



# PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Medium-sized Project

TYPE OF TRUST FUND: GEF Trust Fund

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## PART I: PROJECT INFORMATION

Project Title:	Creation of an enabling environment for small to medium scale renewable energy investments in the electricity sector		
Country(ies):	Guinea Bissau	GEF Project ID: <sup>1</sup>	5331
GEF Agency(ies):	UNIDO (select) (select)	GEF Agency Project ID:	130012
Other Executing Partner(s):	Ministry of Energy, Industry and Natural Resources (MEINR) and the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)	Submission Date: Resubmission Date:	03/13/2013 05/04/2013
GEF Focal Area (s):	Climate Change	Project Duration (Months)	48
Name of parent program (if applicable): • For SFM/REDD+ <input type="checkbox"/> • For SGP <input type="checkbox"/>		Agency Fee (\$):	164,840

### A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK<sup>2</sup>:

Focal Area Objectives	Trust Fund	Indicative Grant Amount (\$)	Indicative Co-financing (\$)
CCM-3 Renewable Energy: Promote Investments in Renewable Energy Technologies	GEFTF	1,735,160	7,450,000
Total Project Cost		<b>1,735,160</b>	<b>7,450,000</b>

### B. INDICATIVE PROJECT FRAMEWORK

Project Objective: To promote investments in small to medium scale renewable energy technologies in the electricity sector and creation of an enabling environment for replication and up-scaling						
Project Component	Grant Type <sup>3</sup>	Expected Outcomes	Expected Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Cofinancing (\$)
Component 1: Promoting investments in small to medium scale renewable energy technologies	Inv	<p>1. The feasibility and viability of small to medium scale renewable energy technologies and business models in the urban and rural context are demonstrated.</p> <p>2. A national renewable energy investment plan to replicate and up-scale renewable energy projects is developed and presented to interested developers</p>	<p>1.1. Development and execution of high impact renewable energy projects (solar, small hydro, wind and bioenergy) with a generation capacity of at least 2,5 MW (around 50% of the overall installed electric capacity in 2012)</p> <p>2.1. Based on the undertaken site assessments and feasibility studies a pipeline of renewable energy priority projects is compiled</p>	GEFTF	1,000,000	6,010,000

<sup>1</sup> Project ID number will be assigned by GEFSEC.

<sup>2</sup> Refer to the reference attached on the [Focal Area Results Framework](#) when completing Table A.

<sup>3</sup> TA includes capacity building, and research and development.

		and investors	2.2. The national investment plan with priority projects is developed and disseminated to interested developers and investors			
Component 2: Consolidating a comprehensive policy, regulatory and support framework for renewable energy in alignment with the ECOWAS Renewable Energy Policy	TA	3. A national renewable energy policy including supporting laws and incentive mechanisms is developed and implementation support provided	3.1. Based on the gap analysis in the existing energy policy framework a national renewable energy policy and targets are developed and implementation support provided.  3.2. Law(s) for the introduction of various incentive mechanisms for on-grid and decentralized renewable energy solutions are developed and implementation support provided.  3.3. The ECOWAS Renewable Energy Facility (EREF) has established as special grant financing window for Guinea Bissau and undertakes regular call for proposals to support project development and small investments.	GEFTF	390,000	790,000
Component 3: Implementation of a national program to build capacity and awareness on different aspects of renewable energy;	TA	4. The capacities of key market enablers on different aspects of renewable energy are strengthened and south-south knowledge transfer from the ECOWAS region established	4.1. Design of a national capacity building program based on the results of a renewable energy capacity needs assessment  4.2. Development and dissemination of a handbook on project development based on the lessons learned of the implemented demonstration projects  4.3. The capacity of local institutions is	GEFTF	148,000	250,000

			strengthened through three (3) train the trainer workshops and south-south knowledge transfer from the ECOWAS region  4.4. At least one hundred (100) key market enablers are trained on various renewable energy aspects in workshops conducted by the trained trainers  4.5. Experts of the national utility EAGB are trained in renewable energy economics and technical aspects of grid integration and stability			
Component 4: Monitoring and Evaluation , Management	TA	5. Adequate and systematic monitoring of all project indicators together with regular and comprehensive assessment of an on-going and / or completed initiatives to ensure successful project implementation	5.1 At least two annual project steering committee meetings  5.2 Yearly reports  5.3 Final evaluation	GEFTF	46,621	60,000
Subtotal					1,584,621	7,110,000
Project Management Cost (PMC) <sup>4</sup>				GEFTF	150,539	340,000
Total Project Cost					<b>1,735,160</b>	<b>7,450,000</b>

### C. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME IF AVAILABLE, (\$)

Sources of Cofinancing	Name of Cofinancier	Type of Cofinancing	Amount (\$)
National Government	Ministry of Energy, Industry and Natural Resources (MEINR)	Cash	600,000
National Government	Ministry of Energy, Industry and Natural Resources (MEINR)	In-kind	220,000
Private Sector	Various promoters and financial institutions	Cash	5,000,000
Bilateral Aid Agency (ies)	European Union	Cash	800,000
Other Multilateral Agency (ies)	ECREEE	Cash	400,000
Other Multilateral Agency (ies)	ECREEE	In-kind	200,000
GEF Agency	UNIDO	Cash	60,000
GEF Agency	UNIDO	In-kind	170,000
<b>Total Cofinancing</b>			<b>7,450,000</b>

<sup>4</sup> To be calculated as percent of subtotal.

**D. INDICATIVE TRUST FUND RESOURCES (\$) REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY<sup>1</sup>**

GEF Agency	Type of Trust Fund	Focal Area	Country Name/Global	Grant Amount (\$ (a)	Agency Fee (\$ (b) <sup>2</sup>	Total (\$) c=a+b
(select)	(select)	(select)				0
<b>Total Grant Resources</b>						

<sup>1</sup> In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.

<sup>2</sup> Indicate fees related to this project.

**E. PROJECT PREPARATION GRANT (PPG)<sup>5</sup>**

Please check on the appropriate box for PPG as needed for the project according to the GEF Project Grant:

	<u>Amount Requested (\$)</u>	<u>Agency Fee for PPG (\$)<sup>6</sup></u>
• No PPG required.		
• (upto) \$50k for projects up to & including \$1 million		
• (upto)\$100k for projects up to & including \$3 million	91,324	8,676
• (upto)\$150k for projects up to & including \$6 million		
• (upto)\$200k for projects up to & including \$10 million		
• (upto)\$300k for projects above \$10 million		

**PPG AMOUNT REQUESTED BY AGENCY(IES), FOCAL AREA(S) AND COUNTRY(IES) FOR MFA AND/OR MTF PROJECT ONLY**

Trust Fund	GEF Agency	Focal Area	Country Name/Global	(in \$)		
				PPG (a)	Agency Fee (b)	Total c = a + b
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
<b>Total PPG Amount</b>				<b>0</b>	<b>0</b>	<b>0</b>

MFA: Multi-focal area projects; MTF: Multi-Trust Fund projects.

<sup>5</sup> On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

<sup>6</sup> PPG fee percentage follows the percentage of the GEF Project Grant amount requested.

## PART II: PROJECT JUSTIFICATION<sup>7</sup>

### A. PROJECT OVERVIEW

#### A.1 PROJECT DESCRIPTION

##### *A.1.1 Global environmental problems, root causes and barriers that need to be addressed*

A severe energy crisis hampers the social and economic development of Guinea Bissau. The country is facing the interrelated challenges of energy access, energy security and climate change mitigation simultaneously. The chronic crisis in the electricity sector represents a high cost for the entire economy of Guinea-Bissau, adversely impacting production costs and the population's standard of living. As long as the country continues to depend on expensive diesel-based electricity generation the situation will not improve by the following decade.

There is a rapidly growing gap between electricity demand and the available national generation capacity. The electricity and water production, and distribution, have virtually collapsed since 2000. In 2012, the total available power generation capacity was 5.5 MW whereas the steadily increasing demand was close to 30 MW in the capital Bissau. In practice the generation capacity is even less as the state-owned utility EAGB (Empresa Publica de Electricidade e Aguas da Guine Bissau) has not sufficient resources to buy fuel. Due to the failure of the public supply and regular power cuts large consumers such as embassies, international organizations, hotels and other institutions use private diesel generators with an estimated capacity of 20 MW. There is also an estimation of 800-1000 small generators in use by the residential sector.

The current electricity generation capacity is exclusively dependent on diesel generators. High generation costs, commercial and technical grid losses exceeding 30%, as well as a small base of 19.000 clients with a low ability and willingness to pay present a heavy burden to the utility and the Government. Due to the budget constraints of the Government, a US\$10 million subsidy from ECOWAS and UEMOA was given to support Guinea Bissau, between 2010/2011, to purchase diesel fuel for EAGB. Existing short-term development plans in the electricity sector are focused on the expansion of thermal plants without considering renewable energy alternatives in the least-cost analysis. By 2013, the Government plans to add a thermal capacity of 20 MW (5MW heavy fuel oil and 15 MW diesel fired) financed by the World Bank and BOAD.

The grid system of the country remains underdeveloped. The country's electrical network is divided into several isolated grids which include the main grid for the capital city Bissau and secondary production centers (Bafata, Gabu, Farim, Mansoa, Bissora, Cantchungo, Catio). With exception of the grid in the capital city, none of the other networks are in operation due to high cost of purchasing diesel, poor maintenance or theft. The Government plans to construct an interconnected national grid system which includes 900 km of 30 kv lines and 150 km of 225 kv lines. The European Union (EU) approved €15 million to invest in the EAGB power transmission ring around Bissau and the second phase of distribution rehabilitation (the first phase was implemented by the MIRP). The realization of the regional interconnection project of OMVG/WAPP which would enable cost-effective power trade between Guinea, Guinea-Bissau, Gambia and Senegal seems to stay very uncertain. This project would comprise the construction of two large hydro power stations at Sambangalou (128 MW) and Kaleta (240 MW) and a 1,677 km 225 kV transmission line.

In 2009, the country's national electricity access rate was 15% with around 2% in rural areas and 40% in urban areas. The urban and rural poor in Guinea Bissau spend more of their income on poor quality energy services, than the better-off on clean and modern energy services. Biomass represents over 95% of all the energy consumed by households in Guinea-Bissau. Fuelwood is the dominant source of fuel with a demand that exceeds 500,000 tons per year, followed by charcoal being the most-used fuel in the capital and urban areas. The lack of access to modern, affordable and reliable energy services is interlinked with a variety of economic, social, environmental and political problems experienced in the country. The pressure on forest resources increases. Indoor pollution arising from the use of traditional biomass is a serious problem for women and children.

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<sup>7</sup> Part II should not be longer than 5 pages.

The country is not taking advantage of its local renewable energy resources due to various technical, financial, policy, capacity, awareness and knowledge barriers. Up to date there are no running grid-connected renewable energy projects and decentralized mini-grids have been exclusively powered by diesel generators. Most of the generators in rural and peri-urban areas are out of operation due to the increase in petroleum prices, poor operation and maintenance techniques, as well as theft. There is no favorable policy and regulatory framework for renewables in place and incentive schemes are not existing. Standard procedures (e.g. Power Purchase Agreements) to guide the involvement of Independent Power Producers (IPPs) or Public Private Partnerships (PPPs) are not in place. The technical capacities of local experts and the utility are weak or focused on conventional solutions (e.g. diesel generators). Higher education in the energy sector is weakly developed. Due to the political instability and the difficult situation of the utility, investors are hesitant to invest in the power sector. Most of the investments are undertaken by development institutions (e.g. EU, development banks, NGOs). There exists a widespread lack of knowledge on the economics and technical feasibility of renewable energy technologies. EAGB experts lack of knowledge on renewable energy integration and grid stability.

### ***A.1.2 The baseline scenario and baseline project***

The GEF project builds on the political commitment of the Government and the few promising developments in the on- and off-grid renewable energy market in Guinea Bissau. At the background of rising generation costs of thermal generation units and the delay of regional interconnection projects the Government has drawn its attention to the development of local renewable energy resources. The promotion of renewable energy has been included as key activity in the Poverty Reduction Strategy Paper (PRSP), covering the period 2011 to 2015, the national energy policy and other official documents. Recently, the ECOWAS member states (including Guinea Bissau) adopted a regional policy for renewable energy which aims at increasing the share of renewables (excl. large hydro) to 19% of the overall electricity mix of the region by 2030. The action plan foresees that Guinea Bissau, and the other 14 countries, will develop their own national renewable energy policy and targets.

The emphasis of the Government lies on the promotion of medium-scale grid-connected and small-scale decentralized renewable energy solutions to satisfy the growing power demand of the capital, to boost rural electrification and productive uses in the main sectors of the industry (e.g. agriculture, fishery, mining of bauxite, tourism). Decentralized systems can play an important role in the agricultural and fishery sectors which are predominant in the economy of Guinea Bissau (e.g. water pumping, processing, ice production). The economics of some renewable energy technologies in the urban as well as rural context are very promising in comparison to the diesel or heavy fuel oil (HFO) fired plants or generators. This is particularly true for small hydro, wind and bioelectricity. The economics are even more promising when negative externalities of thermal plants (e.g. local pollution, GHG emissions) are considered. The GEF project will help to transform the commitments of the Government into concrete laws and regulations.

The GEF project creates links to the few ongoing renewable energy investment activities in the country. It will create synergies to the pre-feasibility work undertaken by the Ministry of Energy and the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) concerning the construction of a 9 MW PV plant near Bissau and the development of the 18 MW small hydro project in Salthino. Moreover, the project will create synergies and make use of co-funding possibilities with regard to the on-going off-grid activities particularly in the PV sector. Under the Programme Régional Solaire (PRS), which is implemented by CILSS and co-funded by the European Union, around 61 small scale PV systems for water pumping, communication and lighting were installed in rural areas (around 450 kw). Under the Regional Programme for the Promotion of Household and Alternative Energies in the Sahel (PREDAS), which is also coordinated by CILSS, around 14 biogas units were installed. UNDP supports the construction of 25 small-scale solar systems for different villages. Various NGOs are providing support in creating a local market for improved cook stoves and dissemination of solar lamps. A small-scale decentralized bioelectricity pilot project using the waste of cashew is currently under construction with support of the Programme Régional de la Biomasse Energie (PRBE) and the Indian Government. The GEF project will evaluate the results of the project and promote its possible replication in other locations.

### ***A.1.3 GEF alternative scenario and project:***

The specific project objective is to demonstrate the feasibility and viability of small and medium scale renewable

energy technologies in the electricity sector of Guinea Bissau and to create an enabling market environment for replication and up-scaling. The project will primarily focus on the mitigation of existing barriers for the dissemination of renewable energy on-grid and off-grid solutions. It foresees interventions in the areas of investment promotion, policy and capacity development as well as awareness raising. It will facilitate:

the development and construction of viable small to medium scale renewable energy investment projects sector with high social, economic and environmental impact;

the development of a national renewable energy investment plan with priority projects;

the development of a national renewable energy policy including supportive laws and the establishment of a financing mechanism in the framework of the ECOWAS Renewable Energy Facility (EREF).

increased awareness on the benefits of renewable energy technologies in comparison to the existing options (e.g. diesel, HFO);

the strengthening of capacities of local institutions to train renewable energy market enablers (e.g. utility, developers, institutions, banks) as well as knowledge transfer from the ECOWAS region;

### **Component 1: Demonstrating the technical feasibility and commercial viability of small to medium scale renewable energy projects in the urban and rural context**

The project will mainstream renewable energy generation capacity into the fossil fuel dominated electricity market. The technical feasibility and viability of the technologies will be demonstrated. The project will promote the design and construction of small- to medium scale renewable energy projects (bioelectricity, small to medium scale hydro, wind and solar) with a generation capacity of at least 2,5 MW (around 50% of the overall available electric capacity in early 2012). Considerable CO<sub>2</sub> emission savings are expected (in comparison to the diesel baseline). The investment projects will be selected and further developed during the PPG phase. The preparatory work will particularly consider projects which are already in the pre-feasibility stage (e.g. 9 MW PV plant near Bissau, 18 MW hydro site Salthino) and link up with already undertaken projects in the off-grid market (e.g. PV, cashew powered bioenergy plant).

The CO<sub>2</sub> emission reductions will be calculated in-detail during the PPG phase when the used renewable energy technologies are selected. The executed projects will demonstrate income savings due to lower operation costs in comparison to diesel and HFO fired units. The neighboring country Cape Verde with a similar dependency on fossil fuels has demonstrated the benefits of integrating renewable energy into the electricity system (e.g. wind power). Short-term development plans of the national utility and locally active banks are focused on the expansion of heavy fuel stations without considering renewable energy alternatives in the least-cost analysis. The lessons learned, recommendations and guidelines drawn from these projects will be disseminated to key market enablers and interested investors under the capacity development component of the project.

In parallel the GEF project will support the development and dissemination of a national renewable energy investment plan which will be presented to potential investors and project developers. The investment plan includes a pipeline of priority projects with relevant data on the feasibility and viability. The pipeline will be developed on the basis of the site and potential assessments undertaken during the PPG phase and further feasibility work to be done during project implementation. The existing renewable energy potentials in Guinea Bissau are estimated as follows:

The rivers Corubal and Geba have significant feasible potential for small and medium scale hydro power. Hydro would be the better economic alternative to diesel or HFO fired units. However, the so far available hydrological data is not reliable, outdated (measurements from the 70s or 80s) and not bankable. There is the need to undertake and/or update the measurements and feasibility studies for the sites Salthino (18 MW) and Cussilinta (32 MW) at the Corubal river. The two sites are located around 170 km from Bissau and are nearby the planned transmission line of OMVG from Guinea to Senegal. The hydraulic contribution of the Geba River seems to be more modest. The flow volume of the Geba River will be also affected by the construction of dams at Anambé and Kaleta. Further studies have to be undertaken.

The solar radiation in Bissau throughout the year lies between of 4.6 to 6.6 kWh/m<sup>2</sup>/day. Solar could play an important role in powering mini-grids. So far around 450 kW of off-grid PV was installed in the country.

The forest areas of Guinea-Bissau are estimated at two million hectares. The available biomass resource is roughly 48.3 million m<sup>3</sup>. The annual consumption of wood for energy purposes is estimated at 625,000 m<sup>3</sup> and leads to a significant reduction of existing forest areas. The available biomass potential from agricultural products, wood processing residues and livestock manure is about 67,000 m<sup>3</sup> per year. Guinea Bissau has a limited potential for cassava and needs all the production for food purposes. The rainfall patterns in the country are also not conducive for optimal production of Castor Bean, Groundnut and Jatropha. Some groundnut is produced today in specific parts of the country. Dedicated Energy from Sweet Sorghum may have potential, although the rainfall patterns may be more conducive for successful sugarcane production. Cashew nuts are the major export crops and the country can develop at least a portion of its bio-energy strategy on the surplus fruit production and conversion technology that can exploit this. Bioelectricity has promising economics and could play an important role either grid-connected or concerning mini-grids.

Wind energy has a more modest potential, favoured by the country's geomorphology and geographical location (island part). Around 30% of the territory, mostly near the coast and islands, might be suitable for grid-connected wind power. In these areas the monthly wind speeds lie between a range of 4 to 6 m/s. However, the data is not very reliable and would have to be assessed site-specific.

The potentials for tidal and geothermal energy have not been explored so far.

## **Component 2: Consolidating a comprehensive policy, regulatory and support framework for renewable energy in alignment with the ECOWAS Renewable Energy Policy;**

The GEF project will support the creation of an enabling framework for the replication and up-scaling of small and medium scale renewable energy projects. The following activities will be implemented:

The existing energy policy and regulatory framework for urban and rural areas will be reviewed and gaps will be identified during the PPG phase.

Based on the assessment a renewable energy policy including targets will be developed under the GEF project. Its implementation will be facilitated. Previous efforts of the Government to develop and adopt a renewable energy policy did not materialize. Renewable energy is more a cross-cutting issue in other policies. The development of a national renewable energy policy is part of the action plan of the ECOWAS Renewable Energy Policy (EREP) which was adopted by the ECOWAS Energy Ministers in October 2012 in Ghana.

Based on the policy, law(s) for the introduction of various support and incentive mechanisms for on-grid and decentralized renewable energy solutions are proposed and their implementation facilitated. The feasibility of instruments such as tax exemptions, net-metering, portfolio standards and feed-in-tariffs will be evaluated.

A special grant financing window for Guinea Bissau will be established by the ECOWAS Renewable Energy Facility (EREF). The Facility, which is managed by ECREEE, will undertake regular call for proposals and provide grants for renewable energy project development and small investments. A first call for proposals will be launched by the Facility under the GEF project. The special window for Guinea Bissau will be co-financed through the GEF project, ECREEE and other donor sources.

The policy component will be implemented in close partnership with the main institutional players in Guinea Bissau and the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE). ECREEE oversees the implementation process of the ECOWAS Renewable Energy Policy at national levels. In the energy sector of Guinea Bissau the Ministry for Energy, Industry and Natural Resources (MEINR) under the supervision of the State Secretary for Energy is in charge of the formulation of energy policies and the promotion of renewable energy and energy efficiency. The General Directorate of Energy (GDE) at the Ministry is in charge of the execution of this policy. The electric system of Guinea-Bissau is managed by EAGB (Electricidade e Águas de Guinea-Bissau). Within the existing market structure, there are several private energy producers in Guinea-Bissau feeding part of their production into the distribution network of EAGB (all based on diesel). As for forest



resources and domestic fuels, the overall sector is controlled by the Directorate General of the Forests supervised by the Ministry for Rural Development and Agriculture. There are plans to separate the institutional responsibility for urban grid operations covered by the utility and decentralized operations in rural areas. Under the GEF project, south-south knowledge transfer from Cape Verde, which already implements its national renewable energy policy, will be promoted. The policy will focus on grid-connected and off-grid markets as well as on other forms of energy. Particular emphasis will lie on the promotion of productive uses in the main sectors of the industry in Guinea Bissau (e.g. agriculture, fishery, mining, tourism).

### **Component 3: Implementation of national program to build capacity and awareness on different aspects of renewable energy**

A national renewable energy capacity building program will be developed. The focus and target groups of the program will be defined during the PPG phase through a capacity needs assessment. Synergies to the regional renewable energy needs assessment currently undertaken by ECREEE will be created. The main emphasis of the capacity building component of the GEF project will lie on the promotion of train the trainers approaches and local institution building. Three train-the-trainers workshops will be executed. At least one hundred key market enablers (Government, municipalities and rural electrification agents, project developers, banks, technical experts for installation and maintenance) will be trained on various renewable energy aspects by the trained trainers in follow-up workshops. A handbook on renewable energy project development based on the lessons learned of the implemented investment projects under component one of the GEF project will be developed and disseminated to workshop participants. A series of trainings for experts of the utility on the economics and technical aspects of renewable energy grid integration and grid stability will be undertaken. Since the local capacities concerning higher education in Guinea Bissau are low, south-south cooperation with the Engineering Department of the University of Cape Verde in Mindelo, Sao Vicente, will be promoted. Synergies to the regional capacity building program of ECREEE will be harnessed.

The **implementing partners** for the project are the General Directorate for Energy at the Ministry for Energy, Industry and Natural Resources (MEINR) and the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECEEE). A Project Management Unit (PMU) will be set up in the General Directorate for Energy at the MEINR and will be responsible for the implementation of the project activities. ECREEE will support the PMU in the execution of the project activities through its Portuguese speaking technical experts (e.g. preparation of technical documents, procurements). The national focal point of ECREEE in the General Directorate for Energy will be part of the PMU. ECREEE will facilitate south-south knowledge transfer from Cape Verde. The organizational structure and terms of reference for the implementing partners will be detailed during the PPG phase (such as number and profiles of staff, location, budget etc.). A project steering committee, which is expected to meet at least two times annually, will oversee the implementation of the project. For monitoring purposes yearly progress reports will be provided. After its completion, the project will be evaluated by an external contractor.

#### **A.1.4. Incremental/Additional cost reasoning**

The project will contribute to the much needed transformational change of the electricity sector of Guinea Bissau towards more sustainable patterns. Without the GEF intervention it is not expected that such a change (as explained in the section on the baseline and alternative scenario) will become a reality in the short or mid-term view. Due to the lack of financial resources from the Government, parts of the extra-costs have to be covered from external sources. Moreover, current international support in the electricity sector of Guinea Bissau seems to be focused more on energy investments with low investment costs but high operating costs for the country (diesel, HFO). Only a holistic set of interventions will enable the country to create an enabling environment for small and medium scale renewable energy investments in urban and rural areas. The GEF funding will leverage considerable funding from other local and international sources. The Ministry of Energy and ECREEE expressed their intentions to co-fund the GEF project.

### **A.1.5. Estimation of Global Environmental Benefits:**

Currently, the energy sector in Guinea Bissau is the second largest emitter of CO<sub>2</sub> after the forestry sector. The total emission of CO<sub>2</sub> was estimated at 3,780.81 Gg of CO<sub>2</sub>, of which 156.81 Gg CO<sub>2</sub> comes from the energy sector and 3,623.99 from land-use change and forestry. Without the GEF intervention it is expected that the country will continue to expand its fossil fuel based power generation capacities (diesel and HFO based).

It is estimated that the installation of 2,5 MW of renewable energy capacity under the investment component of the GEF project will lead to emission reductions of 98,550 tCO<sub>2</sub> eq/MWh (calculated with an average plant capacity factor of 30%, a project life-time of 20 years, 30% grid losses and a GHG emission factor for diesel power plants of 0.75 tCO<sub>2</sub> eq/MWh). Using the GEF bottom-up methodology, indirect emission reductions attributable to the project are 197,100 tonnes of CO<sub>2</sub> eq. This figure assumes a replication factor of 2. The detailed direct and indirect GHG emission reductions from the different components of the project will be calculated during the PPG phase when the technologies for the demonstration projects are selected. It depends on the technology to which extend CO<sub>2</sub> emission reductions can be expected in comparison to the diesel alternative (e.g. capacity factor, life-time).

The detailed direct and indirect GHG emission reductions from the different components of the project will be calculated during the PPG phase when the investment projects are selected. It depends on the technology to which extend CO<sub>2</sub> emission reductions can be expected (e.g. capacity factor, life-time). The project activities are of high social and economic relevance to the final beneficiaries in Guinea Bissau. It will contribute significantly to the improvement of energy security, energy access and mitigation of GHG emissions. It will assist in meeting the peak load demand in the capital Bissau and to provide access to modern, reliable and affordable access to energy services in rural areas. The use of cost-effective renewable energy technologies (in comparison to the use of diesel) will reduce the high electricity generation costs and consumer tariffs in the long-run. The reduction of dependence on imported diesel will free-up scarce financial resources for the Government, public utility, industry and private households. The reduction of wood fuel and diesel use will decrease land degradation and air pollution respectively.

### **A.1.6. Innovation, replication and sustainability**

The most innovative aspects of this project are:

A strong technical south-south partnership between Guinea Bissau and the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE);

South-south knowledge transfer from Cape Verde; Cape Verde is currently the leading country concerning renewable energy policy and investments in the ECOWAS region. UNIDO in cooperation with ECREEE and the Government of Cape Verde is currently implementing a similar renewable energy GEF project in Cape Verde;

The lessons learned from the GEF project will be disseminated to other ECOWAS countries through the ECOWAS Observatory for Renewable Energy and Energy Efficiency.

The GEF project includes mechanisms to ensure replication and sustainability throughout all its components. To ensure the replication of the demonstration projects a national renewable energy investment plan, an enabling policy framework and a financing facility will be created. The capacity building activities will use a train-the-trainers approach to ensure continuity after the completion of the GEF project. The implementation of the project in cooperation with ECREEE ensures the dissemination of the results and deliverables of the projects through the ECOWAS Observatory for Renewable Energy and Energy Efficiency ([www.ecowrex.org](http://www.ecowrex.org)). Moreover, the project can take advantage of the regional ECREEE activities (e.g. co-funding, synergies) and the regional project coordinating the energy component of the GEF Strategic Programme for West Africa (SPWA). The regional project is coordinated by UNIDO and ECREEE.

## **A.2. STAKEHOLDERS**

The project components will be implemented in alignment with the main institutional players, private market enablers and beneficiaries in Guinea Bissau.

- The main institutional partners are the General Directorate for Energy (GDE) at the Ministry of Energy, Industry and Natural Resources (MEINR) under the supervision of the State Secretary of Energy as well as the public Electricity and Water Company (EAGB). The Ministry and EAGB are key partners to develop and implement the national renewable energy policy and the envisaged investment plan. EAGB plays a key role as a promoter and possible operator and/or buyer of grid-connected renewable energy. The GDE plays a key role for rural electrification.
- Other stakeholders are IPPs which feed part of their diesel generation into the distribution network of EAGB and private companies which sell diesel backup equipment to private households. They could have a role with regard to the execution of renewable energy demonstration projects.
- Local associations, institutions and NGOs such as Ajuda de Desenvolvimento de Povo para Povo na Guiné-Bissau (ADPP), the Instituto Nacional de Investigação e Tecnologia Aplicada (INITA), Centro de Instrução e Formação Artesanal Profissional (CIFAP), the Assembléia de Cooperação Pela Paz (ACPP) and Solar-Tech can play a role as partners with regard to the implementation of renewable energy off-grid programs (e.g. stand alone systems or mini-grids) and capacity building.
- Bilateral donor partners, local and development banks as well as project developers and investors are important stakeholder when it comes to the implementation of demonstration projects.

### A.3 RISK ASSESSMENT

Risk	Rating	Mitigation Measures
Political instability may drive the project off track	Medium	High-level access to the local authorities through the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) and Cape Verde will help to resolve possible challenges;  Possible delays will be considered in the project implementation schedule;
Poor performance and low interest of EAGB in renewable energies maybe an obstacle to feed into the main grid. (Medium)	Medium	Possible Independent Power Producer (IPP) and Public Private Partnership (PPP) models will ensure the sustainability of the projects;  Strengthening of capacities of utility experts on renewable energy integration and grid stability through the capacity building component;
Lack of interest of companies, investors and financiers to engage in projects	Medium	Bankable high quality feasibility studies will ensure risk mitigation  Early dialogue with (soft-)loan and grant providers will be initiated
Local capacities to implement renewable energy projects is limited and/ or unavailable	Medium	Local capacities will be strengthened in cooperation with ECREEE in parallel; Guinea Bissau is participating the ECREEE Capacity Development Program;  The Engineering Department of the University of Cape Verde in Mindelo will be involved in the capacity building activities and will ensure knowledge transfer;
Delay in commissioning of demonstration and replication projects and availability of results	Medium	The status of projects will be regularly reviewed and any necessary corrective steps will be promptly taken.

After the project is commissioned, demonstration and replication project participants do not comply fully with the stipulated terms and conditions	Low	Support will be terminated to projects which are not in compliance, and there will be provisions for cost recovery in such cases. Other projects will then be considered for support.
Sustainable financing mechanism cannot be established due to a lack of support	Low	Early dialogue with grant providers will be initiated Links to the ECOWAS Renewable Energy Facility will be created

#### **A.4 COORDINATION**

The GEF project will coordinate closely with already started activities and available capacities in the renewable energy sector in Guinea Bissau as well as at the ECOWAS regional levels. Synergies and the potential for replication and up-scaling through the GEF project will be determined during the PPG phase. The GEF project will contribute to a better coordination and strategic orientation of the currently fragmented off-grid activities in the sector. Possible synergies to the ongoing off-grid PV projects of the Programme Régional Solaire (PRS) of CILS/EU, UNDP and different NGOs will be created. The lessons learned from the bioelectricity cashew project funded and executed under Programme Régional de la Biomasse Energie (PRBE) of UEMOA will be studied and replicated, if the results turn out to be promising. Synergies to the planned diesel generation projects supported by the World Bank and BOAD will be created. The pre-feasibility work for some grid-connected projects will be evaluated and included into the pipeline of demonstration projects if promising (e.g. 9 MW PV plant near Bissau, 18 MW small scale hydro project in Salthino). Moreover, through the involvement of ECREEE the project will take advantage of the regional activities implemented on the ECOWAS regional level in the renewable energy sector (e.g. regional capacity building program, regional RE resource assessment). The GEF project will contribute directly to the implementation of the adopted ECOWAS Renewable Energy Policy which foresees the implementation of the regional targets at the national levels. The Policy foresees that all ECOWAS countries shall develop their own national renewable energy policy which contributes to the regional targets. The project will benefit from and contribute to the energy component of the GEF Strategic Component for West Africa (SPWA) which is coordinated by UNIDO in cooperation with UNIDO. The lessons learned from the project will be disseminated through the ECOWAS Observatory for Renewable Energy and Energy Efficiency (<http://www.ecowrex.org>) which was established under the SPWA.

### **B. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:**

#### **B.1 NATIONAL STRATEGIES AND PLANS**

The project is fully in line with the energy and climate policy of Guinea Bissau. The promotion of renewable energy has been included as a key activity in the Poverty Reduction Strategy Paper (PRSP), covering the period 2011 to 2015, the national energy policy and the ECOWAS Regional Renewable Energy Policy. Recently, the ECOWAS member states (including Guinea Bissau) adopted a regional policy for renewable energy which aims at increasing the share of renewables (excl. large hydro) to 19% of the overall electricity mix of the region by 2030. The action plan foresees that Guinea Bissau and all other countries develop their own national renewable energy policy and targets. Furthermore, Guinea Bissau has ratified the United Nations Framework Convention on Climate Change (UNFCCC) and is eligible to receive financial support for adaptation and mitigation interventions. The energy sector is one of the two sectors considered as a priority sector for GHG emission reductions, technology transfer in renewable energy is defined as a strategy under the Climate Change mitigation measures to be adopted by the country.. The proposed project will contribute to the targets and priority actions outlined in the Second Communication of Climate Change in Guinea Bissau (2011);

#### **B.2. GEF FOCAL AREA:**

The project is fully aligned with GEF's focal area strategy under Climate Change Mitigation and its priorities. It will contribute particularly to Objective 3: "Promote investment in renewable energy technologies" and will

produce the expected outcomes and outputs with regard to the development and implementation of renewable energy policy and increase of investments. The project will assist Guinea Bissau in the transformational change of the electricity sector to a sustainable low-carbon path. It combines activities in the areas of investment promotion, technology and knowledge transfer as well as technical assistance for creating an enabling market environment for renewable energy technologies. Under the investment component a set of demonstration projects will be developed and implemented and a national renewable energy investment plan will be adopted. Under the policy component a national renewable energy policy and a supporting laws will be developed and implemented. A financing mechanism to facilitate further investments in the sector will be created. The capacity building component foresees the strengthening of capacities of local trainers as well as of key market enablers.

**B.3 UNIDO COMPARATIVE ADVANTAGE:**

UNIDO’s mandate within the United Nations system is to promote and accelerate sustainable industrial development in developing countries and economies in transition. Specifically in the area of energy and environment UNIDO promotes sustainable patterns of industrial consumption and production through cleaner technologies and processes in order to de-link economic development from environmental degradation. UNIDO can therefore draw on its long term experience in the area of renewable energy for industry, including in the field of energy generation from solar energy, bioenergy and small hydro power. South-south cooperation has also been supported through UNIDO’s technology centers and partner institutions. UNIDO was key technical partner in the establishment process of the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) and contributed to the development of the ECOWAS Renewable Energy and Energy Efficiency Policies as well as the design of the ECOWAS Renewable Energy Facility (EREF). Moreover, UNIDO is the coordinator of the energy component of the GEF Strategic West Africa Programme (SPWA). Within UNIDO, potential synergies with relevant programmes, such as the Environmental Management, Business, Investment and Technology, Trade Capacity-Building and Agri-Business Development, will be established. UNIDO gives special attention to mainstream gender equality throughout its technical cooperation project portfolio, and with local productive activities in Guinea Bissau mainly carried out by women, this is expected to be a very important component of this project.



**PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)**

**A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):** (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this template. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Mr. Ernesto Augusto Pereira	GEF Operational Focal Point	MINISTRY OF ENVIRONMENT	01/18/2013

**B. GEF AGENCY(IES) CERTIFICATION**

<b>This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for project identification and preparation.</b>					
<b>Agency Coordinator, Agency name</b>	<b>Signature</b>	<b>DATE (MM/dd/yyyy)</b>	<b>Project Contact Person</b>	<b>Telephone</b>	<b>Email Address</b>

Philippe Scholtès Officer-in-Charge Programme Development and Technical Cooperation Division (PTC) UNIDO GEF Focal Point		05/04/2013	Martin Lugmayr, PTC/ECC 	+43(1)26026 3595	m.lugmayr@unido.org
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