and Water Reform project are still too immature to report improvements in access to water and improved sanitation, which the project does intend to monitor.

1.52 Only five projects report monitoring and evaluation indicators that relate indirectly to health benefits. The OP5, Pakistan Fuel Efficiency and Mongolia Improved Household Stoves have both developed monitoring frameworks for air quality monitoring. However both projects provide little 'concrete' data. The OP6 Cape Verde Energy and Water Reform and the Mexico RE of agriculture projects also have instituted monitoring of water provision to households, but both projects have yet to reach sufficient maturity to show results[101]. Based on the available documentation, the health implications of project activities appear understated. Where they are stated, monitoring and evaluation, including the establishment of baselines, is generally unsystematic and limited. Projects have not tracked health benefits, which could substantiate their 'well meaning' statements, improve understanding and dissemination of the local benefits of new technologies and aid stakeholder 'buy-in' and replication.

[100] Sudan Community-based Rangeland Rehabilitation for Carbon Sequestration and Biodiversity. Terminal Evaluation (2001).
[101] Cape Verde Energy and Water Reform project PIR (2001, 2002); Mexico Renewable Energy for Agriculture project PIR (2002).

Table 1.4 Health benefits enabled by GEF Financed Climate Change Projects

Projects	Provision of electricity in health centers / hospitals		Reduced indoor and / or outdoor air pollution		Improved access to clean water		Monitoring and Evaluation
	Int	Rec	Int	Rec	Int	Rec	
OP5							
Tehran Transport Emissions Reduction Project	✗	✗	✓	n.a.v.	✗	✗	n.a.v.
High Efficiency Lighting Pilot Project	✗	✗	✗	✗	✗	✗	✗
Improved Household Stoves in Mongolian Urban Centers	✗	✗	✓	n.a.v.	✗	✗	✔
Fuel Efficiency in Road Transport Sector	✗	✗	✓	n.a.v.	✗	✗	✔
OP6							
Renewable Energy in Rural Markets Project	✗	✗	✗	✗	✗	✗	✗
A Program for Rural Electrification with Renewable Energy Using the Popular Participation Law	✓	n.a.v.	✗	✗	✓	n.a.v.	✗
Energy and Water Sector Reform and Development	✗	✗	✗	✗	✓	n.a.v.	✔
Promoting Sustainability of Renewable Energy Technologies and Rural Renewable Energy Service Companies	✗	✗	✓	n.a.v.	✗	✗	✗
Renewable Energy-Based Electricity for Rural, Social and Economic Development	✓	✔	✗	✗	✓	✔	✗
Renewable Energy based Small Enterprise Development in the Quiche Region	✓	✔	✓	✔	✗	✗	✗
Optimizing Development of Small Hydel Resources in the Hilly Regions	✗	✗	✓	✔	✗	✗	✗
Solar-Home Systems	✗	✗	✓	n.a.v.	✗	✗	✗
Off grid Renewable Energy Electrification Pilot Demonstration	✗	✗	✗	✗	✗	✗	✗
Household Energy Project	✗	✗	✗	✗	✗	✗	✗
Renewable Energy for Agriculture	✗	✗	✗	✗	✓	n.a.v.	✔
Photovoltaic-Based Rural Electrification in Peru	✓	n.a.v.	✗	✗	✗	✗	✗
Renewable Energy Systems in the Peruvian Amazon Region (RESPAR)	✗	✗	✗	✗	✗	✗	✗
Palawan New and Renewable Energy and Livelihood Support Project	✗	✗	✓	n.a.v.	✗	✗	✗
Barrier Removal to Secure PV Market Penetration in Semi-Urban Sudan	✗	✗	✓	n.a.v.	✗	✗	✗
Electricity, Fuel and Fertilizer from Municipal and Industrial Organic waste: Demonstration Biogas Plant for Africa	✗	✗	✓	n.a.v.	✗	✗	✗
Solar Water Heating	✗	✗	✗	✗	✗	✗	✗
Uganda photovoltaic pilot project for rural electrification	✗	✔	✗	✔	✗	✔	✗
Photovoltaics for Household and Community Use	✓	n.a.v.	✗	✗	✗	✗	✗

Projects	Provision of electricity in health centers / hospitals		Reduced indoor and / or outdoor air pollution		Improved access to clean water		Monitoring and Evaluation
	Int	Rec	Int	Rec	Int	Rec	
OP7							
Biomass Integrated Gasification	✗	✗	✗	✗	✗	✗	✗
OP11							
Introduction of viable Electric and Hybrid-Electric Bus Technology	✗	✗	✓	n.a.v.	✗	✗	✔
STRM							
Alternatives to Slash and Burn	✗	✗	✗	✗	✗	✗	✗
Mini-Hydropower Project	✗	✗	✗	✗	✗	✗	✗
Decentralized Wind Electric Power for Social and Economic Development	✗	✗	✗	✗	✓	n.a.v.	✗
Sustainable and Participatory Energy Management	✗	✗	✗	✗	✗	✗	✗
Community-based Rangeland Rehabilitation for Carbon Sequestration and Biodiversity	✗	✗	✗	✗	✓	✔	✗
Total	5	3	11	3	6	3	5

F. Intended and Recorded Improvements in Human Capital

> "*Eight hundred mechanics have received formal training in major cities, four hundred and forty three workshop owners have attended formal training courses. The courses were held for the purpose of training workshop owners and mechanics in the establishment and operation of instrumented tune-up centers."*[102]

Intended Benefits

1.53 **Improved Local Human capital (skills and training)**: Nineteen projects propose local skills transfer and training as part of their capacity building to support income and employment generation (see Table 1.5 pages 43 – 44) either directly (e.g., through small business training; agricultural extension), and / or indirectly through support to maintain and operate new technologies (e.g. Solar PV and Mini-hydro). The India Small Hydel project includes a comprehensive package of local capacity building measures for local livelihoods; training communities in the installation, maintenance and operation of mini-hydro, training (particularly for women) in the use of electric appliances for cooking and heating, income generating opportunities such as irrigation based cultivation to replace 'jhoom' cultivation, and train local communities in small business operation to allow them to set up their own small scale businesses[103]. Similarly, the Peru PV Rural Electrification project proposes training to strengthen the 'human resource base' at three key levels. Firstly training at University level for the principles of RE energy and operation of RE businesses. Secondly, training program for technicians to assist installation, PV standards and compliance. This will include certification scheme for technicians. Thirdly, training program for end-users (communities), which will teach them about correct operation and maintenance procedures.

1.54 **Electricity for schools**: Six OP6 projects propose to install RE technologies in schools to provide lighting, thereby extending opportunities for learning. The Argentina RE in Rural Markets and the Bolivia Program for Rural Electrification and RE are typical

[102] Pakistan Fuel Efficiency in Road Transport Sector PIR (2002)
[103] India Optimizing Development of Small Hydel Resources in Hilly Areas project design document; Peru Photovoltaic-based Rural Electrification Project design document.

examples. Both projects intend to install solar PV in rural schools to produce educational benefits for children and adults[104]. In contrast, many other OP6 projects understate opportunities to extend RE services to schools, repeating a similar pattern observed for health center / hospital related installations (see Table 1.5).

1.55 **Improved household lighting for study**: Three OP6 projects propose the installation of solar PV systems which will result in education benefits through improvement of home study lighting (see Table 1.5). The Indonesia Solar Home Systems is typical of these three projects. It states that the installation of SHS will have a 'profound impact on the quality of education experienced by children' as well as improving their knowledge of the 'external world' through TV and radio use[105].

1.56 **Monitoring and Evaluation**: The monitoring and evaluation of human capital improvements tends to be weighted towards indictors for training and skills transfer project components, as opposed to education *per se*.

[104] Argentina Renewable Energy for Rural Electrification Project design document; Bolivia Program for Rural Electrification and Renewable Energy using the Popular Participation Law Project design document
[105] Indonesia Solar Home Systems Project design document.

Table 1.5 Improvements in Education enabled by GEF Financed CC Projects

Projects	Improved Local Human capital: skills and training		Electricity for schools		Improved household lighting for study		Monitoring and Evaluation
	Int	Rec	Int	Rec	Int	Rec	
OP5							
Tehran Transport Emissions Reduction Project	✗	✗	✗	✗	✗	✗	✗
High Efficiency Lighting Pilot Project	✗	✗	✗	✗	✗	✗	✗
Improved Household Stoves in Mongolian Urban Centers	✗	✗	✗	✗	✗	✗	✗
Fuel Efficiency in Road Transport Sector	✓	✓	✗	✗	✗	✗	✓
OP6							
Renewable Energy in Rural Markets Project	✓	✓	✓	✓	✓	n.a.v.	✓
A Program for Rural Electrification with Renewable Energy Using the Popular Participation Law	✓	✓	✓	n.a.v.	✗	✗	✓
Energy and Water Sector Reform and Development	✗	✗	✗	✗	✗	✗	✗
Promoting Sustainability of Renewable Energy Technologies and Rural Renewable Energy Service Companies	✓	✓	✗	✗	✗	✗	✓
Renewable Energy-Based Electricity for Rural, Social and Economic Development	✓	✓	✓	✓	✗	✗	✓
Renewable Energy based Small Enterprise Development in the Quiche Region	✓	✓	✗	✗	✗	✗	✓
Optimizing Development of Small Hydel Resources in the Hilly Regions	✓	✓	✗	✗	✗	✗	✓
Solar-Home Systems	✗	✗	✗	✗	✓	n.a.v.	✗
Off grid Renewable Energy Electrification Pilot Demonstration	✓	n.a.v.	✗	✗	✗	✗	✗
Household Energy Project	✓	✓	✗	✗	✗	✗	✓
Renewable Energy for Agriculture	✓	n.a.v.	✗	✗	✗	✗	✗
Photovoltaic-Based Rural Electrification in Peru	✓	✓	✓	n.a.v.	✗	✗	✓
Renewable Energy Systems in the Peruvian Amazon Region (RESPAR)	✓	✓	✗	✗	✗	✗	✓
Palawan New and Renewable Energy and Livelihood Support Project	✓	✓	✗	✗	✗	✗	✓
Barrier Removal to Secure PV Market Penetration in Semi-Urban Sudan	✗	✗	✗	✗	✗	✗	✗
Electricity, Fuel and Fertilizer from Municipal and Industrial Organic waste: Demonstration Biogas Plant for Africa	✗	✗	✗	✗	✗	✗	✗
Solar Water Heating	✗	✗	✗	✗	✗	✗	✗
Uganda photovoltaic pilot project for rural electrification	✓	✓	✓	n.a.v.	✓	n.a.v.	✓
Photovoltaics for Household and Community Use	✗	✗	✓	n.a.v.	✗	✗	✗

Projects	Improved Local Human capital: skills and training		Electricity for schools		Improved household lighting for study		Monitoring and Evaluation
	Int	Rec	Int	Rec	Int	Rec	
OP7							
Biomass Integrated Gasification	✗	✗	✗	✗	✗	✗	✗
OP11							
Introduction of viable Electric and Hybrid-Electric Bus Technology	✓	✔	✗	✗	✗	✗	✔
STRM							
Alternatives to Slash and Burn	✓	✔	✗	✗	✗	✗	✔
Mini-Hydropower Project	✗	✗	✗	✗	✗	✗	✗
Decentralized Wind Electric Power for Social and Economic Development	✓	n.a.v.	✗	✗	✗	✗	✗
Sustainable and Participatory Energy Management	✓	✔	✗	✗	✗	✗	✔
Community-based Rangeland Rehabilitation for Carbon Sequestration and Biodiversity	✓	✔	✗	✗	✗	✗	✔
Total	19	16	6	2	3	0	16

Recorded Benefits

1.57 Sixteen projects reported on the implementation of training and skills transfer activities at the local community scale. For example, the Pakistan Fuel Efficiency project reported training nearly one thousand mechanics. An independent survey revealed that ninety five percent of mechanics were highly satisfied with the training and seventy nine percent reported an increase in income as a result of developing a 'tune-up' business. Similarly, four hundred workshop owners were trained. According to a survey, eighty one percent were satisfied with the training and sixty seven percent reported an increase in annual income due to increased 'tune up' business[106].

1.58 Two projects reported the installation of solar PV in schools. The Ghana RE for Rural, Social and Economic Development projects reported installation of six school systems[107]. The Argentina RE for Rural Energy Markets reported:

> *"Province of Santiago del Estero has completed the negotiation of an implementation agreement with the existing concessionaire for the installation and operation of solar systems in 503 rural schools."*[108]

[106] Pakistan Fuel Efficiency in Road Transport Sector PIR (2001, 2002)
[107] Ghana RE for Rural, Social and Economic Development PIR (2001, 2002)
[108] Argentina Renewable Energy for Rural Markets PIR (2001, 2002).

1.59 In both cases the reporting of benefits was unsystematic and not linked to project monitoring and evaluation indicators. There appear to be no project reports on improvements in home lighting for education.

1.60 Formalized monitoring of human capital benefits is restricted to indicators for local capacity building, such as training and knowledge building. No project provides an education baseline, from which improvements in educational level of children or adults could be measured (e.g. improvements in literacy; increase in study time), and no indicators are developed to monitor education improvements in schools or the home caused by installation of RE. Where education benefits are reported for school use of RE technologies they tend to focus on ‘installation rates’ rather than educational benefits on communities and individuals. The opportunity has not yet been taken for projects to systematically report education benefits within their log frame and evaluation frameworks. For example even small-scale attitude surveys could provide a basic qualitative understanding of educational changes caused by lighting in schools and homes. Furthermore, there is no indication that RE technologies in schools are mainstreamed with government education policies and strategies.

G. Summary

1.61 The review of thirty CC projects across OP5 – 7 and STRM has shown that there is a very significant range of 'intended' local livelihood benefits. These benefits are predominantly income and employment opportunities, legal and policy changes to enable increased access to new technologies at local levels, improved access to information and human capital training and skills transfer. However, the evidence from available documents reviewed is that projects do not systematically target or measure a broad range of livelihood benefits, particularly in health and education (see Table 1.4 and 1.5)[109], to which their activities may contribute and provide improved incentives for global environmental gains.

1.62 Although the GEF mandate does not make explicit reference to poverty alleviation considerations, several of the projects reviewed, which are under implementation or completed have demonstrated the clear potential to combine poverty reduction with improved environmental management[110]. Seven of the 'younger' projects reviewed[111] refer to a relationship between to climate change mitigation technologies and poverty to be realized through linkages to established donor assistance frameworks (e.g. Country Assistance Strategies etc). This is encouraging, however the review found scant evidence that projects have yet developed approaches to operationalize explicitly, poverty – environment linkages at the field level, in accordance with their adoption of internationally accepted development frameworks[112]. Furthermore, it is difficult to discern if projects are systematically considering equity concerns within communities,

[109] For example, Argentina Renewable Energy for Rural Markets, Lao Off-grid Renewable Energy Electrification Pilot Demonstration, Mali Household Energy, Peru Renewable Energy Systems in the Amazon, Tunisia Solar Water Heating, Macedonia Mini-Hydropower project, Senegal Sustainable and Participatory Energy Management, Mexico High Efficiency Lighting projects.

[110] For example, Mexico Renewable Energy for Agriculture; India Optimizing Development of Small Hydel Resources in Hilly Areas; Guatemala Renewable Energy for Small Enterprise Development; and Sudan Community-based Rangeland Management; Pakistan Fuel Efficiency for Transport Sector project design documents

[111] For example see Cape Verde Energy and Water Sector and Development, Egypt Introduction of viable Electric and Hybrid-Electric Bus Technology, Indonesia Solar Home Systems, Macedonia Mini-Hydropower, Mexico RE for Agriculture, Mongolia Improved Household Stoves in Mongolian Urban Center, Senegal Sustainable and Participatory Energy Management Project design documents.

[112] Although more recent GEF-2 and GEF-3 projects may be developing more explicit links through the incorporation of more recent advances in knowledge and lessons learned.

which would enable them to target the rural poor in climate change projects[113]. For example, the OED review of the Mali Household Energy project states:

> *"… the issue of sharing of benefits within a village community also needs adequate attention … where there are socioeconomic and ethnic differences…"*[114]

1.63 Indeed, based on the data available to this study, projects do not exhibit explicit comprehension of the nuances of 'community' at the design / implementation stage in terms of socioeconomic differentiation, ethnicity, political and cultural power structures and rights that pattern target beneficiaries and impact equity and poverty issues. Hence, this review was unable to accurately assess *who* is benefiting from interventions.

1.64 With the exception of the Cape Verde Energy and Water Reform, and Mongolia Improved Household Stoves projects, none of the activities reviewed explicitly recognized any potential negative social impacts (including equity concerns) arising from their activities.

1.65 Drawing on available forms of reporting[115] to the GEF, the review has demonstrated that the recording of benefits, even where they are intended (or expected) during implementation, is given little attention. Where projects do report on local benefits, the claims tend to be unsubstantiated and to lack either quantitative or qualitative rigor. Evidence suggests that few projects have established socio-economic baselines, against which to measure change and progress towards their stated local livelihood goals[116]. Critically, where indicators were developed by projects, mainly focused on outputs / activities as opposed to outcomes / impacts[117]. The OED concur and state with regard to the Mali Household Energy project:

[113] See also Liebenthal (2002) who highlights similar issues within Bank environmental operations.
[114] Mali Household Energy Project Peformance Assessment Report OED (2003).
[115] PIRs, MTE, TE and ICRs etc.
[116] Although, we also recognize that adherence to the GEF Mandate has caused more mature projects to suppress the consideration and monitoring of local livelihood benefits and their links to facilitating global environmental benefits.
[117] This review recognizes that with short time frames for implementation developing outcome and impact indicators is challenging, however it is no excuse for inaction. For results there has to be a result driven monitoring and evaluation framework.

> *"… experience shows that despite the emphasis on results in the Bank, greater emphasis was placed in project design on achieving outputs than outcomes. The emphasis in monitoring was also on physical output targets – number of fuelwood markets formed, number of hectares brought under improved forest management, number of stoves marketed, etc. It is not surprising, therefore that though several physical targets were achieved, it is difficult to say how far the project was successful in promoting rational use of energy resources or abating forest resource depletion in Mali. Undoubtedly, the project had the potential to help the country build a system that can promote rational use of energy resources, but since the focus of implementation remained on achievement of outputs, progress on outcome, crucial to building such a system, did not receive the attention required. The underlying assumptions seem to have been that achievement of outputs would somehow result in achievement of effective outcomes. The follow-on project has to avoid being caught in the same trap."*[118]

1.66 This experience is similar to other IA completed projects and those under implementation. Therefore, it was not possible to accurately assess impacts on livelihoods. This acknowledges that there may be additional data held at the field level, which could be accessed to provide more useful information.

1.67 Based on data available to this review the reporting across the sampled projects of social and stakeholder assessment during design or implementation phases appears to be minimal.

1.68 Projects were found to concentrate on technical aspects of the delivery of GHG mitigation technologies, to the exclusion of their social reception within target communities. This finding broadly concurs with that of the *Climate Change Program Study*, which states:

> *"… very little documentation is available on the extent to which GEF supported rural energy projects serve development objectives such as increased employment … health, sanitation, water access and literacy. Challenges for … projects are … documenting … social benefits known to have resulted from the projects."*[119]

[118] Mali: Household Energy Project (2003) OED.
[119] GEF (2001: 9)

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Appendix I Summary of GEF Climate Change Sample

Project	Intended Benefits	Objectives / Activities / Components
Argentina Renewable Energy Markets	▪ The ultimate beneficiaries and target population of the project are about 108,000 low-income households located in rural dispersed areas of 10 argentine provinces. ▪ These households will be provided with electricity services for lighting and basic communications. Apart from the physical benefits it is expected that there will be a remarkable improvement in the quality of life of this population due to the ability to enjoy clean and modern form of energy for end-uses such as illumination. ▪ There should be positive impact on education, productivity and social development. Improved lighting will allow time to undertake additional income generating activities. ▪ Women also note that better lighting enables them to respond to infant needs at night. ▪ Children benefit from additional time to study. Television and radio access will be improved	Objective: Project will provide rural areas with reliable electricity supply in a sustainable manner using renewable sources where feasible. GEF support would facilitate removal of market barriers to application, implementation and dissemination of renewable energy sources Components: ▪ Policy and institutional reforms for private sector participation ▪ Development of an institutional framework for off-grid rural electrification ▪ Equipment installation by existing concessionaires of about 55000 shs in individual households in rural areas ▪ Installation of decentralized energy supply in about 3000 communities. This equipment may include mini-hydro, wind turbines, diesel – hybrid plants ▪ Installation of 2000 for provincial public service institutions (public schools, medical centers, police stations and public agencies) ▪ Two pilot projects based on wind home systems ▪ Capacity building including training and technical assistance and public education campaign
Bolivia Rural Electrification with Renewable Energy through Popular Participation Law	▪ Benefits will be for community services - potable water, agricultural water supply, health posts, schools, lighting of streets and market places, economically productive activities. ▪ Improved agricultural and livestock production, artisan activities, small industry and the like.	Objective: Project will remove barriers to the successful implementation of rural electrification projects using renewable energy technology. By focusing on financial, institutional, technical and human resource barriers. Components: ▪ Institutional options for implementing RE based rural electricity companies evaluated, validated and adopted for implementation in each project site ▪ Best practices in water sector for mixed public-private enterprises working in rural development are identified and replicated to the energy sector ▪ Viable, effective and cost-effective public-private financing options available for financing and managing renewable electrification under popular participation law. ▪ Removal of barriers to efficient and effective operation of financing mechanisms for renewable energy-based electrification ▪ Strengthen institutions including formulation of training and technical assistance program ▪ Revolving fund established / Institutional strengthening of local electricity utilities / trained users, beneficiaries and nominees selected to serve on boards of directors. ▪ Training of persons to fill skilled and semi-skilled positions within local electricity utilities ▪ Installation of 22 community-level rural electrification projects

Project	Intended Benefits	Objectives / Activities / Components
Brazil Biomass Integrated Gasification	▪ Generation of employment in rural areas in project area ▪ Afforestation for energy production ▪ Long term programs for sugar cane and wood production.	Objective: The project aims to develop globally replicable commercial scale prototype unit for co-generation of electricity based on the gasification of wood chips and sugar cane biogases. Components: ▪ Development and testing of gas turbines suitable for biomass gasification as well as gas cleaning equipment ▪ Development of fuel plant engineering process ▪ Development and specification of the basic engineering and process work for gasification plants / selection of site and development of EIA ▪ Fuel supply and energy sales contracts
Cape Verde Energy and Water Sector Reform	▪ Improved quality of life and health for target population (both in urban and rural areas) through increased access to electricity, safe water and sanitation systems. ▪ Enhanced private sector development through supply of least cost, reliable energy and water by private companies ▪ Increased private sector investment with consequent alleviation of pressure on public services ▪ Modernization of power and water sectors ▪ Foreign exchange savings by reducing the imports of fuel for power generation. The project is targeting major and secondary urban centers include those unsatisfactory power and water services. The project also targets isolated rural households that are likely to be excluded from modern supply of electricity (about 12,000 households).	Objective: Increase the supply of power, water and sanitation systems and increase the operational and end-user efficiency in the power and water sectors and foster sound management of water resources Components: ▪ Reform and development of the power sector ▪ Renewable energy promotion and development ▪ Reform and development of the water sector ▪ Sanitation development ▪ Project monitoring
Egypt Fuel Cell Bus Demonstration Project	▪ Citizens of Cairo who will benefit in the long run from reduction of pollution in congested areas in metropolitan districts ▪ Long-term target include domestic bus manufacturers as well as small and medium sized business will gain from technology transfer to become component suppliers and creation of employment opportunities.	Objective: Project proposes a demonstration program to operate fuel cell / electric buses on the Giza Plateau (Cairo). Components: ▪ Demonstration of hybrid electric bus technology ▪ Build local experience and capacity to supply parts and operate / maintain buses ▪ Public awareness and education ▪ Accumulate experience with private sector to further develop hybrid electric buses

Project	Intended Benefits	Objectives / Activities / Components
Fiji Promoting Sustainability of Renewable Energy Technologies and Rural Renewable Energy Companies	▪ Electricity will be provided to 900 unelectrified villages; ▪ Village residents will be trained in operating a renewable energy hybrid system; ▪ The project will be beneficial to the poor. In particularly the widespread application of renewable energy resulting from the project should have a positive impact on vulnerable groups ▪ Babies and children / sick and elderly people will benefit from the convenient form of energy – electricity ▪ Reduced local air pollution from fossil fuels ▪ Women will have to spend less time going to the market to buy kerosene and less time collecting wood ▪ More productive community meetings will result	Objective: Remove policy, capacity and institutional barriers to rural electrification in rural Fiji. This will be accomplished by establishing RESCOs; Components: ▪ Establish the legal and regulatory framework for the Rural Energy Service Company; ▪ Establish the financial framework for the Rural Energy Service Company; ▪ Train ESCO staff and managers in business management skills ▪ Establish a public awareness program in the Rural Electrification Unit; ▪ Installation of a 720 kwh/day Renewable Energy Hybrid Power System in Nabouwalu – the hybrid system contains inverter/controller, solar panels and wind turbine generators.
Ghana Renewable Energy-based Electricity for Rural, Social and Economic Development	▪ Un-electrified rural communities for which grid electrification is unlikely to occur soon or ever due to costs and logistics will benefit from access to cheap source of electricity. ▪ PV systems will also be extended to schools, health centers and water pumping systems in the pilot area. ▪ The project will have direct impact on the lives of women (p.47) through training of bore-hole committees in the use of PV- retrofitted boreholes ▪ Employment opportunities, training and use of PV powered grain grinding cooperatives; expand economic opportunities such as for dress-making and sewing centers ▪ Enhance opportunities for education and training. The project will work with NGOs to ensure women's issues are address proactively.	Objective: The project will result in the establishment of a private sector renewable energy based service company (RESCO) to provide off-grid electricity for households, community services such as schools, health clinics, water pumping and security lighting. Components: ▪ Establishment of RE services project unit ▪ Disseminate information on various programs, projects and technologies ▪ Establishing training, build capacity ▪ Establish field based facilities such as RE service center, local service and sales facilities and bonded cashiers. ▪ Marketing and outreach.
Global Alternatives to Slash and Burn	▪ Farmers at the forest margins will benefit through the adoption of technologies that provide sustainable crop yields and sufficient firewood, fodder and fiber ▪ Increased income and improved living standards. Consumers will benefit through greater availability of produce at lower prices.	Objective: Project aims to provide sustainable slash and burn alternatives to enable millions of poor farmers to make an adequate living without destroying additional rainforests Components: ▪ Determining farmer constraints and needs through participatory processes ▪ Developing and testing alternative slash and burn technologies with groups of farmers ▪ Identifying suitable policies that provide incentives

Project	Intended Benefits	Objectives / Activities / Components
Guatemala Renewable Energy based Small Enterprise Development in the Quiche Region	▪ Increase the development of RE services aimed at productive uses of electricity in the area with relevance to industrial processing ▪ Promote innovative financing and social organization schemes for renewable energy based on small enterprises for income and employment ▪ Provision of RE for basic energy services.	Objective: Project aims to create and strengthen renewable energy based inputs for industrial, communal and domestic small enterprise development and strengthen small enterprise development, in the Quiche region. Aims to raise the quality of life of the local population. Components: ▪ Two financial entities which buy-in and finance renewable energy systems are established. ▪ Four Renewable Energy Service Enterprises are established and significantly strengthened; ▪ Six new Renewable Energy driven micro-enterprise activities are operational; ▪ Feasibility and financial packages are developed for eight Renewable Energy Projects (vaccine cold chain in six sites, stand- alone PV systems in three communities and solar phones and a solar drier)
India Optimizing Development of Small Hydel Resources in the Hilly Regions	▪ The project will benefit women in that it will reduce the need to collect and carry fuelwood, reduce indoor smoke pollution and improve the health of women and children. ▪ Electricity will also assist villagers in developing small-scale industries. Women will have more time as they will be freed from task of collecting wood and will be able to redirect into income-earning jobs in small-scale industries. ▪ The project will indirect enhance the welfare of women. In general with low cost energy villagers will be able to invest in food processing to take advantage of local conditions, which are opportune for fruit and vegetable growing. ▪ It is also expected that more villagers will switch from fuelwood for cooking and lighting purposes to electricity, use of electricity for water pumps and irrigation-based cultivation and this will arrest further deforestation	Objective: The project will assist the government of India in the optimum utilization of small hydroelectric resources. The goals will be achieved through installation of 20 hydel demonstration projects. Components: ▪ Development of a national strategy and master plan with detailed proposals ▪ Development of a package of commercially viable and environmentally sound technologies based on the installation of 20 demo units for generation of hydro electricity in a people-centered and participatory approach ▪ Develop institutional capacity and resource capabilities including training / skills transfer ▪ Project review and monitoring

Project	Intended Benefits	Objectives / Activities / Components
Indonesia Solar Home Systems	▪ Improvement in the quality of life of the rural households as they switch to clean, modern form of energy for high value end uses such as lighting, security and education ▪ Primary benefit will be to women and children in terms of reduction in domestic smoke pollution leading to a - (a) profound impact on quality of education experienced by children (b) increased productivity at home for income generating activities made possible by extending the hours available to work c) increased freedom of movement and ability for community participation (d) households will have access to information and knowledge through radio and tv and thus improve understanding of the 'external world' available to women and children	Objective: The projects development objectives are to provide modern form of energy to rural customers who can not be served economically or in a timely manner by conventional rural electrification and facilitate the participation of the private sector in RE commercialization Components: ▪ Credit component consisting of IBRD loan and GEF grant to enable purchase of SHS by rural households and commercial establishments on an installment plan basis ▪ Technical assistance including support of detail monitoring and evaluation activities. ▪ Policy support through decentralization of rural electrification strategy study and SHS action plan ▪ Strengthening of BPPT solar testing and certification capabilities
Iran Tehran Transport Emissions Reduction Project	▪ Reduction in conventional urban pollutants (CO, HC, NOx, SO2 etc) ▪ Improvements in air quality	Objective: The project will assess measures including efficient pricing of inputs and urban transport services, that would reduce GHG emissions from transport, whilst simultaneously improving air quality Components: ▪ Emissions inventory and air quality monitoring ▪ Traffic management and restraint ▪ Vehicle fleet and fuel improvement ▪ Strategic urban transport emissions reduction planning ▪ Project support and transport air quality seminars
Lao Off-grid Electrification Pilot Demonstration, A Component of the Southern Provinces Rural Electrification Project	▪ Provision of electricity for rural communities with low probability of connecting to the grid. ▪ Productive uses and low electricity costs through solar battery charging.	Objective: To increase electricity access in remote, rural areas of Laos and to demonstrate that renewable energy technologies (micro-hydro, solar battery charging and mini-grids) are viable off grid electrification options to displace diesel power. Components: ▪ Install RE demonstration systems ▪ Demonstrate the potential to displace diesel generators with RE systems ▪ Development of institutional arrangements and scope for a national off-grid rural electrification program incorporating RE technologies

Project	Intended Benefits	Objectives / Activities / Components
Macedonia Mini-Hydro power project	▪ The municipal authorities will have an alternative source of income, thus perhaps holding down increases in water tariffs to communities ▪ Limited number of construction and operation jobs will be created; increased security of electricity supply ▪ Provision of cheaper electricity to communities	Objective: Reducing GHG emissions by substituting hydropower for power generated by lignite fuels. Components: ▪ Install mini-hydro at Debar ▪ Install mini-hydro at Kavadarci ▪ Encourage the development of independent power plant especially mini-hydro plants.
Mali Household Energy and Universal Rural Access	▪ The project would improve living standards of rural populations in affected areas and stabilize employment opportunities in the firewood trade. ▪ Increased proper use of kerosene and charcoal stoves would reduce the cost of cooking for low-income urban consumers and cooking time and make food preparation easier.	Objective: Reduce GHG emissions by abating forest resource degradation and promoting household energy efficiency through improved end use of household fuels and popular participation in household energy activities. Component: ▪ Enabling regulatory policy and environment for project implementation ▪ Technical assistance to local communities, charcoal makers, producers and sellers of stoves and urban consumers to efficiently harvest and carbonize fuelwood ▪ Management natural forests through production of master plans for villages ▪ Effective market use of improved kiln, biomass and kerosene stoves ▪ Increase participation of private sector in household energy ▪ Information, education and dissemination of technologies and skills
Mauritania Decentralized Wind Electric Power for Social and Economic Development	▪ Rural communities, cooperatives, and enterprises that benefit from the availability of reliable decentralized small-scale electricity supply, local private sector involved in equipment assembly, installation and maintenance. ▪ Women are expected to benefit: availability of clean abundant water - reduce the incidence of death and disease among children, as well as time required to fetch water, ▪ Light and broader use of media, television will open a window on the outside world, bring information etc; the ability to free up more time for crop production; ▪ Increased comfort through electrification in terms of refrigeration, and lighting ▪ Refrigeration of fish in coastal villages to preserve catch and improve market penetration	Objective: he project will work to establish replicable and sustainable diffusion and support of small-scale decentralized wind electric power generation units. Components: ▪ Demonstration of needs, markets and opportunities of small scale wind electric technologies ▪ Establishment of technical, financial and institutional mechanisms for private sector based introduction and sustainable diffusion of these technologies ▪ Implementation of an effective program of wind electric application in 100 villages aimed at social and economic development

Project	Intended Benefits	Objectives / Activities / Components
Mexico Renewable Energy for Agriculture	▪ In social terms the project would lead to improvements in overall food security and quality of life in rural areas. Outputs - 890 demonstration renewable energy systems to be installed ▪ 840 solar water pump systems / 33 wind powered water pump systems ▪ 16 solar powered refrigerated milk storage tanks. ▪ 1,500 technicians and extension trained.	Objective: To promote the use of renewable energy for productive purposes in Mexico's agricultural sector by removing barriers and reducing implementation costs Components: ▪ Promotion campaign targeting RE for productive purposes ▪ Institutional strengthening, technicians, agricultural extension and RE system vendors will receive training ▪ Specifications and certification technical specifications introduced to farm-based RE equipment ▪ Market development for productive applications of RE ▪ Demonstration of RE systems (such as solar / wind powered water pumps, refrigerated milk storage tanks) ▪ Technical assistance to agricultural extension ▪ Vendor financing for RE in four states
Mexico High-Efficiency Lighting	▪ Project will target low electricity consumers, low-income households. ▪ Project will result in socio-economic benefits to 1) project participants who will enjoy comparable or higher lighting levels at reduced cost 2) society at large and CFE which will be able to postpone investments for about 100MW and save 169GWh annually ▪ Energy that will be saved by the FLs and therefore not consumed or paid for by participants, as well as the incandescent bulbs that will be replaced by the FLs	Objective: To demonstrate the technical and financial feasibility of reducing GHG emissions and simultaneously reduce local pollution through widespread installation of high efficient lighting Components: ▪ Replacement of approximately of 1.7 million bulbs with fluorescent light bulbs among residential users in the cities of Guadalajara and Monterrey thus reaching 10 – 15% of households ▪ Information dissemination, education and awareness among end-users of FLs
Mongolia Improved Household Stoves in Mongolian Urban Centers	▪ Benefits will be reduce expenditure on coal due to more efficient cook stoves ▪ Reduced indoor and outdoor air pollution resulting in improvements in health. ▪ The project will also create a new type of service and enterprise therefore creating employment through SMEs needed to install approx 50,000 kits. ▪ Negative impacts: coal suppliers and fuel wood collectors could be adversely impacted by the project.	Objective: To introduce improved heating stoves, on a market based system, among producers and consumers in the Ulaanbaatar areas and establish a replication basis for provincial Aimags. Components: ▪ Social marketing activities (public education / awareness) / credit mechanisms for facilitation of project goals ▪ Capacity building for energy service providers / training technicians and skills training for medium sized commercial producers of improved stoves ▪ New product facility activities ▪ M&E activities

Project	Intended Benefits	Objectives / Activities / Components
Pakistan Fuel Efficiency in Road Transport Sector	▪ Economic benefits to small business (mechanics) and consumers in terms of increased incomes and employments ▪ Health benefit from reduced urban air pollution ▪ Improved skills and training (human capital) ▪ Awareness of health benefits arising from increased fuel efficiency	Objective: The project aims to reduce at source emissions of greenhouse gases and other pollutants by improving fuel efficiency of road transport vehicles Components: ▪ Establishment of tune-up demonstration stations ▪ Capacity building workshop for mechanics and owners ▪ Public awareness campaign ▪ Institutional strengthening and capacity building of ENERCON ▪ Revolving loan fund established for purchase of tune up equipment
Peru Renewable Energy Systems in the Peruvian Amazon.	▪ 4,085 people to be provided with hybrid systems, which will replace the use of candlesticks, torch pines, and dry cell batteries. ▪ Systems will deliver a total of 900 Kwh per day. People in project communities are expected to receive electricity for 24 hrs a day (up from 5 hours a day). ▪ It is expected that small businesses dealing in fisheries, crafts, pottery, agriculture, carpentry, sewing shops, restaurants, mini-markets will be benefited by the advent of electricity; ▪ Fisheries lack preservation systems; electricity is expected to power ice makers and refrigeration systems; ▪ Women will be provided with electricity to develop crafts and pottery; ▪ Electricity provision is also expected to lead to better processing of agricultural products, vegetables, medicinal plants and fruits. Final products that will be developed for marketing include flour, meals, soaps, dry juices, marmalades and medicinal products. ▪ Project will also undertake a number of workshops and training sessions to create and foster business attitudes amongst local stakeholders.	Objective: The project will assist in removing financial, technical, informational and institutional barriers to renewable energies. Components: ▪ Installation and operation of RAPS (Remote Area Power Supply Systems) which are off-grid hybrid PV/diesel systems, in two provinces; ▪ Identification and training of private RAPS systems operators; ▪ Establishment of energy efficiency program and tariff structure; ▪ Identification and promotion of income generating activities; ▪ Coordination, monitoring and evaluation of RAPS systems; and ▪ Promotion of policy dialogues for renewable energy and rural electrification.

Project	Intended Benefits	Objectives / Activities / Components
Peru Photovoltaic based Rural electrification in Peru	▪ Installation of 3000 systems over 4 years; ▪ Will impact 250 communities (60,000 people). ▪ The electrification of rural community centers may be considered. Electricity may be made available for health care.	Objective: To remove barriers to sustainable rural electrification using PV systems in remote areas while also demonstrating the viability of micro-enterprises, which would sell, maintain and operate PV systems and create incentives for increased public and private sector involvement in PV based electrification. Components: ▪ Development of Renewable Energy databases and data; ▪ Development of standards for PV systems and certification of installations; ▪ Establishment of model rural electricity concessions and local companies; ▪ Strengthening financial institutions for renewable electrification; ▪ Installation of PV systems
Palawan New and Renewable Energy and Livelihood Support Project	▪ Will aid 50,000 households; ▪ Project will demonstrate a village power model to promote activities of productive use of renewable energy. These include: ▪ Ice making for fisheries; ▪ Eco-tourism; ▪ Fruit drying; ▪ Project will also promote private sector involvement in rural electrification of Palawan.	Objective: Removing barriers to commercial use of renewable energy power systems, which would substitute away from the use of diesel generators in Palawan, while demonstrating the viability of the RESCO (Rural Energy Service Company) delivery mechanism and productive use of renewable energy services for rural communities. Components ▪ Build capacity for local government unit and rural electric cooperatives; ▪ Public awareness campaign on Renewable Energy; ▪ Strengthen the capacity of CRREE (Center for Renewable Resources and Energy Efficiency); ▪ Design a Risk Sharing Mechanism to Support RESCO.

Project	Intended Benefits	Objectives / Activities / Components
Senegal Sustainable and Participatory Energy Management Project	▪ Generate employment and economic development opportunities in 250 rural villages in the Tambacounda and Kolda including women in the management and marketing woodfuels and other related income generating activities ▪ Generation during the project lifetime of more than 10$M in direct revenues for 250 villages from trade in woodfuels and generate ▪ Additional revenues to communities from natural resource management activities (agro-forestry, livestock, beekeeping, NTFPs); ▪ Provide 225,000 improved charcoal stoves and increase the availability and access of low income households to more efficient and modern fuels; strengthen participation of communities and local NGOs in civil society	Objective: Reduce woodfuel related deforestation and loss of biodiversity; reduce net CO2 emissions; increase income generation for rural population, with special attention to women. Components: ▪ Support and capacity building including training and extension for communities and local NGOs ▪ Sustainable woodfuels and supply management - would provide technical assistance to forestry service, communities for agro-forestry enterprises to carry out - implement sustainable community managed forestry ▪ Technical support and extension services for communities for the implementation of management modules for exploitation of woodfuels, and other wood and NTFP, support for establishment of rural based micro enterprises such as community operated carbonization units, agro-forestry processing units ▪ Demand management and inter-fuel substitution - support for re-organization and modernization of urban charcoal trade and establish long term supply agreements between rural communities and urban traders to guarantee unconstrained entry of community produced woodfuels.
Sudan Community-based Rangeland Rehabilitation for Carbon Sequestration	▪ Generate employment and economic development opportunities in 250 rural villages in the Tambacounda and Kolda including women in the management and marketing woodfuels and other related income generating activities; ▪ Generation during the project lifetime of more than 10$M in direct revenues for 250 villages from trade in woodfuels and generate additional revenues to communities from natural resource management activities ▪ Development of rehabilitation of shallow water wells. ▪ Agro-forestry, livestock, beekeeping, NTFP ▪ Provide 225,000 improved charcoal stoves and increase the availability and access of low income households to more efficient and modern fuels ▪ Strengthen participation of communities and local NGOs in civil society	Objective: Carbon sequestration and biodiversity conservation in region of drought, traditional shifting cultivation and overgrazing have had drastic effects. Project develops and implements community-based land use and range management master plans. Components: ▪ Capacity building among local communities to improve natural resource management on an effective and sustainable level ▪ Testing of reliable technical and institutional models of participation and physical interventions ▪ Diversify local production systems through improvements in basic inputs and introduction of appropriate technologies ▪ Drought contingency measures

Project	Intended Benefits	Objectives / Activities / Components
Sudan Barrier Removal to Secure PV Market Penetration in Semi-Urban Areas	▪ Provision of clean sources of household energy ▪ Helping to meet small power demands in semi-urban areas	Objective: To meet suppressed and growing demand for electric energy in semi-urban Sudan through reliable, domestic PV systems that substitute for fossil based systems. Components: ▪ Formulate a national policy strategy for PV ▪ Undertake extensive stakeholder awareness ▪ Implement private sector support program ▪ Design sector specific credit and financing mechanism ▪ Undertake institutional strengthening program ▪ Implement pilot activities demonstrating credit and financing mechanisms
Tanzania Electricity, Fuel and Fertilizer from Municipal and Industrial Organic Waste: A Demonstration Biogas Plant for Africa	▪ The completed energy plant will collect, receive and dispose of waste, thus improving living conditions for the people of the city, and providing benefits to industry. ▪ The project will have a positive impact on the life of women at many levels society in Tanzania. The increased availability of electricity will help low income families to gain access to electricity for heating and lighting. ▪ The disposal of waste has often been the job of women and project includes creation of accessible and hygienic waste disposal sites around Dar es Salaam making waste disposal safer and easier - therefore improving health.	Objective: To reduce emissions of GHG in Tanzania by replacing the use of fossil fuels with bio-energy produced from the anaerobic digestion of industrial and municipal waste. Components: ▪ Construction and operation of the biogas plant for the treatment of municipal and industrial organic wastes ▪ Infrastructure for sustaining and replicating projects through education
Tunisia Solar Water Heating Project	▪ Investment in SWH by targeted users project will finance about 150 tailored packages in schools, sports centers and large multifamily buildings.	Objective: Assist Tunisia in encouraging the substitution of renewable solar energy for fossil fuels in public and commercial private institutions so as to mitigate global warming and demonstrate GHG reducing technology Components: ▪ Technical assistance component ▪ Organizing and carrying out product promotion and publicity to increase market awareness ▪ Investment in SWHs equipment by targeted end-users.

Project	Intended Benefits	Objectives / Activities / Components
Uganda Photovoltaic Pilot Project for Rural Electrification	▪ 12,000 people will benefit from access to electricity for lighting, household systems and battery charging ▪ Rural women will benefit most from the project so that they can respond to infant needs at night ▪ Allow additional time for education activities, listen to radio and watch TV, ▪ Allow additional time to development additional income generating activities ▪ Project will address the needs of low-income rural population in Uganda which uses Kerosene, candles and flashlights for lighting ▪ Increase public awareness to educate end-users ▪ Training for end-users in the 'dos and don't' of operation and maintenance	Objective: To establish the foundation for the sustainable use of PV technology for rural electrification in areas which will not be accessed by the National grid and overcome financial, social and institutional barriers Components: ▪ Identify areas of high market demand and develop strategies to overcome institutional, financial and social constraints ▪ Strengthening capacity of private sector to provide PV based on commercial demand driven basis. Including preparation of national policies and program to support PV adoption in electricity market. ▪ Provision of high quality sustainable PV based electricity to 2,000 households including awareness, training and micro-finance.
Photovoltaic Project for Household and Community Use in Zimbabwe	▪ As many as 25,000 rural home will be directly illuminated. ▪ Training for local community maintenance and installation ▪ The program will also attempt to target the 'true' rural poor - the 80% without PV purchasing power - by helping them develop and produce very small 5 - 15 W lighting systems along with affordable hire purchase financing. ▪ Ten percent of the available development fund will be allocated for community use, including clinics, hospitals, schools and community centers.	Objective: Support widespread use of solar electric installations as an alternative to grid extension and diesel generators for household and community applications in rural Zimbabwe through collaboration of private sector, NGOs and CBOs Components: ▪ Project will develop rural market / and access for solar PV home systems and for community applications including end-user financing and training ▪ Project to develop sustainable solar rural electrification strategy with appropriate institutional mechanisms. Develop local manufacturing capacity ▪ Over three years the project will have facilitated the installation of a minimum of 9000 45W solar electric systems through development of a revolving fund. Private sector is expected to install 90% of solar systems ▪ Project will create awareness of appropriate uses of solar electricity among communities and benefits associated with it. ▪ To establish a sustained mode of product delivery through three modes; commercial; Zimbabwe Electricity Supply Company and NGO / CBOs.