

MALI
Mali Household Energy and Universal Access Project

Project Appraisal Document

Africa Regional Office
AFTEG

Date: September 12, 2003		Team Leader: Koffi Ekouevi							
Sector Manager/Director: Yusupha B. Crookes		Sector(s): General energy sector (50%), Renewable energy (50%)							
Country Manager/Director: A. David Craig		Theme(s): Rural services and infrastructure (P), Other rural development (P), Climate change (P)							
Project ID: P073036									
Lending Instrument: Specific Investment Loan (SIL)									
Global Supplemental ID: P076440		Team Leader: Koffi Ekouevi							
Sector Manager/Director: Yusupha B. Crookes		Sector(s): Renewable energy (100%)							
Lending Instrument: Specific Investment Loan (SIL)		Theme(s): Climate change (P)							
Focal Area: C - Climate change									
Supplement Fully Blended? Yes									
Project Financing Data									
<input type="checkbox"/> Loan <input checked="" type="checkbox"/> Credit <input type="checkbox"/> Grant <input type="checkbox"/> Guarantee <input type="checkbox"/> Other:									
For Loans/Credits/Others:									
Amount (US\$m): \$35.65									
Proposed Terms (IDA): Standard Credit									
Financing Plan (US\$m):									
	Source	Local	Foreign	Total					
BORROWER		5.25	0.00	5.25					
IDA		28.73	6.92	35.65					
GLOBAL ENVIRONMENT FACILITY		2.76	0.74	3.50					
UN DEVELOPMENT PROGRAMME		0.00	0.00	0.00					
FOREIGN PRIVATE COMMERCIAL SOURCES (UNIDENTIFIED)		8.95	0.00	8.95					
Total:		45.69	7.66	53.35					
Borrower/Recipient: GOVERNMENT OF MALI									
Responsible agency: AMADER									
Address: Batiment CRES, Badalabougou, B.P. 1872 Bamako, Mali									
Contact Person: Mr Amadou Tandia									
Tel: 223-222-45-38		Fax: 223-223-73-96		Email: dnenergy@afribone.net.ml					
Estimated Disbursements (Bank FY/US\$m):									
FY	2004	2005	2006	2007	2008				
Annual	8.47	8.93	10.50	11.75	13.70				
Cumulative	8.47	17.40	27.90	39.65	53.35				
Project implementation period: 2004-2008									
Expected effectiveness date: 01/31/2004 Expected closing date: 12/01/2008									

A. Project Development Objective

1. Project development objective: (see Annex 1)

The household energy and universal rural access (HEURA) project would support the Government of Mali's efforts to increase access of isolated low income populations to basic energy services to help achieve economic growth and poverty reduction targets, including those linked with the Millennium Development Goals (MDGs).

The HEURA project's specific objectives are:

- (i) accelerating the use of modern energy in rural and peri-urban areas in order to increase productivity of small and medium enterprises, to enhance the quality and efficiency of health and education centers, and to improve living standards;
- (ii) promoting further community based woodland management to reduce un-sustainable pressure on forest resources while simultaneously encouraging interfuel substitution and energy efficiency initiatives; and,
- (iii) strengthening energy sector reform processes and related institutions to create a favorable investment environment for increased private sector participation in decentralized energy services delivery in rural and peri-urban areas.

2. Global objective: (see Annex 1)

The global environmental objective is to initiate a program aimed at removing the barriers to adoption of renewable energy technologies (RETs) – under GEF Operational Program 6 – in order to reduce gross calculated greenhouse gas (GHG) emissions, primarily those of carbon dioxide (CO₂).

3. Key performance indicators: (see Annex 1)

Key Output indicators include:

I. Capacity Development and Institutional Strengthening Component

- (i) Number of staff in DNE (*Direction Nationale de L'Energie*), CREE (*Commission de Regulation d'Eau et d'Electricite*), and DNCN (*Direction Nationale de la Conservation de la Nature*) trained in policy formulation, program monitoring and impact assessment;
- (ii) The establishment of the AMADER (*Agence Malienne pour le Developpement de l'Energie Domestique et de l'Electrification Rurale*) capable of managing state and donor resources to improve access to energy services;

II. Energy Services Delivery Component

- (i) Increase in the number of private operators providing decentralized electricity services from present number of two operators to about 10;
- (ii) Increase in number of homes (40,000), enterprises (1080), public institutions (water supply facilities etc.), trading centers and communities having access to modern energy outside the EDM (

Energie du Mali) concession area;

- (iii) Increase in the number of rural schools (125) and health clinics (107) electrified;

III. Household Energy Component

- (i) Reduction in the volume of wood harvested, converted and consumed (a reduction of 400,000 tons per year);
- (ii) Increase in the forest area under community management from about 350,000 hectares to about 1,4 million hectares;
- (iii) Increase in the use of improved charcoal stoves (210,000), improved wood stoves (300,000), kerosene stoves (61,000);
- (iv) Increase in the penetration of LPG as a household fuel (from 4000 tons in 2002 to 20,000 tons by 2008).

Key Outcome indicators include:

- (i) Increased employment in rural areas facilitated through the provision of decentralized delivery services to small productive enterprises;
- (ii) Increased hours spent in education and productive activities due to improved access to energy;
- (iii) Increased rural awareness of energy, health, and environment-related issues;

A monitoring and evaluation study will design specific targets and methodologies for regular measurements of progress towards these goals.

B. Strategic Context

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1)
Document number: 25663 MLI **Date of latest CAS discussion:** July 31, 2003

The World Bank Group work in Mali focuses on the following strategic axes in line with the PRSP adopted in May 2002 and reconfirmed in October 2002 by the new Government: (i) accelerated and re-distributive growth to continue macroeconomic and structural reforms to facilitate diversification of production and exports; (ii) institutional development while improving governance and participation in a context of decentralization; (iii) human resources development and improvement of access to quality basic services; and, (iv) develop basic infrastructure services. Specifically, the objective of the Bank's Country Assistance Strategy in Mali is: (i) to promote economic growth; (ii) to develop human resources; and (iii) to support public finance management and good governance. The CAS intends to help the Government improve economic competitiveness and to carry out key legal, regulatory and institutional reforms susceptible to create an enabling environment for an increased private sector participation in productive economic sectors.

The Household Energy and Universal Access (HEURA) Project is timely and fits well within the CAS objectives by aiming to put in place policy, institutional and financing frameworks to increase access of energy services in rural and peri-urban areas with the participation of private entrepreneurs. Indeed, access to energy services is crucial in the enhancement of quality and productivity of social sectors as well as productive sectors. The HEURA supports thereby the key pillars of the PRSP by strengthening the institutional capacity of the public sector and by helping to develop basic infrastructure needed to enhance productive sectors with the involvement of the private sector and also with the participation of local communities.

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

The objectives of the project are fully consistent with GEF Operational Program 6: Promoting the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs. The GEF co-financed activities in this project are primarily for energy-focused RETs but are also directed at technical/institutional pilots for non-energy applications of RETs.

2. Main sector issues and Government strategy:

Energy Resources. Mali's domestic energy resources consist of biomass (fuelwood, charcoal, agricultural and agro-industrial residues), hydro, and solar energy. Presently, only biomass for household energy and hydro for electricity generation are exploited on a significant scale. The country's hydroelectric potential, based on the Senegal and Niger river system, is estimated at about 1,000 MW capable of producing 5,000 GWh in an average year. Of this potential, only about 250 MW have been developed so far, at the Selingue and Sotuba dams on the Niger River and the Manantali dam on the Senegal River. Mali has no significant known fossil fuels. Petroleum product consumption is entirely dependent on imports (about 300,000 tons annually).

Government Strategy on Energy. The Government's letter of sector policy on energy and water of 1999 has stated the following main objectives: (i) to provide a wide access of energy services to the majority of populations at an affordable cost; (ii) to ensure a sustainable management of wood energy resources to protect the remaining forest cover; (iii) to develop all available national energy sources (hydro, solar, wind, and biomass); (iv) to liberalize the energy sector by encouraging participation of private operators and initiatives of decentralized municipalities; and, (v) to strengthen institutions in charge of strategy development and monitoring of sector activities. In March 2003, the Government has adopted reference frameworks for the development of household energy and rural electrification.

Energy Sector Reform. Until 2000, unreliable power supply has been a major constraint for business expansion in Mali. Tariffs were also below the economic cost of supply. Moreover, the state-owned power utility Energie du Mali (EDM) was poorly managed and lacked investment funds to ensure the quality and reliability of service to consumers as well extend access to a growing number of households in need of electricity. The GoM has taken important steps on reform to improve the efficiency and management of the grid-based electricity sector with the successful privatization of EDM and the privately managed Manantali dam. Under the recently closed IDA-financed Selingue Rehabilitation Project, the Government set up a new legal and regulatory framework, establishing an independent regulatory authority, *Commission de Regulation d'Eau et d'Electricité* (CREE), in March 2000, prior to transferring EDM's assets to a private concessionaire selected through competitive bidding.

However, reform processes and institutions that provide energy for rural populations still need to be strengthened in order to foster a competitive business environment that is attractive to private investors and operators. The provision of energy services to the poor calls for a spectrum of energy services and innovative service delivery mechanisms, involving the active participation of communities and NGOs, in addition to the private sector.

Energy in Rural Areas. In Mali, barely 1 percent of the rural population has access to electricity. Most rural households meet their lighting and small power needs with kerosene, dry cell and car batteries. Kerosene is the primary source of lighting, with an average household expenditure of US\$ 4 to 7 per month. The use of dry cell batteries for flashlights and radio/sound equipment and the growing demand for televisions powered by car-batteries result in high average household expenditures for energy of around US\$ 10-15 per month for the upper-income rural households and environment hazards (disposal of dry cell batteries).

More than 80% of the 5700 villages of Mali have a school or a literacy center, most of which are without any form of energy for lighting and audio-visual applications. Rural health centers are providing services in 55% of the villages without access to energy. Quality of education and health services can be considerably enhanced with access to energy services.

Renewable Energy: The Government of Mali has launched several initiatives over the past decades aimed at bridging this energy divide through the development of decentralized renewable energy based systems. Several pilot projects, using renewable (hydro, solar, wind, biofuels) have been undertaken with donor, public, and private financing to test both market appetite and different technical and institutional arrangements- with highly positive results. These pilots have demonstrated: (i) the affordability of electricity in certain rural areas; and (ii) the interest of rural populations and local- private entrepreneurs in the energy services delivery business.

Experience with Private DSCs. Following the deregulation of the electricity sector, the Government granted 12-year licenses to two decentralized services companies (DSC) outside EDM SA's concession area: (i) SSD Yeelen Kura involving the electrification of 20 localities; and (ii) SSD in the Senegal River Basin involving the electrification of 5 localities. The license areas served in each case have quite different characteristics:

(i) SSD Yeelen Kura. This license area is a cotton producing area to the south of Bamako comprising low income families. A low voltage grid for about 20 localities with PV systems was used; the target was to connect about 6,700 (out of some 8,300 families); a grant was provided by the Dutch government which helped finance 30% of the cost of 1,700 PV systems. Subsidies of the capital investment only were required to make the operation commercially viable, users covering full cost of operation.

(ii) SSD Senegal River Basin. This license area is in the west of Mali close to the Senegal border. It is a migrant region with the majority of families having considerably higher incomes than the average. The capital was provided by EdF(70%) and the remainder(30%) by TOTAL FINAELF. In 4 villages there were about 450 consumers, 90% of which were connected to a low voltage grid and the remaining 10% supplied with PV systems. No subsidies of the capital costs were needed, reflecting the higher capacity to pay of this group of consumers.

Although both companies have been established locally, the initial capital of these DSCs has been provided by major international companies (Electricité De France, NUON of Netherlands and TOTALFINAELF) which have so far been able to sustain commercially viable operations. Further scale up of these private,

decentralized initiatives would require finding solutions to the following constraints: (i) the need for an adequate level of subsidies on the capital costs to be calculated on a case by case basis; (ii) establishing a clear and stable regulatory framework and pricing system for rural electrification; (iii) attracting a minimum number of qualified private operators to bid on new license areas. Notwithstanding these constraints, the track record of the two decentralized initiatives has been encouraging and provides a sound basis for expanding electricity coverage in rural areas.

Experience with the multifunctional platforms. The multifunctional platform consist of a diesel engine connected to several equipment items (cereal grinding mills, battery charger, dehuskers, water pump, welding and carpentry equipment) costing about US \$ 3000 for a basic system. The multifunctional platform can also run on biofuels such as jatropha oil. In rural Mali, the multifunctional platform initiative funded by UNIDO, IFAD and UNDP has met enthusiasm from communities and policy makers. Indeed, in communities where modern electricity services do not exist, these devices are the first exposure to motorization of many activities that had always been undertaken up to then using human energy. With these devices, the time of women and children used for grinding cereals and fetching water (about 6 to 7 hours a day) can be devoted to more productive and fulfilling activities (education, leisure, etc...). Local artisans such as carpenters, blacksmiths and mechanics can also process their materials faster and more efficiently using electricity, increasing thereby their income generation potential. Although the experience of the multifunctional platforms in Mali is generally assessed so far as a positive one with about 450 platforms installed, it is necessary to address environmental, managerial, and cost effectiveness issues before proceeding to scale up.

Wood Energy: Traditional biomass energy in the form of fuelwood, charcoal, and dung represents about 90 per cent of the final energy consumption in Mali. The use of charcoal in urban areas is estimated to be increasing by about 20 percent a year. High rates of urbanization experienced in Mali are likely to further increase the rate of utilization of charcoal. Total woodfuel consumption in Bamako is estimated to have grown from 600,000 tons in 1994 to about 800,000 tons in 2000.

Adverse effects on health and the environment: The use of firewood and charcoal by households has substantial detrimental effects on health and on the environment. Inefficient burning of firewood and dung emits toxic substances like carbon monoxide, sulfur, and nitrogen oxides which cause bronchitis, emphysema and other respiratory diseases. These health hazards affect mostly women and children and contributes to low birth weight and high mortality rates. Increasing the use of wood for energy is also a serious threat for the environment, especially in fragile ecosystems such as those found in Mali. Although land clearance, grazing and bush fires are more important factors contributing to deforestation, the mining of forest for energy contributes considerably to deforestation when natural regeneration is low. Pressure on forest resources is exacerbated due to the growing reliance of urban populations on charcoal for cooking. The efficiency of earthen kilns used in charcoal production is low, in the range of 40-60 percent, while in some areas 7 kilograms of wood is needed to produce 1 kilogram of charcoal. The inefficient conversion of wood to charcoal is a serious threat to the environment. Local wood shortages occur in many villages due to over exploitation.

The need for community-based forest management and interfuel substitution: At current rates of rural electrification, the poorest of the poor will have to wait for many decades to have access to electricity services. In the meantime, energy needs for cooking, heating and lighting will be covered predominantly by wood energy resources. Community-based forest management initiatives and the introduction of efficient charcoal kilns and improved wood and charcoal stoves which increase fuel efficiency by a least 30 percent and 25 percent respectively are necessary since they provide health and environmental benefits in the short to medium term, as well as social and economic benefits. Moreover, such initiatives by improving income

levels in communities are likely to prepare the ground for the affordability of modern energy services.

Prior Satisfactory Experience in Household Energy. The GoM concluded a Household Energy Project in 2000 financed by the GEF and the Government of the Netherlands and managed by the World Bank. The project implementation completion report indicated that the overall achievement with respect to the project specific objectives was satisfactory. This project has demonstrated an innovative approach to achieving sustainable management of the natural forest cover with the involvement of rural communities. Based on a management plan, agreed upon between villagers and the forestry service, a village management committee is responsible for the use of forest resources. The woodfuel harvested is sold to commercial transporters at a market created by the village and at a price determined by the villagers themselves. The transporters pay a woodfuel tax on entering the urban area, where the origin of the woodfuel is checked by a forestry service control post. Urban consumers thus pay the price of woodfuel (determined at the rural market) plus a transportation cost, a mark-up and a tax element, and thus a woodfuel price that reflects economic cost. In order to discourage the marketing of woodfuels from non-managed forests, the tax paid at the control post by transporters with wood from non-managed areas is higher than the tax plus the fuelwood cost at the rural markets. Effective control and monitoring systems did not work well. Further interventions should pay particular attention to these aspects and design appropriate systems to ensure effective functioning of the rural markets. This approach will consolidate achievements on policy and legislative fronts.

Scaling up: More than 250 village management plans exist covering about 346,377 ha. Also, about 250 rural firewood markets were established, of which 50 are managed by 14 private operators. Better management of the forests and better carbonization techniques have been introduced for greater efficiency in the production of woodfuels. Furthermore, to encourage conservation of woodfuel, improved stoves and substitute fuels were promoted. More than 150,000 low cost charcoal stoves costing about US \$5 each and fully manufactured locally have been sold in cities where the project intervened.

While considerable momentum is created by these initiatives, further interventions are needed to strengthen sustainability mechanisms and to scale up. In particular, the control system for regulating the cutting, transporting and monitoring of harvested woodfuel needs to be improved. Also, the completed woodfuel supply master plans for the main towns need to be implemented to increase the areas under management. Regarding household energy efficiency and interfuel substitutions initiatives, further support is needed to enable the private sector and NGOs to play their roles in the dissemination of improved stoves, and alternative fuels such as biofuels, kerosene and LPG.

The Government's Rural Energy Strategy. The Government's rural energy strategy is to build upon the lessons learned so far on the ground in order to reduce inequalities in access to modern energy and, thereby, increase social welfare, education, health and income generating opportunities in rural and peri-urban areas. The government plans to create national institutions with responsibility for scaling up successful programs (such as the private DSCs, multi-functional platforms, household energy initiatives) to help achieve this goal.

The Government is aware that any rural energy program has to address severe technical and economic constraints, which are a direct consequence of the intrinsic characteristics of rural areas and hamper the profitability prospects of such programs. These constraints are the high investment costs and wide dispersion of loads, which discourage power network expansion, and the low capacity-to-pay and irregular income of rural populations.

To accelerate energy access in rural areas in a sustainable manner, it is thus critical to develop an optimal combination of an institutional (legal and regulatory) framework and tools (technical, economic and

financial) adequate to address the above-listed constraints and sufficient to attract private investors -operators. The GoM has already taken steps towards this goal and has decided to create: (i) a rural energy services agency, AMADER, *Agence Malienne pour le Developpement de l'Energie Domestique et de l'Electrification Rurale* ; and (ii) a financial instrument, a rural energy fund, REF, *Fonds d' Electrification Rurale*. The HEURA project aims at strengthening AMADER and FER, thus providing the remaining building blocks to enhance the GoM initiatives under way, and preparing for the integration of AMADER and FER in the national budgeting process.

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

The project will support the government's effort to address the following sector issues:

- (i) further strengthening of the reform process and particularly government institutions responsible for decentralized rural energy;
- (ii) improving decentralized energy services coverage in rural areas by encouraging private investors and operators to help deliver sustainable services; and,
- (iii) expanding the sustainable production and use of woodfuel and charcoal while minimizing the detrimental effects of these fuels on health and on the environment.

A number of strategic choices were made that guided the design of the project. The first strategic choice was to strengthen DNE, CREE, and DNCN in order to enhance the environment for private sector participation in the provision of rural energy services. Although these two institutions have taken steps to monitor the few existing private operators in the rural energy business, their performance needs to be increased through targeted capacity building activities. In that respect, the Government has requested Bank support to assist the CREE, DNE, DNCN to further improve their regulating and monitoring capabilities through the provision of technical assistance, training and studies, information resources and systems (software and hardware), and vehicles. Giving priority to capacity building was considered critical to maintaining an attractive and stable environment for private sector operators for the delivery of basic electricity services in rural areas. The alternative was to rely solely on individual licences, for private/public partnership regulation, which may be simpler to administrate but flexible over time.

A second strategic choice was to support to the promotion of private sector-based decentralized energy services delivery schemes as the most cost-effective way to increase rural access to basic electricity services. The lack of access to modern energy is an important handicap for rural development. To boost productivity of the rural economy and improve quality of life in rural areas, innovative energy service delivery schemes must be promoted. Rural energy represents an integral part of the government's wider poverty reduction agenda which is consistent with identified Millennium Development Goals. The primary objective of the rural energy strategy is to reduce inequalities in access to energy and to expand the associated opportunities for increased social welfare, education, health and income generation. GEF funds will also support activities related to this strategic choice, particularly those associated with the removal of barriers to the promotion, adoption, and dissemination of renewable technologies (solar PV systems and bio-energy systems) These funds will also assist in building up the capacity of private sector operators, NGOs, and local communities to ensure installation, operation, maintenance, and sustainability of renewable energy technologies.

The following areas will be targeted as being the most promising ones from an economic, financial sustainability, and developmental point of view: (i) the cotton zone (CMDT), (ii) the rice zone (Office du Niger) and (iii) the zones with strong emigration, which either have regular cash-flow revenues and/or access to credit. The following groups will be targeted: (a) peri-urban households that have no access to electricity; (b) small businesses; (c) various communal associations (religious; cultural centers, markets); and (d) public sector agencies (schools, health centers, youth centers, gendarmerie, army, etc.) with the coordinated support of relevant line ministries. As a rule, energy services will be developed on the basis of demand after proper needs' assessments have been carried out, in collaboration with experts from social and productive ministries paying attention also to the preferences of end-users. An output-based contracting approach will be adopted using private operators and community-based organizations where payments of subsidies are linked to outputs. The alternative would have been to rely on the extension of EDM's concession area to supply electricity in rural and peri-urban areas, an option that would have restricted coverage to a small number of higher income populations, mostly in peri-urban areas. The alternative was to rely on a government agency or the utility managing the main grid to extend access. It was rejected as state-run decentralized systems have proven to be more costly and less effective commercially. Utilities are generally less cost effective for decentralized systems and less motivated to extend access.

The third strategic choice was to provide further support for community-based woodland management and to promote interfuel substitution and energy efficiency initiatives: Given the innovativeness of activities of the former Household Energy Project in the areas of woodland management, interfuel substitution and energy efficiency, additional time and fine-tuning are necessary to firmly establish resulting practices in the targeted communities. Also, to achieve significant impacts such as the preservation of forest cover and a sustainable management of woodland resources, a scale up of interventions is needed while control and monitoring systems are strengthened. Based on available master plans, the HEURA will generalize rural wood markets, modernize woodfuel production, trade, and utilization, and further promote household demand-side energy efficiency initiatives. In particular, efforts will be made to strengthen the legal and regulatory instruments to ensure the commercial viability of the woodfuel markets and trade, and to encourage a regulated involvement of the private sector, NGOs and rural communities. Particular attention will also be paid to ensure that control and monitoring systems of the rural fuelwood markets are effective. The alternative to channeling support for household energy through AMADER was to rely on the Directorate of Nature Conservation and the Directorate of Energy to implement effective programs, an option that was rejected because these directorate have the tendency to focus on their primary responsibilities because of lack of adequate human, technical, and financial resources, and close attention to household energy issues is often neglected.

C. Project Description Summary

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

Component	Indicative Costs (US\$M)	% of Total	Bank financing (US\$M)	% of Bank financing	GEF financing (US\$M)	% of GEF financing
Capacity Development and Institutional Strengthening	11.64	21.8	6.67	18.7	0.00	0.0
Energy Services Delivery	28.24	52.9	18.42	51.7	3.50	100.0
Household Energy	13.47	25.2	10.56	29.6	0.00	0.0
Total Project Costs	53.35	100.0	35.65	100.0	3.50	100.0
Total Financing Required	53.35	100.0	35.65	100.0	3.50	100.0

1.1 Component 1: Capacity Development and Institutional Strengthening(US \$11.64 million)

A. Support to CREE (US \$0.71 million)

B. Support to DNE (US \$0.73 million)

C. Support to DNCN (US \$0.82 million)

D. Support to AMADER (US \$9.38 million)

The Capacity Development and Institutional Strengthening component will have four two main purposes:

- (i) to support the capacity development of the Regulatory Commission staff (CREE) to enable them to carry out their responsibilities of contract oversight, monitoring and compliance more effectively;
- (ii) to support institutional strengthening of the National Directorate of Energy (DNE) to monitor implementation progress of energy sector strategy and reform;
- (iii) to support institutional strengthening of the National Directorate of Nature Conservation (DNCN) to play an active role in the management of the household energy sector; and,
- (iv) to support the capacity development of AMADER to become an operational institution.

At present, the CREE, the DNE, and the DNCN are poorly equipped and lack the critical expertise needed to carry out their functions. AMADER is newly created and needs support to become operational and efficient.

Sub-component A: *Capacity development support to the CREE:* This support will help ensure that the regulatory and institutional reform of the energy sector is deepened and paves the way for decentralized energy in rural and peri-urban areas. Following the restructuring of the power sector, the GoM has created the Commission de Regulation d'Eau et d'Electricite (CREE) in March 2000. This agency has a key role to play in fostering a competitive business environment attractive to private investors and operators. IDA will support the following activities:

- Training and capacity building program for Commissioners technical specialists of the CREE in

the areas of financial regulation (20 staff weeks), analytical accounting (18 staff weeks), financial management (25 staff weeks), contract monitoring (10 staff weeks) and tariff design (30 staff weeks). These activities will be carried out through formal training sessions, study trips or on-the-job training, on an as-needed basis.

- Short and long term technical assistance (24 man-months equivalent) to develop and implement the monitoring and evaluation program of the operators, and to build awareness on regulatory issues among consumers and technical staff of the ministries.

- Establishment of a local area network with 15 workstations (hardware and software) and other office equipment, software for economic and financial modeling, accounting and other decision making tools.

Sub-component B: *Institutional strengthening of the DNE:* The GoM decision to develop energy services delivery services in rural and peri-urban areas have assigned to the National Directorate of Energy (DNE) new responsibilities for sector strategy and policy formulation, monitoring and evaluation, and impact assessment. IDA will support the following activities:

- Training and capacity building program for staff in the areas of policy formulation (20 staff weeks), monitoring, evaluation, and impact assessment (40 staff weeks), demand side management and energy efficiency (30 staff weeks). These activities will be carried out through formal training sessions, study trips or on-the-job training, on an as-needed basis.

- Short and long term technical assistance (30 man-months equivalent) to set up monitoring, evaluation, and impact assessment systems and databases, to develop a national energy efficiency program.

- The establishment of a local area network with 25 workstations (hardware and software), supply of 6 portable computers with related accessories, 18 printers, 16 photocopiers, and other office equipment; the creation of a documentation center with a state-of-the-art information/cataloging system, the supply of 10 vehicles.

Sub-component C: *Institutional Strengthening of the DNCN:* For the household energy sector to be developed and properly managed besides the DNE, the DNCN should be strengthened to be more efficient in policy and strategy development, monitoring and evaluation of activities in the forestry sector. The DNCN has an important role to play in the supervision of activities to be undertaken by the woodland energy management sub-component of the household energy component. In particular, the DNCN has a critical role in ensuring that control and monitoring systems of the fuelwood rural markets are efficient and effective. IDA will support the following activities:

- Training and capacity building program for staff in the areas of policy formulation (20 staff weeks), monitoring, evaluation, and impact assessment (40 staff weeks), supply side wood energy management (30 staff weeks). These activities will be carried out through formal training sessions, study trips or on-the-job training, on an as-needed basis.

- Short and long term technical assistance (30 man-months equivalent) to set up monitoring, evaluation, and impact assessment systems and databases, to develop a national wood energy management program.

The establishment of a local area network with 25 workstations (hardware and software), supply of 6 portable computers with related accessories, 18 printers, 16 photocopiers, and other office equipment; the rehabilitation of the documentation center with a state-of-the-art information/cataloging system, the supply of 10 vehicles.

Sub-component D: Capacity development of AMADER: This support would enable AMADER (i) to promote the expansion of the coverage, capacity, and reliability of rural distribution grids; (ii) to promote and support the financial performance of private rural electricity operators; (iii) to improve the delivery of energy services to basic social services and productive activities ; (iv) to facilitate the development of small power projects using renewable energy sources, where feasible, to be owned and operated by the private sector Solar Home Systems (SHS) in remote rural areas; and, (vi) to support initiatives in rural areas for productive uses of electricity to increase household income; IDA support would comprise the following goods, services and activities:

- o office furniture, computers, and vehicles;
- o working costs, and maintenance needs;
- o capacity building, training and technical assistance programs for the staff;
- o promotional activities;
- o studies to evaluate the cross-sectoral impact of rural electrification investment.

1.2 Component 2: Energy Services Delivery (US \$28.24 million)

The Energy Services Delivery component would support the government's strategy of providing access to basic energy services in rural and peri-urban areas. It is based on an output-based approach (OBA), using private operators, and linking payments of subsidies to outputs. For the expansion of PV systems co-financed by the GEF, a fee-for-service model is adopted. This business model is more conducive for the expansion of PV systems for the following reasons: (i) it allows the most affordable payment schemes and can reach a larger client base; (ii) clients do not have to invest in systems but only pay for services provided by operators; (iii) clients do not have to worry about after sales systems maintenance which is centrally provided by operators; and, (iv) product standardization and quality assurance is easier as operators can obtain economies of scale in procurement and in the delivery of services. Investment costs would be funded by a mix of private equity, commercial bank loans, and grants for the subsidized portion of the capital expenditures, channeled through a rural electrification fund. The approach will build on the successful experience of two 'demonstration' schemes that have been in operation since 2000. The rationale for this new approach, process for the selection of future private operators, mechanisms for the provision of subsidies, and the experience to date with energy service delivery schemes are fully described in Annex 2.

Component 2 has three subcomponents:

A. Promotion of Rural Electrification Investments (US \$24.64 million)

B. Promotion of Multi-functional Platforms (US \$1.55 million)

C. Information, Education, and Communication (US \$2.05 million)

Subcomponent (A) for the Promotion of Rural Electrification Investments would comprise the following:

- A special fund Rural Electrification Fund (REF) to be used to promote rural electrification investments undertaken by private operators; related studies to prepare and evaluate bids;
- Study to assess the need for the special financing instruments to help mobilize the required financing from

commercial banks;
- Monitoring and evaluation studies of individual investments;

It is estimated that some **5-7 larger decentralized schemes**, including the two ongoing concessions, (i.e.schemes involving in excess of 5,000 consumers, and including rural family residences, social institutions, and small productive companies) and between **8-10 smaller decentralized schemes** (i.e.involving isolated rural communities with less than 1,000 consumers and either none, or a limited number of, small productive companies) would be financed over the five year period from 2004-2008, starting with a slower growth of new schemes in the early years as AMADER builds up its institutional capacity. If achieved, these aggregate decentralized schemes would represent 40,000 new consumers of basic electricity services in rural areas by 2008, benefiting more than 400,000 people, or double the present number. In addition, an estimated 125 rural schools and over 107 rural health centers would benefit by having access to basic electricity, thereby acquiring a capability to provide education through audiovisual services, improved classroom illumination over longer hours, and refrigeration for vaccines. The specific targets of new consumers, broken down by social and economic groups, are given in Annex 2, together with the forecast annual disbursements.

Subcomponent (B) for the Promotion of Multi-Functional Platforms Investments would comprise the following:

-A study to assess the sustainability of existing multifunctional platforms focusing on: (i) their ownership, management, operation, maintenance, and equipment renewal aspects; (ii) their viability in the presence of other private energy services companies; and, (iii) the possibilities for scale up taking into account environmental concerns.

-Micro-financing to support the equipment start up costs of multifunctional platforms to be operated by community associations, women associations, NGOs, and the private sector.

Subcomponent (C) Information, Education, and Communication is intended to help communities to be aware of energy services schemes. There is a need to reach out to these communities with relevant information for them to have basis to participate in project activities: IDA support will include :

- extensive information and promotional campaigns through existing media in rural areas (radio, institutional, grassroots, national and regional workshops),
- demonstration workshops where utilization of energy devices are shown to prospective users
- field trips to neighboring villages where services are installed and working
- organization of focus groups to have feedback from users and to register concerns from prospective users
- organization of workshops for private operators, NGOs, and other civil society groups

- updating information on performance and impact assessment.

1.3 Component 3: Household Energy (US \$ 13.47 million)

The household energy component will build on achievements of the previous Household Energy Project and support the scaling up of initiatives of the national strategy on household energy. It would have three main subcomponents:

A. Community-based Woodland Management (US \$8.31)

B. Interfuel Substitution and Energy Efficiency (US \$ 2.89)

C. Information, Education, and Communication (US \$2.27)

The subcomponent (A) for Community-based Woodland Management will finance:

- the updating of 10 woodland management master plans
- the production of 5 new woodland management master plans -the creation of 1000 rural markets
- the implementation of village woodland management systems in woodfuels supply basins covering an area of about 1,4 million hectares in the regions of Bamako, Segou, Mopti, Koutiala, Niono, Kayes and San to provide about 70 percent of urban consumption of woodfuels
- the modernization of woodfuel production and trade (a target of 80 percent of tax collection on woodfuels by year 3 of the project)
- the creation of more than 300 modern charcoal production associations with efficient techniques and adequate management capacity; and,
- the support to the central and regional forestry service departments to elaborate legislative measures applicable at communal levels

The subcomponent which was develop in coordination with the Ministry of Finance and the Ministry of Interior will support the development of standard contracts for use by communities and local governments for management and exploitation of wood resources. Based on institutional and regulatory reforms initiated under the former project, support will be provided to municipalities in tax collection and monitoring of woodfuel flows following decentralization principles. Taxes collected will contribute to fund basic modern infrastructure services and income derived from activities of this component will help participating local communities afford modern infrastructure services.

The subcomponent (B) for Interfuel Substitution and Household Energy Efficiency will finance:

- the promotion and scale up of improved wood (300,000) and charcoal (210,000) stoves utilization
- the promotion of alternative household fuels (61,000 kerosene stoves , 10,000 tons of wood briquettes)

- the penetration of LPG as a household fuel (from 4000 tons to 20,000 tons by 2008).
- power demand-side management initiatives at the household level to reduce the peak power by 5 MW by the use of at least 2000 evaporative coolers and 20,000 compact fluorescent lamps.

The promotion of efficient wood energy and alternative products is a continuation and extension of the HEP project demand side component. Its main thrust is the promotion of efficient charcoal stoves and substitution by kerosene, LPG and alternative biomass fuels. A process of certification will be established for best quality and most environment friendly products. Regional private operators will provide adequate technical assistance and training to efficient charcoal stove producers, while support will be given through technical assistance and investment subsidies to private stakeholders for importing or locally manufacturing kerosene stoves and new biomass fuels (briquettes). The main thrust of the power demand-side management activity is to promote the penetration of low-Energy consumption lamps and energy efficient evaporative air-coolers to reduce the peak power demand curve and to reduce the electricity bill for end-users. Private distributors will receive support for the promotion of energy efficient products and appliances. Introduction of air-coolers, to substitute for inefficient air-conditioners through a demonstration program.

The subcomponent (C) Information, Education, and Communication

- extensive information and promotional campaigns through existing media in rural areas (radio, institutional, grassroots) in order to raise interest and formal requests from rural communities in support of the community-based woodland management, interfuel substitution and household energy efficiency activities;

- woodfuel sector training, planning and monitoring. This latter activity will focus strengthening sector capacities to monitor performance as well as measure the impact of reform and project activities. It will be based on updating information on (i) regional woodfuel supply master plans and (ii) adequate environmental, forestry, and social monitoring data.

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

The project will complement energy sector reforms initiated under the Selingue Rehabilitation Project (Cr. 2850-MLI). The Selingue project focused on reforms for the grid-based system, where the HEURA will address reform for the non-grid based decentralized systems. It will develop and strengthen the new policy framework for the promotion of energy services in rural and peri-urban areas. A clear and transparent policy framework backed up with rules and regulations to promote an attractive and secure business environment for private investments.

Regarding the promotion of solar PV systems, the project will endeavor to build institutions to manage support funds from the external donor grant-financed commercial/ institutional market for solar PV systems, and develop local competitive procurement. It will also establish the financial, technical, and business development intermediation mechanisms for local operators. These aspects will benefit from the GEF grants through the Bank.

The Household Energy Component will strengthen the legal and regulatory framework sustaining the woodfuel sector. In particular : (i) delegation of tax collection to credible and equipped communal institutions; (ii) guaranteeing a significant tax share to local communities with proper village woodland management schemes; (iii) defining clearly the roles and responsibilities of communes, the private sector, and NGOs in the production, control, and trade of woodfuels; (iv) encouraging price incentives for the development of alternative fuels to wood energy, and (v) ensure that control and monitoring systems of fuelwood rural markets are efficient and effective.

3. Benefits and target population:

There are both direct and indirect benefits associated with different project interventions that have an impact on poverty reduction targets as well as links to the Millennium Development Goals (MDGs). Access to modern energy will have an important influence in enhancing the quality and efficiency of health and education facilities in rural areas as well as the productivity of small rural enterprises. Empirical evidence on these causal relationships pertaining to contexts in Mali is under development. However, based on experiences of the decentralized rural energy services companies and those of multifunctional platforms, the following benefits are expected:

Direct benefits. Access to, and an improved quality of, energy services directly increases the ability to generate income, and enhances the well being and sense of empowerment of the poor by:

- Ø reducing the extensive time and effort spent gathering woodfuels; access to modern energy services can reduce this time, spent mainly by women and children in basic survival activities, and allow them to devote more time to educational, productive and recreational activities;
- Ø enhancing labor productivity through irrigation, crop processing, and mechanization; agricultural outputs can then be enhanced, thereby helping meet hunger and extreme poverty reduction targets;
- Ø improving illumination – by moving from open fires and candles to higher quality lighting - that encourages improved educational attainment and income producing entrepreneurial activities in a more

diversified manner;

- Ø reducing health risks through the use of cleaner burning fuels and better cooking equipment; access to cleaner fuels also helps reduce health risks associated with indoor air pollution such as acute respiratory diseases, lung cancer, low birth weight;
- Ø improving access to information and markets (through radio, television and electronic communication) to help entrepreneurs build partnerships and benefit from global development resources;
- Ø empowerment of village communities by transferring control of local woodfuel resources to them, thereby helping them become independent players in the market while ensuring environmental sustainability of the forest resources.

Indirect benefits. Improvements in the availability and quality of energy services to small enterprises and communities can indirectly benefit the poor by:

- Ø creating jobs -- both farm and non-farm – which helps reduce overall unemployment pressures, and opens up more possibilities for livelihood diversification; retention of teachers in rural and peri-urban areas;
- Ø easing pressures on destructive natural resource exploitation, particularly depletion of natural forests for wood fuel.

Empowerment of women : Women are major actors in fuelwood production, transformation and trade. Interventions in these areas are susceptible to change their working habits by providing them with more time to devote to other productive and educational activities. The HEURA will develop synergy's with other rural development programs focusing on other employment opportunities for women. In rural and peri-urban areas where modern energy services will be provided, women will have the possibility to develop small food processing enterprises and add more value to agricultural produce. Moreover, education opportunities will increase and women will have more exposure to alternative lifestyles.

Communes: By recognizing their key role in energy services delivery processes and woodfuel management, the project will contribute significantly to the empowerment of communes, in their relationship with government bodies as well as with their local constituents. The project benefits directly support and reinforce the effectiveness of the decentralization process which is at the center of the Government's interventions in the rural and peri-urban areas.

Monitoring and evaluation will be conducted by a non-governmental organization (NGO) to be selected by AMADER following World Bank procedures. The NGO's work will be funded by about \$450,000 from the energy services delivery component of the project. Evaluation will be conducted to measure output and outcome performance indicators indicated in Annex 1. AMADER will ensure (i) that the NGO integrates output and outcome indicators as well to provide a comprehensive assessment; (ii) that the NGO integrates all monitoring and evaluation and impact assessments of the project. The project seeks to develop a participatory M&E design that integrates monitoring and evaluation and impact assessments as a project-based 'management information system' and learning tool, and not just a data collection and reporting tool. The monitoring and evaluation protocol should meet GEF interests in RETs as well as those of the GoM, the Bank, and other donors.

Specifically, the following functions will be performed by the NGO:

(i) Establish baseline parameters for output and outcome indicators shown in Annex 1 without a baseline parameter.

(ii) Aggregate sub-project level indicators into the project level Indicators of Annex 1. Sub-project level information will be obtained from AMADER: i) monitoring of sub-projects as part of each contract with a private operator, and ii) reporting progress to the World Bank as defined in the project implementation plan. Sub-project monitoring activities undertaken by AMADER will:

- determine actual RETs systems installed by private operators and associated CO2 emissions abated following the International Measurement and Verification Protocol (Volume I, 2002), and will be specifically designed as part of each contract with a private operator.
- provide the internal management information needed for: the implementation of output based aid principles, project activity control, and identification of causes of variances from plan. The reporting will be supervised by the Monitor and Evaluation Expert of AMADER, and also subject to review by the World Bank supervision.

(iii) Conduct the mid-term review and advise on corrective actions (if project objectives are not being achieved). This review will include:

- study of relevant published statistics, progress reports, and impact assessment surveys covering beneficiary communities, consumers, private operators and NGOs involved in the energy efficiency industry, and the banking community.

(iv) Develop an exit strategy in Year 3 based on the mid-term review

(v) Review performance indicators at project completion in a following the same methodology to that of the mid-term review.

Monitoring and evaluation reports will be delivered in year 1 (baseline confirmation), year 3 (mid-term), year 4 (definition of exit strategy) and year 5 (at project completion).

4. Institutional and implementation arrangements:

The GoM has decided to create a rural energy services agency, **AMADER**, to promote the development rural electrification and household energy in Mali. The main responsibilities of AMADER will be the following:

in rural electrification:

- to promote the development of rural electrification projects through the provision of up-front investment subsidies from the Rural Electrification Fund (REF);
- to prepare and update periodically the RE master plan;
- to provide technical and, if applicable, financial assistance, to ensure the technical and commercial viability of operators in rural areas;
- to conduct awareness, information, and, when applicable, training activities for the different stakeholders in the RE sector.

in household energy:

- to encourage the manufacture, promotion, and use of low cost equipment for woodfuel;
- to intensify the use of fuel substitution for woodfuels;
- to improve the regulatory and fiscal framework as well as enforcement;
- to expand rural markets for woodfuels;
- to consolidate the planning, monitoring, and evaluation tools in the sector.

Under its charter, AMADER must coordinate activities with the regulatory commission for electricity and water sectors, **CREE**, the National Directorate of Energy (**DNE**), and the National Directorate for Nature Conservation (**DNCN**).

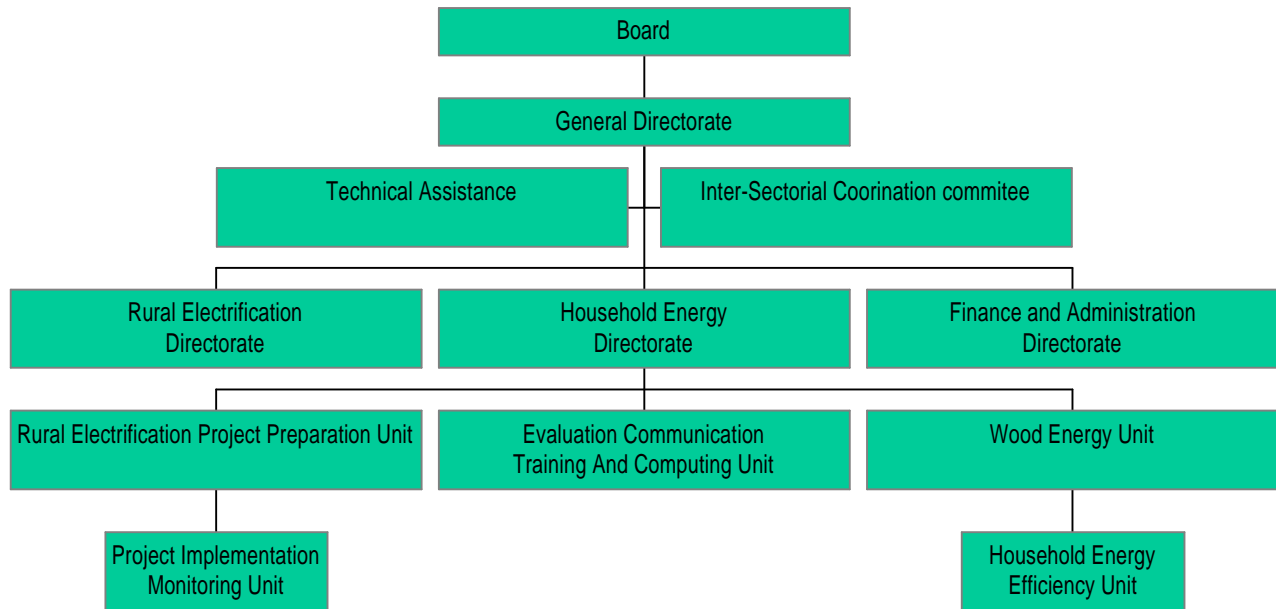
CREE will be strengthened to handle more efficiently regulatory issues and better assume its responsibilities, including the control of the procurement processes of AMADER and operations of rural energy services providers, control and approval of tariffs proposed by operators, oversight of contractual obligations by operators and protection of rural consumers' rights.

DNE will be strengthened through this project to assure more efficiently its role of policy formulation, strategy development, monitoring, evaluation, and impact assessment of activities in the energy sector.

DNCN will be strengthened to be more efficient in policy and strategy development, monitoring and evaluation of activities in the forestry sector. The DNCN has an important role to play in the supervision of activities to be undertaken by the woodland energy management sub-component of the household energy component.

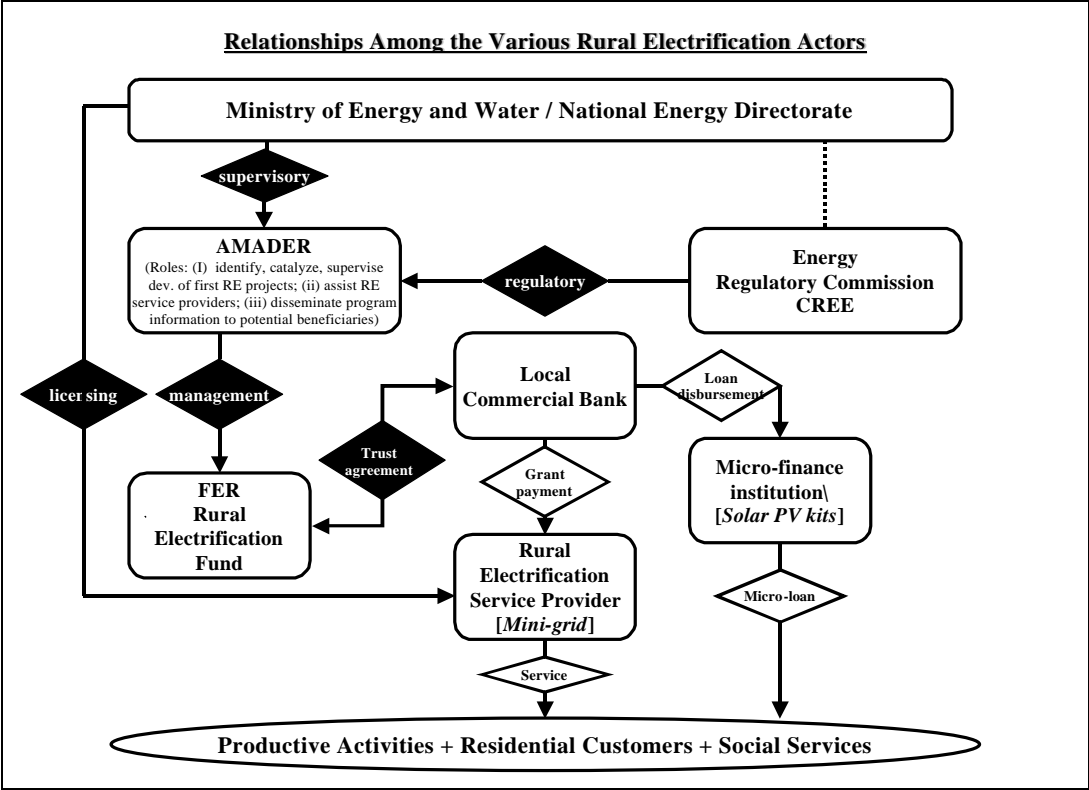
A cautious approach to implementation will be adopted as AMADER builds up its capacity and emphasis is placed both on selecting experienced operators and reaching agreement on sound contractual frameworks. A transitional period of six months will be needed for AMADER to recruit its essential staff and to become operational.

AMADER'S ORGANIGRAM



Financing Mechanism and Flow of Funds

A key objective of AMADER will be to help mobilize private investment for Decentralized Energy Companies (DSCs). A license area will be awarded, normally competitively, for the right to provide DES in a specific service area of the country. All project funds, whether grants, credits or loans, will be channeled to the Rural Electrification Fund (REF) which will be administered by a local commercial bank competitively selected. This fund is being established to respond to the medium- and long-term funding needs of private contractors.



Accounting, Financial Reporting and Auditing arrangements:

AMADER will be in charge of the overall Project coordination and financial management. To this end it will be responsible for the management of both the Special account and the project account (Counterpart funds) and for the preparation of the project annual consolidated financial statements and quarterly financial management reports (FMRs).

The other implementation agencies namely DNE, DNCN, CREE will operate on the basis of cash advances determined by their annual work programs and budgets. Each one will have an experienced and competent financial officer to keep the financial records and report to AMADER (the PIU for the first 6 months) on a quarterly and annual bases. They will prepare the entity annual work program and budget, will manage the resources, keep the records and ensure that requests for funding are prepared and submitted to AMADER on a timely basis.

A computerized financial management information system, including budgetary, accounting, financial and internal controls will be established within AMADER. This system, which will take over financial management function from the PIU after six (6) months will be able to provide FMRs acceptable to IDA as soon as it assumes full responsibility over the financial management function.

Financial management of the REF sub-component will be carried out by a Trustee (A commercial bank to be recruited on the basis of competitive bidding). The financial statements thus produced will be submitted to AMADER and presented along with the consolidated project financial statements to IDA.

AMADER will be responsible for the preparation of quarterly and annual FMRs and their submission to the Borrower and IDA. AMADER will submit annually to the Borrower and IDA a set of financial statements to be audited. The records and accounts of the project will be audited annually in accordance with international audit standards by an experienced and internationally recognized audit firm acceptable to IDA. The audit will include a comprehensive review of all SOEs and the management of Special Account. The auditor will also be expected to issue a management report with practical recommendations for improving the project internal control system. Audit report will be submitted to the Bank no later than 6 months after the closing of each fiscal year.

The recruitment of AMADER General Manager, Chief Financial Officer (Directeur Administratif et Financier), Accountant, Procurement Specialist and the selection of the auditor are conditions of project effectiveness.

D. Project Rationale

1. Project alternatives considered and reasons for rejection:

Alternative lending instruments to a SIL were considered. These included: (i) a LIL, which was rejected since there was a sound framework for decentralized electrification schemes, based on two years of operational experience in two different socioeconomic regions of the country; there had also been a prior lending operation for household energy. The government now required support for scaling up rural energy schemes; (ii) an APL, with a first phase for institution building, was considered and rejected. While the creation and strengthening of a new government institution to manage and administer the expansion of rural energy remains an important objective, the key step with the creation of AMADER and FER have already been taken and the scale up of experience with decentralized electrification is the more pressing need- for which a SIL is the appropriate lending instrument in order to monitor effectively different implementation experiences. Institutions for rural energy have been designed, the feasibility of decentralized energy services already tested through demonstration projects, and the interest of private sector investors established. Given also the strong commitment of the Government and the interest shown by prospective private operators, this allows one to build rapidly on lessons learned so far and achieve significant expansion results.

The option of providing support to EDM's investment plan on transmission and distribution was rejected because EDM is unlikely to serve isolated rural areas outside of the concession zone which are the main focus of the present project.

The option of expecting private sector operators to engage in rural energy by simply improving the legal and regulatory frameworks through technical assistance was considered and rejected. Experience in the region is showing that, without a financial and/or risk mitigation support to the private sector, rural areas are unprofitable for operators and left out in the expansion of modern infrastructure services, although they generate substantial revenues and benefits, which are not captured through the tariff. The choice adopted, therefore, was to start small and test innovative institutional and financial mechanisms to sustain rural energy schemes and later build on them. Several innovative, PRG-backed, output-based solutions will be considered to provide liquidity and/or political risk mitigation to either private financiers and/or investors/operators.

The option of letting rural communities build on achievements of the recently completed household energy project was considered and rejected. These achievements still need to be strengthened, expanded to other communities, and sustainability mechanisms have to be further explored.

A specific ICT component was considered and rejected since a telecom project is under preparation and will address these issues. However, during implementation, the HEURA project will provide energy services that have the potential to enhance ICTs on a demand basis. The energy access program, therefore, will coordinate closely with the telecom program.

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

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed			
Power Sector	Mali Selingue Rehabilitation (P034617)	S	S
Household Energy	Mali Household Energy Universal Access (P073036)	S	S
OMVS Regional Energy Project	Mali OMVS Regional Energy Project (P046651)		
Rural Sector	Mali IRRIG Promotion (P001738)	S	S
Rural Sector	Mali Agro- processing TRD	S	S
Rural Sector	Mali Agricultural and Producer Organization (P035630)	S	S
Rural Sector	Mali Rural Infrastructure (P041723)	S	S
Other development agencies			
Solar Regional Programme, CILSS-EU project completed. Another phase is under preparation on solar pumping			
Electrification of 4 villages in the Kayes region; French cooperation, completed			
Electrification of 20 villages in the cotton region; French cooperation, on-going			
Women and renewable energy, on-going			
Support for deconcentrated forestry services (PASFD) completed			
Development of Protected forests of Sousan, Monts Mandingues, and Faya; French cooperation completed.			
Development of Kita forests by farmer organizations, OIT, on-going			
Forest sustainable management in 3rd region (PGDF3R), French cooperation, on-going			

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

3. Lessons learned and reflected in the project design:

· **Regulation:** Legislative changes up front are needed to bring decentralized energy initiatives in rural areas into effect on a sustainable basis. The specification of a comprehensive set of regulatory and administrative rules for decentralized rural energy is indispensable to create an enabling climate for private sector and local government involvement. A well-defined and operational energy policy needs to be in place, with proper specifications that spell out clearly the roles of the different actors- local communities, private sector operators, NGOs, public agencies. In Mali, an appropriate energy policy has been drawn up and a Rural Energy Agency will be created prior to project appraisal. In regard to the household energy component, the definition of a comprehensive legal and regulatory framework with clear implementation rules and the design of simplified fiscal and pricing mechanisms are required to avoid loopholes, distortions and opportunities for corruption in household fuels market.

- **Contractual Framework:** An important lesson, from recent experience in Mali with private operators, is that a sound contractual framework at the outset is a critical factor in helping safeguard longer term stability of the contract. For this reason, the project design envisages a slower build up initially of new operators of decentralized energy services, not only to ensure qualified operators but also to ensure that new contracts are satisfactory to all parties and reflect the early operating experience of ongoing schemes.
- **Community Ownership, Participation, and Entrepreneurial Contribution:** Without ownership and participation of local communities, rural energy programs are not sustainable. Participatory approaches, already started under the first Household Energy Project, proved to be a key factor determining a successful outcome of different components of the project. They should be continued and extended to new activities of rural energy under the HEURA project. This will leave more initiatives with local communities on a demand driven basis. Experience from other projects in the region suggests that extensive consultation/participation of all stakeholders throughout the entire policy-project cycle, as well as the implementation of a sound communication strategy, are both needed for ownership of the project.

· **Capacity:** Past experience has also demonstrated the necessity to have adequate capacity at both central and decentralized levels for successful project implementation. As a consequence, the capacity building component of the HEURA project will address existing capacity weaknesses at both levels as well as organize training activities for private sector operators, NGOs, and regional staff of the concerned ministries.

· **Promotion of renewable energy technologies (RETs):** Significant resources are required initially to lower the barriers that impede greater use of these technologies. These include, for instance, resource assessments and energy use audits, strategy papers, demonstration schemes, training, and building broader awareness of RETs as a viable retail business. At the same time, such “upstream” activities, if carried out in isolation and without links to a program of actual procurement and use of RET, do not lead to market development. To the contrary, a viable investment financing program helps “learning by doing” and improves the quality and impact of such “upstream” activities. This project aims to build on the prior project experience of other donors and develop a coherent program of knowledge and financing support for the promotion of these technologies.

- **Profitability of schemes:** It is important to stress profitability of RE schemes. They should be set up on a commercially viable basis. At initial stages, some subsidies are generally required, but recurrent cost subsidies undermine sustainability. A review by the World Bank Solar Home Systems Projects: Experiences and Lessons Learned 1993-2000 noted that initial pace of implementation is likely to be slow, and recommended to provide adequate after sales service, including consumer education in proper

maintenance and operating procedures to ensure consumer satisfaction.

4. Indications of borrower and recipient commitment and ownership:

Government commitment to energy sector reform: In 2000, GoM adopted a new legislative framework for electricity, abolishing EDM's national monopoly and allowing private access for the generation and distribution of electricity. This policy framework also promotes rural electrification, in association with private enterprises and local governments, which will be developed under the HEURA project. The government's policy letter of November 1999 has already identified rural electrification and energy conservation as major energy sector priorities for the next decade. Regarding wood energy, the GoM has already changed significantly the woodfuel law (1996) & decree (1998) governing woodfuel taxation, in order to incorporate concepts such as rural markets, village wood lots management, and differential taxation depending on the mode of management and efficiency of commercialization.

Government commitment to legislative and regulatory reforms for rural electrification: The principles governing the conception and implementation of the legislative and regulatory framework for rural electrification (RE) in Mali are embodied in a rural energy legislation enacted by the Malian Government. In a letter of October 2002 to the Prime Minister, the President of Mali stresses the need to "valorize rural areas" to make them "the engine of Malian economic development, and the booster of agribusiness in the country". The President insists that the valorization of rural areas implies the growth of investment in infrastructure and "the broadening and diversification of the energy infrastructure to rural areas." The Malian legal framework was crafted in the context of electricity sector reforms that the Malian Government had initiated several years ago. The elaboration of a comprehensive regulatory framework stems from a sector policy letter ("Electricity and Drinking Water Sector Policy Letter") of November 10, 1999. The letter indicates that since only 8% of the general population, and less than 1% of the rural population, have access to electricity, priority should be given to sector reforms, starting with the privatization of EDM, the introduction of competition in the sector, its restructuring, and the implementation of a rural electrification program involving private investors and operators. The letter also indicates that the National Energy Directorate (DNE) would conduct the process and make proposals to establish the institutions needed to carry out the rural electrification program.

Government commitment and ownership of the PRSP. In 1998, GoM adopted a national Poverty Reduction Strategy Program (PRSP) in order to coordinate programs for health, human resource investment, gender equity and the environment as well as target specific actions towards poorer segments of the population. In July 2000, the Interim Poverty Reduction Strategy Paper was finalized, and in May 2002 the full PRSP was completed. The HEURA project supports this poverty reduction strategy by targeting the poorest segments of the population in the provision of rural energy services .

Government policies on decentralization: Mali has made the decentralization process one of the most important vehicles to sustain interventions in rural areas. Rural municipalities were created and mayors elected in 1999, autonomous budgets were set up in 2000, and new support procedures were implemented, directly and indirectly, through the Agence Nationale d'Investissement des Collectivités Territoriales (ANICT). Substantial tax revenues are intended to be directed to the communes, villages and municipalities for their use in support of priority community needs (e.g., improved water supply, access to energy services, improved education and health services, etc.). This decentralization of decision making, financial resources, and budgetary autonomy means that communes can make decisions and contract for products and services (including energy services) to support their specific priorities.

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

Building on its experience in supporting rural energy and household energy programs in over 30 developing countries, the Bank is actively assisting the GoM in the preparation of the HEURA project; it will continue to assist the country during the implementation phases. In this regard, the Bank will tap the worldwide experience of international utilities in implementing rural and peri-urban electrification schemes in developing countries. The Bank will also assist the GoM in creating institutions and funding mechanisms such as AMADER and REF that have the capability to carry out donor coordination in a decentralized energy sector.

The overall Bank investment project in support of decentralized energy services in Mali makes it possible to include a GEF operation- under OP 6 -to help remove the barriers impeding the adoption and promotion of RET. The project fully realizes the institutional commitments of the Bank to removing major barriers in the country towards promoting, adopting and disseminating RETs for the benefit of social welfare in Mali and reduction of GHG.

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

1. Economic (see Annex 4):

● Cost benefit NPV=US\$29 million; ERR = 29 % (see Annex 4)

○ Cost effectiveness

○ Incremental Cost

○ Other (specify)

x Cost Benefit

An economic analysis has been undertaken for the overall project which combines the costs and benefits derived from the rural electrification and household energy components. On this basis, the internal rate of return (IRR) is estimated conservatively to be 29 % using a 12% discount rate. This calculation does not take into account either environmental benefits, due to green house gas mitigation. When these benefits are included and then combined, the IRR becomes 60%.

The economic analysis was also conducted separately for the following components: (1) energy services delivery; and, (ii) household energy. The analysis made respectively specific assumptions for rural electrification, GEF specifics, and multi-functional platforms for the energy services delivery component, and community-based forest management and substitution and efficiency for the household energy component. Detailed results are provided in Annex 4.

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

NPV=US\$ 4 million; FRR = 16 % (see Annex 4)

The financial cost benefit analysis was undertaken with the assumptions of substituting economic value of rural electrification service by reasonable tariff level of future utilities and by considering for the household energy component commercial price of woodfuels.

Fiscal Impact:

Overall the project will result in positive fiscal impacts. In particular, the woodfuel taxation reform will generate resources for both local governments and the Treasury. These revenues will pay for the necessary public operations in the sectors and contribute to provide participating

communities with resources to address local development priorities. Revenues will also be collected from private operators involved in the decentralized energy services delivery schemes.

3. Technical:

The HEURA rural energy program has adopted the principle of a technology neutral approach, looking for reasonable and cost-effective solutions to both providers' and customers' needs. In case renewable energy solutions are adopted, the GEF grant will provide a specific upfront subsidy to buy down investment costs. Quality control and conformity to environmental performance of equipment will be a major concern and AMADER will initiate the certification and/or labeling process of equipment promoted on a large scale under the different components of the project (stoves, low-consumption lamps and selected appliances). AMADER will work with the DNE and CREE to identify and launch the preparation of technical standards to be developed either for light grid technologies or for solar PV systems and start the development of specific operational strategies.

4. Institutional:

4.1 Executing agencies:

The executing agencies are: AMADER (*Agence Malienne pour le Developpement de l'Energie Domestique et de l'Electrification Rurale*), DNE (*Direction Nationale de l'Energie*), CREE (*Commission de Regulation d'Eau et d'Electricite*) and DNCN (*Direction Nationale de la Conservation de la Nature*).

4.2 Project management:

AMADER will in charge of overall coordination, as well as overall monitoring and evaluation. Since the development of AMADER will still be on-going, it will rely in a transitional phase of about six months on the implementation unit of the DNE more experienced in management of Bank-financed projects. Several measures will be taken to ensure adequate and satisfactory project execution, particularly in the early years:

- reinforce the AMADER with high level staff consisting of experienced individuals that are competitively contracted and paid;
- ensure proper funding of AMADER
- pre-approved operating, procurement and administrative guidelines and regulations for project management;
- setting up of technical assistance arrangements for the energy services delivery component;
- training the AMADER's staff in procurement and financial management;
- financial auditing of the Agency accounts and progress reports every six months;
- external expertise will be provided on project management issues on a timely basis.

4.3 Procurement issues:

Procurement issues:

Procurement activities in Mali are characterized among other issues:

- insufficient procurement planning
- substantial contracts signing delays

- lack of transparency in the contract award process
- inadequate contract management systems
- candidates being required to furnish large number of administrative documents along with their bids/proposals.

Mitigating measures to tackle the above issues will be addressed within the framework of the procurement implementation arrangements of the HEURA. More details on procurement issues are provided in Annex 6A.

4.4 Financial management issues:

The financial management system would be comprehensive and allow for the proper accounting of all the transactions at every level of project implementation. The system would be capable of producing Financial Management Reports, as required by the Bank, as well as meeting the project information needs in a timely manner. The project Financial management system will consist of proper books of accounts, a reliable and functional internal control system and competent and experienced accounting and financial staff. Annual audits would be carried out by both external auditors selected on the basis of competitive bidding and the Government own Inspection des Finances and Contrôle Général des Services Publics to ensure full involvement of the Ministry of Finance in the project implementation. More details are provided in Annex 6B.

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

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

An Environment and Social Management Framework (ESMF) has been prepared (i) to establish the mechanism to determine and assess future potential environmental and social impacts of sub projects that are to be identified (specific information on numbers of sub-projects, site location of sub projects, land requirements, local communities, geophysical land features, nature, type and use of equipment/plant, were not available) and (ii) to set out mitigation, monitoring and institutional measures to be taken during implementation and operation of the subprojects to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

Discussions are on-going with the Directorate of Energy and the Directorate of Nature Conservation on the prospective sub-project sites. The ESMF outlines a consultation and participation plan to be applied during the preparation of sub-projects.

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

Since the sites for future sub-projects have yet to be finalized, the ESMF identifies and illustrates the specific steps involved in the environmental and social assessment process leading towards the clearance and approval of EAs of sub projects. The ESMF gives also generic but sector specific potential environmental and social impacts to assist the stakeholders with the process. The proper application of the environmental and social assessment process at the level of the subprojects will bring about impacts as they relate to sub project activities under the Energy Services Delivery and Household Energy Components of the project. To address HEURA project impacts effectively, the proposed ESMP provides for environmental and social assessment capacity building for Village Management Committees (VMCs) at Private Sector Bidders (PSBs) at the local level, and environmental and social oversight capacity at the regional and central levels as well as capacity building for Forest Management Plans.

To enable VMCs and PSBs to apply the environmental assessment process for subprojects effectively, they will require technical support in this regard. At the subproject identification stage, this technical support would be provided through service providers who would be responsible for assisting the VMCs and PSBs

in the preparation of subproject proposals, including Forest Management Plans (FMPs), bids for provision of rural energy services delivery, resettlement plans and environmental and social screening and preparation of mitigation measures as necessary and environmental and social assessment reports consistent with the ESMF.

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

Date of receipt of final draft: March 31, 2003

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

Throughout project preparation, discussions were held with the Directorate of Energy, the Directorate of Nature Conservation, NGOs, and some private sector operators regarding potential sub-projects. Throughout the preparation of the ESMF and the RPF, some potential sites were visited in order to assess possible environmental and social impacts of proposed project interventions. Target project beneficiaries, NGO representatives, and other civil society representatives were consulted in the preparation of these documents.

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

The monitoring plan outlined by the ESMF consists of a set of mitigation, monitoring, and institutional measures to be taken during implementation and operations to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The plan also includes actions needed to implement these measures. The monitoring plan specifies the monitoring measures to be carried out with linkages to specific potential identified impacts. Basically, it requires, (i) scheduling and coordinating monitoring tasks; (ii) evaluating mitigation effectiveness; (iii) identifying where applicable, corrective management practices; and (iv) ensuring that monitoring findings are suitably evaluated and incorporated into future management decisions.

The rural energy approving group (REAG) members who are AMADER, the Regulatory Agency (CREE) and the National Directorate of Energy (DNE) will assign the leading role of monitoring the environmental and social impacts and mitigation measures to the DNE. The DNE will carry out this role by ensuring that the subproject environmental and social management plan contained in the approved subproject ESIA reports is being implemented as specified therein.

6. Social:

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

The project primarily addresses the rural and peri-urban poor, as energy producers or consumers. Social benefits include improvement of living standards, self employment as well as indirect benefits such as local community and government empowerment. Evidence has established that rural energy programs have a positive impact on women and children's education and health (reduction in respiratory diseases caused by wood fumes). These programs also contribute to reduce the overall energy expenditures of the poor. Revenues generated through the household energy component will contribute to help communities afford modern energy services.

The GOM has prepared a Resettlement Policy Framework (RPF) as the sub-projects are not yet identified. The RPF establishes the resettlement and compensation principles, organizational arrangements and design criteria to be applied to meet the needs of the people who may be affected by the project.

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

The HEURA project will generalize participatory methods used by the former household energy project. Through focus group discussions, sensitization meetings and surveys, stakeholders concerns will be studied and accounted for in project activities. Stakeholders through consumer and operators associations will interact with the project and to express their concerns, preferences, and suggestions.

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

Through various workshops and sensitizations campaigns NGOs and civil society organizations will be consulted. This process has started with a national forum on rural electrification held in January 2003. Provisions are made by the project to support information, education, and training campaigns in support of project activities.

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

A special interministerial committee will be part of AMADER with responsibility to monitor social development outcomes of the HEURA.

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

Through the special interministerial unit and with the technical support of the Directorate of Energy, a monitoring, evaluation, and impact assessments will be conducted based on an agreed terms of references.

7. Safeguard Policies:

7.1 Are any of the following safeguard policies triggered by the project?

Policy	Triggered
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	<input type="radio"/> Yes <input type="radio"/> No
Forestry (OP 4.36, GP 4.36)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Pest Management (OP 4.09)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Cultural Property (OPN 11.03)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Indigenous Peoples (OD 4.20)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Involuntary Resettlement (OP/BP 4.12)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Safety of Dams (OP 4.37, BP 4.37)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)*	<input type="radio"/> Yes <input checked="" type="radio"/> No

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

To ensure that potential environmental and social impacts of the HEURA are appropriately addressed, an Environmental and Social Management Framework and a Resettlement Policy Framework have been prepared.

F. Sustainability and Risks

1. Sustainability:

A key strategic reason to initiate rural energy investments is to seek sufficient, gradual nurturing of the local markets and capacities so as to ensure long-term sustainability of activities in the sector. GEF grants are intended to help remove current barriers preventing the development of such initiatives. For solar PV systems, for example, the decline in costs will come from: (i) economies of scale –which are often realized when a credible expectation of a large market has been created, (ii) formation of links to lower-cost suppliers abroad, and (iii) rising incomes, which will increase the affordability of the systems.

The project's energy services delivery component places emphasis on reducing the initial costs, building capacity, and providing incentives for quality after-sales service to ensure that the systems (including solar home and institutional systems) financed under the project are sustained long after the project has closed. To the extent that both the initial capital costs come down and that after-sales service requirement needs are properly met, the 'replacement' costs for the investments under the project will be lower, and the need for subsidy will gradually decline.

It is expected that when companies have proven the effectiveness of solar technology and their sales and service capabilities, additional public institutional customers (in the health and education sectors, but potentially expanding to other such sectors) will be interested in benefiting from their services and the demonstration effect would also encourage other large, private users (private schools and health clinics, for instance) to do the same.

Sustainability of PV markets is dependent upon the speed of expansion and their threshold size in home and institutional markets. By linking subsidies as triggers to lowered PV costs; number of PV units installed, and demand creation for PV products, it is possible to improve the sustainability of PV markets

Given the GEF share of 20-25% in total costs, it is reasonable to expect that cost reductions and income increases over a number of years will offset the need for such support after the project is over. Additionally, the planned capacity strengthening activities will support 'learning by doing' and incorporating mid-term revisions and corrections along the way; taking care to reduce grant dependencies of individual sub-projects after the initial phase.

A major change this project proposes is to incorporate energy services requirements as a routine part of budgetary processes of individual line ministries. The interministerial committee's work will be devoted to ensure that sectoral ministries budget their demand of energy services to enhance their activities.

Regarding household energy, the project through further legal and regulatory reform intends to ground sustainable woodland management based on incentive mechanisms. The strengthening of the DNCN will also ensure that control and monitoring is improved. As for interfuel substitution, sustainability is a major objective to be pursued by private operators operating in a cost-effective manner. Initial capital subsidies appear justified to mitigate the first steps of market development, scheduled to be phased-out as soon as a market is firmly established.

1a. Replicability:

The improvement of the legal, regulatory, and financing environment for energy services delivery will ensure sustainability and replicability. Initially, subsidies and output-based grants will boost the

commercial viability of the energy services delivery schemes. With the growing demand for energy services from rural and peri-urban areas, operators will get accustomed to profitability in the provision of services. Efforts of information, education, and communication will help remove barriers to the development of modern energy services to the benefit of customers as well as operators.

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

Risk	Risk Rating	Risk Mitigation Measure
From Outputs to Objective		
Difficult municipal empowerment for rural energy services contracting.	M	<p>Ensure all aspects to be considered are included in the new regulatory texts</p> <p>Prepare detailed administrative kits in order to facilitate the process</p> <p>Organize specific training for municipal and local officers</p> <p>Publicize new principles and rules through brochures, in local and French languages, largely disseminated among public services, municipalities and rural actors</p>
Resistance to delegation of tax system to rural communities and privatization of flows control	S	<p>Ensure all aspects to be considered are included in the new regulatory texts</p> <p>Organize specific training for forestry department and other relevant State services</p> <p>Publicize new principles and rules through brochures largely disseminated among public services, municipalities and rural actors</p>
AMADER not autonomous or not self-financing or not sufficiently efficient	S	<p>Clearly establish rules and authorities with public counterparts before project effectiveness, in particular for AMADER manager and top staff selection process;</p> <p>Systematically revise operating and funding conditions during Bank project monitoring</p> <p>Set up an autonomous recruitment system with clear rules and responsibilities and monitor its operations.</p>
Insufficient private sector interest in decentralized energy schemes	S	<p>Undertake careful market assessment at project startup. Identify measures such as financing instruments to encourage comfort to potential investor/operators</p>
Financial Management of AMADER	M	<p>Ensure that proper training is provided to AMADER staff and that regular audits are performed</p>
Financial Sustainability of AMADER	H	<p>Make sure that the Government budgetary allocation incorporates AMADER operational</p>

Difficulty for home and institutional market for solar PV to develop significantly due to weak financial markets	M	budget requirements from inception Provide assistance to cross-sectoral ministries in assessing their energy requirements and demand. Continued support to private sector entrepreneurs to open up new markets. Promote a variety of financing instruments.
Small market size for the development of solar PV initiatives	M	Start with geographic regions with greater economic potentials for demonstration, encourage collaborative arrangements with neighboring countries, adopt aggressive information campaigns.
From Components to Outputs		
Problems in energy distribution operation and maintenance, political interferences	M	Clearly establish rules, rights and obligations through adequate information and publications among State, local governments and private stakeholders; Setup output obligations, at stakeholder responsibility and cost, within regulation for proper monitoring Include proper management training in training programs
Insufficient involvement of stakeholders in rural energy schemes	M	Set up rules to protect former stakeholders already engaged in informal electrification (through adequate upgrading or compensation measures) Develop specific and decentralized actions to identify and train national stakeholders Publicize widely through seminars, workshops and adequate publications (in professional associations, banking system)
Kerosene, LPG stoves or new biomass fuels not accepted	M	Support private stakeholders initial marketing efforts, through awareness campaigns and specific local support activities Provide technological watch to propose more attractive and better accepted products when available.
Limited or deficient use of new products	M	Take particular care of after sales services in product dissemination Set up awareness campaigns for full, rational and secure use of the new products
Overall Risk Rating	S	

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

3. Possible Controversial Aspects:

The issue of differential tariffs between rural, peri-urban, and urban areas on one side and between different zones in rural and peri-urban areas on the other side is a potential controversial one. Even with subsidies, tariffs will vary between zones of services. Another potential controversial issue is the enforcement of tax collection on the exploitation, production, and trade of woodfuels. Interest groups are

going to loose profits in the benefit of rural communities. The information, education, and communication campaigns will help sensitize different stakeholders in order to minimize these controversial issues.

G. Main Credit Conditions

1. Effectiveness Condition

- Key staff of AMADER – Director of Rural Electrification, Director of Household Energy, Director of Administration and Finance recruited through a publicly advertised selection process and their appointments confirmed by the appropriate authority.
- The operational and financial manuals are prepared and approved by IDA.
- Measures taken to meet IDA's financial management requirements, comprising:
 - design and installation of financial management systems;
 - appointment of a qualified Trust Agent and finalization of a Trust Procedures Manual;
 - counterpart funds opened and initial deposits of counterpart funds made;
 - appointment of a relevantly qualified external auditor for the project.

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

H. Readiness for Implementation

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

I. Compliance with Bank Policies

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

Koffi Ekouevi
Team Leader

Yusupha B. Crookes
Sector Manager/Director

A. David Craig
Country Manager/Director

Annex 1: Project Design Summary

MALI: Mali Household Energy and Universal Access Project

Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
<p>Sector-related CAS Goal: Promote rural economic development and reduce poverty</p>	<p>Sector Indicators: Improved household living standards due to the provision of decentralized energy services</p> <p>Increase in rural access to modern energy services to enhance social sectors</p> <p>Increase productivity by the use of modern energy</p>	<p>Sector/ country reports:</p> <p>Household expenditure surveys</p> <p>Socio-economic surveys</p>	<p>(from Goal to Bank Mission) Continued commitment of the Government to attract local private sector financing</p> <p>Strong interest from communes, villages and the private sector</p> <p>Political and social stability and economic growth</p>
<p>GEF Operational Program: Promote the adoption of renewable energy technology by removing barriers and mitigate CO2 emissions (GEF-Operational Program No. 6)</p>	<p>Outcome / Impact Indicators: Increased share of renewable energy technology in energy generation</p> <p>Quantity of CO2 emissions avoided due to project interventions</p>	<p>GoM program documents Enterprise surveys Project monitoring and evaluation reports</p>	<p>Project interventions contributes effectively to removal of barriers</p> <p>Promotion of lower-carbon technologies contributes to global environmental protection</p>
<p>Project Development Objective: accelerate the use of energy services in rural and peri-urban communities to improve quality of life</p> <p>develop sustainable</p>	<p>Outcome / Impact Indicators: Reliability of energy supply is increased . About 350 communities benefiting from modern energy services delivery and an additional 100 under preparation by year</p> <p>Reduction of harvested wood</p>	<p>Project reports:</p> <p>Progress reports Consultants reports Supervision reports Site visits AMADER Reports Supervision reports Consultants reports Site visits Progress reports Project monitoring and evaluation reports Impact assessment surveys</p> <p>Consultants reports</p>	<p>(from Objective to Goal)</p> <p>Adequate legal, regulatory and fiscal framework in place</p> <p>Reform minded Government Sufficient incentives in place to encourage private providers of energy services (PDES)</p> <p>Willingness of stakeholders to</p>

<p>woodland management at the village level, and promote interfuel substitution</p> <p>Global Objective:</p> <p>Removal of barriers to wider use of clean energy technologies</p>	<p>and reduction of greenhouse gas emissions</p> <p>Wood markets are functioning properly Taxes are collected and properly managed</p> <p>Increase in the number of viable PV systems installed by private operators</p> <ul style="list-style-type: none"> • About 500 institutional solar PV systems are installed over five years • About 450 large solar home systems are installed over five years • About 5000 medium solar home systems are installed over five years • About 4200 small solar home systems are installed over five years <p>Actual tons of CO2 abated by project interventions</p> <p>Improved awareness of RETs by private operators, end-users, and policymakers</p>	<p>Supervision reports Site visits Project monitoring and evaluation reports AMADER Reports Impact assessment surveys Supervision reports Consultants reports Site visits</p>	<p>be involved in financing and managing energy services schemes</p> <p>Sufficient incentives in place for woodfuel markets and substitution fuel markets to function in a satisfactory manner</p> <p>Subsidized) cost of RETs is attractive</p> <p>The progress achieved will be sustained.</p> <p>There is sufficient human resource capacity to carry out the relatively new technical and commercial activities</p> <p>Financing mechanisms of the Rural Electrification Fund are efficient and sustainable</p>
<p>Output from each Component:</p> <p>1. Capacity development and institutional strengthening</p> <p>Setting up of AMADER</p>	<p>Output Indicators:</p> <p>AMADER is fully operational</p> <p>Monitoring & Evaluation system is in place</p> <p>About 100 staff weeks of training undertaken by CREE's staff</p>	<p>Project reports:</p> <p>Project Reports:</p> <p>Progress reports</p> <p>Consultants reports</p> <p>Supervision reports</p> <p>Site visits</p>	<p>(from Outputs to Objective)</p> <p>Project is implemented on time and within budget</p> <p>Strong commitment of stakeholders</p>

Support to CREE	About 100 staff weeks of training undertaken by DNE's staff		Project is implemented on time and within budget
Support to DNE	About 100 staff weeks of training undertaken by DNCN's staff		
Support to DNCN	Monitoring and control of woodfuels flows and tax revenues in place		
2. Energy Services Delivery			
Sustainable mechanisms for providing energy services in rural and peri-urban areas is in place	40,000 consumers are connected in five years 1080 public institutions are connected in five years	Government of Mali energy and rural development program documents.	Strong commitment of stakeholders
A program of priority projects is prepared	125 schools in rural and peri-urban areas are connected in five years	Feedback from providers of energy services, NGOs and financial institutions	
Technical and financial support to rural energy activities is provided to buy down the cost of RETs	107 health clinics in rural and peri-urban areas are connected five years	Project monitoring and evaluation reports	
	500 institutional solar PV systems are installed over five years	Market surveys Progress reports Consultants reports Supervision reports Site visits Impact assessment surveys	
	9650 solar home systems are installed over five years A commercial bank manages on a sustainable commercial basis loans for DRE activities		
	An information, education, and communication strategy is in place and operational		
3. Household Energy			
Promotion of rural markets and village woodland management is launched	Increase in the forest area under community management from 350,000	Progress reports Consultants reports Supervision reports	

<p>Modernization of woodfuel production and trade is promoted</p> <p>Tax and control systems for traditional fuels are enhanced</p> <p>Substitution and household energy efficiency are enhanced</p>	<p>hectares to 1,4 million hectares in five years</p> <p>Improved techniques of charcoal production</p> <p>New tax and control systems are designed and operational</p> <p>Increase in households adoption of LPG from 4000 tons in 2002 to 20,000 in 2008</p> <p>power demand-side management initiatives at the household level to reduce the peak power by 5 MW by the use of at least 2000 evaporative coolers and 20,000 compact fluorescent lamps</p> <p>An information, education, and communication strategy is in place and operational</p>	<p>Site visits</p> <p>Project monitoring and evaluation reports</p> <p>Impact assessment surveys</p>	
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Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
<p>Project Components / Sub-components:</p> <p>1. Capacity and institutional strengthening</p> <p>2. Energy Services Delivery</p> <p>3. Household Energy</p>	<p>Inputs: (budget for each component)</p> <p>US\$ 11.64 million</p> <p>US\$ 28.24 million</p> <p>US\$ 13.47 million</p>	<p>Project reports:</p> <p>Progress reports</p> <p>Supervision reports</p> <p>Project monitoring and evaluation reports</p> <p>Impact assessment surveys</p>	<p>(from Components to Outputs)</p> <p>Government remains committed to reforms</p> <p>Incentives are sufficient for development of rural energy services by the private sector</p> <p>Counterpart funds are available on time</p> <p>Satisfactory participation process</p> <p>Authorities are able to integrate different inputs into their poverty reduction strategy</p>

Annex 2: Detailed Project Description

MALI: Mali Household Energy and Universal Access Project

The HEURA project has three main components: (i) Capacity Development and Institutional Strengthening (ii) Energy Services Delivery and (iii) Household Energy Management. These are described in further detail below.

By Component:

Project Component 1 - US\$11.64 million

The Capacity Development and Institutional Strengthening component will have four two main purposes:

- (i) to support the capacity development of the Regulatory Commission staff (CREE) to enable them to carry out their responsibilities of contract oversight, monitoring and compliance more effectively;
- (ii) to support institutional strengthening of the National Directorate of Energy (DNE) to monitor implementation progress of energy sector strategy and reform;
- (iii) to support institutional strengthening of the National Directorate of Nature Conservation (DNCN) to play an active role in the management of the household energy sector; and,
- (iv) to support the capacity development of AMADER to become an operational institution.

At present, the CREE, the DNE, and the DNCN are poorly equipped and lack the critical expertise needed to carry out their functions. AMADER is newly created and needs support to become operational and efficient.

Capacity development support to the CREE: This support will help ensure that the regulatory and institutional reform of the energy sector is deepened and paves the way for decentralized energy in rural and peri-urban areas. Following the restructuring of the power sector, the GoM has created the Commission de Regulation d'Eau et d'Electricite (CREE) in March 2000. This agency has a key role to play in fostering a competitive business environment attractive to private investors and operators. IDA will support the following activities:

- Training and capacity building program for the 5 Commissioners and 8 technical specialists of the CREE in the areas of financial regulation (20 staff weeks), analytical accounting (18 staff weeks), financial management (25 staff weeks), contract monitoring (10 staff weeks) and tariff design (30 staff weeks). These activities will be carried out through formal training sessions, study trips or on-the-job training, on a as-needed basis.
- Short and long term technical assistance (24 man-months equivalent) to develop and implement the monitoring and evaluation program of the operators, and to build awareness on regulatory issues among consumers and technical staff of the ministries.
- Establishment of a local area network with 15 workstations (hardware and software) and other office equipment, software for economic and financial modeling, accounting and other decision making tools.

Institutional strengthening support to the DNE: The GoM decision to develop energy services delivery services in rural and peri-urban areas have assigned to the National Directorate of Energy (DNE) new responsibilities for sector strategy and policy formulation, monitoring and evaluation, and impact assessment. IDA will support the following activities:

- Training and capacity building program for staff in the areas of policy formulation (20 staff weeks), monitoring, evaluation, and impact assessment (40 staff weeks), demand side management and energy efficiency (30 staff weeks). These activities will be carried out through formal training sessions, study trips or on-the-job training, on an as-needed basis.
- Short and long term technical assistance (30 man-months equivalent) to set up monitoring, evaluation, and impact assessment systems and databases, to develop a national energy efficiency program.
- The establishment of a local area network with 25 workstations (hardware and software), supply of 6 portable computers with related accessories, 18 printers, 16 photocopiers, and other office equipment; the rehabilitation of the documentation center with a state-of-the-art information/cataloging system, the supply of 10 vehicles.

Institutional Strengthening of the DNCN: For the household energy sector to be developed and properly managed besides the DNE, the DNCN should be strengthened to be more efficient in policy and strategy development, monitoring and evaluation of activities in the forestry sector. The DNCN has an important role to play in the supervision of activities to be undertaken by the woodland energy management sub-component of the household energy component. IDA will support the following activities:

- Training and capacity building program for staff in the areas of policy formulation (20 staff weeks), monitoring, evaluation, and impact assessment (40 staff weeks), supply side wood energy management (30 staff weeks). These activities will be carried out through formal training sessions, study trips or on-the-job training, on an as-needed basis.
- Short and long term technical assistance (30 man-months equivalent) to set up monitoring, evaluation, and impact assessment systems and databases, to develop a national wood energy management program.
- The establishment of a local area network with 25 workstations (hardware and software), supply of 6 portable computers with related accessories, 18 printers, 16 photocopiers, and other office equipment; the rehabilitation of the documentation center with a state-of-the-art information/cataloging system, the supply of 10 vehicles.

Capacity development of AMADER: This support would enable AMADER (i) to promote the expansion of the coverage, capacity, and reliability of rural distribution grids; (ii) to promote and support the financial performance of private rural electricity operators; (iii) to improve the delivery of energy services to basic social services and productive activities; (iv) to facilitate the development of small power projects using renewable energy sources, where feasible, to be owned and operated by the private sector or by community-based organizations (NGOs, cooperatives, etc.); (v) to promote the use of Solar Home Systems (SHS) in remote rural areas; and, (vi) to support initiatives in rural areas for productive uses of electricity to increase household income; IDA support would comprise the following goods, services and activities:

- office furniture, computers, and vehicles;

- working costs, and maintenance needs;
- capacity building, training and technical assistance programs for the staff;
- promotional activities;
- studies to evaluate the cross-sectoral impact of rural electrification investment.

Project Component 2 - US\$28.24 million

The energy services delivery component is composed of three main sub-components: (i) the promotion of investments to support energy services (ii) the promotion of multifunctional platforms; and (iii) information, education, and communication.

The promotion of investments to support energy service: The strategic approach to the promotion of energy services. The development of energy services in rural and peri-urban areas is a major priority of the government which considers access to basic electricity services as an important instrument in its fight against poverty. Access to energy in rural areas contributes to increasing income generation as well as employment opportunities, especially when developed in coordination with other social services such as education, health, agriculture and fisheries, and the provision of water. For this reason, reform of the energy sector, which has been underway since 1998, has led to the creation of an institutional framework for rural electrification, including domestic energy, with the establishment of AMADER and a Rural Electrification Fund[REF] to help promote greater coverage in rural areas. Two main elements underpin this new strategy: i) attracting the private sector to invest in and manage different schemes within the framework of public-private partnerships; to achieve this will normally require subsidies on the capital investment; ii) adopting a 'concession' approach for priority rural electrification schemes but with the flexibility to support smaller initiatives, within the concession area, proposed by cooperatives, consumer groups, village organizations or local operators. The approach is predicated on the following considerations:

- a. traditional approaches to rural electrification have not worked;
- b. it is important to emphasize the provision of "services" rather than "energy";
- c. public-private partnerships enhance the prospect for success;
- d. sizeable and well-targeted subsidies on investment are normally required;

Implementation of this strategic approach will be carried out through the newly-created institution, AMADER, with funding provided from the REF. To achieve these objectives in rural areas, the National Directorate of Energy (DNE) has elaborating a commercially- and community-driven policy framework (Cadre de reference pour le Developpement de l'Electrification Rural au Mali) for expanding access to electricity in rural areas; further details can be found in the Project File. This framework is aimed at developing an integrated program of new small and medium private suppliers, providing investment incentives, and helping promote affordable technologies necessary to accelerate access to electricity. A revised Master Plan (MP) for rural electrification will then be elaborated to identify and map out sustainable rural electrification schemes that the AMADER would tender to the private sector and community-based organizations for financing their implementation and operation. The plan would cover both extensions of the existing grid to delineated rural areas and/or installation of mini-grids through traditional and renewable energy technologies in isolated areas, leaving the final choice of technology to the developer. The Government is also benefiting from a GEF grant through the Bank and UNDP to remove barriers to the development of renewable energy technologies. This is intended to increase the rate of expanding access of energy to the rural poor by providing access to community services in clinics, dispensaries, schools, and community centers .

Process for the Selection of Private Operators and Provision of Subsidies. The selection of private

operators will take place within the framework of a country wide plan for rural electrification that will be updated taking into account the priority elements of the government's poverty reduction strategy [PRSP]. Three main procedures will be adopted to select private operators and which are summarized below:

(i) competitive bidding on the basis of the lowest subsidy for a given project area and which satisfies the technical requirements;

(ii) competitive bidding on the basis of a detailed bid package prepared by AMADER for a concession area that forms part of the government's priority rural electrification plan;

(iii) a direct bid proposal for a specific project area; in such cases, a provisional authorization will be granted immediately and a two month period allowed for the reception of alternative proposals; once a proposal is accepted, a firm business plan for the project area must be provided within six months.

Experience with Decentralized Service Companies [DSCs] The commercial and socioeconomic viability of this new approach to rural electrification has been demonstrated convincingly by two different schemes that have been operating successfully in different regional areas of the country: Yeelen Kura Company in the cotton area and the Koraye Kurumba Company in the Kayes region of Mali with a large migrant population.

SSD Yeelen Kura.

This company has been operating in a cotton producing region of Mali where there were approximately 70,000 inhabitants of which 8,000 were potential customers. The basic goals were to (i) provide minimum lighting and audiovisual services to very low income homes as well as to education and health centers; (ii) meet the electrical needs of communities for small enterprises, water pumping, and refrigeration activities.

SSD Yeelen Kura is a limited company, based in Mali, whose capital is shared equally between EDF (50%) and NUON (50%); it represents 18 local offices situated in several villages in 8 prefectures. The total cost of the project was approximately \$4 million. A subsidy on the investment was required to make the overall operation commercially viable; a Dutch grant, for 1,700 solar home systems, helped finance 50% of the investment cost. Different categories of service were provided—from minimum lighting (2 lamps) to lighting(3 lamps) and radio/TV. Monthly payments to consumers for this service vary correspondingly from about \$8.80 to \$17.70. The company has been in operation since late 2000, its financial position has been sound throughout, and the operation has been a commercial success.

SSD Koraye Kurumba

This company is a limited company, based legally in Mali, with two shareholders: EDF (70%) and Total FinaElf (30%). Its area of operation is in the west region of Mali, also in a cotton producing region, with a large migrant population. The cost of the project is about \$110,000 covering 5 villages and with 600 potential consumers. No subsidy was required primarily because of the higher capacity to pay of this mainly migrant community. The operation began in November 2000 and by end 2002 there were 500 customers connected either to the mini-diesel grid(90%) or to individual PV systems(10%). Up to 7 different categories of service were offered, varying from minimum lighting(2 lamps) to 9 lamps and 1 'price'. The monthly payments varied correspondingly from \$8.80 to about \$36.

Further details of these two operations can be found in the Project File.

Project Selection and Development Project selection and development will be the responsibility of AMADER which will screen, evaluate, and authorize financing and/or subsidies for all development proposals, except for projects of less than 50kW. The tendering and evaluation process will be in accordance with the three procedural modalities described above. A full description of the different authorizations under the responsibility of AMADER, including issues affecting the license area, its duration and exclusivity, and regulations governing the tendering procedures are available in the Project File.

The first step in project selection will be to determine the threshold demand for the targeted communities and what level of payment the local population can afford in relation to the amounts required to cover operating costs. Non-viable projects may drag an entire program into losses, resulting in the diversion of

subsidies to sustaining the existing system rather than expanding access to electricity.

A particularly effective approach to project selection consists in emphasizing the contribution—especially the financial contribution—to be made by the local organization sponsoring the project, whether community associations, cooperative organizations, private companies, local authority, or nongovernmental organization. This demand-driven approach to selecting projects will help ensure that those selected have local support and that there is sufficient willingness to pay for electricity. It will also improve the probability that the forecast demand for new connections and electricity will materialize rapidly, thus helping to ensure projects' financial viability, and that the allocation of capital costs and subsidies is targeted toward maximizing the desired output.

Financing Mechanisms The financing mechanisms for output-based rural energy programs may include an IDA credit, a grant from the GEF and other donor resources. Private sector investors and community-based organizations (private rural entrepreneurs) would receive subsidies for the investment cost of on- or off-grid rural energy systems from the *Rural Energy Fund* (REF), following appropriate bidding procedures.

The Rural Energy Fund (REF) The Government may consider endowing the REF in different ways, depending on resource availability. General budgetary resources may complement an oil levy, an urban kWh sold levy, and grants from bilateral and multilateral donors. The purpose of the REF is to use subsidies as catalyst for expanding private and community-based investment to support increased access to electricity in rural areas. The REF would also play an equalizing role by facilitating socially- and economically-viable access to electricity, and by funding productive demand for energy, REF would contribute to the economic development objective of reducing income poverty. For example by funding public institutional or community-oriented demand for special services requiring electrification (social development impact of poverty reduction); and the need for household lighting and other essential uses (household welfare).

Disbursements from REF. The disbursement profile for the REF has been estimated over a 6 year period for each of the three tendering modalities:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	US\$ Million					
Process (i)	0.5	1.5	2.0	2.5	2.5	2.5
Process (ii)				0.5	1.0	2.5
Process(iii)		0.25	0.25	0.25	0.25	0.25

The profile for Process (i) is based on the assumption that there will be seven separate tendering processes during the first four years of implementation i.e. 2003-2006.

Key Economic and Social Targets. The key customer, economic and social targets for each of the six years of implementation(2003-2008) have been estimated and are summarized below:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	TOTAL
	Number of Consumers						
Domestic	1,500	4,500	6,500	7,500	10,000	10,000	40,000
Schools	5	15	20	25	35	35	125
Health							
Centers	2	10	15	20	30	30	107
Prod.							
Activities	30	100	150	200	300	300	1,080

The promotion of multi-functional platforms investments: . In rural Mali, the multifunctional platform initiative funded by UNIDO, IFAD and UNDP has met enthusiasm from communities and policy makers. Where modern electricity services do not exist, these devices are the first exposure to motorization of many activities that had always been undertaken up to then using human energy. IDA support to this initiative would comprise the following:

- A study to assess the sustainability of existing multifunctional platforms focusing on: (i) their ownership, management, operation, maintenance, and equipment renewal aspects; (ii) their viability in the presence of other private energy services companies; and, (iii) the possibilities for scale up taking into account environmental concerns.
- Micro-financing to support the equipment start up costs of multifunctional platforms to be operated by community associations, women associations, NGOs, and the private sector.

Information, Education, and Communication : For communities to be aware of energy services schemes, there is a need to reach out to these communities with relevant information for them to have basis to participate in project activities: IDA support will include :

- extensive information and promotional campaigns through existing media in rural areas (radio, institutional, grassroots, national and regional workshops),
- demonstration workshops where utilization of energy devices are shown to prospective users
- field trips to neighboring villages where services are installed and working
- organization of focus groups to have feedback from users and to register concerns from prospective users
- organization of workshops for private operators, NGOs, and other civil society groups

- updating information on performance and impact assessment

Project Component 3 - US\$ 13.47 million

The main issues associated with the household energy sector in Mali can be summarized as follows: (i) a high consumption of wood fuels representing a risk to deforestation and environmental degradation (ii) low energy efficiency for both charcoal production and consumption; (iii) household fuel substitution is hampered by a lack of fossil fuel resources, reliance on expensive petroleum imports, and very low incomes. This component is a scaling up and strengthening of the former Household Energy Project (HEP) closed in 2000. The component is subdivided in three sub-components: (i) community-based woodland management (ii) interfuel substitution and household energy efficiency and (iii) information, communication, and training.

Community-based woodland management: Based on a thorough evaluation of operational conditions and sustainability of the rural markets already created under the HEP, this activity will provide support for the further development of rural markets and village woodland management systems. This will take place in woodfuels supply basins that are already partly covered with rural markets as well as new ones, based on: (i) providing services by trained private operators to create rural woodfuels markets and village woodland management schemes, according to community decisions and local conditions; and (ii) developing standard contracts for use by communities and local governments for management and exploitation of wood resources. Key

activities will include the modernization of woodfuel production and trade, the creation of modern charcoal production associations with efficient techniques and adequate management capacity; and the development of formal urban professional trade associations. This sub-component will pay a particular attention to effectiveness of tax and control systems. Based on new institutional and regulatory reform, this activity will delegate tax collection and monitoring of woodfuel flows to municipalities following the decentralization principles. Woodland management responsibility will be transferred from the State to the regional and municipal level, through the provision of adequate information, training and technical assistance to local government and State forestry services.

Interfuel substitution and household energy efficiency: The two main activities of this sub-component are: (i) the promotion of efficient wood energy and alternative products; and (ii) power demand-side management. The promotion of efficient wood energy and alternative products is a continuation and extension of HEP project demand side component. Its main thrust is the promotion of efficient charcoal stoves and substitution by kerosene, LPG and alternative biomass fuels. A process of certification will be established for best quality and most environment friendly products. Regional private operators will provide adequate technical assistance and training to efficient charcoal stove producers, while support will be given through technical assistance and investment subsidies to private stakeholders for importing or locally manufacturing kerosene stoves and new biomass fuels (briquettes). Awareness campaigns, using conventional media and grassroots promotion activities, will promote the purchase and efficient use of the new products. The main thrust of the power demand-side management activity is to promote the penetration of low-consumption lamps and energy efficient evaporative air-coolers to reduce the peak power demand curve and to reduce the electricity bill for end-users. Private distributors will receive support for the promotion of energy efficient products and appliances. Introduction of air-coolers, to substitute for inefficient air-conditioners that are unknown in Mali, will be supported through a demonstration program.

Information, Education, and Communication: This sub-component has two main set of activities: (i) launching extensive information and promotional campaigns through existing media in rural areas (radio, institutional, grassroots) in order to raise interest and formal requests from rural communities in support of the community-based woodland management and interfuel substitution activities; and (ii) woodfuel sector planning and monitoring. This latter activity will be dedicated to monitor sector performance as well as measure the impact of reform and project activities on the population and the environment. It will be based on regularly to be updated information on (i) regional woodfuel supply master plans (that for each supply basin aim to manage overall regional balances between wood exploitation and forestry resources); and (ii) adequate environmental, forestry, and social monitoring data.

Annex 3: Estimated Project Costs
MALI: Mali Household Energy and Universal Access Project

Project Cost by Component	Local US \$ million	Foreign US \$ million	Total US \$ million
CD & Inst. Str.	7.00	3.70	10.70
Energy Services Delivery	23.68	2.11	25.79
Household Energy	10.94	1.33	12.27
Total Baseline Cost	41.62	7.13	48.76
Physical Contingencies	0.08	0.08	0.15
Price Contingencies	4.00	0.44	4.44
Total Project Costs	45.70	7.65	53.35
Total Financing Required	45.70	7.65	53.35

Category Name	Local US \$ million	Foreign US \$ million	Total US \$ million
Civil Works	0.29	0.00	0.29
Goods	0.52	1.84	2.36
Consultancy	2.50	5.69	8.19
Training & Workshops	1.48	0.12	1.60
REF-funded Subprojects	24.65	0.00	24.65
Special Funds Household Energy	10.82	0.00	10.82
Operating Costs	5.44	0.00	5.44
Total	45.70	7.65	53.35

Annex 4: Cost Benefit Analysis Summary
MALI: Mali Household Energy and Universal Access Project

1.1 Synthesis

The following economic and financial analysis have been performed for the household energy and universal access project.

US \$ million	Economic	Financial	Fiscal impact
Cost	99	128	29
Benefit	128	132	29
Net benefit	29	4	
IRR	29%	16%	
Environmental benefit	32		
Net benefit with environmental	61		
IRR with environmental	61%		

Notes: The discount rate used for the analysis is 12% discount rate, 2004-2032

1.2. Economic analysis

1.2.1. Results

(MUS\$)	NPV	EIRR
Project costs (without contingencies)	33	
Operating and replacement costs		
Rural electrification	17	
Multi-functional platforms	1	
Forestry management	3	
Inter-fuel substitution and energy efficiency	44	
Total	66	
Total costs	99	
Benefits		
Rural electrification	57	
Multi-functional platforms	4	
Forestry management	8	
Inter-fuel substitution and energy efficiency	58	
Total benefits	128	
Net benefits	29	
Economic IRR		29%

1.2.2. Sensitivity analysis

Global sensitivity to cost and benefit variations is as follows :

EIRR	120%	110%	90%	80%	SV
Costs	16%	22%			128%
Benefits			21%	14%	78%

SV : Switching value

One specific parameter will be considered for overall project sensitivity : the fossil fuel costs:

EIRR	120%	110%	90%	80%	SV
Fossil fuel costs	23%	26%	32%	35%	170%

1.2.3. Assumptions

The economic analysis is based on three cost-benefit models :

- one for rural electrification, also downscaled and used for multi-functional platforms;
- another for household energy : use of equipments and commercial fuels for cooking, mainly in urban areas;
- and finally one for power demand-side management in urban areas (substitution of existing systems by efficient air-coolers and bulbs).

Economic return is calculated over a 2004-2029 period, due to village distribution grid equipments, 5 years (project investment) + 20 years (life duration). Discount rate is 12%.

Assumptions for each of these models, as well as sensitivity specifics, are detailed in part 2.

1.3. Environmental impact

1.3.1. Results

Greenhouse gas impact mitigation has been estimated as follows:

(1000 tons of CO2)	Over project period	Over 15 year period
Rural electrification	26	278
Multi-functional platforms	1	7
Forestry management	577	3190
Inter-fuel substitution and energy efficiency	2855	14315
Total	3459	17791

In monetary equivalent:

(MUS\$)	NPV	EIRR
Environmental benefits	32	
Net benefits including environment	61	
Economic IRR with environmental		60%

5 US\$/ton of CO₂

1.3.2. Assumptions

Greenhouse gas mitigation is considered coming from modification of energy mix :

Components	Positive impacts	Limited negative impacts
Rural electrification and multi-functional platforms	Reduction of kerosene for lighting Limited direct use of other fossil fuels	Use of diesel for power generation
Forestry management	Better forestry productivity in managed areas	
Inter-fuel substitution and energy efficiency	Reduction of wood and charcoal use	Incremental use of kerosene and LPG for cooking
	Reduction of electricity consumption through demand-side management	

Mitigation has been calculated using the following values :

Fuel	Emission
Gas oil	0,9 kg of CO ₂ per KWh in main system thermal generation
Diesel	1,7 kg of CO ₂ per liter in rural electrification
Kerosene	2.4 kg of CO ₂ per liter for lighting or cooking
LPG	5.6 kg of CO ₂ per kg
Wood	From 1.7 kg to 0.3 kg of CO ₂ per kg of wood, according to forestry management conditions 1.4 kg of CO ₂ in case of sequestration (improvement of forest productivity)
Charcoal	wood equivalent, depending on charcoal production efficiency

Source: DNE, 2002

Cost of emissions is estimated at 5 US\$/on of CO₂ in reference of similar projects funded by GEF in the last decade.

1.4. Fiscal impact

1.4.1. Results

Project fiscal impact appear as follows :

Fiscal impact (MUS\$)	NPV
Rural electrification	- 1.6
Multi-functional platforms	0.1
S/Total Energy services	- 1,5
Forestry management	15.5
Inter-fuel substitution and energy efficiency	14.6
S/Total Household energy	30.3
Total	29.0

1.4.2. Assumptions

Main consequences of the different project's components in terms of tax can be listed as follows:

Component/sub-component	Tax loss/gain	Reason
2.	Energy services	LossReduction of consumption of kerosene for lighting and direct use of other fuels to power engines (diesel, gasoline)
		GainIncrease of consumption of diesel used by new village grids
3.1	Forestry management	GainIncrease of tax coverage on forestry products (fuelwood and charcoal)
3.2	Interfuel substitution	GainIncrease of kerosene and LPG consumption
3.2	Power demand-side management	LossReduction of tax and duties on equipments
		LossReduction of energy consumption due to air-coolers and LCB

1.5. Financial analysis

1.5.1. Results

(MUS\$)	NPV	FIRR
Total costs	128	
Total benefits	132	
Net benefits	4	
Financial IRR		16%

1.5.2. Assumptions

Financial benefits will differ basically (i) within the energy service component (mainly rural electrification sub-component), substituting economic value of service by reasonable tariff level of future utilities (see rural electrification specifics) and (ii) within the household energy component considering commercial price of fuels.

2. ANALYSIS PER COMPONENT

2.1. Energy services

2.1.1 Results

(M US\$)	NPV	EIRR
Component costs (without contingencies)	18	
Operating and replacement costs		
Rural electrification	17	
Multi-functional platforms	1	
Total O and R costs	19	
Total costs	37	
Benefits		
Rural electrification	57	
Multi-functional platforms	4	
Total benefits	61	
Net benefits	25	
Economic IRR		36%

2.1.2. Assumptions

Rural electrification

Cost-benefit analysis of this component goes over a 25 year period (defined by village grid life duration of 20 years).

	Quantified parameter
Costs	Project costs + energy supply operation and replacement costs
Benefits	Economic value of service, estimated from spontaneous electrification schemes
Environmental benefits	CO2 mitigation due to energy mix changes (reduction of kerosene for lighting, limited savings on other fossil fuel - diesel or gasoline - direct use)

Baseline scenario is based on persistent use of low pre-electrification services, such as kerosene lamps for lighting, second-hand car batteries to power small television sets in better-off families, and poorly efficient diesel or gasoline engines for some productive activities or in some cases for water delivery.

Project scenario is rural electrification, considered upon the following hypothesis :

- electrification unit scheme of 230 clients, of which 200 domestic and “para-domestic” (shops) clients with some productive activities, social facilities and public lighting;

- off-grid village schemes including diesel-powered micro-grid for clients in the village center and individual solar systems for remoter (domestic or non domestic) clients, leading to an average of 64% of grid customers and 34% of solar customers; market segment supposed to be electrified in year 1, with reasonable hypothesis on yearly increase of overall client basis and energy consumption per grid user;
- pay-for-service systems, without metering for smaller customers (flat tariffs) and with meters for bigger clients (large domestic clients, workshops with needs of power, pumping facilities);
- some non-paying facilities (basically few public lighting posts), costs being covered through tariffs by paying customers;
- low access fees to allow poorer villagers to get access to service and full recuperation of costs through monthly tariffs;

This “unit” scheme sizing is only established for modeling purpose, as globally representative of off-grid rural electrification in Mali. Real schemes will be wider of smaller according to AMADER tenders’ results or local initiative, as well as proportion between solar and diesel-grid, according to local market density and stakeholder decisions (from all-grid to all-solar scheme).

Total electrification objective will represent the equivalent of about 127 such schemes, meaning the electrification of 30 000 domestic and non domestic clients.

Electrification costs cover :

- initial investment and replacement costs for (i) diesel generation (civil work, generator, LV facilities), associated LV distribution grid, (ii) solar systems (panels, regulation, batteries), (iii) connection and metering when considered and (iv) indoor installation, including wiring and lighting systems. Unit costs and life duration are detailed for each equipment in supporting cost-benefit tables;
- technical operation and maintenance costs, as well as
- pre-investment costs (study and engineering), commercial investment, operation for management and monitoring costs.

Initial investment costs are around 700 US\$ per customer (domestic or not) , meaning about 600 US\$ for diesel-grid customer and 820 US\$ for solar customer. Solar investment range between 9 to 12 US\$/Wp according to service level.

Economic analysis uses as benefit a value of service established at 8.3 US\$per month for minimum “basic”service (smaller client, 2-3 bulbs) in reference of customer willingness-to-paying spontaneous electrification schemes in Mali (2500 F CFA per bulb and per month), about 20-30% over the pre-electrification service price. Value for bigger clients is established by pro-rata of service, which leads to a value of about 56 US cents/KWh for metered clients. Service value is to compare with avoided costs found for smaller customers (kerosene lighting only, between 6 and 12 US\$ for 2 to 4 lamps) and for bigger customers (kerosene lighting + battery charging for TV in better-off families, over 20 US\$).

Quite a number of benefits, identified in impact assessments of electrification upon poverty alleviation and gender equity, can be quoted, but cannot be quantified in the present analysis: improvement of family and

women daily routines, alleviation of house chores, impacts on health and education, family and community safety and security.

Other figures are used for the financial analysis, based on the following assumption of future utilities' tariffs, based on (i) financial long term marginal cost, (ii) favorable access conditions (connection fees equivalent to 3 months of consumption) and (iii) project financial IRR around 25% for private stakeholder.

Due to significant project support (as a whole around 64% of the initial pre-investment and investment costs), resulting tariffs are estimated around 4 US\$ per month for basic service. This means that poorer clients (basically those benefitting of flat tariffs with SHS or minigrid connections) will pay significant less the same than before electrification while getting a far better service, and metered customers will pay around 26 US cents/KWh, meaning around 40% over main utility tariffs for better-off.

GEF specifics

Specifically regarding expected GEF results for solar energy development, this means:

- 34% of the target population equipped in solar, i.e. over 10,000 solar system users, of which 9500 households using SHS up to 100 Wp, about 500 social and community facilities;
- with overall 5 year installed capacity over 760 Wp;
- CO2 mitigation around 155,000 tons of CO2 over 15 years.

Impacts assessment is based on mainstream procedure selected for project implementation (pay-for service). Because it will sustainably boost the local solar market and allow establishing decentralized solar maintenance facilities (trained electricians, solar system spare parts) in electrified communities, the project will also bring impacts on direct sales to domestic and non domestic clients in neighboring unelectrified communities (non quantified indirect benefits).

Multi-functional Platforms

The multi-functional platform sub-component is based on a model basically similar to the one considered for rural electrification, with very small unit systems composed of one workshop (mill or equivalent) and a limited grid to neighboring users (around 20 customers). The project will support over 80 schemes, that will provide energy to village productive facilities and allow electrifying some additional 1700 customers.

Elements of costs for fossil fuels are as follows :

US\$/1000 liters (kerosene)/ US\$/ton (diesel)	Supply cost (CIF)	Commercialization margin	Tax level
Kerosene (ex-Cotonou)	393	92	113
Diesel (ex-Abidjan)	377	135	160

Source, DNE, Prices for April 2003

2.1.3. Sensitivity analysis

Sensitivity to electrification investment cost is estimated as follows :

EIRR	120%	110%	90%	80%
Fossil fuel costs	35%	35%	36%	37%
% of rural electrification objective completed			36%	36%
Electrification investment costs	34%	35%	37%	38%
Service value			30%	24%

SV : Switching value

2.2. Household energy

2.2.1 Results

(MUS\$)	NPV
Component costs (without contingencies)	9
Operating and replacement costs	
Forestry management	3
Inter-fuel substitution and energy efficiency	44
Total	48
Total costs	57
Benefits	
Forestry management	8
Inter-fuel substitution and energy efficiency	58
Total benefits	66
Net benefits	9
Economic IRR	55%

2.2.2. Sensitivity analysis

Sensitivity to fossil fuel costs, forestry management and demand management benefits are as follows :

EIRR	120%	110%	90%	80%	SV
Fossil fuel costs	17%	30%			124%
Gain of forestry productivity due to management			47%	44%	
Effectiveness in woodfuel demand management			25%	10%	81%
Effectiveness in power demand management			39%	32%	

SV : Switching value

2.2.3. Assumptions

Regarding woodfuels and other cooking fuels (sub-components 2.1 and 2.2), household energy cost-benefit analysis is based on a urban supply demand mode based on the Malian “Globus” model derived from existing woodfuel supply masterplans (SDAB) built up for main cities of the country.

In the baseline scenario, the model consider the following hypothesis:

- continuing progression of charcoal in substitution of fuelwood in urban context, with its generalization in bigger cities and significant progression in smaller ones;
- penetration of LPG only among better-off customers, and slow progression of kerosene for cooking, in spite of previous public efforts of promotion;
- persistence of low-efficient techniques and practices, for energy use (traditional stoves for fuelwood and charcoal) as well as for charcoal production (traditional kilns);
- as well as poor forestry management (lack of follow-up of existing rural markets, development of anarchic tree cutting);
- and limited performances of the existing public control and tax system of the woodfuel sector.
- persistent dominant use of high energy consumption electric appliances such as incandescent bulbs and air-conditioning systems in public as well as private building, leading to over-costs of energy and power for the Malian main utility.

In the project scenario, the model implies:

- on demand side, substitution of wood and charcoal by kerosene and LPG as popular fuels, as well as a globally better energy efficiency due to shift to more efficient equipment and better use due to public awareness campaigns. This leads to new energy consumption patterns and lower pressure on forestry resources;
- within this new context and on supply side, reduction of tree cutting due to better charcoal production practices, increased share of wood products coming from community-managed forestry resources and better control and tax system, with significant financial return for communities and central government.
- replacement of air-conditioning systems and incandescent bulbs by air-coolers and fluorescent LCB.

Benefits are based on the following assumptions regarding project results:

- 85,000 improved fuelwood stoves, 300,000 improved charcoal stoves as well as 40,000 LPG “popular” stoves (mainly 6 kg) and 100,000 kerosene stoves disseminated over the project implementation period, leading to global penetration rates about 30% of urban households for LPG and kerosene;
- better use of equipments due to proper public awareness campaign leading to a sustainable 5% reduction of energy consumption fo fuels;

- savings on fuelwood and charcoal consumption leading to a 40% reduction of wood-cutting by 40% on the 5th year of project implementation;
- securing existing rural market and implementation of about 1000 community based forestry management schemes and rural markets, providing over 50% of the woodfuel supply to cities and increasing global charcoal production efficiency by 2 points (from an average of 16% to 18%);
- promoting the replacement of 5,000 air conditioning systems by evaporative air-coolers, of which 2,000 in public facilities and 3,000 among private consumers, as well 20,000 low consumption bulbs, leading to a peak load reduction of about 4,5 MW and significant energy savings.

In this component as in the previous, some impacts, such as indoor-pollution mitigation due to fuelwood use reduction, women time gain and house chore alleviation (woodfuel sector) as well as indirect effects on air-cooler and LCB future market development (power demand-side management) are identified but not quantified. Cost-benefit balance of this component only goes over a 15 year period (modeling project effects over a longer period being considered as inaccurate).

Forestry management

Regarding community-based forestry management, quantified costs and benefits are as follows :

	Quantified parameter
Costs	Project costs + forest management follow-up costs
Benefits	Increased forestry productivity in managed areas
Environmental benefits	CO2 sequestration due to forestry resource increased productivity in managed areas

Forest management follow-up operation cost, in the case of community-based management, is estimated at an equivalent of 3,8 US\$/ton of wood, based on regional Sahelian and Malian experience.

Proper forestry management and tree-cutting (with rotation systems and quotas) allows lowering pressure on already over-exploited and degraded zones and is considered to lead to higher forestry productivity in managed areas by around 20%. Economic benefits may be estimated in terms of avoided costs of management of equivalent supply areas (at 8.8 US\$/ton of wood, including investment and follow-up operation cost), while environmental benefits derive from increased capacity of sequestration of local forestry resources.

Substitution and energy efficiency

Regarding substitution and energy efficiency, quantified costs and benefits are as follows :

	Quantified parameter
Costs	Project costs + investment and operation costs of new systems for households (new cooking equipments and fuels, air-coolers, LCB)
Benefits	Savings on investment (equipment replacement) Saving on operation costs (fuel purchase) of systems discarded by

	households (former cooking equipments and fuels, air-conditioning systems, conventional bulbs); Savings on forestry management necessities due to reduction of wood product uses (demand-side management) and more efficient charcoal production
Environmental benefits	CO2 balance due to new energy mix (inter-fuel substitution and energy conservation)

Apart of project costs, economic analysis will thus consider three aspects : balance on equipments, balance on fuels, and benefits due to avoided forestry management : specifically, economic cost of saved fuelwood products will include the costs that would have been necessary to insure their production in a sustainable way. Elements of costs of fossil fuels are as follows :

US\$/1000 liter (kerosene)/ US\$/ton (LPG)	Supply cost (CIF)	Commercialization margin	Tax level	Subsidy
Kerosene (ex-Cotonou)	393	92	113	92
LPG (ex-Cotonou)	532	577	45	620

Source, DNE, Prices for April 2003

The following economic and financial analysis have been performed for the household energy and universal access project.

US \$ million	Economic	Financial	Fiscal impact
Cost	99	128	29
Benefit	128	132	29
Net benefit	29	4	
IRR	29%	16%	
Environmental benefit	32		
Net benefit with environmental	61		
IRR with environmental	61%		

Notes: The discount rate used for the analysis is 12% discount rate, 2004-2032

Summary of Benefits and Costs:

Main Assumptions:

Sensitivity analysis / Switching values of critical items:

Annex 5: Financial Summary
MALI: Mali Household Energy and Universal Access Project
Years Ending

	IMPLEMENTATION PERIOD						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Total Financing Required							
Project Costs							
Investment Costs	7.7	7.8	9.3	10.6	12.5	0.0	0.0
Recurrent Costs	0.7	1.1	1.2	1.2	1.2	0.0	0.0
Total Project Costs	8.4	8.9	10.5	11.8	13.7	0.0	0.0
Total Financing	8.4	8.9	10.5	11.8	13.7	0.0	0.0
Financing							
IBRD/IDA	6.3	6.0	6.7	7.6	9.0	0.0	0.0
Government	0.9	1.0	1.3	1.0	1.1	0.0	0.0
Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Provincial	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Co-financiers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
User Fees/Beneficiaries	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GEF	0.6	0.6	0.7	0.8	0.8	0.0	0.0
Private Sector	0.6	1.3	1.8	2.3	2.9	0.0	0.0
Total Project Financing	8.4	8.9	10.5	11.7	13.8	0.0	0.0

Main assumptions:

Annex 6(A): Procurement Arrangements

MALI: Mali Household Energy and Universal Access Project

Procurement

General

A Country Procurement Assessment Review (CPAR) was carried out in Mali in December 1998. The Malian Procurement Code is regulated by Decree No 95-401 of November 10, 1995. This code was revised in 1995, and in 1999 with IDA assistance. In general, the country's procurement procedures do not conflict with the Bank Guidelines. No special exceptions permits or licenses need to be specified in the credit documents, since Mali procurements practices allow IDA procedures to take precedence over contrary provisions in local regulations.

Use of Bank Guidelines

Procurement of works, goods, and consultant services financed by the IDA credit will be carried out in accordance with the appropriate IDA Guidelines: Procurement for IBRD Loans and IDA Credits (January 1995, revised in January and August 1996, September 1997, January 1999) and Guidelines for the Selection of Consultants by the World Bank Borrowers published in January 1997 and revised in September 1997, January 1999, and May 2002. To the extent practicable Bank's standard bidding documents for works and goods, and Standard Request for Proposals for consultants as well as all standard evaluation forms will be used throughout the project implementation. The Bank's Standard Bidding Documents and Standard Evaluation reports will be used for ICB. National Competitive Bidding (NCB) advertised locally, will be carried out in accordance with the Republic of Mali procurement laws and regulations acceptable to IDA. NCB procedures should ensure that (i) bids are advertised in national new papers with wide circulation; (ii) the bid document explain clearly the bid evaluation and award criteria, (iii) bidders are given adequate response time (minimum four weeks) to prepare and submit bids; (iv) bids are awarded to the lowest evaluated bidders and not arbitrarily; (v) eligible bidders, including foreign bidders, will not be precluded from participating; and (vi) no domestic preference margins are applicable to domestic manufacturers and suppliers.

Advertising

The draft General Procurement Notice (GPN) was prepared for the project and will be finalized and published in Development Business and in National press after board approval. It shall include all contracts under ICB and all large consulting contracts (i.e estimated to cost \$ 100, 000 or more) The GPN will be updated on a yearly basis and will show all outstanding International Competitive Bidding (ICB) for works and goods contracts and all international consulting services. In addition, a specific procurement notice (SPN) is required for all goods and works to be procured under ICB and Expression Of Interest (EOI) for all consulting services costing with US\$ 100,000 equivalent or more. All NCB procurement packages for goods and works will be advertised in the national dailies. The related bidding documents for goods and services will not be released and the shortlist for consultants services will not be prepared before eight weeks after the GPN has been published. Sufficient time will

be allowed to obtain bidding documents.

Procurement Capacity Assessment

A procurement capacity assessment was carried out during the appraisal mission to assess the capacity of the implementing unit. A detailed procurement capacity assessment report has been prepared and kept in the project files. The review addressed the legal aspects, procurement cycle management, organization and function of procurement staff, support and control system, and record keeping. The review assessed the risks (institutional, procedural) that may negatively affect the abilities of AMADER to carry out procurement activities as “high”. The main risks identified in the assessment are the following: (i) deficient procurement planning and filing capacity; (ii) lack of sound support and control system; (iii) staff not sufficiently familiar with IDA procurement policy and procedures. Details of the proposed action to address the above findings are presented in the attached Annex 6.a. The plan includes: (i) hiring of a qualified procurement specialist at AMADER; (ii) the use of consultant as necessary to provide assistance in procurement (iii) the reinforcement of the implementing unit and the beneficiaries through training of staff in the area of procurement; (iiv) the development of a project Implementation Manual (POM) which ensures adequate coverage of procurement (v) the inclusion of procurement planning and monitoring and contract management tools in the computerized project financial management system and (vi) the reorganization of the project filing system so that all procurement documents are readily available

Procurement Planning

A draft detailed procurement plan for the first year of implementation and a general procurement plan for the entire project to be prepared by the Government with assistance of the procurement specialist at the Mali country office were discussed during the negotiations. They shall be finalized before effectiveness. The procurement plan for the first year was prepared based on the project initial needs. The agreed plan will be updated yearly, and sent to IDA for clearance no later than three months before the end of the fiscal year. The plan includes relevant information on goods, civil works and consulting services under the project, as well as the timing of the procurement process. This plan will be reviewed by IDA during each supervision mission.

A project launch workshop will be organized before effectiveness to familiarize the AMADER staff with the Bank’s procedures. The workshop will cover procurement policy and procedures and their application to procurement arrangements planned for project implementation, disbursement, reporting and audit requirements.

The government gave assurance at negotiations that it will (i) use the Bank’s Standard Bidding Documents, for ICB, the standard Request for proposals for the selection of consultants, and the standard Bid Evaluation Report; (ii) apply procurement procedures and arrangements outlined in the above documents; (iii) carry out an assessment of the effectiveness of the bidding procedures and performance as relate to project procurement experience, and propose for IDA’s consideration any modifications to the current procedures to the extent that would accelerate procurement while maintaining compliance with the Bank’s procurement Guidelines, adequate contract award and payments.

Procurement Implementation Arrangements

Procurement of works, goods and services would be the responsibility of AMADER. Such responsibility shall be delegated to a procurement specialist based at its Headquarters. The procurement specialist would be primarily responsible for (i) the preparation and implementation of the procurement plan; (ii) monitoring the progress of procurement; (iii) the preparation of bidding documents for goods and civil works, contracts and request for proposals for consulting assignments; and bid opening and evaluation.

Information regarding procurement administration will be collected, recorded and sent to IDA through quarterly reports by the procurement specialist. These reports will include information about (i) complaints/disputes; (ii) performance of contractors/consultants; (iii) procurement issues; (iv) revised cost estimates for contracts; (v) revised timing of procurement actions and completions times; updated procurement plan for the year; and (vii) compliance with aggregate limits on specified procurement methods.

Procurement Methods

A. Goods financed under the project totaling US\$ 2.24 million, would include vehicles, computers, and miscellaneous equipment. To the extent possible and practicable, goods and equipment to be purchased under the project would be grouped into bid packages to take advantage of bulk purchase. Each contract for good, estimated to cost the equivalent of US\$ 200,000 or more, would be procured under ICB procedures using IDA Standard Bidding documents. Each contract for goods, estimated to cost between US\$ 100,000 and US 200,000 up to an aggregate of US\$ 0.23 million would be procured through National Competitive Bidding (NCB) using procedures acceptable to IDA. Procurement for readily available of the shelf-goods that cannot be grouped or standard specification commodities for individual contracts, or goods estimated to cost less than US\$ 50,000, up to an aggregate of US\$ 0.21million, would be procured under National Shopping or International Shopping procedures as detailed in paragraph 3.5 and 3.6 of the "Guidelines": Procurement under IBRD Loans and IDA Credits. Solicitations would:

- (a) Be issued in writing to at least three reputable suppliers (it may be better to approach five or six suppliers, because not all three suppliers may respond, so that at least three competitive quotations are received.
- (b) Include specifications, and if goods are not immediately available, the delivery time
- (c) Give the estimated cost, including cost of inland transportation and insurance.
- (d) Be opened at the *same time* for evaluation (to avoid abuse)
- (e) In the case of International shopping quotations, be solicited from at last three suppliers from two different countries

As an alternative to international Shopping, the UNDP Inter-Agency Procurement Services office (IAPSO) may be used..

To ensure that these limits are observed, each quarterly progress report of the project will include a table setting out the number and value (in US\$ equivalent of the contracts issued through Local, International Shopping and National Competitive Bidding during the quarter as well as the

cumulative total value of contracts under each of these two procedures from the date of the project start-up.

B. Civil Works

Civil works to be financed under this project will cover mainly offices rehabilitation works. Because of their small contracts amounts, it is unlikely that these works would attract foreign contractors (though they would not be prevented from bidding. Civil works contracts estimated cost US\$50,000 equivalent or more if any, will be procured through National Competitive Bidding (NCB). Small works estimated to cost less than US\$ 50,000 equivalent per contract, up to an aggregated amount of US\$ 0.29 million may be procured through price comparison received from at least three contractors in response to a written invitation to at least three contractors (including NGO if appropriate). The invitation shall include a detailed description of the works, including basic specifications, start and completion date, a basic agreement format acceptable to the Bank, and relevant drawings. The award shall be made to the contractor who offers the lowest price quotation and is evaluated to have “the technical capacity for the required work.

C. Consulting Services

Consulting services financed by IDA, totaling 8.1 million equivalent, will be for supervision and project management, capacity building, training, accounting, and technical and financial audit. As a rule, consultant services will be procured through Quality and Cost Based Selection (QCBS) methodology among qualified short-listed firms; by evaluating the quality of the proposals before combining quality and cost evaluation; and by weighting the quality and costs scores. Least-cost Selection (LCS), in accordance with para.3.1 and 3.6 of the consultants Guidelines, will be used for audit contract costing less than US\$50,000. The firm with the lowest price will be selected, provided its technical proposal receives the minimum mark.

The selection of Individual Consultants Services for small studies and specialized advisory services (special assignments, technical assistances) will be on the basis of comparison of curriculum vitae in accordance with para.5.1 through 5.3 of the Guidelines. AMADER will ensure widely publicized Requests for Expressions of Interest (REI) to candidacy from consultants (firms and individuals). AMADER will maintain and update a list of consultants which will be used to establish short-lists. Contracts to be awarded to NGOs and training institutes and valued at less than US\$ 50, 000 may be procured on the basis of Consultants' qualifications.

Short-lists for contracts estimated under US\$ 100,000 may be comprised of national consultants (in accordance with paragraph 2.7 of the Consultants Guidelines) provided that sufficient number of qualified firms (at least three) are available at competitive costs. However, if qualified foreign firms express interest, they will not be excluded from competition The Standard Request for proposal (RFP), as developed by the Bank, will be used for requesting proposals and for selection and appointment of consulting firms. Simplified contracts will be used for short-term assignments, simple mission of standard nature (i.e those exceeding six months) carried out by individual consultants or firms

D. Training, Workshops and Study Tours

At the beginning of each year, each beneficiary will submit their proposed staff development plans in the

form of an annual training plan for the coming year, to be reviewed by IDA. The plan would indicate the persons or groups to be trained, the type of training to be provided, indicative learning outcomes, the provider or location of the training, its estimated cost. Selection of training institutions for workshops/training should be based on a competitive process, using the Consultant 's Qualification Method of selection.

E. Rural Energy Fund and Special Fund for Pre-investment: Procurement of works, goods and consultants services financed under these funds, to be carried out by communities or their designated intermediaries on their behalf will be carried out according to paragraph 3.15 on Community Participation in Procurement of the Guidelines and described in a Procedures manual for **Rural Energy Fund and Special Fund for Pre-investment** that will be based on the Bank's *Guidelines for Simplified Procurement and Disbursement Procedures for Community-Based Investment* (February 1998).

IDA Prior Review

Contracts financed by IDA, above the threshold value of US\$ 200,000 for Goods will be subject to IDA prior review as per paragraph 2 of Appendix I of the Guidelines. The first three contract packages for goods to be procured through NCB shall be subject to IDA prior review as per paragraph 2 of Appendix I of the Guidelines. The first three packages for civil works contracts (irrespective of value) will be subject to IDA prior review. Other contracts will be subject to post review, in accordance with paragraph 4 of Appendix I of the Guidelines.

With respect to consultant services, prior IDA review will apply to contracts for the recruitment of consulting firms and individuals estimated to cost US\$100,000 equivalent or more and US\$50,000 equivalent or more, respectively. Prior review will also apply to single-source hiring, to all contracts for Key AMADER staff members and contracts for audits, or to amendments of contracts rising the value above the prior review threshold. For consultant contracts (firms) estimated above US\$100,000, opening of financial envelopes will not take place prior to receiving the Bank's no objection to the technical evaluation. Prior review will apply for the first three consultant contracts.

Any exceptional extensions to non-prior review contracts raising their values to levels equivalent or above the prior review thresholds will be subject to IDA clearance.

All out of country training will be subject to prior review by IDA. Post reviews will be conducted from time to time to review the selection of institutions/courses, content/trainees, justifications, and costs incurred.

Project Implementation Manual: Procurement

The PIM, to be prepared by the Borrower, as a condition of effectiveness will include a specific section on procurement detailing: (i) procedures for planning, calling for bids, selecting contractors, consultants, and vendors, and awarding contracts;(ii)internal organization for supervision and control of works; and (iii)procedures for handing over completed works.

The government gave also assurance at negotiations that it will take necessary measures to ensure that procurement phases do not exceed the following target periods:

Procurement Phases	Maximum number of weeks
Preparation of bidding documents	4(6 for large contracts)
Preparation of bids by Bidders	4(6-10 for ICB)
Bids evaluation	2(4 for large contracts)
Signature of contracts	2
Payments	2

Procurement methods (Table A)

8

Annex

6.1

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

Expenditure Category	Procurement		Method ¹	N.B.F.	Total Cost
	ICB	NCB	Other ²		
1. Works	0.00 (0.00)	0.00 (0.00)	0.29 (0.00)	0.00 (0.00)	0.29 (0.00)
2. Goods	1.80 (1.37)	0.23 (0.20)	0.21 (0.14)	0.00 (0.00)	2.24 (1.71)
3. Consultant Services and Training	0.00 (0.00)	0.00 (0.00)	9.79 (7.50)	0.00 (0.00)	9.79 (7.50)
4. Rural Energy Fund and Special Fund for Pre-investment	0.00 (0.00)	0.00 (0.00)	36.28 (24.83)	0.00 (0.00)	36.28 (24.83)
5. Operating Cost	0.00 (0.00)	0.00 (0.00)	4.75 (1.76)	0.00 (0.00)	4.75 (1.76)
Total	1.80 (1.37)	0.23 (0.20)	51.32 (34.23)	0.00 (0.00)	53.35 (35.80)

^{1/}	Figures in parenthesis are the amounts to be financed by the IDA Credit. All costs include contingencies.
^{2/}	Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

Table B: Thresholds for Procurement Methods and Prior Review¹

Expenditure Category	Contract Value Threshold (US\$ thousands)	Procurement Method	Contracts Subject to Prior Review (US\$ millions)
1. Works	200,000 if any, or above	ICB	none
	less than 200,000 but more than 50,000 if any	NCB	none
	Below 50,000	Quotations	First three contracts 0.15
2. Goods	Above 200,000	ICB	All contracts 1.80
	Below 200,000 but more than 50,000	NCB	First three contracts 0.20
	Below 50,000	National shopping or International shopping/IAPSO	First three contracts 0.15
3. Services			
a) firms	100,000 or above	QCBS	All contracts 6.4
	Less than 100,000	QCBS/CQ/LC	None, except for TOR
b) Individuals	50,000 and above	CV	0.6
	Below 50,000	CV	None, except for TOR
3. Training, Workshops, Study Tours	All values	CQ/IC	All

Total value of contracts subject to prior review:	US\$ 9.3 million
Overall Procurement Risk Assessment:	HIGH
Frequency of procurement supervision missions proposed: Once every 6 months (includes special procurement supervision for post-review/audits). Post reviews will apply to one (1) contract out of five (5) not subject to prior-review.	

Action Plan for AMADER

PROPOSED ACTIONS	RESPONSIBLE ENTITY	DEADLINE	PROPOSED INDICATORS
Hiring a qualified procurement specialist at AMADER	AMADER	EFFECTIVENESS	A qualified procurement specialist acceptable to the Bank is hired.
Training of staff in the area of procurement; and use of consultants as necessary to provide assistance in procurement	AMADER	WITHIN SIX MONTHS OF PROJECT EFFECTIVENESS	<p>Procurement is adequately covered at project workshop launch</p> <p>The procurement specialist has attended the Bank sponsored regional course in the procurement of goods organized in Dakar, Senegal for Borrower staff.</p> <p>A training module and training program acceptable to the Bank is delivered to other beneficiaries by the Procurement specialist within 3 months after attending the regional training program</p> <p>Procurement consultants are used during the first year of implementation</p>
Development of a project Implementation Manual (POM) which ensures adequate coverage of procurement	AMADER	EFFECTIVENESS	A POM acceptable to the Bank is prepared.
Inclusion of procurement planning and monitoring and contract management tools in the computerized project financial management system	AMADER	EFFECTIVENESS	The project computerized project financial management system including a procurement planning and contract management module acceptable to the Bank is in place.
Reorganization of the project filing system so that all procurement documents are readily available	AMADER	WITHIN SIX MONTHS OF THE PROJECT IMPLEMENTATION	Filing cabinets and folders for procurement documents filing have been procured, and proper filing system has been designed and implemented.

**Annex 6(B): Financial Management and Disbursement Arrangements
MALI: Mali Household Energy and Universal Access Project**

Financial Management

1. Summary of the Financial Management Assessment

Organizational Structure

The project will involve four primary implementing agencies: AMADER, the DNE, the “Direction Nationale de la Conservation de la Nature” (DNCN), the CREE. It will also involve a commercial bank (to be identified and appointed) which will manage the accounts where funds for the REF sub-item of the Energy Services Delivery component will be deposited. Overall Project coordination will be entrusted to AMADER.

Project Components

The Project has 3 components as follows:

Component Number	Component Name	Amount (US\$ million)	Financing IDA and GEF (US\$ million)
1	Capacity Development and Institutional Strengthening	11.64	6.67
2	Energy Services Delivery	28.24	
	2a IDA		18.42
	2b GEF		3.5
3	Household Energy	13.47	10.56
	TOTAL	53.35	39.15

2. Audit Arrangements

The day to day supervision of accounting functions will be performed by the Chief Accountant who will report to the Chief Financial Officer (DAF). The DAF will be responsible for direct operational supervision of the Special Accounts and for consolidated reporting. However, an Internal Auditor reporting to the General Manager of AMADER will be appointed before project effectiveness. His main functions will be to ensure that procedures set forth in the Financial Management Procedures Manual are enforced. He will also perform internal audits from time to time and will coordinate the external audits jointly with the DAF. Detailed TORs for the recruitment of an internal auditor will be annexed to this assessment.

External Audit

The records and accounts of the project will be audited annually in accordance with international audit standards by an experienced and internationally recognized audit firm acceptable to IDA and hired by AMADER. The audit will include a comprehensive review of all SOEs and the management of the Special Accounts and the Counterpart Account. The auditor will also be expected to issue a consolidated management report covering all project accounts and with practical recommendations for improving the project internal control system. Audit reports will be submitted to the Bank no later than 6 months after the closing of each fiscal year.

Supervision

Supervision will be carried out by the Project Financial Management Specialist (FMS) at least twice a year but also before effectiveness and at the end of the transition period. Quarterly reports and also annual audits and Management letters from the external auditors will be reviewed by the FMS. Close supervision will also be performed by the field-based FMS, to ensure that the PIU financial management system is operating adequately and that AMADER's financial management system is progressing at the expected pace.

Accounting System, Accounting Policies and Procedures

Government and parastatal accounts are maintained on a variety of platforms including accounting software, excel spreadsheets and manual books of registry. AMADER will invest in an accounting and financial management system and install the system within its offices. This system should be able to

perform the following major functions: journal processing, budgeting, bank reconciliation, financial reporting and control. AMADER will use a double-entry cash-based system to produce financial data on the project components. This will be maintained on the information system discussed above. The form of reporting would be the FMRs described in the Administrative, Financial Management and Accounting Procedures Manual. TORs for the Manual and the financial management system are shown in the annexes.

Books of Registry

In addition to the computerized accounting system installed, and the books needed to maintain an accurate and complete record of transactions, AMADER will maintain a set of additional books of registry, either within its system or outside it, for control purposes. These books include:

- a. A fixed Asset Register;
- b. A Contracts Register;

A Book of control for document deliveries and controlled stationery such as checks.

Budgeting

The project annual budget will have to be approved by the Committee.

Counterpart funds will have to be inscribed in the Government annual budget and therefore, budgeting for project counterpart funds will follow the Government budget cycle which is as follows:

- March : Ministry of Finance communicates budget limits to Ministries
- From March : Budget prepared and submitted to the Ministry of Finance
- July.: Ministry of Finance consolidates budget
- September : National Budget approved by the Cabinet
- Oct - Dec: National Assembly approves the budget
- December : Approved amounts communicated to Ministries
- January: First funds released for execution in the new year.

Reporting (Financial Monitoring Reports)

AMADER will produce quarterly consolidated reports and provide them to the financiers, IDA, the GEF and the Borrower:

- Financial Reports showing the sources and uses of funds by category;
- Financial Statements showing the uses of funds by project components;
- Physical Reports linking financial information to Project physical output;
- Procurement Monitoring Reports providing information on the procurement of goods, work and related services and on the selection of consultants.

The actual format and content of the FMRs will be agreed at negotiations and AMADER is expected to demonstrate its capacity to produce the required FMRs. The PIU is expected to show, by project effectiveness, its capacity to produce FMRs consolidating all project activities carried out by the different implementing agencies.

Project Financial Statements

In addition to the monthly reconciliation and quarterly monitoring reports, the Project will produce annual Project Financial Statements for analytical and audit purposes. These Financial Statements will be composed of:

- a. A consolidated Statement of Sources and Uses of Funds (showing IDA and Counterpart Funds as well as funds provided by donors);
- b. A Statement reconciling the balances on all Bank Accounts to the bank balances on the Statement of Sources and Uses of Funds;
- c. SOE Withdrawal Schedule, listing individual withdrawal applications relating to disbursements by the SOE Method, by reference number, date and amount;
- d. A Cash Forecast for the next two quarters;
- e. Notes on significant accounting policies and accounting standards adopted by management when preparing the accounts; and on any supplementary information or explanations that may be deemed appropriate by management to enhance the presentation of a “true and fair view”.

Monitoring

Project monitoring will take the following forms:

- Monthly and quarterly monitoring reports;
- Annual external audit of the Project finances.

3. Disbursement Arrangements

Project funding will follow Bank procedures as currently applied. AMADER will manage an IDA Special Account, a GEF Special Account and a Project Counterpart Account that will hold the Government contribution to the project. A Commercial Bank, yet to be selected, will manage 2 accounts in which funds for the REF Sub-projects will be deposited. Funds will be channeled from AMADER Special Accounts to these two funds in the form of 90 days cash advances for the commercial bank to pay the private operators. In response, the commercial bank will provide to AMADER activity reports showing the level and movements in the accounts. An agreement between AMADER and the commercial bank will be drawn spelling the obligation of the latter.

The DNE, DNCN and CREE will also operate on the basis of cash advances determined by their annual work programs and budgets. They will prepare the entity annual work program and budget, will manage the resources, keep the records and ensure that requests for funding are prepared and submitted to AMADER on a timely basis. Eligible expenditures will be defined in the PAD. In spite of the FMR system prescribed for the project, it is suggested that a transaction-based disbursements approach should be used because of the lack of experience of AMADER and of the environment in which the project will operate.

	ACCOUNT	SOURCE OF FUNDS	SIGNATORIES	MANAGING INSTITUTION
1	Special Account A	IDA Credit	AMADER GM AMADER DAF	AMADER
2	Special Account B	GEF Grant	AMADER GM AMADER DAF	AMADER
3	Project Counterpart Account	Government of Mali	AMADER GM AMADER DAF	AMADER

Impact of Procurement Arrangements on Financial Management

Overall Project procurement arrangements will be the responsibility of AMADER.
(See Procurement Assessment)

Staffing and Training

The soon to be recruited DAF of AMADER will oversee all accounting and financial management duties both during and after the transitional period. He will be assisted by a Chief Accountant and a Procurement Specialist. During the transitional period, he will work jointly with the PIU coordinator and he will be assisted by the accountant presently on duty at the PIU. An internal auditor, who will report to the General Manager of AMADER, will also be hired by the project.

Each one of the other implementing agencies, DNE, CREE and DNCN will have an experienced and competent financial officer to keep the financial records and report to AMADER on a quarterly and annual basis.

Training Plan

The Financial Management staff will attend workshops and training sessions on the new financial management computerized system before project effectiveness. Accountants and administrative and procurement staff will also be trained in procedures relating to the use of IDA funds (i.e. Special Accounts, SOEs, Procurement, FMR, etc.) and in Financial Management including internal controls, information systems and computer applications.

II RISK ASSESSMENT

Country Risks

The overall conclusion of the Country Financial Accountability Assessment (CFAA) carried out in 2002 in Mali is that *“the public finance management system is fairly coherent with relatively strong budget procedures implemented within a clear institutional setting with improving and strengthened control measures”*. It goes on to add that *“This reality should not hide malfunctions for which appropriate dispositions should be taken.”* In essence, the CFAA shows that significant progress has been made in the areas of financial management. The country’s own control systems are operating more efficiently despite a few weaknesses in the supervision of projects. Those areas have been clearly identified and appropriate measures recommended for strengthening the system. It also should be noted that the private accounting profession is improving its operating procedures and has entered into a dialogue with the Bank for an IDF Grant. The environment is more reliable for the implementation of new projects. Quality of past audits has improved steadily.

Project Risks

The table below identifies the main risks faced by the project and existing or potential mitigation measures.

Risks	Risk Rating	Mitigation Measures
Delays in the recruitment of AMADER staff	M	Recruitment of key AMADER staff as conditions of effectiveness
The capacity building pace in AMADER is too slow to guarantee that the institution will be able to take over the overall financial management coordinating role 6 months after project effectiveness	H	Financial Management training provided to the staff
	M	Counterpart funds budgeted

Delay in the payment of counterpart funds		annually by the Government and deposited in the Project Counterpart Account
Counterpart funds are not sufficient to meet project needs	M	
Delays in the execution of audits	M	Appointment of an external auditor is a condition of effectiveness and funds for annual audits have been budgeted
Switch from transition period to full-fledged implementation is not smooth	M	PIU staff to provide support to AMADER during the transition and 3 months after AMADER GM and DAF are the signatories of project accounts from the beginning
<i>Risk Rating: H (High); M (Moderate); N (Negligible)</i>		

III CONCLUSION

Based on the evaluation above, the Project does not currently satisfy minimum World Bank financial management requirements. In order to establish an acceptable control environment and to mitigate financial management risks the various measures should be taken by the due dates as indicated in the table below. The project financial management risk is assessed as being moderate provided that the financial management arrangements are properly implemented and the following financial management action plan satisfactorily addressed in practice:

Financial Management Action Plan

ACTIVITY	RESPONSIBILITY	DEADLINE
Agreement on TORs for the recruitment of an External Auditor	Government Team	Negotiation
Agreement on TORs for the recruitment of a Commercial Bank	Government Team	Negotiation
Agreement on TORs for the Project Financial Management Procedures Manual	Government Team	Negotiation
Appointment of AMADER General Manager	Government of Mali	Negotiation
Establish a fully operational Computerized Financial Management System: Acquisition of software; Production of the Project Financial Management Procedures Manual	AMADER	Effectiveness
Appointment of AMADER key financial staff: a) Chief Financial Officer b) Accountant c) Internal Auditor	AMADER	Effectiveness
Appointment of an External Auditor	AMADER	Effectiveness
Appointment of a Commercial Bank	AMADER	Effectiveness
Opening of Project Accounts (Special Accounts,		

Counterpart Funds Account)	AMADER	Effectiveness
First Deposit made in Counterpart Account	Government of Mali	Effectiveness

Allocation of credit proceeds (Table C)

Annex 7: Project Processing Schedule
MALI: Mali Household Energy and Universal Access Project

Project Schedule	Planned	Actual
Time taken to prepare the project (months)		
First Bank mission (identification)	03/15/2002	03/30/2002
Appraisal mission departure	04/21/2003	05/05/2003
Negotiations	05/12/2003	06/23/2003
Planned Date of Effectiveness	09/30/2003	

Prepared by:

Preparation assistance:

Bank staff who worked on the project included:

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Abdoulaye Konate	Economist
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Annex 8: Documents in the Project File*
MALI: Mali Household Energy and Universal Access Project

A. Project Implementation Plan

Draft Project Implementation Plan

B. Bank Staff Assessments

Procurement Assessment

Financial Mngement Assessment

C. Other

Draft Manuel de procedures, May 2003

Cadre de Reference de l'Electrification Rurale, February 2003

Cadre de Reference de l'Energie Domestique, February 2003

Enviornmental Social Management Framework, April 2003

Resettlement Policy Framework, March 2003

*Including electronic files

Annex 9: Statement of Loans and Credits
MALI: Mali Household Energy and Universal Access Project
14-Jul-2003

Project ID	FY	Purpose	Original Amount in US\$ Millions		Cancel.	Undisb.	Difference between expected and actual disbursements ^a	
			IBRD	IDA			Orig	Frm Rev'd
P035630	2002	AGRICULTURAL AND PRODUCER ORGANIZATI	0.00	43.50	0.00	43.15	14.92	0.00
P072785	2002	SAC III	0.00	70.00	0.00	27.70	24.11	0.00
P040650	2001	EDUCATION SECTOR EXPENDITURE PROGRAM	0.00	45.00	0.00	35.20	23.67	0.00
P041723	2000	RURAL INFRASTRUCTURE	0.00	115.10	0.00	100.92	52.71	0.00
P001748	2000	FINANCE SECTOR DEVEL	0.00	21.00	0.00	19.20	12.68	0.00
P040652	1999	INTEGRATED HEALTH SECTOR INVESTMENT	0.00	40.00	0.00	26.06	27.00	0.00
P035617	1998	GRASSROOTS HUN/POVT	0.00	21.50	0.00	0.34	0.75	0.00
P001750	1997	URBAN DEVT & DECENTR	0.00	80.00	0.00	24.33	30.23	0.00
P046651	1997	ML REGIONAL POWER	0.00	17.10	0.00	2.42	2.54	-0.05
P001730	1994	TRANSPORT SECTOR	0.00	65.00	0.00	4.91	6.97	3.60
Total:			0.00	518.20	0.00	284.23	195.58	3.55

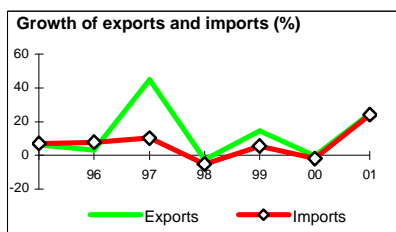
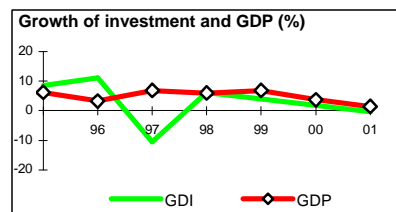
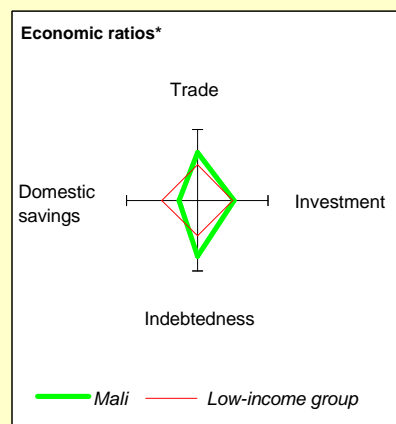
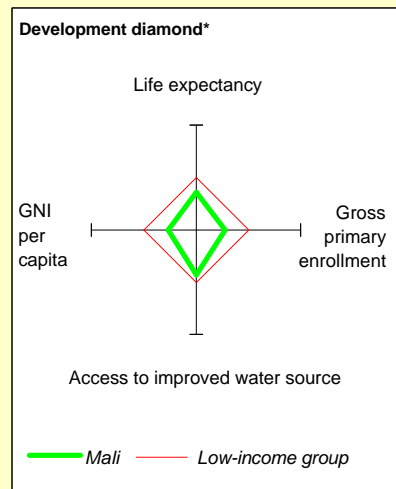
MALI
STATEMENT OF IFC's
Held and Disbursed Portfolio
May 30 - 2003
In Millions US Dollars

FY Approval	Company	Committed				Disbursed			
		IFC				IFC			
		Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic
1996	AEF GGG	0.36	0.00	0.36	0.00	0.36	0.00	0.36	0.00
1994/97	Hotel Bamako	0.80	0.00	0.00	0.00	0.80	0.00	0.00	0.00
0	PAL-Graphique Id	0.69	0.00	0.00	0.00	0.69	0.00	0.00	0.00
0	PAL-Rabelais	0.18	0.00	0.00	0.00	0.18	0.00	0.00	0.00
0	PAL-SANKE	0.61	0.00	0.00	0.00	0.61	0.00	0.00	0.00
1997	SEF 3T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1995	SEMOS	0.00	4.80	0.00	0.00	0.00	4.80	0.00	0.00
	Total Portfolio:	2.64	4.80	0.36	0.00	2.64	4.80	0.36	0.00
		Approvals Pending Commitment							
FY Approval	Company	Loan	Equity	Quasi	Partic				
	Total Pending Commitment:	0.00	0.00	0.00	0.00				

Annex 10: Country at a Glance

MALI: Mali Household Energy and Universal Access Project

POVERTY and SOCIAL	Mali	Sub-Saharan Africa	Low-income		
2001					
Population, mid-year (millions)	11.1	674	2,511		
GNI per capita (Atlas method, US\$)	230	470	430		
GNI (Atlas method, US\$ billions)	2.5	317	1,069		
Average annual growth, 1995-01					
Population (%)	2.4	2.5	1.9		
Labor force (%)	2.3	2.6	2.3		
Most recent estimate (latest year available, 1995-01)					
Poverty (% of population below national poverty line)	64	..	..
Urban population (% of total population)	31	32	31		
Life expectancy at birth (years)	42	47	59		
Infant mortality (per 1,000 live births)	120	91	76		
Child malnutrition (% of children under 5)	25	..	..
Access to an improved water source (% of population)	65	55	76		
Illiteracy (% of population age 15+)	57	37	37		
Gross primary enrollment (% of school-age population)	53	78	96		
Male	63	85	103		
Female	44	72	88		
KEY ECONOMIC RATIOS and LONG-TERM TRENDS					
	1981	1991	2000	2001	
GDP (US\$ billions)	1.5	2.4	2.4	2.6	
Gross domestic investment/GDP	16.0	22.8	21.5	21.1	
Exports of goods and services/GDP	13.4	18.2	25.7	31.5	
Gross domestic savings/GDP	0.1	6.4	9.7	10.3	
Gross national savings/GDP	..	9.2	13.7	9.0	
Current account balance/GDP	-15.4	-6.2	-9.3	-11.0	
Interest payments/GDP	1.8	0.6	0.9	0.7	
Total debt/GDP	..	107.1	108.5	109.2	
Total debt service/exports	21.9	8.9	13.1	6.3	
Present value of debt/GDP	..	..	54.8	50.1
Present value of debt/exports	..	..	186.4	182.2
	1981-91	1991-01	2000	2001	2001-05
<i>(average annual growth)</i>					
GDP	1.5	4.3	3.7	1.4	6.0
GDP per capita	-1.1	1.8	1.2	-0.9	4.2
Exports of goods and services	5.5	10.1	-0.2	24.7	6.4
STRUCTURE of the ECONOMY					
	1981	1991	2000	2001	
<i>(% of GDP)</i>					
Agriculture	45.7	45.1	41.2	37.8	
Industry	14.0	16.9	21.3	26.4	
Manufacturing	6.9	8.5	3.6	3.6	
Services	40.3	38.0	37.5	35.9	
Private consumption	88.9	80.1	77.5	76.7	
General government consumption	11.0	13.5	12.8	13.0	
Imports of goods and services	29.3	34.6	37.5	42.3	
	1981-91	1991-01	2000	2001	
<i>(average annual growth)</i>					
Agriculture	4.5	3.1	6.7	-13.0	
Industry	4.2	7.7	7.5	31.0	
Manufacturing	7.1	2.6	6.0	-1.5	
Services	1.7	3.4	6.1	1.2	
Private consumption	1.1	3.1	3.4	2.8	
General government consumption	7.0	5.9	23.7	-8.5	
Gross domestic investment	4.7	3.3	..	-0.4	
Imports of goods and services	6.5	2.8	-2.0	24.0	

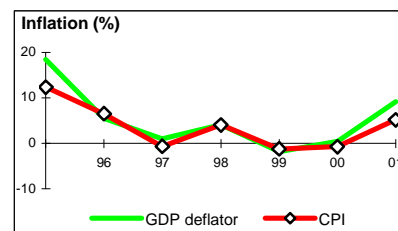


Note: 2001 data are preliminary estimates.

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

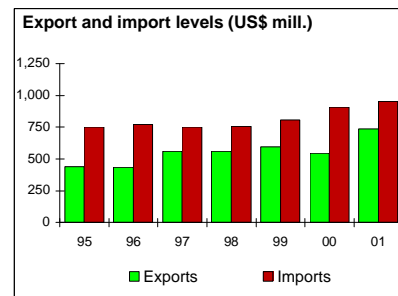
PRICES and GOVERNMENT FINANCE

	1981	1991	2000	2001
Domestic prices				
(% change)				
Consumer prices	..	1.8	-0.7	5.2
Implicit GDP deflator	12.4	2.0	0.4	9.2
Government finance				
(% of GDP, includes current grants)				
Current revenue	72.8	19.4	17.4	18.0
Current budget balance	23.2	7.4	6.1	5.4
Overall surplus/deficit	-32.8	-9.0	-7.9	-9.6



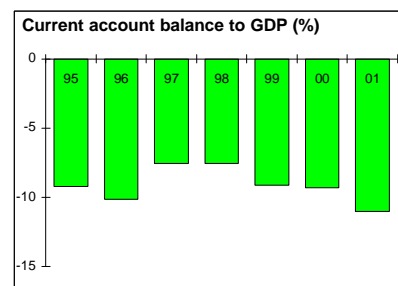
TRADE

	1981	1991	2000	2001
(US\$ millions)				
Total exports (fob)	616	371	546	739
Cotton	258	182	154	111
Gold	266	44	267	498
Manufactures	..	..	..	..
Total imports (cif)	852	683	909	952
Food	110	117	111	118
Fuel and energy	113	79	166	147
Capital goods	239	188	257	280
Export price index (1995=100)	71	102	82	77
Import price index (1995=100)	84	92	101	102
Terms of trade (1995=100)	84	110	80	75



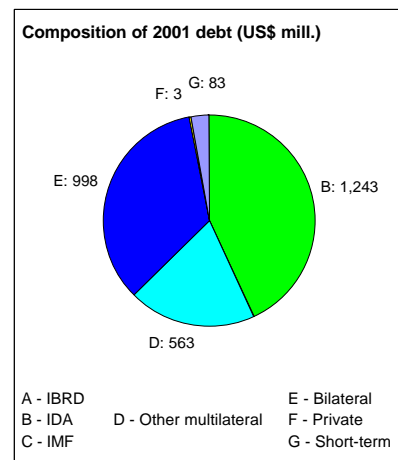
BALANCE of PAYMENTS

	1981	1991	2000	2001
(US\$ millions)				
Exports of goods and services	200	442	631	829
Imports of goods and services	438	838	955	1,100
Resource balance	-238	-396	-324	-271
Net income	-21	-3	-30	-133
Net current transfers	28	249	127	112
Current account balance	-231	-150	-227	-291
Financing items (net)	235	329	208	320
Changes in net reserves	-5	-178	19	-28
Memo:				
Reserves including gold (US\$ millions)	25	326	348	377
Conversion rate (DEC, local/US\$)	271.7	282.1	712.0	728.0



EXTERNAL DEBT and RESOURCE FLOWS

	1981	1991	2000	2001
(US\$ millions)				
Total debt outstanding and disbursed	..	2,596	2,651	2,890
IBRD	..	0	0	0
IDA	..	569	1,169	1,243
Total debt service	54	48	94	95
IBRD	..	0	0	0
IDA	..	5	7	19
Composition of net resource flows				
Official grants	102	317	162	158
Official creditors	154	127	..	..
Private creditors	-20	75	0	0
Foreign direct investment	4	-8	89	55
Portfolio equity	..	..	..	..
World Bank program				
Commitments	..	120	210	114
Disbursements	..	69	49	71
Principal repayments	..	2	0	11
Net flows	..	67	49	59
Interest payments	..	4	7	8
Net transfers	..	63	42	52



Additional Annex 11: GEF Incremental Cost Analysis MALI: Mali Household Energy and Universal Access Project

Introduction and GEF Program Rationale

The key rationale for GEF co-financing of interventions in the current Malian context of strengthening power sector reforms and initiating a large-scale effort to expand rural access to energy services is to place renewable energy technologies (RETs) – and associated supply and intermediation chains – on a strong, sustained footing for competition against more conventional alternatives, thus helping move the economy to a lower-carbon energy development trajectory. The project seeks to support a ‘critical mass’ of solar PV investments and to help drive down the local investment and implementation costs. The Bank’s primary role would be to provide investment finance and engage the GoM in policy dialogue, and to provide targeted capacity building to enhance RETs development.

Compared to some of the neighboring West African countries, Mali appears to offer at this point a special opportunity to introduce a commercial approach to solar PV and other RETs. This is in part because Mali has a longer and more substantial experience with these technologies, and also because Mali is farther ahead in its power sector reforms and administrative decentralization. The key risk is that small market size, limited absorptive and implementation capacity, and the weak status of local financial markets would limit the potential for a rapid scale-up of RETs over the longer term. Careful monitoring and evaluation (M&E) is therefore critical to define an exit strategy as well as a scale-up strategy.

Broad Development Goals

The overall project has three **development** objectives, consistent with the Malian Poverty Reduction Strategy:

- (i) accelerating the use of modern energy in rural and peri-urban areas in order to increase productivity of small and medium enterprises, to enhance the quality and efficiency of health and education centers, and to improve living standards;
- (ii) promoting further community based woodland management to reduce unsustainable pressure on forest resources while simultaneously encouraging interfuel substitution and energy efficiency initiatives; and,
- (iii) strengthening energy sector reform processes and related institutions to create a favorable investment environment for increased private sector participation in decentralized energy services delivery in rural and peri-urban areas.

The **global environmental objective** of the components proposed to be co-financed by the GEF is to initiate a program of removing the barriers to adoption of renewable energy technologies (RETs) – under GEF OP 6 – in order to reduce gross calculated greenhouse gas (GHG) emissions, primarily those of carbon dioxide (CO₂).

The proposed **GEF co-financed activities** are primarily for *electricity-focused* RETs. The distinction here is that the GEF co-financed activities would not address the direct thermal application of renewable energy technologies or efficiency improvements in the thermal applications of fossil or biofuels (e.g., improved cooking stoves, ovens) but are also directed at technical/institutional pilots for non-electric applications of RETs. The bulk of investments would be in solar PV systems, with relatively small amounts allocated for

resource/market assessments. If the results are as encouraging as hoped, subsequent investment operations would help expand the markets for solar PV as well as non-PV RETs. The summary cost figures are given in the following tables.

Indicative Project Costs

	Indicative Cost	Bank Group	GEF	GoM
Component 1: Capacity Development and Institutional Strengthening				
Capacity Building and Institutional Strengthening:				
• Support to CREE	0.71	0.67	0	0.04
• Support to DNE	0.73	0.66	0	0.06
• Support to DNCN	0.82	0.74	0	0.08
• Support to AMADER	9.38	4.60	0	4.78
TOTAL Component 1	11.64	6.68	0	4.96
Component 2: Energy Service Delivery				
• Rural Electrification Investments	24.64	15.18	3.5	0.03
• Multifunctional Platforms	1.55	1.29	0	0.00
• Information Education and Communication	2.05	1.94	0	0.09
TOTAL Component 2	28.24	18.42	3.5	0.12
Component 3: Household Energy				
• Community-based woodland management	8.31	6.83	0	0
• Interfuel Substitution and Energy Efficiency	2.89	1.59	0	0
• Information, Education and Communication	2.27	2.12	0	0.17
TOTAL Component 3	13.47	10.55	0	0.17
TOTAL PROJECT COST	53.35	35.65	3.5	5.25

* This table excludes financing from the private sector.

Summary: Indicative Cost and Financing of Renewable Energy Program

Categories	Total Indicative	GEF	IDA
------------	------------------	-----	-----

	costs		
Consultants and Studies	1,84	0,44	1,40
Training	1,36	0,56	0,80
Monitoring & Evaluation	0,60	0,30	0,30
Investments Solar PV	9,00	2,20	5,10
Total	12,80	3,50	7.6

The design of the overall project and of the GEF co-financed activities reflects several inter-related **strategic choices** for the removal of barriers to adoption of RETs:

Strengthening institutions resulted from power sector reforms with rural electrification and promotion of renewable energy in a single project: This choice reflects judgment that access expansion and environmentally friendly sector development paths need to be squarely put forth as legitimate goals in the sector reform process. The alternative, of ‘retrofitting’ a policy framework initially geared solely to parastatal privatization with another, subsequent round of policy and institutional changes for additional objectives and goals, is neither practical nor efficient. In the Malian context regulatory and institutional development for decentralized electricity access has followed the privatization of EDM, and is consistent with the overall sector development policy. This choice increases project complexity and implementation difficulties somewhat, and may require greater Bank supervision efforts. At this time, it is judged that a relatively small-scale, well-targeted investment program – with GEF co-financing – is the appropriate beginning given the capacity and institutional constraints. The PV systems proposed are for large institutional customers (average size 800 Wp), fixed solar home systems (of two size ranges, averaging about 100 Wp and 50 Wp), and small/mobile systems (average size 15 Wp).

Exploiting the ‘policy space’ of broader economic reforms and re-direction of public expenditures: The choice of working via private sector operators, and selective targeting of ‘cross-sectoral’ initiatives in turn reflects the judgment that economic reforms that create greater private sector role in the economy (via privatization of parastatals) and put “hard budget constraints” on public sector agencies provide an opportunity to develop *commercial* approaches to RET promotion. In other words, it reflects a hope that the Malian business environment over the next five years and beyond would be substantially different from that ten years ago, and that, as economic reforms take hold, broader *absorptive and implementation capacity* will develop to help create *private income generation* via expansion of electricity access.

Selective ‘cross-sectoral’ market development: A correlate of the preceding choice is that, within the Bank, GEF, and other donors’ investment projects that are traditionally sector-focused, there is a need to work ‘cross-sectorally’, e.g., to selectively build and exploit synergies via coordinated investments in education, health, and water supply facilities in rural areas. Stand-alone RETs such as solar PV systems are ideally suited to meet the needs of such institutional customers, and electricity supply to them also facilitates the use of certain information and communication technologies (ICTs). Rural electrification in general, and RET-based electricity service provision in particular, also offers opportunities for local employment in installation and maintenance. The project provides for training and capacity building for the ‘cross-sectoral’ partner ministries as well as SMEs. The proposed project would seek to systematically expand such ‘cross-sectoral’ links, and to use the ‘public institutional demands’ as the ‘baseload’ upon which greater penetration of household markets can be achieved. The key idea is to develop the demand for solar PV-based electrification AND an efficient supply response that can be scaled up in an opportunistic manner (e.g., via provision of decentralized electricity services).

Building on other donors’ efforts and establishing a sustainable policy and institutional framework to enable later ‘scale up’: Several bilateral and multilateral donors have been engaged in assistance to the

Malian renewable energy sector over the years. The proposed project here seeks to build on these efforts and bring the Bank ‘value added’ in terms of placing renewable energy promotion within a well-defined policy and institutional approach. Additionally, the project will explore opportunities for institutional mechanisms for multi-donor, multi-project and/or multi-country ‘market facilitation’ largely outside the scope of this project and over the longer term. The idea is to bring together the learning of sub-project design, implementation, and M&E across different projects and to strengthen the ‘entry points’ for capacity building within Mali (across different donor projects) and in the region (including Burkina Faso and Mauritania, where similar Bank/GEF projects are being prepared). Such a ‘market facilitation network’ (MFN) could be an efficient and effective means to develop replication strategy in what are otherwise fairly small projects and country markets, with high overheads and transaction costs. It could also help develop timely indicators of ‘warning signs’ for projects under implementation as well as of new demands for investments and financing across different RETs and customer groups.

Monitoring and Evaluation (M&E): The project seeks to implement a participatory M&E design that integrates M&E as a project-based ‘management information system’ and learning tool, and not just a data collection and reporting tool. A proper M&E system can help increase the beneficiaries’ ‘ownership’, strengthen the hands of emerging ‘champions’ among the investors and financiers, and provide ‘leading indicators’ of problems and new opportunities. Compared to recently submitted Bank/GEF projects in Uganda or Mozambique, this proposal reflects a judgment that it is not yet feasible to mount a long-term program of rural energization for productive transformation in Mali, and that the viability of private sector-based, commercial approach to rural electrification needs to be tested first. There is a need to develop a M&E protocol that meets the GEF interest in RET market development indicators as well as the GoM, the Bank, and other donors’ (including those supporting investment programs of other ministries) interest in other indicators (for instance the developmental impact of electricity access via solar PV for health, education, or water supplies). The Monitoring and Evaluation Plan is described on Page xx.

Risks: The implementation risks of proposed investments in solar PV systems are relatively small. While there are many barriers to widespread adoption of a whole range of RETs, there is already a relatively good awareness of the PV systems, and they have been accepted as a part of electricity service supply solution by the government, donor agencies, and NGOs. The key risks are that (a) the local development impacts of RETs, in particular the improvements in service delivery at rural public institutions (health, education) or rural public infrastructure (e.g., water, telecom), are judged to be insignificant and the extent of ‘ownership’ is very low; (b) various donor programs provide conflicting signals to the government and the beneficiaries on the importance of commercial viability of RET promotional investments; and, (c) the human and institutional capacity fails to take shape as planned for. The key assumptions are that the overall macroeconomic framework would remain stable, the GoM poverty reduction program would proceed as planned (and agreed to in the HIPC negotiations), and that, while the overall market will remain small and fragmented for a considerable period still, there would be adequate interest in private financing of rural electrification projects as well as RET equipment and service businesses, comparable to many other industries in the economy.

Barriers to Renewable Energy Market Developments and Barrier Removal Strategy

As in several other sub-Saharan African countries, there are some common barriers to RET investments as well as rural electrification in general – principally, (a) limited awareness of benefits and information about supply chains; (ii) lack of policy and regulatory framework conducive to competition (to the utility monopolies That is, monopoly in generation and distribution to a utility with a *de jure* nationwide franchise, combined with uniform national tariffs, is a barrier to access expansion in general. When only generation is de-monopolized, economically justifiable RETs face certain barriers in supplying bulk power to the grid (which may or may not be necessary for access expansion) because of their risk and financing profiles. When generation as well as distribution are de-monopolized and uniform national tariff abolished, barriers to access expansion per se are lowered, and the barriers the economically justifiable decentralized RETs face are (largely) those specific to the cost and financing profiles of RETs themselves (vis-à-vis fossil-based alternatives).); (iii) limited market size and concomitant high transaction costs of initial investments, especially if private sector-led; (iv) lack of financing and risk mitigation mechanisms, and difficulties in validating workable business models; and, (iv) limited institutional and human resource capacity, often diverted to heavily grant-driven projects of external donors, resulting in low local ownership and commitment to global environmental benefits.

In the context of project such as the one proposed here (similar to that in other recent Bank/GEF projects in sub-Saharan Africa – Uganda and Mozambique, for instance), the focus of GEF assistance is in removing the barriers specific to RETs, the thrust of main power sector reforms being that on removing the barriers to access expansion in general. The strategic choices noted above address the main approach to removing these barriers – i.e., combining sector reforms with a comprehensive rural electrification strategy addresses policy and institutional barriers – and the overall project philosophy of putting access expansion on a commercial footing, via ‘learning by doing’ is aimed at removing the other barriers.

Compared to some other sub-Saharan African countries, Mali has a longer history of renewable energy development, and a small renewable energy industry has been established over the years. Barriers to more widespread use of RETs, identified in consultations with Malian private sector companies and NGOs during the PDF phase, are described below:

Institutional barriers

There is almost no coordination on existing activities on renewable energy among various government agencies, arch and academic institutions, NGOs, financial institutions, and the private sector. This is a barrier because agencies could be using renewables are not generally aware of the options and opportunities.

The association of renewable energy technology providers has not been forceful in coordinated advocacy of policy atives that would support the use of renewables.

Private sector and market barriers

Mali is a poor country, with a highly dispersed population. Consequently the *potential* market for renewable gy products and services is difficult and expensive to access and serve.

Norms and standards in terms of renewable energy performance, manufacture, installation and maintenance are ally nonexistent, although companies representing major international PV module and systems equipment suppliers do e technical reference standards.

After-sales service is often limited or unavailable.

There is very limited private sector capacity for marketing, distribution, installation and maintenance of renewable

gy systems. However, this reflects the limited presently realizable market for such equipment and services and the high ncial and logistical costs of serving this market.

Bulk procurement of renewable energy technologies and the associated economies of scale are not possible due to current small market for renewable energy services. The occasional exception is a government agency procurement.

Financial barriers

In the absence of dedicated financial mechanisms, the high up-front costs of renewable energy technologies prevent e potential end-user groups from purchasing such technologies that on the longer-term might very well be cheaper than native options providing similar energy services;

There are significant explicit or implicit subsidies and cross-subsidies to extend the national electricity grid. These idies are not available for decentralized energy solutions.

Banks are reluctant or unwilling to loan for commercial renewable energy enterprises and (especially) for end users i as village associations or individual households.

Custom duties on solar PV systems have been reduced beginning 1999; however, even the 10% duty adds ifficantly to the already high capital costs.

Information, Education and Training Barriers

There is insufficient technical training available for renewable energy technicians and engineers.

There is limited practical access to information on renewable energy technologies, costs, and applications. Although siderable information is available via the Internet, the very limited capacity of Mali's Internet services makes it very cult to use the Internet efficiently for accessing this information.

There is limited knowledge on renewable energy markets, including energy needs and the ability to pay for services rget groups;

There is little public awareness of non-PV renewable energy products, services, and costs.

Renewable Energy Experience in Mali

Mali has hosted and initiated a variety of projects and programs for the application and diffusion of renewable energy technologies, beginning in the 1970s. Renewable energy equipment introduced or manufactured or assembled in Mali includes the following: Solar thermal systems: cookers, water heaters, dryers; and Photovoltaic (PV) systems for water pumping (400), communication systems (100), and ca. 5,000 PV systems for lighting and entertainment.

Only the use of photovoltaic equipment can be considered commercially meaningful, with a reported 5,000+ PV installations in Mali. Attempts to promote widespread use of other renewable energy technologies have had limited success. Many of the initiatives for PV-based pumping and health and education applications have been funded by development cooperation agencies or by international NGOs. In most cases there was no provision for long-term sustainability, and there has been no investment in a sustainable infrastructure for this purpose.

PV systems are an important option for widespread commercial distribution, especially for rural communities and households, now that both decision making and financial resources are targeted at the village level through the new decentralization program of the government and of key donors. An NGO in Mali successfully introduced sustainable PV water pumping in the country, and the Regional Solar Program (*Programme Regional Solaire – PRS*) has been responsible for the installation and ongoing

maintenance of several hundred PV water pumps in Mali. Both programs provided good training for PV technicians and established mechanisms for maintenance and repair of the pumps. The small (ca. 12 firms) local PV industry has sold several thousand PV units throughout the country, for telecommunications and other commercial and industrial applications as well as for NGOs and households.

However, the broad diffusion of renewable energy technologies remains inhibited due to the lack of an attractive market environment for industry and financial institutions. It is apparent that, as regards technologies and services based on renewable energy, the markets are not sufficiently developed; there are no appropriate credit mechanisms, and the relationships and procedures between public institutions and private actors lack flexibility. Un-electrified communities, now with funds and decision-making authority for determining priority infrastructure investments, are largely unaware of the potential for using renewable energy in concert with investments in water supply, improved health clinics and schools, public lighting, refrigeration, and other areas.

Opportunities offered by administrative decentralization:

Mali is in the midst of a major structural and policy transformation characterized by decentralization of authority to the provincial and village levels. Under the decentralization plan being implemented, all villages now have mayors, and substantial national tax revenues are being directed to villages and municipalities for their use in support of priority community needs (e.g., improved water supply, access to electricity services, improved education and health services, etc.). This decentralization of decision making, financial resources, and budgetary discretion means that individual villages can make decisions and contract for products and services to support their specific priorities. Since for most villages the priorities include those infrastructure services mentioned above, decentralized supply of electricity and in some cases thermal energy services as well will be required.

Decentralized Administrative Structure of Mali

Name/Level	Number of Entities	Characteristics
National	1	Republic of Mali
Localities / regions	8	Regions with governor and regional administration
Prefectures (cercle)	ca. 40	
Municipalities (commune)	701	Administrative district, typically with 10 to 20 villages
Villages	ca. 12,000	All villages are associated with a specific commune; typically 500 – 5,000 people

At the village and municipality levels there is a need for GEF support. This intervention involves providing expert and consultancy services to assist communities in identifying alternative options for obtaining the energy services required to support specific investments that they will be making in infrastructure services. This includes providing technical and financial information, and information on available organizations with the expertise and experience to provide products and services. It also means providing assistance in the design of equipment and service bids.

Rural municipalities are going to be funded through the decentralization process, including access to bilateral and multilateral funds. These municipalities will be making decisions regarding their priorities

for uses of these funds, reflecting the proposals from each village in the municipality for specific investments. Such investments could be for improved community water supply, upgrading and electrification of schools, clinics, government centers, community centers, etc.

The Baseline

Without GEF participation, (a) the focus on RET promotion would be diffuse, and not linked to a broader vision of a cleaner energy future; (b) RET investments will not reach a ‘critical mass’ to mobilize local private sector capacity for competitive supplies; and (c) the justification to invest human and institutional resources into technical assistance and capacity building will be much weaker.

That is, the core problem of RETs – limited market size with limited or no competition, resulting in unnecessarily high capital and service costs, and low domestic capacity, in turn requiring high external support – would persist. Even if the market grows because of external financing, it would remain inherently non-sustainable, with at best a marginal reduction in supply and implementation costs, in response to competition in the international markets. There would be limited local ‘ownership’ or ‘championship’ of a commercially viable RET program.

Most rural households meet their lighting and small power needs with kerosene, dry cell and car batteries. The use of dry cell batteries for flashlights and radio or sound equipment and the growing demand for televisions powered by car-batteries result in average household expenditures for energy of around US\$ 10-15 per month for the upper-income households. UNDP-sponsored studies estimated that these upper-income rural households would be willing to pay between US\$ 7 to 15 per month, according to service level, from just a few light spots to several lamps and a (B&W) television. This is confirmed by some spontaneous rural electricity distribution schemes, organized by local entrepreneurs, showing that people are ready to pay the equivalent of US\$ 3.5 per month for powering one electric lamp or a TV.

Therefore, the baseline for the proposed project would consist of:

A. Increased reliance on petroleum-based fuels – with associated carbon emissions – for small electricity markets:

Rural public facilities (health clinics, schools) will continue to rely on gasoline generators for the provision of electricity, and there will be no ‘demonstration effects’ on private customers – ‘larger’ commercial customers or individual households;

Peri-urban and rural households that cannot be effectively served by the main grid or independent grid supplies will continue to rely mostly on kerosene lighting (with some use of automobile batteries or dry cells)

Future concessionaires of mini- or micro-grids would not incorporate PV systems as a part of their supply plan.

The solar PV market would continue to expand, but largely via small ad hoc donor programs with heavy grant component, procurement tied to the donor country(ies) sources, and limited local content in assembly. The overall market would remain small, supply chains would be weak, the differential between world and local equipment prices would remain high, and the local service costs would also remain high.

B. Limited capacity development in private and public sectors:

Domestic solar PV industry will remain small, serving an unpredictable and geographically spotty market, and its

ntives to establish reliable supply chains externally or internally, or invest in human resource capacity, will be sharply or;

There will be virtually no capacity in the public sector to help identify, design, and implement RE projects. In turn, scale and experience base of technology adaptation and ‘localization’ will remain very low, and the pace of RE development will remain largely subject to small, uncoordinated projects of individual external grant donors.

The potential benefits of the next phase of ‘sector reforms’ – establishment of third party access and unbundled fees, and issuing concessions for mini- and micro-grids – will not accrue to the RE industry (or will be sharply limited, or go to support unnecessarily higher costs).

The volume of overall cost-effective investments over the longer term will be lower. This is because, to the extent RE technologies provide an opportunity to serve small, disperse markets more cost-effectively over the long term, continued reliance on higher-cost options such as main grid extension or kerosene would necessarily imply an economic loss. Also, to the extent that continued reliance on low-quality lighting sources such as kerosene lamps involve higher costs (over the long term), there is a corresponding loss in economic welfare, and the transition to modern lighting services would proceed slower. Donor assistance will remain fragmented and less effective.

The Alternative (The Project)

Under the project alternative, the market for RETs – particularly, solar PVs – would be expanded in a competitive manner so as to lower the costs – at least, substantially reduce the current cost differentials between the international and local prices for the imported equipment, and lower the domestic costs of after-sales service. With associated efforts in capacity building in both the public and private sectors, the key approach is that of ‘learning by doing’, with the intent that the learning acquired and assimilated during the project offers an opportunity for a subsequent rapid scale-up. That is, *at this stage the key barriers sought to be lowered are high costs and low domestic absorptive and implementation capacity (including the capacity to develop additional projects for future financing.)* As the sector reforms and new institutional framework take hold, and as the Government’s Poverty Reduction Program gains momentum, it may be possible in a few years to mount a more ambitious program of lowering the supplier and end-user financing barriers.

Capacity building: At final stages of project preparation it was decided to have IDA funds cover capacity building activities to support WB implemented investments. The project through IDA funds will finance technical assistance and equipment for the establishment, outfitting, training, and some operational activities of CREE, the regulatory agency, DNE, the National Directorate of Energy, AMADER, the household energy and rural electrification agency as well as the agencies at the level of municipalities. A program will be established using workshops and training materials to expand the business and managerial capabilities of the local companies. market and business plan development, identification of potential local and international joint venture partners, and facilitate market expansion through support of outreach to potential customers (e.g., rural community associations). Key capacity building initiatives are targeted to enhance (i) *Renewable energy information dissemination* to provide practical and accurate information to facilitate rural energy investment decisions; (ii) *Capacity Development for Renewable Energy Investment* to lay the foundation for successful investment in renewable energy; (iii) *Renewable energy business training and development* to expand and extend the training and development of renewable energy businesses, NGOs, and others to address the potential renewable energy markets; and, (iv) *Development of Investment Pipeline* to prepare a pipeline of feasible renewable investment projects. Assistance will be provided as well in ‘cross-sectoral’ market development and in promoting income- generating applications

of decentralized RETs. This will require cross-sectoral collaboration among different ministries, accompanying experts and businesses. To facilitate this process an inter-ministerial working groups may be established. The group will support the government officers in establishing functional specifications, technology assessment tools, operation and maintenance schedules, fee collection mechanisms, definition of responsibilities, procurement guidelines etc. . The overall development objective is to reduce CO2 and other greenhouse gas emissions by removing barriers preventing a sustainable market development of renewable energy technologies and ensuring affordable energy access to the rural communities.

Investments in institutional/household solar PV systems: There are two potential markets for solar PV systems in Mali: (a) **households in the peri-urban areas** of cities and towns; and, (b) **households as well commercial/institutional customers in the rural areas;** the non-household part of this market is likely to be mostly grant-driven, with grant financing coming largely from donor projects in other sectors (rural development, education, and health). The growing emphasis on human development and the enhancement of productive sectors by the Government of Mali within the agreed poverty reduction strategy document are positive developments susceptible to provoke the meeting of institutional and commercial energy needs. Discussions during project preparation and negotiations pointed to the willingness of the Government of Mali to consider a systematic budgeting of energy needs of social and key productive sectors as part of the national budget.

The project will seek to open up the external donor grant-financed commercial/ institutional market for solar PV systems to local competitive procurement, and to establish the financial, technical, and business development intermediation mechanisms for local operators. Once such operators are established and can provide reliable sales and services to a largely grant-financed market, it is expected that the information, marketing, and financing barriers to solar PV systems will be substantially lowered and the resultant increase in market size (combined with the continued price reductions for solar PV in the international market) will diminish the need for grant-financing of solar PV investments.

A fee-for-service business model : A fee-for-service business model is adopted by the project. Instead of paying subsidies to PV dealers, subsidies will be paid to concessionaires to provide services. The fee-for-service model is more conducive for the expansion of PV systems for the following reasons: (i) it allows the most affordable payment schemes and can reach a larger client base; (ii) clients do not have to invest in systems but only pay for services provided by operators; (iii) clients do not have to worry about after sales systems maintenance which is centrally provided by operators; and, (iv) product standardization and quality assurance is easier as operators can obtain economies of scale in procurement and in the delivery of services.

The Rural Electrification Fund: Subsidies to promote rural electrification investments will be channeled through, a “Rural Electrification Fund” (REF) created by the Government of Mali in 2000 (article 50, ordonnance no 00-019/P-RM du 15 mars 2000). The REF is designed to ensure the competitiveness of rural electrification projects, and to maintain electricity tariffs at an affordable level for the poor, hence making rural electrification programs viable in the long-term. Prospective operators have a choice among three selection processes: (i) a national/international competitive request for proposals; (ii) a national/international competitive bidding process; and (iii) a process allowing a fair and independent evaluation of direct, unsolicited offers.

Involvement of the commercial banking sector: The Government has decided to associate the Malian commercial banking sector in support to achieve its goals of providing energy services to the poor. Malian commercial banks will be invited to compete for:

Administering and remunerating REF's deposits at the best available terms and conditions (to be negotiated with AMADER);

To effect, on behalf of AMADER, the transfer of subsidy payments to qualified RE license holders;

To monitor, on behalf of AMADER, the activity of RE license holders and the application of funds during construction and for at least 36 months following their start in operation (and, as the case may be, for the term of the loan if a commercial bank has extended a loan to the RE license holder);

To make their own independent credit and project appraisal and, on the basis of such evaluation, give AMADER an assessment of the project;

Subject to credit committee approval, extend to the RE license holders medium- and long-term loans for terms comprised between 5 and 7 years. In order to minimize subsidization levels without incurring tariff increases and without putting the project equilibrium at risk, AMADER and the commercial bank will reach an understanding on the terms and conditions of those loans. The selection process of such commercial bank has already started.

Output-based contracting/Exit Strategy: Subsidies to promote rural electrification investments will be channeled to private rural electrification concessionaires ("Concessionaires") through the Rural Electrification Fund ("REF") created by the Government of Mali in 2000. The REF has no set term, but IDA's financial contribution to the REF is limited to a period of 5 years. Throughout the life of the REF, to ensure that funds earmarked for the development of rural electrification ("RE") are not diverted to other uses, the REF will contract independent inspectors agreeable to IDA, to verify that the connections made by the Concessionaires are eligible for reimbursement under the terms of their respective concession agreements. Payment of subsidies are stopped if results on the ground do not match the quarterly, semi-annually, or annually connection targets agreed in the concession agreement. If no connections are made, no payment is made. Because the REF is designed to operate on "output-based aid" principles where the payment of subsidies to concessionaires is linked to the number of connections they effectively make, IDA contributions to the REF unused at the end of the IDA Contribution Term will be cancelled and rebated to IDA. Throughout the life of the REF, however, the Government has the possibility to endow the REF from its own resources (non-IDA). We believe that this mechanism will ensure the competitiveness of rural electrification concessions and will maintain electricity tariffs at an affordable level for the poor, hence making rural electrification programs viable in the long-term.

Incremental costs: Under the GEF **alternative**, therefore, the annual PV market be expanded to over \$3.5 million (for over 350 kWp of new sales plus repair and maintenance contracts) per year by the end of the project. PV businesses would be assisted in finding best-price sourcing opportunities from around the world (including possibly local production of some components), and would be provided a per Wp subsidy to reduce first costs and enable expansion of sales and service networks. The businesses will also be given other direct assistance, as necessary, in strengthening their capacity to access commercial and quasi-commercial short- or long-term finance (from other project windows, or from foreign equipment suppliers and private grant donors).

This package of interventions to rapidly expand the market in a predictable manner and supporting the entire delivery chain as well as pioneering institutional customers is expected to lead to significant cost and price reductions (via international competitive bidding) as well as greater awareness and acceptance – first for the larger institutional systems and gradually for the smaller systems. A larger and growing market also helps reduce the costs of training for service and maintenance. Taken together, GEF funds finance both the equipment subsidy (an average of about \$1.8/Wp, see below) and the costs of implementation and monitoring and evaluation. That is, while the calculated incremental costs for solar PV investments turn out to be about \$2.4/Wp, not all of it would go for direct equipment subsidies.

PV Investments	Avg.size, Wp	# of systems	Capital cost \$/Wp	Incremental cost		
				per Wp	per ton CO2	per ton C
Institutional PV systems	800	500	\$12.4	\$3.0	\$25.6	\$ 94
Large SHS	100	450	\$11.9	\$2.4	\$10.9	\$ 40
Medium SHS	50	5,000	\$13.2	\$2.6	\$10.1	\$ 37
Small solar systems	15	4,200	\$10.5	\$3.4	\$26.9	\$ 99
Total/weighted average	758 kWp		\$12.4	\$2.8	\$16.9	\$ 62

Note: Incremental costs are differences in the net present values. Capital costs and incremental costs are averages over project duration. There is no 1:1 relationship between incremental cost in \$/Wp and in \$/t CO2 across because of different baselines for different PV systems types/sizes.

Since the awareness of PV technologies is fairly significant by comparison to other sub-Saharan African countries, and some investments in supply chains have already been made, the key barrier sought to be lowered by these investments is the high cost differential between the domestic and international equipment costs, and the weak local capacity for installation and after-sales service. If the ‘decentralized rural electrification’ service providers – i.e., future concessionaires for mini- and micro-grids – can be interested in incorporating PV systems in their supply plan, on a ‘fee-for-service’ basis, the project would have contributed significantly to the end-user finance barriers for PV and other renewable energy technologies.

Use of GEF Grant Funds: GEF funds will be kept administratively separate from other funds. All GEF funds will be used on a grant basis to support private sector initiatives aiming at the development of solar PV. The grant funds are in principle directed at the change agents who actually help remove the specific barriers and not the beneficiaries of barrier removal, so the ‘subsidy’ element is more a ‘reward for barrier removal and risk-taking’ and does not cause a direct, long-term reliance on GEF grants per se to meet the affordability constraints for electricity access (which, as discussed above, are to be distinguished from barriers to the adoption of RETs for such access)

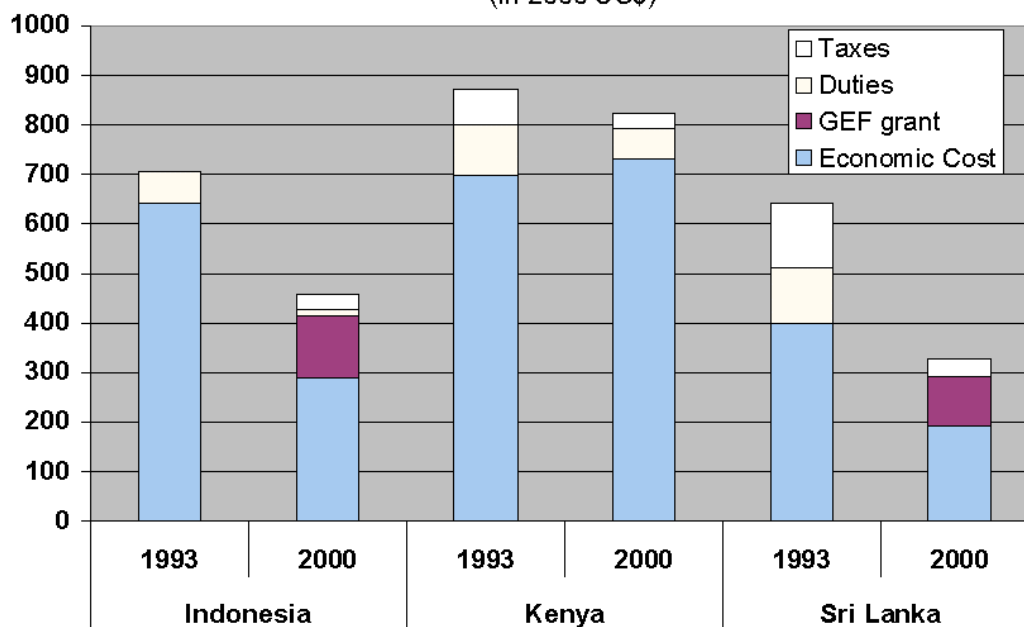
Output-based GEF Co-financing Grant Release Mechanism			
PV Systems	Years 1 & 2	Years 3 & 4	
Avg. Wp	\$/Wp	\$/Wp	Avg. \$/Wp
Institutional systems (~800 Wp)	\$ 2.0	\$ 1.5	\$ 1.7
Large SHS (~100 Wp)	\$ 2.0	\$ 1.5	\$ 1.7
Medium SHS (30-50 Wp)	\$ 2.5	\$ 2.0	\$ 1.8
Small/mobile systems (10-20 Wp)	\$ 2.5	\$ 2.5	\$ 2.5
total	\$ 2.1	\$ 1.6	\$ 1.8
Total \$m			
Institutional PV systems	\$ 0.32	\$ 0.36	\$ 0.68
Large SHS	\$ 0.03	\$ 0.05	\$ 0.08
Medium SHS	\$ 0.19	\$ 0.26	\$ 0.45
Small solar systems	\$ 0.03	\$ 0.13	\$ 0.16
total	\$.56	\$ 0.80	\$ 1.36

Note: Sums may not equal to totals because of independent rounding. The indicative budget is based on a certain assumed distribution of sales across system sizes.

In other Bank/GEF projects, it has been observed that the proposed approach of providing GEF grants as a limited ‘incentive payment’ to operators – rather than a subsidy to the final end-user – results in a significant reduction in economic cost (so that the Bank/GEF contribution via market expansion and catalyzing competition is much more than just the initial capital subsidy).

SHS by Cost by Component: 1993 and 2000 Compared

(in 2000 US\$)



Global Environmental Benefits

The direct calculated gross avoided CO₂ emissions due to solar PV investments are in the order of about **142,700 tons** (or about **38,900 tons** of carbon). The \$/Wp and \$/tC incremental cost estimates presented above are strictly on the basis of investments proposed under this project; i.e., secondary impacts via expansion of market for other investments during the course of this project or beyond have not been taken into account.

Sustainability: A key strategic reason to choose to initiate RE investments in the context of ongoing sector reforms is to seek to ensure sufficient, gradual nurturing of the local markets and capacities so as to ensure the long-term sustainability of RE investments under the project AND acceleration of these investments beyond the period when GEF grants cease. The overall approach is that, over time, sustainability will come from barrier removal, cost reductions, rising incomes, and declining GEF grants. Also, as the Government plans to finance the electrification fund via a levy on main grid-based electricity, the need for external grants to support electrification in general, or that via RE technologies in particular, will decline.

For solar pv systems, the decline in costs will come from: (i) economies of scale –which are often realized when a credible expectation of a large market has been created, (ii) formation of links to lower-cost suppliers abroad, and (iii) rising incomes, which will increase the affordability of the systems. Further, the GEF grant per unit for solar pv systems is also slated to decline over time.

Thus, the key assumptions underlying the viability and replication prospects are that cost-reductions will be realized and incomes will rise. Given the GEF share of 20-25% in total costs, it is reasonable to expect that cost reductions and income increases over a number of years will offset the need for such support after the project is over. Additionally, the planned TA/CB activities will support ‘learning by doing’ and incorporating mid-term revisions and corrections along the way; taking care to reduce grant dependencies of individual sub-projects.

As one of the least-developed countries, Mali is expected to remain dependent on grant support from donors in social sector investments – e.g., health and education. To that extent, the expansion of the ‘public institutional market’ will remain indirectly dependent on donor support. The major change this project proposes in this regard is to incorporate ‘energy provision’ as a routine part of budgetary processes of individual line ministries. Initially the PV sellers take the usual commercial risk that this portion of their market depends on the ability of the GoM to fund public-sector social services. Over time, as their market grows and diversifies, this risk would become relatively smaller.

A key lesson from the EU-financed Regional Solar Program for community-level PV systems (largely for water pumping) is that the communities must be prepared to pay for the repair and maintenance of PV systems, and the quality of such services in turn must satisfy their requirements. (In Mali as of 1999, about 20% of the villages with maintenance contracts were more than two years overdue with their payments.) Remuneration of the maintenance contracts is also a significant part of the revenues of local PV companies, and it allows them a platform for engaging in new commercial activities and product lines (e.g., battery charging).

Some of the initial as well as replacement capital cost may come from the governmental sources – either directly to the institutional users (clinics, schools) themselves or via the funds for local governments.

In turn, the beneficiaries should also value the improvement in service quality – e.g., water availability, or lighting in schools and clinics – enough to either contribute to the repair and maintenance costs or higher fees for services (school or clinic visits). The project's emphasis on reducing the initial costs and building capacity (and incentives) for quality after-sales service seeks to ensure that the systems financed under the project are sustained long after the project has closed. To the extent that both the initial capital costs come down - in line with expected cost reductions in the international markets - and that after-sales service requirement needs are properly met, the 'replacement' costs for the investments under the project will be lower.

Beyond the lifetime of the project, experienced and capable operators would also be able to engage in some supplier credit to the new end-users, and other credit mechanisms also become more viable (e.g., micro-finance to household or small commercial end-users). If the businesses have proven the effectiveness of PV technology and their sales and service capabilities, additional public institutional customers (in the health and education sectors, but potentially expanding to other such sectors) will be interested in purchasing PV systems, and the demonstration effect would also encourage other large, private users (private schools and health clinics, for instance) to do the same. Similarly, grid concessionaires could also be interested in incorporating PV systems as a part of their supply plan, either for retail or short-term credit sales or on a fee-for-service basis.

Sustainability of the Rural Electrification Fund: The Government may consider endowing the REF in different ways, depending on resource availability. General budgetary resources may complement an oil levy, an urban kWh sold levy, and grants from bilateral and multilateral donors. The purpose of the REF is to use subsidies as catalyst for expanding private and community-based investment to support increased access to electricity in rural areas. The REF would also play an equalizing role by facilitating socially- and economically-viable access to electricity, and by funding productive demand for energy, REF would contribute to the economic development objective of reducing income poverty.

Replicability/Exit Strategy: It is as yet difficult to fully assess the implementation risks to define an appropriate 'exit strategy or develop 'leading indicators' of project troubles. Similarly, it is as yet difficult to develop 'leading indicators' of project successes conducive to the preparation of a 'follow-on' project. It does appear that not all barriers to a large-scale adoption of RETs in the Malian context can be adequately removed during the course of a single project, and the monitoring and evaluation systems to be designed must be 'forward looking' and facilitate ongoing learning and information dissemination to the project implementing unit. This would be further refined during the course of project preparation. Tentative proposals for an exist strategy that would be firmed up in consultation with the Government and other key stakeholders are that by mid-term review: (i) a minimum 25% of both the Bank credit funds (for institutional customers) and the GEF grant funds have to be disbursed in the first two years of the project, otherwise the PV component will be re-designed or its scope significantly reduced; and, (ii) the GoM and other donors must be adequately supportive of the commercial approaches to rural electrification in general, and PV promotion in particular, and provide adequate support to building local capability in efficient sourcing, after-sales service capability, technical and commercial certification, program administration, and M&E.

Monitoring and Evaluation, and Dissemination: Monitoring and evaluation toward the GEF objectives would be coordinated to the maximum extent with the overall project monitoring and evaluation (M&E), which will focus on three broad categories of impacts – direct and indirect benefits of electricity access; market viability of a variety of suppliers and technologies; and, achievement of environmental objectives. GEF-specific indicators will be linked to the second and third of these categories, and are

briefly described in the table below. Baseline levels at the beneficiary level will be established during project preparation and initial implementation, using both quantitative survey techniques as well as participative techniques for qualitative data. It is felt that some of the M&E should be increasingly 'mainstreamed' and 'localized' – so that the beneficiaries and market players themselves have an interest in providing, collecting, and reporting data. Dissemination of program results will be accomplished through regular reporting to local and donor stakeholders.

Two additional considerations arise in the design of M&E:

- Pre-existing or complementary investments: to the extent that some of the project investments – in particular, the solar PV investments – and related local capacity building may occur in the same geographic areas of the country as where some similar complementary investments may already have been made or may be made during the course of this project (e.g., those funded by other donor projects), M&E activities for the proposed project may capture some of the positive or negative impacts of those other investments. Similar considerations arise where an independent grid operator includes solar PV systems as a part of his/her service plan. .

- Multi-project information-sharing and market facilitation activities: Several other countries in the region have significant renewable energy projects – completed, under implementation, as well as new (including the EU-sponsored Programme Regional Solaire phase I and II, and anticipated Bank/GEF 'climate change' projects in Burkina Faso and Mauritania). Many of these projects share, and are expected to share, common features in market and capacity development for a number of RETs. A multi-project and multi-country institutional mechanism that adopts a somewhat 'standardized' approach to capacity building and M&E may be useful in several respects – common approach to procurement of goods and services, adoption of a standard M&E 'protocol' for GEF-financed as well as other projects, and gearing up regional market development plans for other sources of 'carbon finance' (such as may be created under bilateral or multi-lateral arrangements whether or not the Kyoto Protocol becomes effective roughly by the end of the proposed projects in Mali and other countries.)

The table below provides an indication of the types of indicators that would be incorporated in the M&E plan.

The indicators are from the viewpoint of PV market development. From the viewpoint of the 'indirect' development impacts of electricity service provision to rural health and education facilities - irrespective of the supply technology - the performance indicators must be (a) consistent with those used in health and education sector projects - i.e., reflect on the quality of health and education services provided, not just the quality of electricity services provided - and (b) supportive of further development of those markets. During the course of further preparation, the indicators and measurement/reporting procedures will be clarified along these lines as part of an overall M&E plan in consultation with Bank colleagues and Malian counterparts in the telecom, health, education, and rural development sectors. This would also draw upon the experience of M&E under other donor-supported projects, e.g. the EU-financed Regional Solar Program.

<u>Market segment</u>	<i>MARKET DEVELOPMENT INDICATORS</i>
Solar PV Investments	<ul style="list-style-type: none"> • Sales not financed or subsidized by the project • Performance and perceptions of market participants at different points in supply and service chains; foreign participants' interest • Percentage cost/price reduction at various levels in the supply chains • Cost/prices compared to regional and world markets • Varieties of systems available outside the project • Varieties of sales and financing terms offered • Codes, standards, and certification • Consumer protection mechanisms developed and accepted •
Grid-based RETs	<ul style="list-style-type: none"> • Regulations development for independent grids and for bulk sales to the main grid or independent grids • Reform of tariff structure conducive to RET-based independent grids • • Number of participants, duration and commitment, cost-sharing • Studies completed and decisions taken by GoM • Academic/training programs mainstreamed • Utilities and distribution concessionaires adopt off-grid systems in their planning and marketing • Number of PV businesses certified by the project implementing unit. • Number of business plans developed under business support programs • Number of community-level participatory appraisals conducted.
	<i>MARKET INTERVENTION INDICATORS</i>
Solar PV Investments	<ul style="list-style-type: none"> • Direct sales (# of systems, kWp, \$, terms of sales) • Geographic spread of customers • Size distribution of household PV systems • Amount of subsidies disbursed • Budgets of participating ministries for electricity services • Amount and sources of supplier financing
TA/CB	- to be developed -
	<i>MARKET SUSTAINABILITY INDICATORS</i>
Solar PV Investments	<ul style="list-style-type: none"> • Consumer acceptance of PV systems as well as more generally of the criticality of electricity services in education, health, and local administration performance; • Incorporation of PV option in the business plans for grid electricity distributors (main or independent grids); • Pipeline development for future projects, and sourcing additional financing • Localization of assembly and service

Incremental Cost Analysis:

Component 1 and 3 are fully baseline and GEF co-financing is not requested for these two components. Below is the Incremental Cost Analysis for Component 2 (Energy Service Delivery).

Incremental Cost Analysis		
Component 2: Energy Service Delivery	Baseline	Alternative
C.1.Promotion of Rural Electrification Investments		
	<p>Grant-driven programs fizzle out and there is a waste of resources</p> <p>Other off-grid market grows slowly, and primarily with diesel and kerosene</p> <p>Solar market small, product availability narrow, and near exclusive dependence on imports for hardware and human capacity</p> <p>Private investors select only diesel gensets for electricity provision to independent grids</p>	<p>Program improvements</p> <p>Acceptance of PV technology by users and financiers</p> <p>Cost reduction in PV and other RE technologies, and narrowing of cost gap with international market</p> <p>Expansion of large institutional PV market</p> <p>Introduction of a wider range of household-size systems</p> <p>SHS and lanterns become available in several geographic markets</p> <p>Some private concessionaires incorporate PV systems in their service delivery plans</p> <p>Successful demonstration of a range of technologies and business approaches</p> <p>Offset of GHG emissions via avoidance of gasoline, kerosene,</p>

C.2.Promotion of Multi-Functional Platforms		
	<p>The multifunctional platform has met enthusiasm from communities and policy makers</p> <p>In areas with no previously existing modern electricity services, activities are motorized that used to be undertaken by human manpower.</p>	
	\$1.55 million	
C.3. Information, Education, and Communication		
	<p>Demonstration workshops for utilization of energy devices, information and promotional campaigns, field trips to neighboring villages for learning purposes, workshops for private operators, NGO and civil society groups have been undertaken and communities are aware of available energy service schemes and have the relevant information to participate in project activities as a result.</p>	
	\$2.05 million	
TOTAL COST COMPONENT	\$24.74 million	\$28.24 million
2		

Additional Annex 12: STAP Roster Technical Review
MALI: Mali Household Energy and Universal Access Project

STAP REVIEWER'S COMMENTS AND RESPONSE

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To: Nikhil Desai, Richard Hosier, Christophe Crépin
Email: Richard.Hosier@undp.org, ndesai@worldbank.org, ccrepin@worldbank.org
From: Daniel M. Kammen
Re: Review of: Household Energy and Universal Rural Access
(Project ID: P076440)

Summary:

The goal of this project is excellent, to facilitate the development of an vital renewable energy market in Mali. Following on the lessons of renewable energy market stimulation efforts in other nations (e.g. Martinot, et al., 2001; Duke, et al., 2002) the capacity and policy lessons learned clearly signal that these sorts of programs are ready for widespread application. The project brief is vague in places, and there are a number of particular items listed in the comments below, but overall this project should be implemented.

I recommend support for this project.

Major Comments:

The project focus on PV needs some added discussion. While it is clear that more focused – single technology – projects concentrate expertise and are therefore easier to manage successfully, there are some issues in the case of Mali that warrant additional analysis. As a researcher who has worked extensively in the PV and biomass markets and industry in East Africa, I am keenly aware of the arguments that can be made against this broader market view (e.g. Duke et al., 2020). In this light, it is vital to maintain an active program in at least the biomass sector as well (e.g. Kammen, Bailis & Herzog, 2001).

The arguments against the single technology focus include:

- (i) Least cost clean energy development (wind and biomass are both considerably less expensive in many applications)*
- (ii) A larger potential market stimulation package, where both electricity and mechanical work (e.g. wind water pumping and CHP applications from biomass) are potential technologies and services rendered.*
- (iii) Greater diversification of the companies capable of providing services, thus reducing the very real danger that rural energy companies become the de facto local utility. The discussion of capacity on page 16 'Capacity' reflects the large potential for monopoly statu*

Page 12: The biomass project is a significant project component. It is unclear, however, how much benefit this will provide without a effort at the same time to expand the Malian improved stove market. The benefits of reduced indoor air pollution has recently been recognized to significantly reduce acute respiratory illness, the leading cause globally of ill-health (Ezzati and Kammen, 2001).

Page 18: While power sector reform (Section E.2, financial) is important, it remains to be seen if this is of central importance to the effort to provide rural energy. In many countries where full, or even partial, reform has not taken place (e.g. Kenya, Mexico, Sri Lanka) significant progress has taken place in building a renewable energy market. To be sure, often this is mainly a function of the failure of the state enterprise to provide rural energy services, but RET markets can clearly evolve in both restructured/deregulated and state/single-provider controlled markets.

Minor Comments & Clarifications:

Page 1: the table 'Costs and Financing' is in error. The costs are indicated in millions, which would make this project cost \$17 billion dollars.

Page 5: While it does not satisfy ideas of national equity, the focus of the GoM on electrification services in the commercially important areas (the cotton, rice, and emigration zones) makes not only commercial sense, but also permits the experience of countries like Kenya to be used significantly in designing best practices for Mali.

Page 8: lead table, Section C. The term 'universal rural access' is not recommended. This program, like many before, can not honestly claim to be on a path to providing universal access in the next one or even two decades. As happened in South Africa, the promise of universal access, if not delivered, can do great harm to rural energy efforts.

Page 10 & 11: Capacity Development and Institutional Strengthening.

*This project component is clearly important, and if done correctly can greatly enhance the functioning of the market through the provision of credit, analysis of project and entrepreneurial opportunities, and formal or informal certification of vendors and components. As written, however, this section is unclear as to what will actually be done. Specifically, what instruments will be used to address the 6 bulleted points and then discussed in some added conceptual detail in Annex 2? For example, in Appendix 2, page 29, it is unclear what will take place in, item 3, "**Exploiting the 'policy space' of broader economic reforms and re-direction of public expenditures**". Item 5 is similarly vague and while carbon credits and other mechanisms are politically popular at present, specifically how with the prototype carbon fund*

be accessed given that PV, while important for development will offset, per dollar, very little carbon.

Page 36: The major obstacles to RET market evolution are probably not ‘absorptive’ [i.e. demand side issues] power so much as they are stable market opportunity where investment in RET businesses proves a better return on the investment than other pursuits.

Page 39: The use of ‘output’ based incentives (i.e. kWh of energy production and not Wp installed) is a critical step forward that this project can take. The implications of this are not mere rhetoric. Performance-based standards require significant long-term monitoring and follow-up to be effective, and the project budget will need to support this not only in terms of technical monitoring capacity, but also the ability to train local individuals and groups to perform this function.

Page 39: the figure (SHS cost does not state system, components included, type and size).

Page 45, table: kWt – acronym needs to be explained.

Incremental Cost Analysis (File Mali ICA 030702 ND.xls)

On the sheets: ‘100 Watt’, ‘50 Watt’ and ‘Small Systems’ the final cost/tC is relatively low because the assumed kerosene substitution values chosen are exceedingly high. The work of Kaufaman, Duke, et al., (Renewable Energy Policy Project Report <http://www.repp.org>, 2001) found that much lower substitution values were representative for much of Africa.

References:

Duke, R.D., Jacobson, A., and Kammen D.M. (2002), "Product Quality in the Kenyan Solar Home Systems Market," in press, *Energy Policy*.

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Kammen, D. M., Bailis, R., and Herzog, A.V. (2001) "Clean Energy for Development and Economic Growth: Biomass and Other Renewable Energy Options to Meet Energy and Development Needs in Poor Nations," UNDP report for the 7th Conference of the Parties to the UN Framework Convention on Climate Change (COP7-UNFCCC): Marakech, Morocco (October 29 - November 9), 111 pages, in press.

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Kammen, D. M., Bailis, R., and Herzog, A.V. (2001) "Clean Energy for Development and Economic Growth: Biomass and Other Renewable Energy Options to Meet Energy and Development Needs in Poor Nations," UNDP report for the 7th Conference of the Parties to the UN Framework Convention on Climate Change (COP7-UNFCCC): Marakech, Morocco (October 29 - November 9), 111 pages, in press.

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Martinot, E., Chaurey, A., Lew, D., Moriera, J. and Wamokunya, N. (2002) “Renewable energy markets

in developing countries”, Annual Review of Energy and the Environment, 27, *in press*.

RESPONSE TO STAP REVIEWER'S COMMENTS:

Comment “The project focus on PV needs some added discussion. .. In this light, it is vital to maintain an active program in *at least* the biomass sector as well (e.g. Kammen, Bailis & Herzog, 2001).

Response: The apparently exclusive focus on PV investments may give an impression that the project is technology-focused. This is not the case. The choice of PV follows from the choice of market niches – critical electricity needs of off-grid public institutions and of households and commercial customers who otherwise spend significant amounts of money on low-quality lighting from kerosene and car batteries for small appliance use. This market can be served by DC power, and PV is eminently suited for such applications. There are other DC power technologies that are perhaps better suited for other markets, but at this point, the best opportunities for cost reductions and commercialized approaches to renewable energy promotion appear to lie in the DC power, and hence PV, market. The PV delivery chains are well-established and understood, there has been considerable donor support to PV applications in Mali and neighboring countries, and the PV market appears poised for a steady expansion. Component 4 of the UNDP/GEF activities is addressing the issue of identifying the markets – and developing the supply chains – for biomass-based power/CHP applications over the longer term.

Comment “The arguments *against* the single technology focus include:

Least cost clean energy development (wind and biomass are both considerably less expensive in many applications)”

Response: Agree, in part, but it is debatable whether wind and biomass can meet the needs of the markets identified and addressed at this time in a least-cost manner, all costs considered. (See the comment above – the technology focus comes from market focus, not the other way around.) Cost comparisons in terms of cents/kWh delivered are not very meaningful for PV battery-charging versus wind or biomass AC power. The scale of applications is different, and hence also the geographical market. In the particular demographic/geographic markets selected, wind and biomass-based AC power technologies may well be attractive to some concessionaires of independent grids. At this juncture, the project’s concern with such decentralized grids is more in terms of getting the institutional framework right and working, not promoting particular technologies. This is all the more so because of weak financial and technological intermediation mechanisms for grid-capable renewable energy technologies. They compete against diesel in a wide range of scale and applications – from 10 kW to MWs; in the context of the present project’s objectives – expanding electricity access – their utility to a private investor may well be high, but is relevant only insofar as s/he chooses them for grid distribution applications. (That is, attractiveness of wind/biomass technologies for uses other than expanding access is not the focus of this project.)

As the power sector reforms take hold, as the decentralized electrification (mainly, a combination of independent grids and PV systems) concept is accepted by the Malian society, as the financial intermediation channels are strengthened, a broader renewables-promotion program can be mounted. This is indeed the purpose of the TA and capacity building activities outlined in the project brief. Unlike regulated power systems with detailed cost disclosure requirements, decentralized electrification does not - and cannot - depend on external judgments of what 'least cost clean energy development' might be; the buyer of a PV system or a wind generator decides whether it is 'least cost' to him/her.

Comment “A larger potential market stimulation package, where both electricity *and* mechanical work (e.g. wind water pumping and CHP applications from biomass) are potential technologies and services

rendered.”

Response: Agree in concept, but not in practice at this time. There is a relatively large EU-financed Regional Solar Program in several West African countries that focuses exclusively on solar water pumping. (Phase I was completed in 2000; Phase II has just been prepared.) No doubt there would be markets for wind water pumping and CHP for biomass; the critical question to be answered is, “What are the opportunities for scaling up and rapid cost reductions in order to expand access?” In some other parts of the world, wind and biomass power (or CHP) can contribute to the main grid supplies; this does not seem to be the case at this point in Mali.

Comment “Greater diversification of the companies capable of providing services, thus reducing the very real danger that rural energy companies become the *de facto* local utility. The discussion of capacity on page 16 ‘Capacity’ reflects the large potential for monopoly status.”

Response: There is nothing undesirable per se in that rural energy companies - meaning, concessionaires of independent grids - would become *de facto* local utility. Where conditions of natural monopoly permit, regulated utilities are the answer. The key issue is whether these utilities have the incentives to reduce costs and expand access. Re-bidding of concessions may in part reduce these risks. No general judgments can be made at this point; much depends on the economic geography of the concessions and the cost structures. This is why it is critical to establish workable institutional framework first, but not lose sight of challenges and potentials down the line.

Comment: Page 12: The biomass project is a significant project component. It is unclear, however, how much benefit this will provide without a effort at the same time to expand the Malian improved stove market. The benefits of reduced indoor air pollution has recently been recognized to significantly reduce acute respiratory illness, the leading cause globally of ill-health (Ezzati and Kammen, 2001).

Response: Agree. The biomass energy component will have both a supply side (community forest management) and a demand side (efficiency improvements, interfuel substitution) initiatives. Activities that will facilitate the expansion of improved stove market are part of the demand side initiatives. Basically, these activities include: (i) the provision of technical assistance to the private sector operators and NGOs to promote the local manufacturing of improved wood and charcoal stoves; (ii) the definition of rules and regulation on the cooperation of private and public partners in the household energy sector to facilitate dissemination of improved stoves; and, (iii) the implementation of an information and communication strategy to make households realize health benefits from switching to improved stoves.

Also, UNDP is sensitive to the issue raised with respect to the need to work further on fuel-efficient wood stoves. However, given the large amount of previous support to fuel-efficient woodstoves in Mali (especially by the World Bank, UNDP, and ESMAP) it is not altogether clear that there is a role for GEF to play in this regard. As a result, during the final stages of project formulation and documentation, UNDP will reconsider this question. If it is considered advisable to support more work on fuel-efficient woodstoves to complement the modern biomass work, the funding for this initiative will be sought from other, non-GEF sources.

Comment: Page 18: While power sector reform (Section E.2, financial) is important, it remains to be seen if this is of central importance to the effort to provide rural energy. In many countries where full, or even partial, reform has *not* taken place (e.g. Kenya, Mexico, Sri Lanka) significant progress has taken place in building a renewable energy market. To be sure, often this is mainly a function of the failure of the state enterprise to provide rural energy services, but RET markets can clearly evolve in both

restructured/deregulated *and* state/single-provider controlled markets.

Response: Disagree. It is the premise of the project that lack of power sector restructuring - demonopolization, level playing field, cost-reflective tariff mechanisms, 'smart' subsidies - is an impediment to rural electricity access. Whether it is also an impediment to renewable energy technologies is debatable. For PV systems alone, it is perhaps the case that markets can be expanded even without reforms of the main power sector; such is certainly not the case for many grid-capable RETs. "Reforms" is not merely 'privatization of a national monopoly with a limited market'. The key challenge in the project concept here is to see how RETs can fit in the overall framework of sector reforms and accelerating access expansion, not how sector reforms and access expansion can fit in an RET promotion program.

Minor Comments & Clarifications:

Comment: Page 5: While it does not satisfy ideas of national equity, the focus of the GoM on electrification services in the commercially important areas (the cotton, rice, and emigration zones) makes not only commercial sense, but also permits the experience of countries like Kenya to be used significantly in designing best practices for Mali.

Response: Agree. Experiences from successful rural electrification programs elsewhere will be integrated throughout the preparation of the project. The commercially important regions are attractive markets for both grid-based electrification as well as sales of PV systems.

Comment: Page 8: lead table, Section C. The term 'universal rural access' is not recommended. This program, like many before, can not honestly claim to be on a path to providing *universal access* in the next one or even two *decades*. As happened in South Africa, the promise of universal access, if not delivered, can do great harm to rural energy efforts.

Response: Agree. Neither the GoM nor the Project Team claim that the project will deliver universal rural access to electricity and telecom services; the key issue is to get the institutional framework and mechanisms right, so that such access can be expanded sustainably, however long it takes. Subject to further discussions with the country officials and Bank colleagues, change of project labels will be under consideration.

Page 10 & 11: Capacity Development and Institutional Strengthening.

Comment: This project component is clearly important, and if done correctly can greatly enhance the functioning of the market through the provision of credit, analysis of project and entrepreneurial opportunities, and formal or informal certification of vendors and components. As written, however, this section is unclear as to what will *actually* be done. Specifically, *what instruments* will be used to address the 6 bulleted points and then discussed in some added conceptual detail in Annex 2? For example, in Appendix 2, page 29, it is unclear what will take place in, item 3, "**Exploiting the 'policy space' of broader economic reforms and re-direction of public expenditures**". Item 5 is similarly vague and while carbon credits and other mechanisms are politically popular at present, specifically how with the prototype carbon fund be accessed given that PV, while important for development will offset, per dollar, very little carbon.

Response: The phrase "exploiting the 'policy space' of broader economic reforms and re-direction of public expenditures" simply means that whereas ten years ago a vibrant private sector in electricity business and their providing electricity services to the rural health/education facilities would have been at best a fantasy,

at this juncture it seems merely a challenge. The project philosophy overall reflects that. As for PCF, CDM and other potential (and necessarily politically popular) sources of carbon finance, the project would seek to see IF such other non-GEF sources of finance can be accessed at a later date. Whether this 'carbon finance' would offset significant amounts of carbon emissions in the Malian context remains to be seen.

Comment: Page 36: The major obstacles to RET market evolution are probably *not* 'absorptive' [i.e. demand side issues] power so much as they are stable market opportunity where investment in RET businesses proves a better return on the investment than other pursuits.

Response: Agreed. There is no way to ensure that private investment would flow in electricity or RET compared to, say, running hotels or making beer. The issue here is, "If there were private investments in electricity service provision, what would it take to switch them to renewable sources of electricity, especially where there might be an opportunity to lower the costs, expand the markets, and meet some developmental needs"?

Comment: Page 39: the figure (SHS cost does not state system, components included, type and size).

Response: For Indonesia, 53 Wp system; for Kenya, 53 Wp for 1993, 51 Wp for 2000; for Sri Lanka, 40 Wp. Spreadsheet behind the figure will be sent to the Reviewer separately.

Comment: Page 45, table: kWt – acronym needs to be explained.

Response: Typographical error.

Comment: Incremental Cost Analysis (File Mali ICA 030702 ND.xls)

On the sheets: '100 Watt', '50 Watt' and 'Small Systems' the final cost/tC is relatively low because the assumed kerosene substitution values chosen are exceedingly high. The work of Kaufman, Duke, *et al.*, (Renewable Energy Policy Project Report <http://www.repp.org>, 2001) found that much lower substitution values were representative for much of Africa.

Response: There is no 1:1 relationship between kerosene displaced for lighting and SHS (the larger ones of which will be used not just for lighting but for radio and TV). Rather, commercial SHS market develops when people are otherwise spending significant amounts of money on kerosene lighting and battery services – say, US\$7-10 a month. In the calculations prepared here, kerosene is in part a proxy for fossil-fuel based battery charging services. Further market assessment is necessary to firm up the numbers here.

As for comparison with Kaufman, *et al.*, averages are useful in average circumstances. Unlike Asia and Latin America, where the SHS promotion is aimed at marginal communities, in sub-Saharan Africa, it is aimed at the top 10% of the income in rural areas, nearly all of which are unelectrified. The project household PV market segment is likely to be even narrower than the top 10%. That is, in sub-Saharan Africa, the market profile for 50 and 100 Wp SHS customers is significantly different from that in other regions. Project monitoring and evaluation (M&E) will include provisions for careful profiling of SHS buyers and potential purchasers.

