



REQUEST FOR CEO ENDORSEMENT/APPROVAL
PROJECT TYPE: Full-sized Project
THE GEF TRUST FUND

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PART I: PROJECT INFORMATION

GEFSEC PROJECT ID: 3874
GEF AGENCY PROJECT ID: 115064
COUNTRY(IES): Benin
PROJECT TITLE: Benin Energy Efficiency Project
GEF AGENCY(IES): World Bank, (select), (select)
OTHER EXECUTING PARTNER(S): Energy Directorate Benin
GEF FOCAL AREA(s): Climate Change
GEF-4 STRATEGIC PROGRAM(s): CC-SP1
NAME OF PARENT PROGRAM/UMBRELLA PROJECT: WEST AFRICA ENERGY PROGRAM

Expected Calendar	
Milestones	Dates
Work Program (for FSPs only)	April 2009
Agency Approval date	May 2009
Implementation Start	Sept. 2009
Mid-term Evaluation (if planned)	Sept. 2011
Project Closing Date	Sept. 2012

A. PROJECT FRAMEWORK

Project Objective: The overall objective of this project is to develop standards and labels for efficient light bulbs and air-conditioners in Benin, and to introduce efficient light bulbs to households through a bulk procurement scheme and awareness. The project will result in GHG emissions reduction from the energy saved through the use of efficient equipment.

Project Components	Indicate whether Investment, TA, or STA**	Expected Outcomes	Expected Outputs	Indicative GEF Financing*		Indicative Co-financing*		Total (\$)
				(\$)	%	(\$)	%	
IAME Project – Component A: Electrical Network Up-grading								
Sub-component A3: GEF EE project¹								
A3.1. Energy Efficient Lighting, public awareness and energy efficient equipment promotion								
A3.1.1 Technical and managerial capacities building	TA	Project implementing unit created and operationalized Capacities of the project unit and key public agents enhanced	Training to increase technical and managerial / organizational capacities of the project unit Workshops	70,000	35	130,000	65	200,000

¹ It is important to note that the proposed project is a sub-component of the World Bank's Increased Access to Modern Energy Project (IAME) with a total cost of US\$ 151.51 million. The IAME project has three components as follows: Component A: Electrical Network Up-grading (US\$79.67 million); Component B: Electrification and Modern Energy Services (US\$61.50 million) and Component C: Sustainable Energy Services (US\$5.34 million). US\$5 million have been earmarked as contingencies. Component A of the IAME project provides necessary investments to allow for continued operation of the existing transmission and distribution grid, as well as for an upgrade of its functionality through its three subcomponents (A1, A2 and A3).

Component A integrates this proposed Benin GEF energy efficiency project (through subcomponent A.3) which includes GEF financing of US\$ 1.82 million, cofinanced by the Government of Benin (US\$ 1.65 million), and additional contribution by Local stakeholders (EPAC, consumers, equipment distributors) in the amount of US\$ 0.7 million for this GEF alternative. Moreover, the GEF EE project preparation cost was entirely financed by the World Bank and co-financiers.

The GEF EE project preparation cost as well as the monitoring costs of the World Bank team will be entirely borne by the World Bank as part of IAME project. The cofinancing of GEF energy efficiency is shown in the following table.

			carried out to raise awareness of government agencies (ministries, regulatory and inspection entities), standardization institutes					
A3.1.2 Development and implementation of media communication and public awareness for energy efficient light bulbs	TA	Marketing and promotion plan developed and implemented Consumer awareness plan developed and implemented	Training of private market players (importers and distributors, retailers), professionals and project agents Consumer information campaigns carried out for energy efficient lighting products and air-conditioners	230,000	57	170,000	43	400,000
A3.1.3 Efficient lighting distribution for household sector	Investment and TA	350,000 incandescent bulbs replaced with energy efficient lighting products	350,000 efficient lighting products introduced in the market	1,100,000	44	1,400,000	56	2,500,000
Sub-Total GEF Component 1				1,400,000	45	1,700,000	55	3,100,000
A3.2. Energy Efficient Light Bulbs and Air-conditioners Standards and Labels								
A3.2.1 Design of label and standards for efficient lights bulbs and air-conditioners	TA	Energy efficient labels developed for efficient lights and air-conditioners Standards developed for energy efficient lights bulbs and air-conditioners	Energy efficiency labels adopted for light bulbs and air conditioning Minimum energy performance standard established	40,000	29	100,000	71	140,000
A3.2.2 Enhancement of legal framework	TA	Legal and regulatory framework for	Energy efficiency law including	30,000	37	50,000	63	80,000

for efficient light bulbs and air-conditioner standards and labeling		energy efficient equipment standards and labeling developed Procedures for product testing and certification of efficient light bulbs and air-conditioners established	standards and labels proposed Regulation proposed to support the implementation of standards and labels of lights bulbs and air-conditioners Procedures for light bulbs testing developed and adopted					
A3.2.3 Design and build a national testing facility for efficient lighting products	TA and STA & Inv	Test laboratories installed	Efficient light bulbs testing facility built and operational.	250,000	42	350,000	58	600,000
Sub-Total GEF Component 2				320,000	39	500,000	61	820,000
A3.3. Project management				98,182	40	150,000	60	248,182
Of which M&E plan (for details see Annex C)				98,182	76	30,000	23	128,182
Total project costs				1,818,182	2.3	2,350,000	97.7	4,168,182

¹ List the \$ by project components. The percentage is the share of GEF and Co-financing respectively of the total amount for the component.

² TA = Technical Assistance; STA = Scientific & Technical Analysis.

B. SOURCES OF CONFIRMED CO-FINANCING FOR THE PROJECT (expand the table line items as necessary)

<i>Name of Co-financier (source)</i>	<i>Classification</i>	<i>Type</i>	<i>Project</i>	<i>%*</i>
Government	Nat'l Gov't	In-kind	1,650,000	70.2
Equipment importers/Distributors (for GEF project)	Private Sector	In-kind	250,000	10.6
Consumers (payment)	Beneficiaries	In Cash	350,000	14.8
Ecole Polytechnique d'Abomey-Calavi (Hosting testing facility)	University	In-kind	100,000	4.4
Total Co-financing			2,350,000	100%

* Percentage of each co-financier's contribution at CEO endorsement to total co-financing.

C. FINANCING PLAN SUMMARY FOR THE PROJECT (\$)

	<i>Project Preparation a</i>	<i>Project b</i>	<i>Total c = a + b</i>	<i>Agency Fee</i>	<i>For comparison: GEF and Co-financing at PIF</i>
GEF financing	0	1,818,182	1,818,182	181,818	2,000,000
Co-financing	0	2,350,000	2,350,000		76,600,000
Total	0	4,168,182	4,168,182	181,818	78,600,000

D. GEF RESOURCES REQUESTED BY AGENCY(IES), FOCAL AREA(S) AND COUNTRY(IES)¹

Not applicable.

E. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

<i>Component</i>	<i>Estimated person weeks</i>	<i>GEF amount(\$)</i>	<i>Co-financing (\$)</i>	<i>Project total (\$)</i>
<i>Local consultants*</i>	250	250,000	0	250,000
<i>International consultants*</i>	24	84,000	0	84,000
Total	274	344,000	0	334,000

* Details to be provided in Annex C.

Budget for consultancies fees under TA sub-components	Total GEF Amount (\$)	GEF fund used for consultants fees (\$)	Total Co-financing (\$)	Notes
A3.1.1 Technical and managerial capacities building	70,000	35,000	130,000	Part of GEF fund to be used for travel of international consultants and partially logistics for workshops. The co-financing will cover workshops expenses.
A3.1.2 Development and implementation of media communication and public awareness for energy efficient light bulbs	230,000	230,000	170,000	A communication firm will be hired to design and implement EE promotion activities. Government agencies (DGE, ABERME, SBEE, CEBENOR, etc.) and private operators will bear their own costs
A3.2.1 Design of label and standards for efficient lights bulbs and air-conditioners	40,000	25,500	100,000	International and local consultants will work together. The remaining GEF fund will be used to organize stakeholders' consultations. Government agencies (DGE, ABERME, CEBENOR, etc.) will bear their own costs. A synergy will be sought with the Togo project.
A3.2.2 Enhancement of legal framework for efficient light bulbs and air-conditioner standards and labeling	30,000	26,000	50,000	International and local consultants will work together. The remaining GEF fund will be used to organized stakeholders consultations. Government agencies (DGE, ABERME, CEBENOR, etc.) will bear their own costs. A synergy will be sought with the Togo project.
A3.2.3 Design and build a national testing facility for efficient lighting products (part to be used for capacity building)	250,000	17,500	100,000	A training workshop on testing procedures and will be carried out along with testing equipment installation. EPAC will cover its human resources costs.
Total	620,000	334,000	550,000	Remaining US\$42,000 of GEF fund will be used for travel fees of international consultants (US\$ 16,000) and logistics for workshops and meetings (US\$26,000).

F. PROJECT MANAGEMENT BUDGET/COST

<i>Cost Items</i>	<i>Total Estimated person months</i>	<i>GEF amount (\$)</i>	<i>Co-financing (\$)</i>	<i>Project total (\$)</i>
<i>Local consultants*</i>	7.5	30,000	0	30,000
<i>International consultants*</i>	2.9	39,900	0	39,900
<i>Office facilities, equipment, vehicles and communications*</i>		13,282	150,000	163,282
<i>Travel*</i>		15,000	0	15,000

Total	10.7	98,182	150,000	248,182
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* Details to be provided in Annex C.

The GEF fund will be used to pay local consultants and international consultants for activities involving project management as well as monitoring and evaluation. The participation of the Government will be in kind.

As part of the IAME project, the management cost of the Benin GEF EE project by the World Bank team and the Energy Efficiency Unit at DGE will be partially born by the IAME project. Additional co-financing for monitoring and evaluation activities could be funded by the IAME project, if justified.

G. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? yes no

Not applicable. The GEF EE sub-component does not involve non-grant instruments.

H. DESCRIBE THE BUDGETED M & E PLAN:

Monitoring and Evaluation of the project will be part of project management and will be carried out to provide feedback to the management unit of the project and to establish project impacts during the project period and a forecast of impact at the end of the project. The M&E strategy will not only track the implementation and progress of each Project component, but also assess the peak load reduction, energy use reduction and associated carbon dioxide emission reduction (and, to the extent possible, the resulting social and economic impacts at end-user level).

The M&E will be based on the success indicators and means of verification that have been developed in the results framework presented in Annex A. All scheduled activities under the proposed project will be monitored and evaluated. However, a set of key success indicators will be used to qualify the achievement of the project goal and outcomes. The means of monitoring and evaluation encompass: (i) Inception reporting; (ii) Quarterly progress reporting; (iii) Yearly project reporting, including project implementation review (PIR); (iv) Tripartite project review (TPR); (v) field visits/surveys of sample beneficiaries and key stakeholders; (vi) Mid-term evaluation; and (vii) Final external evaluation.

The activities will be mainly carried out by the project implementing agency (Energy Directorate of Benin) with the support of local and international consultants. Other local entities involved in the activities are the Ecole Polytechnique d'Abomey-Calavi (Engineering School – EPAC) who will host the testing laboratories, the Centre Béninois de Normalisation et de Gestion de la Qualité (Standard and Quality Management Centre- CEBENOR) for setting the S&L, the national distribution utility (SBEE) for project impacts data collection, and light bulbs distributors (private sector) for sales monitoring.

M&E activities are budgeted as part of the project management cost. Total Project management costs are budgeted at US\$248,182, of which US\$98,182 will be financed by GEF and US\$150,000 with co-financing. Total M&E cost amount to US\$128,182, which includes US\$98.182 from GEF and US\$30,000 in co-financing. Accordingly, all GEF funding under A.3.3. is attributed to M&E cost. M&E cost include principally international and local consultant fees for M&E, but also associated travel cost, and operating cost related to M&E (see details in Annex C). All other operating cost of the Energy Efficient Unit at DGE are covered with co-financing.

PART II: PROJECT JUSTIFICATION:

A. STATE THE ISSUE, HOW THE PROJECT SEEKS TO ADDRESS IT, AND THE EXPECTED GLOBAL ENVIRONMENTAL BENEFITS TO BE DELIVERED:

Issue

Like for most countries in Sub-Saharan Africa, Benin's energy sector is dominated by the use of biomass-based energy sources. Use of traditional biomass-based products such as firewood and charcoal constitute about 67% of Benin's energy balance. The use of electricity is limited to 1.8 million people equivalent to 25% of the population. Nevertheless, Benin's rate of electrification is above the average of Sub-Saharan Africa, which is 17%, and has been increasing steadily from its level of only 8% in 1990. Access to electricity in urban areas is at 53% while access to electricity in rural areas remains at levels of less than 2%.

Benin's total energy consumption was estimated at 2,256 ktep in 2005 for a total population of 7.5 million. The consumption of modern energy is characterized by the total reliance on imported fuel oil and electricity, the increasing gap between demand and supply, the lack of reliability of the grid and the poor performance of equipment and appliances used by consumers. The national electricity utility, Société Béninoise d'Énergie Électrique (SBEE), has 350,000 customers and the total electricity consumption was estimated at 702 GWh in 2007 with the heaviest load stemming from the coastal area around Benin's capital Cotonou. Over the last two decades, electricity demand has continuously increased at a rate of about 7% per year. Most of the demand for electricity stems from households. 85% of the total electricity consumed in the country are imported from Ghana, Côte d'Ivoire and Nigeria through the Electric Community of Benin, a bipartite utility supplying electricity to national distribution utilities in Benin and Togo. The remaining electricity needs are domestically generated by the SBEE and autoproducers. Thermal and hydropower plants account for 99% and 1% respectively of the total domestic power generation.

The peak load is currently at 120 MW while the baseload is between 70 MW. The only demand side management measure applied by the SBEE today is unscheduled load shedding and power cuts (load shedding is unscheduled to reduce risk of theft of distribution level equipment). Benin's energy and lighting consumption is characterized as follows:

- the residential sector is the main responsible for the peak load.
- households account for 48% of the country's total electricity consumption followed by the institutional sector and the industrial sector which account for 32% and 20% respectively. Two daily peak loads are observed: (i) a small peak is observed in the morning between 8:30 and 10:00 when the institutions start working. This morning peak is attributed to the use of air-conditioning; and (ii) the biggest peak load occurs in the evening between 19:00 and 22:00 when consumption of household energy need is high.
- household equipment in Benin is generally of low energy efficiency standard, including air-conditioning, refrigeration and lighting equipment.
- most light bulbs used by households are incandescent, leading to a significant gap between peak load and base load. Efficient light bulbs when available are of low quality, and cannot withstand the high voltage fluctuations to which the Beninese grid is subject.
- the lighting market is not structured and products and brands are imported from various countries. Air-conditioners are not subject to any regulation and the procurement of equipment is guided by low cost practices.
- Air-conditioners are more used in Government buildings and the commercial sector. Energy audits carried out in more than 60 public buildings indicated air-conditioning uses 50% to 70% of the total electricity consumed in these buildings.

In March 2009 a detailed market study for lighting equipment was completed covering 4,500 households. The findings indicate that the key challenge in the Beninese lighting market is the low quality of CFLs in the market, which leads households to return to incandescent or neon light bulbs. The survey estimate indicates that 85% of CFLs are of low quality. For example, 82% of households surveyed suggested that the CFLs burned out in less than one month. While 32% of households use CFLs, 80% are thus not satisfied with the product. Moreover, many households who have used CFLs prefer to return to incandescent light bulbs due to this lack of quality. The key challenge in Benin's lighting sector is therefore in the area of quality control and awareness of best standards. A smaller survey among Government and hotels on the use of air conditioners revealed challenges of a different nature: while the air conditioners are being used for on average 10 hours a day, none of the parties surveyed knew about efficient air conditioning systems.

Few activities have been initiated by the Government of Benin to address energy efficiency challenges on both supply and demand sides. At the supply side, the current actions include the retrofit of existing power plants, the participation in the West Africa Power Pool, investments in new power generation plants, securing electricity purchase, the enhancement of the distribution network and equipment. At the demand side, the Energy Directorate has initiated energy saving projects to reduce electricity expenses in public buildings. In 2004, Benin's Agency for Rural Electrification and Energy Conservation (ABERME) has been set-up. However, no major measures in the area of energy efficiency have been taken since its establishment.

Nevertheless, energy efficiency is still facing many barriers in Benin due to limited budget, the lack of an effective political engagement to promote energy efficient, the lack of an enabling environment for energy efficiency industry, the lack of policy and financial instruments to promote energy efficient products, the low cost of inefficient equipment

combined with the low income of most households and the lack of awareness of decision-makers, consumers, and equipment suppliers on energy efficiency.

The baseline situation will continue to be the operation of fossil fuel based power plants to meet the peak demand and the increasing electricity requirements of households resulting from the poor performance of end-use equipment fostered and the low cost practice in the marketplace. This situation will lead to CO₂ emissions from fuel oil based power plants. Under the baseline scenario, the marginal cost of electricity generation by thermal plant will remain US\$0.25/kWh.

GEF Alternative (the proposed project)

The GEF alternative is the proposed project as part of GEF's West Africa Energy Program that focuses on practical interventions and projects on the ground that will demonstrate the technical and economic viability of promising renewable energy and energy efficient technologies and measures. In the GEF alternative, the equivalent power generation capacity addition of the baseline scenario will be realized through energy efficient equipment and market transformation measures.

The project in Benin aims at introducing standards and labels for light bulbs and air-conditioners, and at diffusing efficient light bulbs to households through a bulk procurement scheme. An associated objective is to enhance energy efficiency awareness of consumers by means of (i) diffusion of information and education, (ii) capacity building of key players, (iii) awareness, regulatory and institutional framework strengthening, including through standards and labels, and (iv) technical capacity building to test equipment. The proposed project is part of GEF's West Africa Energy Program that focuses on practical interventions and projects to demonstrate the technical and economic viability of promising renewable energy and efficient energy technologies and measures.

The proposed project is fully blended with the World Bank's Increased Access to Modern Energy Project (IAME) currently under preparation (US\$151.51 million), that aims at improving the operational efficiency of the transmission and distribution system and increasing access to electricity. The IAME project has three components as follows: Component A: Electrical Network Up-grading (US\$79.67 million); Component B: Electrification and Modern Energy Services (US\$61.50 million) and Component C: Sustainable Energy Services (US\$5.34 million). Component A of the IAME project provides necessary investments to allow for continued operation of the existing transmission and distribution grid, as well as for an upgrade of its functionality. Component A integrates this proposed Benin GEF energy efficiency project as a sub-component (A.3)² aimed at removing key barriers to energy efficiency (EE) in the country through the development of standards and labeling, the promotion of energy efficient equipment and enhancing the legal and institutional framework.

The project will contribute to promote energy efficiency culture through consumer information and education, capacity building and awareness raising within major stakeholders, regulatory and institutional framework strengthening including standards and labeling and technical capacity building to test equipment. As part of Component A of the overall project which has 4 subcomponents, the GEF lends support to Sub-component A3 which constitutes the GEF project. This essentially comprises of two main further sub-components described hereafter. Each sub-component is divided in three further sub-components consisting in different activities that aim at delivering the project outcomes and outputs.

Sub-Component A3.1: Energy Efficient Lighting, Public awareness and Energy Efficient Equipment Promotion

This component envisages the replacement of incandescent lamps with compact fluorescent lamps (CFLs) and energy efficient promotion activities. The CFLs will be procured through bulk procurement using Efficient Lighting Initiative (ELI) standards and specifications. Households, which are supplied by SBEE will be entitled to buy up to 4 CFLs at the

² Subcomponent A.3 includes GEF financing of US\$ 1.82 million, cofinanced by the Government of Benin (US\$ 1.65 million), and additional contribution by Local stakeholders (EPAC, consumers, equipment distributors) in the amount of US\$ 0.7 million for this GEF alternative. Moreover, the GEF EE project preparation cost was entirely financed by the World Bank and co-financiers.

price of a standard incandescent lamp on a first come first serve basis. Particular offer will be directed towards new consumers connected under IAME.

Households will be prevented from reselling of CFLs, and CFLs will be labeled accordingly. The returned incandescent light bulbs will be destroyed to prevent reuse. It is estimated that about 350,000 incandescent light bulbs will be replaced as a direct result of GEF funding. The leverage that will create for local equipment suppliers to imported high quality CFLs is not account for. A market analysis has been conducted and points to the need to increase quality standards for CFLs in the Benin market. An implementation manual has been prepared separately to describe all activities, key stakeholders to be involved and their role, project monitoring, etc.

This EE Lighting and promotion sub-component is subdivided into three sub-components that focus CFLs dissemination and energy efficiency capacity building and promotion.

Sub-component A3.1.1 Technical and Managerial Capacity Building of Public Agencies and Private Market Players

This sub-component will include activities that will strengthen/build capacity building of the Energy Efficiency Unit within the Energy Directorate (DGE) which will be implementing the project as well as the capacity of Benin's ABERME to lead energy efficiency measures in Benin. The project unit will therefore be formally created within DGE and will comprise the EE unit and staff from ABERME. The capacity for project management, monitoring and impact assessment will be developed.

Moreover, other government agencies and private market players that have an critical role in energy efficiency promotion and the implementation of project will be closely involved through targeted actions to ensure they are informed. The project goal and the expected outcomes will be explained to the utility (SBEE), customs services, CEBENOR, other ministries and equipment importers, distributors and retailers.

The mobilization of key stakeholders will be carried out by the DGE and the EE Unit through dedicated workshops and meetings.

Sub-component A3.1.2 Raising Public Awareness about Advantages of using Efficient Light Bulbs and Air-conditioners, through Media Communications

This sub-component will involve activities aimed at advertising consumers in making informed decision in choosing energy efficient products. As a first step, a specialized local firm will be hired to develop and implement a public awareness and media communication plan that will be approved by the EE Unit and the World Bank. The EE Unit will prepare the terms of reference as part of the implementation and operation manual. The plan will encompasses market dissemination strategy for the introduction and dissemination of energy efficient equipment a consumer communication strategy including public awareness campaigns. Specific actions can be directed to particular market segments putting emphasis on CFLs and market players by encouraging the participation of private sector to promote and offer energy efficient products.

A second step could consist in the deployment of ground actions including poster display, brochure distribution, newspapers, TV and radio advertisements, public meetings, etc. Consumers will be informed on the benefits and incentives of using efficient lights and equipment.

This opportunity will also be taken to promote other efficient appliances including refrigerators, electronics ballasts, T5 fluorescent tube lights and energy efficiency in households and building in general. The awareness campaign will be designed accordingly.

The awareness and media campaign will be implemented in three phases. Phase 1 will precede CFLs bulk procurement and distribution and will consist of moderate media communication. Phase 2 will consist of more intensive publicity and public awareness during CFLs dissemination. Phase 3 will start after CFLs distribution till the end of the project. As part of their activities, DGE and ABERME will be encouraged to maintain the awareness and promotion of energy efficient products using lessons learned and material developed under this project.

The awareness will also seek to build on real cases. For this purpose, it is considered to procure and distribute in a preliminary phase about 15,000 CFLs to a sample of costumers for free. These consumers will be monitored based on

their electricity bills. The results will be used to prepare the publicity material including TV spot, interviews and witness of beneficiaries.

Sub-component A3.1.3: Distribution of Efficient Lighting in the Household Sector through Bulk Procurement

Under this sub-component, it is sought to procure and distribute CFLs, recover, store and destroy replaced incandescent bulbs, recover and store used CFLs.

The procurement will be done following ELI standards and specifications and in a manner similar to as is also planned for the bulk procurement in Togo. Using ELI specifications and certifications will allow developing the market quickly and effectively. A logo will be designed to identify the CFLs procured under this project.

350,000 CFLs will be introduced in the market to create synergy with new connections under the IAME project. Thus, the additional offer of 4 CFLs for the price of an incandescent lamp will first and foremost be offered to consumers connected under IAME. The improved quality and increase access to electricity in these zones will likely increase electricity usage rate. Therefore, offering high quality CFLs to newly connected consumers and targeting zones responsible of peak demand will contribute to the GEB.

The preliminary estimate of the impact of CFL dissemination is based on a replacement of 60W or 40 W incandescent lamp with 15 W CFL, leading to power saving of around 28 W per bulb. The peak load reduction is estimated to 9.8 MW corresponding to about electricity savings 18,000 MWh per year

A private operator will be selected to supply and distribute the lamps under the supervision of the energy efficiency unit at the Energy Directorate. Each CFL sold at a reduced cost will replace an incandescent lamp which will be recovered and stored and destroyed as it was the case in Uganda.

For CFL recycling there is no selected system at present and therefore, the recycling will have to await a broader recycling initiative from the private sector. However the project will create synergies with the GEF global lighting project and other country-projects to determine a proper way to eliminate used CFLs.

Sub-Component A3.2 - Energy Efficient Light Bulbs and Air-conditioners Standards and Labels

The purpose of this component is to establish clear efficiency standards in Benin for air-conditioners and compact fluorescent light bulbs selected for their impact on the peak load. The purpose is to reduce the average electricity use per piece of household equipment installed as well as the peak load. This sub-component is also subdivided into three further sub-component aiming at creating the framework for the development a market for energy efficient products in Benin.

Sub-component A3.2.1 Design of Label and Standards for Efficient Light Bulbs and Air-conditioners

This sub-component will involve the definition, validation and application of energy efficient labels and establishment of minimum efficiency and quality standards for CFLs and air-conditioners. These two equipment are chosen for their impact on the peak load. Lighting equipment are responsible for the evening peak demand while air-conditioners mainly used in offices cause the morning peak demand.

However, the bulk procurement will be based on ELI standards and specifications to enable quick and fast delivery to the project and development of the market and, further to demonstrate benefits of efficient and good quality light bulbs for households and the utility and promote energy efficiency.

All electrical appliances and equipment are imported. Therefore, it is found that for a small market like Benin the best way to start will be the adoption (and adaptation, if necessary) of international standards taking into other initiatives in the regions. A label will also be designed based on existing models in Africa and other continents.

The Benin project will create synergies with the Togo project for the lighting bulbs, and with other countries like Nigeria, Cote d'Ivoire, Mauritania. For the air-conditioners, the project will seek to build upon Ghana's experience in dealing with room air-conditioners.

A3.2.2 Enhancement of the Institutional and Legal Framework for Efficient Light Bulbs and Air-conditioner Standards and Labeling

This subcomponent will enhance or develop a legal framework for enforcing efficient light bulbs and AC in Benin. The project will build upon the existing framework where CEBENOR (Centre Béninois de Normalisation et de Contrôle de Qualité) is already adopting some international standards including electrical installations. The activities of this subcomponent will require exchanges between the several ministerial departments (energy, trade, industry and finance) and agencies that could any influence in the enforcement of standards and label.

Some in depth assessment will be needed to understand better the existing framework before deciding what is suitable. Based on the findings of the assessment, the project will work with CEBENOR and key national stakeholders to further enhance or elaborate the legal framework for energy efficiency labeling and standards for efficient light bulbs and air-conditioners.

All enforcement mechanisms will be assessed and the necessary policy measures will be fostered. This could include the obligations of equipment importers to obtain the quality certification from CEBENOR through the testing lab for lighting bulbs, incentives to promote efficient products through taxes exemptions/reductions, increase taxes on low quality equipment, etc.

A3.2.3 Design and Build a National Testing Facility for Efficient Lighting Products

This sub-component aims at setting up of equipment testing procedures and testing laboratory to verify the quality of CFLs.

Initially bulk procurement will be based on ELI standards and specifications to enable quick and fast delivery to the project and development of the market and, further to demonstrate benefits of efficient and good quality light bulbs for households and the utility and promote energy efficiency.

As a further step following extensive discussions with the counterparts to ensure sustainability over both the medium and long term, a lamp testing facility will be established. However to enhance cost efficiency, no new laboratory will be established, rather, it is foreseen that additional types of testing equipment will be installed in an existing testing facility at the University of Benin, and the existing staff trained to undertake quality analysis on the basis of this. The purpose in establishing such a in country testing facility for CFLs is to provide Benin with a quality control instrument to allow CEBENOR, the Custom services and the Energy Directorate to play their role in ensuring the application of the label and standards and to be able to guarantee the sustainability of the results achieved under the initial phase of the project, which focuses on bulk procurement of CFLs.

One of the fundamental problems in the light bulb market in Benin today is that it is flooded with cheap low quality products. Low quality is characterized by (i) quick burning of bulbs after only a few days of operations; (ii) electricity usage of bulbs that is higher than for incandescent light bulbs. However, for the public it is impossible to detect whether a bulb is of low quality or not. Thus, the project proposes to introduce a labeling standard. To confirm that a certain product deserves this label, testing is required. The laboratory would thus undertake this testing. The aim is that all types of light bulbs available in the market would be tested, and the label accorded only to those that pass the test. At the moment the quality control carried out by CEBENOR is on a voluntary basis. Therefore, the Energy Ministry will lead actions with other Ministry of energy, Ministry of Finance, Ministry of Trade and other government agencies to enforce minimum energy performance for lights bulbs and ACs.

The range of testing services provided in Cotonou will not only benefit Benin alone, but also the land-locked countries of Burkina Faso, Mali and Niger. The light bulbs for these countries are being imported from the ports of Cotonou (Benin) and Lomé (Togo), and then transported up-country via trucks.

Given the high costs of setting up a testing facility for ACs and the small market in Benin for this equipment, more economic options will be looked at with other countries in the region regarding testing. As ACs market is mainly driven by the public sector building, the Ministry of Energy will work with other Ministries to ensure that the standard developed will be included in the building code envisaged under the World Bank's ESDP and used in the procurement of air conditioning equipment in Government procurement.

Sub-Component A3.3 - Project Management, Monitoring and Evaluation

The two GEF sub-components (A3.1 and A3.2) will be monitored and evaluated as part of IAME using appropriate monitoring and evaluation indicators. Main indicators regarding to the GEF sub-component will include CO2 emissions reduced/avoided, peak load (MW) reduction, energy saved (MWh) and adoption of standards. Moreover, other reduction indicators that will be monitored are the number of lamps distributed, the number of lamps recovered, number participating households. The project result framework is described in Annex A.

The World Bank will be responsible for the financial oversight, administrative control and evaluation following the World Bank and GEF standard rules and procedures.

The project will be implemented by the Energy Directorate of Benin (DGE) under the Ministry of Energy and Water (MEE). The project implementing unit (the Energy Efficiency Unit at the Energy Directorate) will be responsible for delivering the outputs of the project, the actual implementation and daily management.

Many other stakeholders and government agencies will play a major role during the project implementation. This includes the Benin Agency for Rural Electrification and Energy Conservation (ABERME), CEBENOR, EPAC, Ministry of Trade, Ministry of finances, Ministry of Environment, SBEE.

The means of monitoring and evaluation encompass: (i) Inception reporting; (ii) Quarterly progress reporting; (iii) Yearly project reporting, including project implementation review (PIR); (iv) Tripartite project review (TPR); (v) field visits/surveys of sample beneficiaries and key stakeholders. (vi) Mid-term external evaluation; and (vii) Final external evaluation.

Project Inception Report

A Project Inception Workshop will be conducted with the participation of all major interested stakeholders identified above. The purpose and objective of the Inception Workshop will be to: (i) introduce the key actors to each other; (ii) detail the roles, support services and complementary responsibilities of each entity; (iii) provide a detailed overview of the GEF reporting and monitoring and evaluation requirements, with particular emphasis on the Annual Project Implementation Reviews (PIRs) and related documentation as well as mid-term and final evaluations.

This workshop will also set the opportunity to fine-tune the definition and exact content of the various activities as described in the two components above and are being detailed in the project implementation and operation manual. This will include reviewing the project results framework (indicators, means of verification, assumptions), imparting additional detail as needed, and on the basis of this exercise finalize the annual work plan with precise and measurable performance indicators, and in a manner consistent with the expected outcomes.

Periodic Progress Reports

A detailed schedule of project review meetings for the overall project will be developed by the World Bank in consultation with project implementation partners and stakeholders and this schedule will be incorporated into the Project Inception Report. The schedule will include: (i) tentative time frames for the Project Steering Committee meetings, (or other relevant advisory and/or coordination mechanisms) and (ii) project related Monitoring and Evaluation activities.

The implementation progress will be reported to the World Bank, the project steering committee (PSC) and GEF, as applicable, by the Quarterly Progress Reports (QPRs) and through annual Project Implementation Reviews (PIRs). The project implementing unit will be responsible for preparing the overall PIR by drawing from the component specific progress reports.

The performance and impact indicators along with their corresponding means of verification presented in the project results framework provide the basis for PIR reporting and associated assessment of the progress of the project towards the set targets.

Terminal Report

During the last three months of the project, the project implementing unit will prepare the Project Terminal Report for the project by drawing from the component specific terminal reports. This comprehensive report will summarize all activities, achievements and outputs of the project, lessons learnt, objectives met, or not achieved structures and systems implemented, etc. and will be the definitive statement of the project's activities during its lifetime. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the Project's activities.

Independent Evaluations

Mid term assessment will be conducted based on the M&E indicators to inform midcourse progress as per the results framework and to advise on any needed modifications to maximize the impact during the remaining implementation process. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The details of organization, terms of reference and timing of the project's overall mid-term evaluation will be prepared by the World Bank's GEF Regional Coordination.

An independent Final Evaluation will take place before the preparation of the terminal report and will focus on the same issues as the mid-term evaluation. The final evaluation will also look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The Final Evaluation should also provide recommendations for follow-up activities. The Terms of Reference for this evaluation will be prepared by the World Bank's GEF Regional Coordination.

Global Environmental Benefits

Projects such as the proposed Energy efficiency Project in Benin, have proven to be effective for mitigating climate change in all countries in which they have been implemented. The GEF project will result in significant peak load reduction by 9.8 MW (or 5% of Benin's peak load) from the successful diffusion of efficient lamps (sub-component A3.1). The corresponding electricity saving is about 18,000 MWh annually (or 2.6 % of Benin annual electricity consumption). The corresponding reduction in greenhouse gas (GHG) emissions is estimated at about 16,000 tons of CO_{2e}/year.

The introduction of energy efficiency standards and labels for lights bulbs and air-conditioners in Benin (component A3.2) is expected to result in significant energy savings and GHG emission reduction. The preliminary estimate indicates that more than 33,000 MWh can be saved annually by adopting energy efficient air-conditioners. The resulting GHG emissions reduction is estimated at about 30,000 tCO_{2e} per year.

Overall, it is expected that 46,000 tCO_{2e} will be reduced annually through this project at the end of third year when efficient air-conditioner will be introduced in Government procurement.

Furthermore, significant indirect GHG emissions reduction is foreseen from the project. The project will indirectly increase the global environmental benefit through capacity building in energy efficiency, enhancement of the legal framework for energy efficiency labeling and standards and consumer awareness. Besides, it expected that the private sector (importers and retailers of equipment) will continue to develop and extend the market by offering efficient CFLs, AC and other equipment in the market.

B. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH NATIONAL AND/OR REGIONAL PRIORITIES/PLANS:

The energy sector is one of the priority areas identified by the Government of Benin to achieve its overall development target. The Government has prepared the Policy and Strategy Document for the Development the Electricity Sector that provides the long term vision and the strategy of the country by 2025. The overall energy strategy can be summarized as follows: (i) strengthening the legal and institutional framework; (ii) ensuring reliable electricity supply to support economic activities and achieve the national energy security and an efficient energy delivery system with an optimal energy resource mix; (iii) increasing energy access to population through new power generation plants, regional interconnexion and rural electrification; (iv) promoting private investments in the power sector by creating the enabling

market environment for private sector participation; and (v) promoting energy efficiency in the residential, industrial, commercial and institutional sectors.

Actions initiated by the Government for the implementation of the strategy that target energy efficiency include:

- the RESUCE Project of 1995 for reducing energy expenses in public buildings through awareness, installation of battery banks, energy audits, etc. The project has raised awareness on how to reduce electricity wastage in the public sector, realized more than 40 energy audits in public buildings, installed battery banks for power factor correction and electricity bill validation, and raised awareness to reduce electricity waste in the public sector.
- the reform of the electricity sector through the adoption of the Electricity Code 2007, including formal establishment of the Electricity Regulatory Authority through this code.
- the creation of the Benin Agency for Rural Electrification and Energy Conservation (ABERME) in 2004 as an executing agency for rural electrification and promotion of energy efficiency.

Benin is also aligning its national energy priorities with the regional priorities by incorporating recommendations made in the White Paper on energy prepared by the Economic Community of West African States (ECOWAS) and the West African Economic and Monetary Union (UEMOA) into national policy. In the strategy for implementing the regional policy, the White Paper has clearly identified energy efficiency as one of the objectives of the regional energy policy.

The proposed energy efficiency project is consistent with the national and the regional priorities as it will reduce peak load, save energy, reduce CO₂ emissions and defer investments that would have been made otherwise to augment the power generation capacity of Benin to meet the equivalent demand. The project contributes to the achievement of the country's priorities to increase energy access to population at the lowest costs.

C. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH [GEF STRATEGIES](#) AND STRATEGIC PROGRAMS:

The project aims at enhancing energy efficiency standards and labeling for key household appliances and lighting equipment in residential and commercial buildings in Benin, and introducing efficient light bulbs to households through a bulk procurement scheme. The project is therefore consistent with the GEF-4 Strategic Programme CC-SP1: Promoting Energy Efficiency in Residential and Commercial Buildings under the Climate Change focus area.

Moreover, the proposed project will participate in achieving the GEF's global lighting program and Efficient Lighting Initiative, which aims at reducing global GHG emissions through the transformation of the global market toward efficient lighting technologies and accelerated phase-out of inefficient lighting.

D. JUSTIFY THE TYPE OF FINANCING SUPPORT PROVIDED WITH THE GEF RESOURCES.

GEF funding will help overcome the barriers to the development and implementation of energy efficiency Project, to ensure a more widespread understanding and use of energy efficient equipment in Benin through both technical assistance and investment activities. The GEF funding will leverage cofinancing from the Government grant and additional support from the Beneficiaries (EPAC (US\$100,000 in kind), Private equipment distributors (US\$250,000 in kind) and Consumers (US\$350,000 in cash as partial payment of CFLs).

E. OUTLINE THE COORDINATION WITH OTHER RELATED INITIATIVES:

The first initiative in Benin was the 1995 RESUCE project that aimed at reducing the electricity expenses in public buildings. While a lot of energy audits and power factor corrections were carried out during the last 10 years, no other energy efficiency measures were implemented.

In 2004, the Government of Benin obtained a US\$ 45 million loan from the World Bank to implement the Energy Services Delivery Project (ESDP) to increase access to modern energy in urban, peri-urban and rural areas. Under this project, an Energy Efficient Unit has been set up within the Energy Directorate at the Ministry of Energy and Water to carry out energy efficiency projects in the public sector. The previous energy audits realized under the RESUCE project were validated and a number of demonstration projects will be implemented. Moreover, the ESDP project is financing

the development of an energy efficiency code for public buildings to ensure application of best practices in the buildings sector.

The energy efficiency project in Benin will build on the lessons learned from the implementation of current energy efficiency activities. The proposed project will work with the teams related to the above mentioned Projects and share information as well. Where possible some of the key members of these projects will also be involved in some activities of the proposed project.

Built on the work undertaken under the ESDP, the World Bank is currently financing the Increased Access to Modern Energy Project (IAME) that aims at improving the operational efficiency of the transmission and distribution system and increasing access to electricity. Component A of the IAME project focuses upon network rehabilitation and reinforcement consumers and integrates this proposed Benin GEF energy efficiency project as a sub-component. The proposed project will thus be an important complement to the other initiatives to provide modern energy services to consumers.

Furthermore, the developments of standards for energy efficient light bulbs will be coordinated with other similar activities in the region. Caution will also be taken to create synergies between the Togo project, the GEF global project on efficient lighting and the GEF's West Africa Energy Program regarding the development of standards and testing facilities.

F. DISCUSS THE VALUE-ADDED OF GEF INVOLVEMENT IN THE PROJECT DEMONSTRATED THROUGH INCREMENTAL REASONING :

Without the proposed project, the current Government efforts to reduce peak load will continue to be load shedding and low performance of equipment will continue to be used in the country. The lack of institutional and technical capacity, the lack of policies instruments and awareness on energy efficiency will entail that no future projects would be developed. Low performance air-conditioners and incandescent light bulbs will continue to dominate in the marketplace and the purchase decision will continue to be influenced by the initial costs and not by the life cycle cost. Even, new power capacity is added, the consumption will continue to increase due to the use of inefficient equipment. In the ongoing projects, the emphasis will continue to be put on power purchase and investments in thermal plants without addressing demand side issues.

In the absence of the GEF funding, the potentially significant global environmental benefit in terms of CO₂ emissions reduction from phasing out inefficient lights would have limited success as energy efficiency is not common practice in Benin and there is an absence of an enabling environment for energy efficiency. The focus is more on power purchase and generation capacity increase and distribution system strengthening.

GEF funding will help overcoming current barriers that hinder the energy efficiency market in the country. The project will create a market for energy efficient products through introduction of efficient light bulbs and air-conditioners. The expected outcomes are: (i) national technical, institutional and legal capacity building, (ii) 350,000 incandescent lamps replaced with CFLs, (iii) public awareness on energy efficient lights and air-conditioners, (iv) energy efficiency standards and labels development for the selected energy efficient lights and air-conditioners and testing laboratories establishment for air-conditioners and light bulbs.

The marginal cost of electricity generation by thermal plant in Benin is around US\$0.25/kWh while average tariff is at US\$0.18/kWh. The cost of the kWh saved by the project through the introduction of efficient lights in the market is US\$0.11. Moreover, the deferred investment in thermal plant is estimated to US\$1000/kW while the load reduction by the proposed project is at US\$143/kW. The energy efficiency alternative clearly appears to be the least cost option.

The estimate shows that about 18,000 MWh could be saved annually from the replacement of 350,000 incandescent lamps with CFLs. Moreover, it is expected that 10,000 high performance air-conditioners will be introduced in the marketplace. The overall direct energy savings attributable to the project are estimated to 51,000 MWh per year, corresponding to a cumulative GHG emissions reduction of 375,000 tCO₂e over a 10-year period. The CO₂ reduction cost is US\$5 of GEF resources/tonne of CO₂ reduced which is cost effective compared to other GHG emission reduction projects. Moreover, the cost-effectiveness will improve significantly when indirect effects is accounted for.

Role of Cofinancing

The financial arrangement is shown in the table below. GEF grant will be used principally for acquiring efficient lights bulbs and promoting energy efficiency as well as procuring testing equipment.

	Total (\$)	GEF (\$)	GoB (\$)	Other Stakeholders (Private operators, EPAC & Consumers)*
IAME Project Component A ³ : Electrical Network Up-grading				
Details of GEF Sub-Component A3				
A3.1. Energy Efficient Lighting, Public awareness and Energy Efficient Equipment Promotion				
A3.1.1 Managerial and technical capacities building	200,000	70,000	130 000	
A3.1.2 Media communication and public awareness for energy efficient light bulbs and appliances	400,000	230,000	120 000	50,000
A3.1.3 Distribution of Efficient light bulbs	2,500,000	1,100,000	850 000	550,000
Sub-Total Component A3.1	3,100,000	1,400,000	1,100,000	600,000
A3.2. Energy Efficient Light Bulbs and Air-conditioners Standards and Labels				
A3.2.1 Design of label and standards for efficient lights bulbs and air-conditioners	140,000	40,000	100,000	0
2.2 Legal framework for efficient light bulbs and air-conditioner standards and labeling	80,000	30,000	50,000	
A3.2.3 Design and build a national testing facility for efficient lighting products	600,000	250,000	250,000	100,000
Sub-Total Component A3.2	820,000	320,000	400,000	100,000
A3.3. Project management and M&E	248,182	98,182	150,000	
Total project costs	80,368,182	1,818,182	1,650,000	700,000

* Breakdown other stakeholders' contribution: EPAC (US\$100,000 in kind), Private equipment distributors (US\$250,000 in kind) and Consumers (US\$350,000 in cash as partial payment of CFLs).

Incremental Costs Matrix only for the GEF EE sub-component A3.

Cost Category	US\$ Million	Domestic Benefit	Global Benefit
A3.1. Energy Efficient Lighting, Public awareness and Energy Efficient Equipment Promotion			
Baseline	US\$1.26 million (surplus costs for	No domestic benefit is expected from the baseline as electricity will be generated at the	No global benefit

³ The overall component A also includes subcomponents A1 and A2 which total US\$76.2 million.

	operating fuel oil based power plants ⁴)	highest cost	
With GEF Alternative	US\$3.1 million	Reduced energy expenses for the utility and consumers Reduced peak load Differed investments on power plants	Increased level of GHG emission reduction from fuel oil based power plants used for the peak load
<i>Incremental</i>	<i>US\$1.84 million of which US\$ 1.4 million is being requested from the GEF</i>		
A3.2. Energy Efficient Light Bulbs and Air-conditioners Standards and Labels			
Baseline	No baseline cost as this will be the status quo situation	No domestic benefit is expected from the baseline as low cost and poor quality equipment will be used with the associated high energy expenses for consumers and the utility	No global benefit
With GEF Alternative	US\$0.82 million	Reduced energy expenses for the utility and consumers Reduced peak load Differed investments on power plants	Increased level of GHG emission reduction from fuel oil based power plants used for the peak load
<i>Incremental</i>	<i>US\$0.82 million of which US\$0.32 million is being requested from the GEF</i>		
A3.3. Project Management, Monitoring and Evaluation			
Baseline	No baseline cost as this will be the status quo situation	No domestic benefit is expected from the baseline as low cost and poor quality equipment will be used with the associated high energy expenses for consumers and the utility	No global benefit
With GEF Alternative	US\$0.25 million	Reduced energy expenses for the utility and consumers Reduced peak load Differed investments on power plants	Increased level GHG emission reduction from fuel oil based power plants used for the peak load
<i>Incremental</i>	<i>US\$0.25 million of which US\$0.10 million is being requested from the GEF</i>		
<i>Total Baseline: US\$1.26 million</i>			
<i>Total GEF Alternative: US\$4.17 million</i>			
<i>Total Incremental Costs: US\$2.91 million of which US\$ 1.82 is being requested from the GEF while the remaining US\$1.09 million will be contributed by the Government and other stakeholders</i>			

G. INDICATE RISKS, INCLUDING CLIMATE CHANGE RISKS, THAT MIGHT PREVENT THE PROJECT OBJECTIVE(S) FROM BEING ACHIEVED AND OUTLINE RISK MANAGEMENT MEASURES:

Due to many factors related to informational, financial, technical and regulatory barriers, the proposed project is subject to certain risks that might prevent the project objective and outcomes from being achieved. The potential risks, their rating and mitigation are summarized as follows:

⁴ Baseline cost estimates, i.e. surplus costs for operating fuel oil based power plants, have been calculated and provided by the Benin Power Utility (SBEE).

Risk	Rating	Mitigation
Lack of ongoing, long-term support from Government, the private sector or consumers for energy efficiency which lead to low level and ineffective enforcement or policies and regulations.	Medium	This risk is considered to be medium as the project aims at introducing consensus-based structural changes of policies and consumer behavior including the accompanying implementing rules and regulations as well as improving the institutional arrangements for the enforcement of efficient equipment and appliances.
Reluctance of the Government to implement mandatory energy efficiency labeling and MEPS	Medium	The country is looking at proven technology and measures to address the recurring energy deficit. This project is part of the Benin Increased Access to Modern Energy project. The expected output should provide sufficient motivation to engage in energy efficiency promotion programme.
Lack of cooperation by equipment suppliers and consumer preference for low-cost inefficient appliances and equipment.	Medium	As most appliances are imported, equipment suppliers will trade with countries that have energy efficiency standards and labels programs and regulations in place. Consumer awareness campaigns, incentives and related activities will enhance consumer preference for efficient appliance.
Inadequate project implementation.	Low	This risk is minimized through the existing and well qualified Energy Efficiency Unit within the Energy Directorate and by applying a participative approach, involving all relevant actors and stakeholders.

H. EXPLAIN HOW COST-EFFECTIVENESS IS REFLECTED IN THE PROJECT DESIGN:

The energy that is expected to be saved through the use of energy efficient light bulbs and air conditioners that will be facilitated and influenced by the interventions that will be carried out under the proposed program will result in CO₂ emission reductions from the reduced utilization of fossil fuels used in thermal power generation units that produce the electricity utilized in these energy using products. The successful implementation of the energy efficiency programme in Benin, will lead to a cumulative GHG emission reduction estimated at 375,000 tCO₂e over a 10-year period. This translates to a unit abatement cost of US\$5/ton CO₂ eq (i.e. GEF resources/tonne of CO₂ eq reduced) is cost effective compared to other GHG emission reduction projects. It is important to mention that the cost-effectiveness will improve significantly when indirect effects are taken into account.

In addition, the marginal cost of electricity generation from thermal plant in Benin is around US\$0.25/kWh. The cost of the kWh saved by the project through the introduction of efficient lights in the market is US\$0.11/kWh. Moreover, the deferred investment in thermal plant is estimated to US\$1000/kW while the cost of load reduction by the proposed project is estimated at US\$143/kW. The energy efficiency alternative clearly appears to be the least cost option.

The project will facilitate the achievement of the expected outcomes by removing current barriers that hinder the development of the energy efficiency market in the country. The project is cost-effective considering that: (i) incandescent light bulbs are found in the main sectors of the economy and the bulk procurement of CFLs under the project represents part of the residential market segment, leaving a significant potential for replication; (ii) the establishment of standards and labels for lighting and air-conditioners will transform not only the national market as other households equipment such as refrigerators and fans could be included later based on experience gained from the proposed project, but will also affect positively the market of hinterland countries like Niger, Burkina Faso, Mali for which the Port of Cotonou is important for goods importation; (iii) equipment testing procedures and a testing laboratories to verify standards will be built and could serve for the regional market; and (iv) the completion of a legal framework for energy efficiency labeling and standards will ensure long-term sustainability of the market.

PART III: INSTITUTIONAL COORDINATION AND SUPPORT

A. INSTITUTIONAL ARRANGEMENT:

The World Bank is the sole GEF Executive agency involved in the implementation of the proposed project. The project will be a sub-component of the IAME project and will be operated as such. The World Bank will be responsible for the financial oversight and administrative control, following World Bank standard rules and procedures.

The project will be implemented in a way that ensure that close link is established with other national projects, GEF's West Africa Energy Program and GEF global lighting initiative to capitalize on experience and effort from these projects. Particular attention will be given to the Togo EE project to create actual synergy between these two neighbouring countries through periodic exchange between the implementing units. The project team will also be connected to the GEF projects under preparation in Côte d'Ivoire, Mauritania and Nigeria to avoid the unnecessary duplication of effort, particularly for sub-components related to the development of standards for energy efficient light bulbs and testing facilities.

C. PROJECT IMPLEMENTATION ARRANGEMENT:

The project will be implemented by the Energy Directorate of Benin (DGE) under the Ministry of Energy and Water (MEE). The project implementing unit (the Energy Efficiency Unit at the Energy Directorate) will be responsible for delivering the outputs of the project, the actual implementation, input management, and sound administrative management.

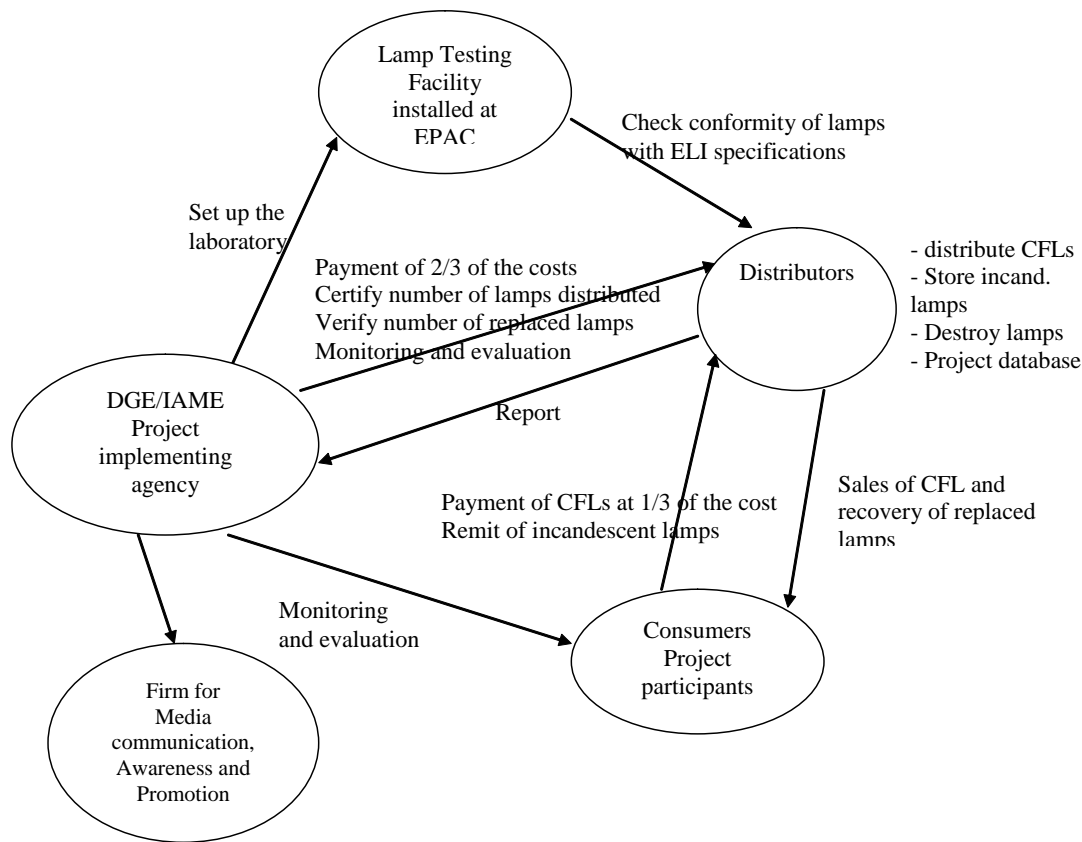
Many other stakeholders and government agencies will play a major role during the project implementation. This include the Benin Agency for Rural Electrification and Energy Conservation (ABERME), CEBENOR, EPAC, Ministry of Trade, Ministry of finances, Ministry of Environment, SBEE.

- **Energy Directorate (DGE):** The DGE is responsible for planning the energy sector, proposing regulations applicable to the energy industry, ensuring the enforcement of regulations and laws, monitoring projects in the energy. Over the past 10 years, the DGE has developed the only energy efficiency project (RESUCE) to reduce electricity expenses in public building. The capacity of DGE was reinforced by creating an Energy Efficiency Unit under the World Bank's ESDP. This Unit will be the project implementing entity and will report to the DGE and the World Bank.
- **Benin Rural Electrification and Energy Conservation Agency:** ABERME is the agency responsible for energy efficiency, while the DGE currently has the only active energy efficiency program. ABERME will be involved in all activities in the view of knowledge transferring. The project will be an occasion for building the capacity of ABERME.
- **Centre Béninois de Normalisation et du Contrôle de la Qualité:** CEBENOR is responsible of setting up of standards and quality control of products imported or manufactured in Benin. It represents ISO in Benin and is currently adopting about 200 international standards including electrical installations. CEBENOR will get involved in standards and labels setting.
- **Ecole Polytechnique d'Abomey-Calavi (EPAC):** the EPAC is an engineering school under the University of Abomey-Calavi. The EPAC currently has an electric engineering and mechanical and energy engineering department hosting electricity laboratory and air-conditioning laboratory. The existing installations will be upgraded to set up equipment testing laboratories envisaged under the proposed project. The project will be built on the qualified and skilled human resources at the EPAC.
- **Ministries of trade and Industry:** All equipment and appliances sold in Benin are imported. As an institutional partner, the Ministry of trade will be involved in the analysis and review the legal framework and the necessary modification to adapt for energy efficient standards and labels. Moreover, CEBENOR is an agency under the Ministry of Industry.
- **Ministry of finance:** As the project will require some financial arrangement from the Government, the Ministry of finance will be in charge of analyzing the financial implication for long-term sustainability of the project that could require the adoption of financial mechanism (subsidies, taxes exemptions, etc.). The enforcement of the standard will also need the customs services to be involved as an executing agency of the Ministry of finance.
- **Ministry of Environment.** It will act as the GEF operational focal point and will ensure that the project is meeting the global environment benefit.

- Société d'énergie électrique du Bénin (SBEE): the SBEE is the national utility responsible for electricity distribution in Benin. SBEE will be a direct beneficiary of the project. SBEE has conducted the market survey and will help with the peak load and energy savings monitoring.
- Furthermore, the private sector (equipment suppliers, retailers) will be closely involved as the executing entities for light bulbs procurement and distribution.

To ensure the successful implementation of the project, support of all the stakeholders will be needed. Therefore, a Project Steering Committee (PSC) is proposed to assess the progress achieved and to provide advice and directives in order to increase the outcomes of the project. This committee will be formed by individual influential within the government and they will benefit from the feedback and information about project impact that will help them to better understand the potential impact of further development of S&L programs in Benin. The PSC will consist of the representatives of the Ministry of Finance, the Ministry of Energy, the Ministry of Environment, the Ministry of Trade, private sector organizations, and World Bank. Individual experts and institutions will be invited to provide inputs as appropriate to specific meetings.

The structure of the efficient lighting sub-component is presented in the chart below.




PART IV: EXPLAIN THE ALIGNMENT OF PROJECT DESIGN WITH THE ORIGINAL PIF:

The project design is similar to the revised PIF submitted to the GEFSEC. The main difference remains in the details provided in this document. The issues raised by GEFSEC during PIF preparation are taken into account (see Annex B for Reponses to project reviews).

PART V: AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies and procedures and meets the GEF criteria for CEO Endorsement.

Agency Coordinator, Agency name	Signature	Date	Project Contact Person	Telephone	Email Address
<i>Steve Gorman Executive Coordinator The World Bank</i>		03/23/2009	Christophe Crepin, Regional GEF Coordinator Africa Region	(202) 473 9727,	ccrepin@Wworldbank.org

ANNEX A: PROJECT RESULTS FRAMEWORK (GEF ENERGY EFFICIENCY PROGRAM)⁵

The Monitoring and Evaluation strategy will track the implementation and progress of each program component, but also assess the actual impact of energy efficient instruments, peak load reduction, energy use reduction and associated carbon dioxide emission reduction.

The project implementing unit (Energy Efficiency Unit at the Energy Directorate) will be responsible for delivering the outputs of the project, the actual implementation, input management, and sound administrative management. The World Bank will be responsible for the financial oversight and administrative control, following standard World Bank rules and procedures. The success indicators and means of verification are presented below.

Project strategy		Objectively verifiable Indicators				
		Indicators	Baseline	Target	Source of verification	Risks and assumption
Goal	Reduction of GHG emissions through electricity savings by introducing and adopting energy efficient CFLs and air conditioners in Benin	<ul style="list-style-type: none"> Reduction in GHG emissions from thermal power generation 	No emission reduction is expected from the baseline as the replaced equipment are of lower efficiency	CO2 emissions reduction of 16,000tCO2/year at full distribution of CFLs Additional emissions reduction of 30,000 tCO2 expected from efficient ACs	Baseline data Survey reports Monitoring report	<ul style="list-style-type: none"> Significant decrease of the energy consumption by light bulbs and ACs is expected Risk is that increased diffusion of EE light bulbs and ACs may increase the energy use of the targeted households and those that later adopt the EE equipment Synergy will be created with new connections under IAME Proper awareness will mitigate this risk
Objective	To reduce peak load and energy use by diffusing CFL to households in Benin and by introducing standards and labels for light bulbs and air-conditioners.	<ul style="list-style-type: none"> Peak load reduction (MW) Energy savings (MWh) 	Energy consumption and demand related to the replaced equipment To be established	Reduce at least the peak load by 5% (9.8MW) and energy consumption by 2% (18,000 MWh) only by distributing 350,000 CFLs	<ul style="list-style-type: none"> Monitoring reports from S&L program Annual survey Impacts report Independent M&E 	<ul style="list-style-type: none"> Significant decrease of the energy consumption by light bulbs and ACs is expected Risk is that increased diffusion of EE light bulbs and ACs may increase the energy use of the targeted households and those that later adopt the EE equipment Proper awareness will mitigate this risk
Outcomes						
Sub-component A3.1: Energy Efficient Lighting, public awareness and energy efficient equipment promotion						
Outcome 1	Capacity building and training of government agencies and other stakeholders	<ul style="list-style-type: none"> Number of workshops and training delivered Number of progress reports submitted by the project unit 	Staff members with minimal training	Full involvement of stakeholders in the EE S&L program.	<ul style="list-style-type: none"> Staff allocation Monitoring and evaluation Minutes of meetings/workshops 	It is assumed that there are no delays due to lack of support from the government by using participatory approach

⁵ The results framework fits within the overall results framework of the IAME project (Annex 3 of the PAD)

					• Consultancies reports	
Outcome 2	Build public awareness and promote energy efficiency	<ul style="list-style-type: none"> • Type and number of promotion activities organized • Level of consumers' participation • Change in the buying behavior of consumers • Increase in energy efficiency bulbs and ACs 	An awareness program is planned in public buildings Households are not targeted	Marketing, promotion and awareness plan in place by the end of 2009	Market or consumer survey every year.	Proactive participation of importers, retailers of EE equipments, engineering firm, electrical technicians and government bodies.
Outcome 3	Distribute efficient lights to households by replacing 350,000 incandescent bulbs with energy efficient lighting products	<ul style="list-style-type: none"> • Lamps procured using ELI specifications • Number of efficient light bulbs distributed • Number of beneficiaries (households) • Number of incandescent lamps replaced and destroyed 	15 W CFL will replaced 40-60 W incandescent lamp	350,000 CFLs distributed by 2012.	<ul style="list-style-type: none"> • Field visits and consumers survey • Progress reports • Monitoring reports 	It is assumed that the new lighting technology will be adopted by the targeted beneficiaries.
Component A3.2: Energy Efficient Light Bulbs and Air-conditioners Standards and Labels						
Outcome 4	Introduce standards and labels for efficient light bulbs and air-conditioners	<ul style="list-style-type: none"> • Standards and labels for CFLs and air-conditioners • Enforcement of standards and labels 	No S&L exists in Benin EE light bulbs and ACs	<ul style="list-style-type: none"> • Progress reports • Legal and regulatory acts 	<ul style="list-style-type: none"> • Progress reports • Legal and regulatory acts 	It is assumed that the best international standards will be adopted and adapted, if needed for Benin in synergy with Togo and the region
Outcome 5	Enhance the legal and regulatory framework for energy efficient equipment standards and labeling	<ul style="list-style-type: none"> • Energy efficiency law including standards and labels proposed • Regulation proposed to support the implementation of standards and labels of lights bulbs and air-conditioners • International testing procedures for light bulbs and air-conditioner testing adopted 	Not planned	Laws and regulations in place in the first quarter of 2011	<ul style="list-style-type: none"> • Government gazette • Progress reports • Monitoring reports 	It assumed that the support and commitment from the government is consistent.
Outcome 6	Build CFL testing laboratory	<ul style="list-style-type: none"> • Testing equipment procured and installed • Handbook of procedures for lamp testing and certification 	Only one metrology lab at Ministry of trade and basic laboratory equipment at EPAC	Enhanced capacities of existing laboratory at EPAC by 2011	Contract for installation awarded Monitoring reports	<ul style="list-style-type: none"> • It is assumed that market demand for testing will increase • The lab will serve as a national instrument for quality verification

ANNEX B: RESPONSES TO PROJECT REVIEWS

1. RESPONSE TO GEFSEC COMMENTS:

The comments received from GEF at PIF preparation and the corresponding answers are listed below.

Comment	Response
<p><i>Comment 1: Please consider how the global environment benefits (GEB) created by the GEF project will correspond with the effect of the IAME project. If the purpose of the IAME project is to increase access to electricity, will the higher electricity usage rate offset the GEB generated by the GEF project? Please consider whether there is a way to create more synergies between the two initiatives, making sure that the households that gain access to electricity are automatically directed towards the use of CFLs as their lighting source.</i></p>	<p>It may be understood at the outset that the GEF project has been developed as a full blended project with the IAME project. At the initial stage, it was planned to introduce 200,000 CFLs in the market. This amount has been increased to 350,000 CFLs to create synergy with new connections with IAME. Thus, the additional offer of 4 CFLs for the price of an incandescent lamp will first and foremost be offered to consumers connected under IAME. The improved quality and increase access to electricity in these zones could increase electricity usage rate. Therefore, offering high quality CFLs to newly connected consumers and targeting zones responsible of peak demand will contribute to the GEB.</p> <p>Budget initially dedicated to constructing an AC testing lab will be used to procure 150,000 more CFLs.</p>
<p><i>Comment 2: Please elaborate on how the issue of air conditioners will be handled with regards to end consumers. Please address the following questions: will a similar piloting activity, as in the case of the CFLs be undertaken with regards to the AC market? If so what is the envisioned strategy? Has the necessary baseline market analysis been done?</i></p>	<p>End users of the air-conditioners are public buildings, offices, hotels. Only few households belonging to the high-income class can afford to have an AC. Energy audits of biggest public building were conducted under the World Bank ESDP project. Five buildings were selected for pilot projects implementation including energy efficient air conditioners in a hospital. It is expected that the pilot projects will be implemented before end of July 2009. Moreover, a design of energy building codes for public building is planned under the ESDP and will be extended to other buildings. As the public sector is the main driver for ACs market in Benin, it is likely that focusing on this segment will pull the other segments of the market towards this, since equipment importers will offer first, the equipment that meets the technical specification of Government procurement.</p> <p>Regarding the market analysis, the energy audits reports will be used and additional data will be collected from hotels, equipment suppliers, professionals and statistics institute, etc.</p> <p>It is agreed that given the high costs of setting up a testing facility for ACs and the small market in Benin for this equipment, more economic options will be looked into with other countries in the region regarding testing. The focus will be first put on adopting international standards for ACs in this project. As the ACs market is mainly driven by the public sector building, the Ministry of Energy will work with other Ministries to ensure that the standard developed will be included in the building code envisaged under the World Bank's ESDP and used in the procurement of air conditioning equipment in Government procurement.</p> <p>The budget allocated to build the AC testing facility has been shifted to procure 150,000 more CFLs for new connected zones and strengthen the awareness and efficient equipment promotion in general.</p>
<p><i>Comment 3: Please consider that domestic hot water preparation by electrical boilers and direct flow heaters contributes further a lot to the electric energy demand. It fits with the time pattern of use. A switch to solar DHW preparation units could help dramatically.</i></p>	<p>The point is noted. However, this is not a priority of the Government now and therefore will not be a focus of this project. However, most energy efficient equipments and usage of energy will be promoted during the public awareness and promotion activity. This could include solar DHW heaters mostly used in hotels and very high class households, lights bulbs, fluorescent tubes, electronics, TV, refrigerators and AC in public buildings and offices etc.</p>
<p><i>Comment 4: Please elaborate further on actual</i></p>	<p>Following the bulk procurement of the CFL's a logo will be designed to</p>

<p><i>dissemination activities of CFLs and on means of disposal of CFLs as well as incandescent bulbs during project proposal.</i></p>	<p>identify the CFLs procured under this project. Using ELI specifications and certifications will allow developing the market quickly. Then the standards options will be evaluated in coordination with other initiatives globally and in the region (mainly Togo, Nigeria, Ghana and Côte d’Ivoire) to see how to set up a standard.</p> <p>A private operator will be selected to supply and distribute the lamps under the supervision of the energy efficiency unit at the Energy Directorate. Each CFL sold at reduced cost will replace an incandescent lamp, which will be recovered and stored and destroyed as it was the case in Uganda. The payment of the private operator will be conditional to the proper execution of the mandate including destruction of returned lamps and storage of CFLs. For CFL, as there is no system at present in this part of the World, the recycling will have to await a broader recycling initiative from the private sector. The project will create synergies with GEF global lighting project and other country-projects to find the proper way to eliminate used CFLs.</p>
<p><i>Comment 5: It appears that no baseline study or market analysis has been done prior to developing this project idea. Therefore, we recommend that a baseline study is conducted prior to commencement of the project and not as one of the major project outcomes. It is suggested that this study be done as part of the PPG activity, which has not been outlined yet. The submission mentions \$ 100,000 for PPG but no PPG proposal has been submitted.</i></p>	<p>It is to be noted that following the submission of the PIF, a market study was initiated by the government which is currently ongoing – as a result the initially proposed PPG for the same activity was no longer needed. The budget of \$100,000 has been shifted to the project and correspondingly the Markey survey component as devised in the PIF has been removed. Furthermore, it is again reiterated that the GEF project document is developed as part of the IAME project.</p> <p>The current market survey is being carried out by the utility SBEE and the Energy Efficiency Unit at Energy Directorate under a funding of ECOWAS Bank for Investment and development (EBID). The field survey of about 4,500 households points strongly to lack of quality of CFLs in Benin’s lighting market. A similar study has been conducted in Togo.</p> <p>In parallel, the Energy efficiency unit will collect additional data from equipment importers and distributors, customs services to derive statistics of the supply chain.</p>
<p><i>Comment 6: Please consider that the bulk procurement of CFL to be based on the best possible option from the efficiency standards established under component 2. This might require a sequential timeline of the project.</i></p>	<p>The procurement in bulk will be done following Efficient Lighting Initiative (ELI) standards and specifications, similar to how it is planned in Togo. This will help speed up the market development. The assessment of the best option of standards to be adopted will be actually carried out in parallel under component 2 and will be coordinated with other initiatives.</p>
<p><i>Comment 7: Please consider that a small market like Benin could hinder the commercialization of CFLs effectively by not adopting already existing international standards for CFLs. Further, a country specific adoption of existing international standards will be very similar to the requirements of the neighboring countries, e.g. Togo. It is suggested that the developments of standards for energy efficient light bulbs is coordinated with other similar activities in the region and the components budget adopted accordingly. Please note that GEF is also funding a global project on efficient lighting and synergies should be considered.</i></p> <p><i>The proposed project is part of GEF’s West Africa Energy Program. Please consider further coordination on developing standards and testing facilities within the program.</i></p>	<p>See previous response also. However it may be explained that the need for an in-country lam testing facility is based on the request of the counterparts and following extensive discussions on the sustainability over both the medium and long term. However to enhance cost efficiency, no new laboratory will be established, rather, it is foreseen that additional types of testing equipment will be installed in an existing testing facility at the University of Benin, and the existing staff trained to undertake quality analysis on the basis of this. Further ELI specifications will be used for bulk procurement of these CFLs.</p> <p>The main purpose in establishing such a in country testing facility for CFLs is to provide Benin with a quality control instrument to allow CEBENOR, the Custom services and the Energy Directorate to play their role in ensuring the application of the label and standards and to be able to guarantee the sustainability of the results achieved under the initial phase of the project, which focuses on bulk procurement of CFLs. One of the fundamental problems in the light bulb market in Benin today is that it is flooded with cheap low quality products. Low quality is characterized by (i) quick burning of bulbs after only a few days of operations; (ii) electricity usage of bulbs that is higher than for incandescent light bulbs. However, for the</p>

	<p>public it is impossible to detect whether a bulb is of low quality or not. Thus, the project proposes to introduce a labeling standard. To confirm that a certain product deserves this label, testing is required. The laboratory would thus undertake this testing. The aim is that all types of light bulbs available in the market would be tested, and the label accorded only to those that pass the test. At the moment the quality control carried out by CEBENOR is on a voluntary basis. Therefore, the Energy Ministry will lead actions with other Ministry of energy, Ministry of Finance, Ministry of Trade and other government agencies to enforce minimum energy performance for lights bulbs and ACs. All enforcement mechanisms will be assessed and the necessary policy measures will be fostered. This could include the obligations of equipment importers to obtain the quality certification from CEBENOR through the testing lab for lighting bulbs, incentives to promote efficient products through taxes exemptions/reductions, increase taxes on low quality equipment, etc.</p> <p>Further the range of testing services provided in Cotonou will not only benefit Benin alone, but also the land-locked countries of Burkina Faso, Mali and Niger. The light bulbs for these countries are being imported from the ports of Cotonou (Benin) and Lomé (Togo), and then transported up-country via trucks.</p> <p>Synergies will be built with Togo and other West Africa countries (Côte d'Ivoire, Mauritania, and Nigeria (S&L) that are implementing efficient lighting projects. Lessons emanating from the Ghana project experience are also under consideration. Particular coordination will be created with the various projects under the GEF West Africa Energy Program.</p>
<p><i>Comment8: Please consider to timely match the distribution of CFL in component 1.3 and public awareness creation in component 2.4.</i></p>	<p>The point is well noted. The awareness will start just before and continue during the distribution of CFL. As designed the awareness and media information dissemination will take place after the end of CFLs distribution activities. An awareness plan will be developed in the implementation manual. A long term energy efficiency promotion plan will be developed under the ESDP and IAME.</p>
<p><i>Comment 9: In the PIF the Monitoring and Evaluation activity is described separately under component 1 and 3. Please consider combining the two M&E activities into a separate and all-encompassing project component with its own budget. A clear monitoring and evaluation plan should be designed as part of the PPG activities of the project. More clarity needs to be given to the monitoring strategy, type of indicators that to be collected, as well as the type of analysis that will be done to review these indicators</i></p>	<p>The point is noted and the M&E activities are synergized under component 3. The monitoring and evaluation plan is now fully developed (including measurable indicators) and are part of the project document.</p>
<p><i>Comment 10: Please note that the wording in component 2.2 is not clear, does "enhancing of the legal framework for efficient light bulbs" imply that some framework already exists or does the component mean to say "develop" instead of "enhance"?</i></p>	<p>It may be clarified that the project will build upon the existing framework where CEBENOR is already adopting some 200 International Electrotechnical Commission (IEC) standards for electrical devices including cable, socket, lamps. The technical electricity committee at CEBENOR is chaired by the Electricity Department of the Energy Directorate. While the targeted equipments are not looked at from the energy efficiency perspective, the proposed project will work closely with CEBENOR and other stakeholders to adopt EE standards for lights bulbs and ACs. The project also intends to coordinate this activity on a regional basis and adopt lessons from the Nigeria experience. Some in depth assessment will be needed to understand better the existing framework before deciding what is suitable in terms of measures to enforce the S&L.</p>

<p><i>Comment 11: Given the high costs of setting up separate testing facilities in Benin, please consider a programmatic approach of setting up test laboratories for the region of West Africa (ECOWAS) or at least in cooperation with Togo. In addition, please elaborate on the purpose of this testing facility: is there a need for such a center to test globally accepted products? Also please elaborate on the budget of this activity. What sources would the 1.8 million in co-financing come from?</i></p> <p><i>Please consider to shift some of the budget used for the testing facilities (Component 2.3) to the CFL distribution component (Component 1.3) in order to distribute more CFL in the market as in the case of the similar Togo efficient lighting program (400,000 CFLs).</i></p>	<p>It may be explained that the testing facility for light bulbs at the country level was included as part of a sustainability measure. In the present situation there is no ban for import of inefficient equipment in Benin and CFLs may be obtained from various sources and origins without any regulatory control. As a result the poor quality of CFLs is an issue in the field extensively discussed. Therefore, during designing the project setting up a testing facility for lamps was found critical since it will contribute to enforce the S&L by providing the country with the technical capacity to control the quality of lamps offered in the market in the medium and long run.</p> <p>Point is noted and budget adjustments have been made. 150,000 more CFLs will be procured and distributed. As previously mentioned, ELI specifications will be used for CFLs procurement under the component 1.</p>
<p><i>Comment 12: Given that enforcement is an important issue in projects dealing with S&Ls, please elaborate on the type of enforcement mechanism to be used in this project.</i></p>	<p>As designed, the mechanism for enforcement will be assessed under component 2. The project will be on the existing framework where CEBENOR (Centre Béninois de Normalisation et de Contrôle de Qualité) is already adopting some international standards including electrical installations. For instance, the electricity meters imported by the utility are tested by another agency. This includes sample testing at the Cotonou port before the customs allow the delivery.</p> <p>The project envisages the creation of a steering committee including the Ministries of energy, environment, trade, finances and specialized agencies such as CEBENOR, ABERME, DGE. The steering committee will be the platform to analyze issues such as enforcement, incentives for promoting efficient equipment in view of the project's sustainability both in the medium and longer terms.</p>
<p><i>Comment 14: Please provide further detail on the exact private sector players, multilateral banks, bilateral banks, and NGOs that will be involved. Please also clarify how the multilateral soft-loan and private sector in kind contributions will be used in the project.</i></p>	<p>The World Bank is co-financing the project as an integral component of the IAME project. This includes project development and preparation, project management and monitoring, etc. Please see Table A and C in Part I of this PIF on the overall co-financing including from IDA and the Government. The incremental cost analysis under the project document will include all additional details.</p>

The comments received from GEF in the review sheet dated March 12, 2009 and the corresponding answers are listed below.

Comment	Response
<i>Comment 1: Detailed baseline and household survey data still missing from comparison.</i>	Initial results from the survey carried out by the utility SBEE and the Energy Efficiency Unit at the Energy Directorate confirm the assumptions on which the project design has been based. Detailed results from the market and household survey have been added in Part II, Section A on p. 6 of the CEO memo as well as in Annex 12 (ICA), Section A of the PAD.
<i>Comment 2: Calculations based on data from a</i>	Detailed estimates on the cost-effectiveness of the project are provided in

<i>baseline study still missing.</i>	Section 4, on p. 14 as well as Section H, p. 17 of the CEO memo (see Section F).
<i>Comment 3: Not all references to the increased number of CFLs have been corrected in the CEO memo. Reference to the AC test lab still appear in the project framework of the CEO memo.</i>	All figures and references related to the CFLs and the AC lab have been corrected in the CEO memo.
<i>Comment 4: A detailed budget for M&E activities needs to be added.</i>	The M&E budget has been clarified in the CEO memo. All GEF funds (\$98,182) allocated to A.3.3. Project management relate to the M&E budget, which includes consultant fees related to M&E assessments, evaluations, and reporting, as well as travel cost and operating cost associated with the M&E assessments and evaluations. In addition to GEF funds, \$30,000 of cofinancing is attributed to M&E costs. The remaining \$120,000 of cofinancing to A.3.3. cover general project management cost.
<i>Comment 5: The document does not describe satisfactorily where the baseline cost of US\$1.26 result from.</i>	The baseline cost are calculated as the surplus cost for operating fuel oil based power plants as per baseline scenario. The Benin Power Utility (SBEE) estimated cost at \$1.26 million.
<i>Comment 6: Consultant Cost in Annex C for component A.3.2.2. amount to \$40,000, while the related GEF project budget only amounts to US\$30,000 in the Project Framework.</i>	This was a calculation error. The consultant costs have been revised to \$26,000. See. Table on p. 4 and Annex C of the CEO memo. The remaining \$4,000 GEF funds will contribute to stakeholder consultations.
<i>Comment 7: The table in Part I-E shows calculation errors. Annex C does not match.</i>	The table has been revised and corrected. Consultants working on TA components and funded by GEF amount to \$334,000. Corrections were also applied to Annex C.
<i>Comment 8: No confirmation of co-financing available.</i>	Confirmation of co-financing will be included in the minutes of negotiations. Negotiations are scheduled for last week of March/first week of April. Signed minutes of negotiations will be submitted as soon as available.

2. RESPONSE TO STAP COMMENTS:

Comment 1. STAP acknowledges the “scientific soundness” of the project framework, but suggests clarification on the potential implications of some of the interventions. The project aims to address major market transformation barriers for efficient lighting and air-conditioners. Experience in other countries shows that major barriers for penetration of energy efficiency appliances to domestic market include consumer awareness, price dynamics, CFL quality issues, consumer purchasing behaviour, and market entrance barriers. Proponents are advised to consider these and other market barriers in a systematic way when conducting market study and survey.

Response: The point is well noted and the mentioned considerations have been taken into account in the detailed household survey and market study, of which preliminary findings have been integrated into the project design. Final results are expected in May 2009. During the surveys, barriers to market transformation for efficient products were gathered and analyzed.

Comment 2. The project puts major emphasis on capacity building for regulatory authorities and consumer education, while other upstream segments of the market (exporters and retailers) are not sufficiently targeted. Proponents are advised to consider and design interventions aimed at providing regulatory and financial incentives for these players, who are central to the supply side of the market for EE appliances.

Response: The point is well noted. As described in subcomponent A.3.1.1., other government agencies and private market players will have a critical role in energy efficiency promotion. Capacity building under the project also targets equipment importers, distributors and retailers. Equipment importers and retailers will play a central role during CFL procurement and distribution and will be closely involved in implementation of the project. There are no CFL exporters in Benin. The project team has visited major equipment importers and retailers during the December 2008 mission. The Energy efficiency unit did the same during the market study to inform and seek the participation all potential

commercial partners. Furthermore, it is intended to involve private operators in the legal framework assessment and specific actions will be directed towards them during the promotion activities.

In addition, intensive consultation of stakeholders including government bodies as well as retailers, professionals and consumers association were carried out as part of the legal framework study and have been included to enhance the regulatory and legal framework for energy efficient equipments.

***Comment 3.** Project aims at transforming markets for key household appliances and lighting in residential and commercial buildings in Benin. These two sectors require differential approaches. Proponents are advised to distinguish these two sectors in market survey analysis and design interventions accordingly.*

Response: The lighting component will first and foremost target the residential sector, whereas the air-conditioner component will be more directed to commercial and public buildings. Two different market surveys were designed targeting these two market segments separately. For further details, please refer to the response to Comment no. 2, Annex B (p.23) of the CEO memo.

***Comment 4.** STAP suggests assessment of the effectiveness and sustainability of the proposed one time CFL bulk procurement. Providing consumers with a one-time opportunity to purchase CFLs at a subsidized price will hardly have a long-lasting impact on CFL market transformation. Project proponents may look for more efficient upstream interventions, e.g. facilitating agreements between Energy Directorate Benin and retailers that provide the latter with incentives to participate actively in the market transformation process.*

Response: The sustainability of the project is included in the project design. Sustainability will be ensured by:

- a) Improvements to the regulatory framework, which seeks to propose necessary policy and financial measures. For example, expected measures include the exemption/reduction of customs duties, VAT and others incentives on energy efficient products (see sub-component A3.2.2, p.10).
- b) Capacity building, which includes general stakeholder awareness raising, and
- c) Quality standards, which will ensure input of higher quality CFLs .

***Comment 5.** Project interventions do not address demand side of the market. How energy consumption will be monitored (lighting audits) and risk of potential ‘rebound effect’ avoided? What financial incentives consumers may have to make a switch to CFLs and more EE air conditioners (subsidy, electricity tariff or etc.)?*

Response: The results framework includes a set of parameters to be monitored. These include sample households monitoring through their energy bills, field surveys to ensure that lights replaced are still operating. Detailed surveys will be undertaken at mid-term and completion of the project. Little “rebound effect” is expected due to the limited purchasing power of the residential energy consumers.

On the incentives, appropriate measures will be discussed through the regulatory framework assessment. For example, cost savings per CFL per year are estimated at US\$ 7.56. Therefore the pay-back-period for each CFL is around 6 months depending on intensity of use. This is considered a high incentive for consumers even with limited purchasing power.

***Comment 6.** Baseline Scenario emissions: Benin imports 85% of electricity. It is important to consider the source of the imported electricity - hydro- or oil- or coal-based? GHG benefit from the project depends on the energy source of the imported power. When energy is used from renewable sources, no net emission reductions will occur.*

Response: Benin imports electricity from three main sources: Côte d’Ivoire, Ghana and Nigeria through the CEB, a bistatal utility. Since 2006, CEB is unable to supply the agreed amount of electricity and power to SBEE due to electricity crisis that is currently faced by the generating sources in Ghana, Côte d’Ivoire and Nigeria. While the peak load is currently at 120 MW, CEB’ supply fluctuates widely between 70 MW and 20 MW. This situation has forced

SBEE to increase the domestic generation by operating costly thermal units to reach a domestic generation of about 30% in 2008. This corresponded to about 120,000 tonnes of fuel oil combusted during the last year (or 380,000 tCO₂)⁶.

It is assumed in this project, any load reduction and energy saved will be essentially reflected on the operation of the SBEE's thermal units as it is more attractive to purchase electricity from CEB at USD 0.1/kWh than to produce it domestically at USD 0.25/kWh. Therefore, the baseline scenario emissions considers only thermal generation.

Assuming a scenario where Côte d'Ivoire, Ghana and Nigeria would be able to supply power, still approximately 60% of imported power would be fossil-fuel based. See p.2, Section I.A. of the project document for further details.

***Comment 7.** How the issue of retrofitting of the existing air-conditioners will be addressed or the project targets only new air-conditioners?*

Response: The project will target only new air-conditioners (window and split systems). The project intends to encourage systematically the use efficient ACs in government procurement as the market is mainly driven by the public sector.

***Comment 8.** If ACs and CFLs are going to be imported, then regulations on imports may be necessary, more than the development of domestic labels and standards. Similar, the rationale for establishing laboratory for testing needs to be clarified.*

Response: All key stakeholders will be involved to assess the best way to restrict the entry of poor quality products in Benin. The legal framework will be assessed and enhanced accordingly. The customs services will play a central role for enforcing the regulation.

On the issue of the need for establishing a laboratory, as has been explained in the CEO Memo earlier that the need for an in-country lamp testing facility is based on the request of the counterparts and following extensive discussions on the sustainability over both the medium and long term. The main purpose in establishing such a in country testing facility for CFLs is to provide Benin with a quality control instrument to allow CEBENOR, the Custom services and the Energy Directorate to play their role in ensuring the application of the label and standards and to be able to guarantee the sustainability of the results achieved under the initial phase of the project, which focuses on bulk procurement of CFLs. One of the fundamental problems in the light bulb market in Benin today is that it is flooded with cheap low quality products. Low quality is characterized by (i) quick burning of bulbs after only a few days of operations; (ii) electricity usage of bulbs that is higher than for incandescent light bulbs. However, for the public it is impossible to detect whether a bulb is of low quality or not. Thus, the project proposes to introduce a labeling standard. To confirm that a certain product deserves this label, testing is required. The laboratory would thus undertake this testing. The aim is that all types of light bulbs available in the market would be tested, and the label accorded only to those that pass the test. At the moment the quality control carried out by CEBENOR is on a voluntary basis. Therefore, the Energy Ministry will lead actions with other Ministry of energy, Ministry of Finance, Ministry of Trade and other government agencies to enforce minimum energy performance for lights bulbs and ACs. All enforcement mechanisms will be assessed and the necessary policy measures will be fostered. This could include the obligations of equipment importers to obtain the quality certification from CEBENOR through the testing lab for lighting bulbs, incentives to promote efficient products through taxes exemptions/reductions, increase taxes on low quality equipment, etc.

It also needs to be understood that to enhance cost efficiency, no new laboratory will be established, rather, it is foreseen that additional types of testing equipment will be installed in an existing testing facility at the University of Benin, and the existing staff trained to undertake quality analysis on the basis of this. Further ELI specifications will be used for bulk procurement of these CFLs.

⁶ A conversion factor of 3.2 kg CO₂ per kg of diesel has been used (following revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories)

Further the range of testing services provided in Cotonou will not only benefit Benin alone, but also the land-locked countries of Burkina Faso, Mali and Niger. The light bulbs for these countries are being imported from the ports of Cotonou (Benin) and Lomé (Togo).

Comment 9. Benin's capacity for Hg-containing CFL disposal has to be addressed in the final project document.

Response: CFL disposal issue is a global challenge. Currently, no specific measure is in place to handle the CFL disposal issue. Expert discussion on the topic acknowledges that a critical mass of used CFL needs to be generated, for a potential recycling facility to be economically feasible. The project will link up with other initiatives and any standards used internationally will be adopted. The Ministry of Environment is involved in the project and will assist to determine the best way to dispose used CFLs.

Comment 10. The risk of meeting the incremental first cost of ACs and CFLs in the long term, from the perspective of consumers, needs to be addressed.

Response: As explained in other points above, the enhancement of the legal framework and the proposed testing laboratory intend to ensure the long term sustainability. Possible incentives may include tax or tariff reductions aimed to reduce the market price of CFLs⁷. Further the preliminary findings of the market survey also indicate that there is high willingness of consumers to pay slightly more for good quality products. As mentioned above in comment 5, the fairly short pay-back-period for CFLs will further provide a long-term consumer incentive to switch to CFLs.

⁷ As an example, the Government has applied such incentives on all computers related IT products.

ANNEX C: CONSULTANTS TO BE HIRED FOR THE PROJECT USING GEF RESOURCES

<i>Position Titles</i>	<i>\$/ person week*</i>	<i>Estimated person weeks**</i>	<i>Tasks to be performed</i>
For Project Management (Sub-component A3.3)			
Local			
Assistance for project monitoring and evaluation	1,000	30	<ul style="list-style-type: none"> • Beneficiaries satisfaction assessment • Support for impact evaluation
International			
Administrative support for monitoring and reporting	3,500	7.4	Compile and review the periodic reports prepared by the implementing unit
Mid term evaluation and final evaluation	3,500	4	Mid term and final evaluation including field missions to assess project outcomes and propose recommendations
Justification for Travel, if any: US\$ 15,000 Travel fees for field assessment by international consultants			
For Technical Assistance			
Local			
Communication firm for EE promotion (sub-component A3.1.2)	1,000	230	Design and implementation of awareness and
Assessment of institutional and legal framework (sub-component A3.2.1)	1,000	15	Assess the institutional and legal framework for enabling and enforcing standards and labels
Design of EE standards and labels (sub-component A3.2.2)	1,000	5	Assist the International consultant in designing standards and labels for efficient light bulbs and air-conditioners
International			
Managerial and technical capacity building of key stakeholders (sub-component A3.1.1)	3,500	10	Build the capacity of the project unit (Energy efficiency unit), ABERME and key governments agencies and market players on EE standards and labeling
Assessment of institutional and legal framework (sub-component A3.2.1)	3,500	3	Assist the DGE in assessing the institutional and legal framework for enabling and enforcing standards and labels
Design of EE standards and labels (sub-component A3.2.2)	3,500	6	<ul style="list-style-type: none"> • Review/Design/propose standards and labels for efficient light bulbs and air-conditioners in Benin • Propose testing procedures to be adopted by CEBENOR
Capacity building on testing equipment (sub-component A3.2.3)	3,500	5	<ul style="list-style-type: none"> • Build capacity of EPAC technicians, CEBENOR, DGE, ABERME on testing procedures • Train EPAC technicians on lamps testing equipment within the testing facility
Justification for Travel, if any: Travel fees of US\$16,000 for international consultants			

* Provide dollar rate per person weeks or months as applicable; ** Total person weeks/months needed to carry out the tasks.

ANNEX D: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS

- A. EXPLAIN IF THE PPG OBJECTIVE HAS BEEN ACHIEVED THROUGH THE PPG ACTIVITIES UNDERTAKEN.
Non applicable.**
- B. DESCRIBE FINDINGS THAT MIGHT AFFECT THE PROJECT DESIGN OR ANY CONCERNS ON PROJECT IMPLEMENTATION, IF ANY:**
- C. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES AND THEIR IMPLEMENTATION STATUS IN THE TABLE BELOW:**

<i>Project Preparation Activities Approved</i>	<i>Implementation Status</i>	<i>GEF Amount (\$)</i>				<i>Co-financing (\$)</i>
		<i>Amount Approved</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>	<i>Uncommitted Amount*</i>	
	(Select)					
	(Select)					
	(Select)					
	(Select)					
	(Select)					
	(Select)					
	(Select)					
Total						

* Any uncommitted amounts should be returned to the GEF Trust Fund. This is not a physical transfer of money, but achieved through reporting and netting out from disbursement request to Trustee. Please indicate expected date of refund transaction to Trustee.

ANNEX E: CALENDAR OF EXPECTED REFLOWS

Not Applicable