REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: MEDIUM-SIZED PROJECT
TYPE OF TRUST FUND: GEF TRUST FUND

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PART I: PROJECT INFORMATION

Project Title: Promoting investments in small to medium scale renewable energy technologies in the electricity sector			
Country(ies):	Guinea-Bissau	GEF Project ID:[1]	5331
GEF Agency(ies):	UNIDO	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), TESE - Associação para o Desenvolvimento	Submission Date: Resubmission Date:	07-02-2014 08-08-2014
GEF Focal Area (s):	Climate Change	Project Duration(Months)	48
Name of Parent Program (if applicable): ➢ For SFM/REDD+ ☐ ➢ For SGP ☐ ➢ For PPP ☐	N/A	Project Agency Fee ($):	164,840

A. FOCAL AREA STRATEGY FRAMEWORK[2]

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount ($)	Cofinancing ($)
CCM - 3	Outcome 3.1: Favorable policy and regulatory environment created for renewable energy investments	Output 3.1: Renewable energy policy and regulation in place	GEF TF	394,404	561,096
	Outcome 3.2: Investment in renewable energy technologies increased	Output 3.2: Renewable energy capacity installed Output 3.3: Electricity and heat produced from renewable sources		1,305,156	9,697,093
CCM-6	Outcome 6.1: Adequate resources allocated to	Output 6.1: Countries receiving GEF support for national	GEF TF	35,600	0

[1] Project ID number will be assigned by GEFSEC.
[2] Refer to the Focal Area Results Framework and LDCF/SCCF Framework when completing Table A.

	support enabling activities under the Convention	communication, etc. Output 6.1: National communications, etc. completed and submitted to the UNFCCC as appropriate			
		Total Project Costs		**1,735,160**	**10,258,189**

B. PROJECT FRAMEWORK

Project Objective: To promote investments in small to medium scale renewable energy technologies in the electricity sector						
Project Component	**Grant Type**	**Expected Outcomes**	**Expected Outputs**	**Trust Fund**	**Grant Amount ($)**	**Confirmed Cofinancing ($)**
1. Investments into small and medium scale renewable energy technologies (PC1)	INV	1.1 The technical feasibility and viability of small to medium-scale on-grid and off-grid renewable energy technologies in the urban and rural context are demonstrated 1.2 The National Renewable Energy Investment Plan to replicate and up-scale on-grid and off-grid renewable energy technology projects is developed and endorsed	**1.1.1** High impact on-grid and off-grid renewable energy investment projects with a total capacity of 2.5 MW are developed and implemented **1.2.1** Development of a pipeline of grid-connected and off-grid renewable energy priority projects **1.2.2** The National Renewable Investment Plan is finalized **1.2.3** An existing grant facility will provide support for project development and small investments	GEF TF	1,305,156	9,697,093
2. Consolidated policy and regulatory framework for renewable energy (PC2)	TA	2.1 The existing policy and legal support framework for renewable energy is strengthened and regulatory mechanisms are	**2.1.1** An assessment on gaps in the existing legal and regulatory framework for renewable energy is undertaken **2.1.2** The National	GEF TF	94,000	75,820

		improved	Renewable Energy Policy (NREP) and the National Renewable Energy Action Plan (NREAP) are developed and endorsed in alignment with the ECOWAS Renewable Energy Policy (EREP) **2.1.3** Facilitate the creation of a National Regulatory Agency for the power sector and support the development and implementation of support mechanisms for IPPs and PPPs **2.1.4** The awareness campaign "SE4ALL for Guinea Bissau" and the registration of the project as a NAMA is facilitated			
3. Capacity development and awareness raising on renewable energy (PC3)	TA	3.1 The capacities of key stakeholders on renewable energy are strengthened	**3.1.1** A national capacity building program is developed and under implementation **3.1.2** A handbook on renewable energy project development based on the lessons learned of the implemented investment projects is adapted **3.1.3** The capacities of the Directorate General of Energy/PMO on renewable energy issues are strengthened **3.1.4** The capacities of local training institutions are strengthened through the implementation of three train-the-trainer workshops in	GEF TF	185,540	204,940

			cooperation with ECREEE **3.1.5** At least one hundred (100) experts of different stakeholder groups are trained on various renewable energy aspects in workshops conducted by trained trainers			
4. Monitoring and Evaluation (PC4)	TA	4.1. 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	**4.1.1** Project monitoring and evaluation through: (a) the establishment of the Project Steering Committee and the execution of two annual committee meetings (b) Yearly progress reports in accordance with the established monitoring plan (c) Final evaluation	GEF TF	46,400	90,000
				Subtotal	1,631,096	10,067,853
				Project management Cost (PMC)[3]	GEF TF	104,064	190,336
				Total project costs	1,735,160	10,258,189

C. SOURCES OF CONFIRMED CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME ($)

During the PPG more co-funding than expected could be raised. The co-financing letters are included in the annex:

Sources of Co-financing	**Name of Co-financier (source)**	**Type of Co-financing**	**Co-financing Amount** ($)
Other Multilateral Agency	African Development Bank (AfDB)	Cash	1,000,000
Other Multilateral Agency	International Finance Corporation (IFC)[4]	Cash	1,234,000
Private Sector	TESE - Associação para o Desenvolvimento (through the European Commission)[5]	Cash	5,564,504
Private Sector	TESE Associação para o Desenvolvimento	In-kind	18,212
Private Sector	Afripeche - Fish processing Plant	Cash	305,763
Private Sector	Bula Cashew Processing Plant	Cash	10,800
Others	Udine University (through the European Commission)	In-kind	858,000
Others	Udine University (through the European Commission)[6]	Cash	72,000

[3] PMC should be charged proportionately to focal areas based on focal area project grant amount in Table D below.
[4] IFC has pledged to raise up to 2,23 million USD
[5] For the Bambadinca project, TESE has already received co-finance from the EU Commission and the Portuguese Cooperation Agency. This money is already secured and is being operated by TESE.

National Government	Ministry of Energy, Industry and Natural Resources (MEINR)	Cash	362,510
National Government	Ministry of Energy, Industry and Natural Resources (MEINR)	In-kind	152,400
Other Multilateral Agency	ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)[7]	Cash	270,644
Other Multilateral Agency	ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)	In-Kind	179,356
GEF Agency	UNIDO	Cash	60,000
GEF Agency	UNIDO[8]	In-kind	170,000
Total Co-financing			10,258,189

D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY[1]

GEF Agency	Type of Trust Fund	Focal Area	Country Name/ Global	(in $)		
				Grant Amount (a)	**Agency Fee** (b)[2]	**Total** c=a+b
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
Total Grant Resources				0	0	0

[1] 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.
[2] Indicate fees related to this project.

F. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount ($)	Co-financing ($)	Project Total ($)
International Consultants	268,000	198,800	466,800
National/Local Consultants	79,200	117,600	196,800

G. DOES THE PROJECT INCLUDE A "NON-GRANT" INSTRUMENT? No.

(If non-grant instruments are used, provide in Annex D an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF/NPIF Trust Fund).

[6] In its co-financing letter the Udine University has committed up to 1,172,000 USD in cash and in-kind to the GEF project. In table C only the needed amount was included. If there is a need further co-financing will be requested from the University during project implementation. The co-finance of the University comes from the European Commission. The funding is secured and operated by the University.
[7] In ECREEE's letter of commitment ECREEE commits to provide $450,000USD (in-kind and cash) for the development and implementation of the project. From the total amount committee $270,644USD will be in cash and $179,356USD in in-kind. ECREEE is one of the executing partners of this GEF-UNIDO project
[8] Detailed in Annex L

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF[9]

The project document is on overall conformity with the PIF. During the PPG phase the set-up of the project was further detailed and has been adapted in accordance with the findings and priorities of the country. The following changes have been included, in comparison to the original information contained in the PIF:

The title of the project was changed to "Promoting investments in small to medium scale renewable energy technologies in the electricity sector". The name of the Project Components were slightly modified in order to better reflect the set of activities under each of them. The table below shows the “Previous title in PIF” and “Current title in GEF CEO Endorsement” for ease of comparison:

Project Component	Previous title in PIF	Current title in GEF CEO Endorsement
PC 1	Promoting investments in small to medium scale renewable energy technologies	Investments into small and medium scale renewable energy technologies
PC 2	Consolidating a comprehensive policy, regulatory and support framework for renewable energy in alignment with the ECOWAS Renewable Energy Policy	Consolidated policy and regulatory framework for renewable energy
PC 3	Implementation of a national program to build capacity and awareness on different aspects of renewable energy;	Capacity development and awareness raising on renewable energy
PC 4	Monitoring and Evaluation, Management	Monitoring and Evaluation

The Expected Outcomes in the PIF have a different numbering in this document as shown in the following table:

Previous numbering in PIF for the “Expected Outcomes” in Table B	Current numbering in GEF CEO Endorsement (this document) for the “Expected Outcomes” in Table B
1	1.1
2	1.2
3	2.1
4	3.1
5	4.1

In addition, some of the Expected Outcomes included in table B have been rewritten in order to better reflect the results to be achieved by the project:

- Current Outcome #2.1 was formerly described as “A national renewable energy policy including supporting laws and incentive mechanisms is developed and implementation support provided” in the PIF, and is now described as “The existing policy and legal support framework for renewable energy is strengthened and regulatory mechanisms are improved”.
- Current Outcome #3.1 formerly involved only “key market enablers” and the current document involves a broader set of stakeholders and thus states “key stakeholders” in its description.

In addition, the Outputs were also re-numbered following the Outcomes’ numbering. The following table shows the

[9] For questions A.1 –A.7 in Part II, if there are no changes since PIF and if not specifically requested in the review sheet at PIF stage, then no need to respond, please enter “NA” after the respective question

previous numbering in the PIF and the current numbering in the GEF CEO Endorsement (this document), as well as the modifications made to the description of the Outputs and other relevant changes in order to better reflect the objectives of the project:

PC	Previous numbering and description in PIF for the "Expected Outputs" in Table B	Current numbering and description in GEF CEO Endorsement (this document) for the "Expected Outputs" in Table B
1	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). 2.1. Based on the undertaken site assessments and feasibility studies a pipeline of renewable energy priority projects is compiled 2.2. The national investment plan with priority projects is developed and disseminated to interested developers and investors	1.1.1 High impact on-grid and off-grid renewable energy investment projects with a total capacity of 2.5 MW are developed and implemented. 1.2.1 Development of a pipeline of grid-connected and off-grid renewable energy priority projects 1.2.2 The National Renewable Investment Plan is finalized 1.2.3 An existing grant facility will provide support for project development and small investments
2	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.	2.1.1 An assessment on gaps in the existing legal and regulatory framework for renewable energy is undertaken 2.1.2 The National Renewable Energy Policy (NREP) and the National Renewable Energy Action Plan (NREAP) are developed and endorsed in alignment with the ECOWAS Renewable Energy Policy (EREP) 2.1.3 Facilitate the creation of a National Regulatory Agency for the power sector and support the development and implementation of support mechanisms for IPPs and PPPs 2.1.4 The awareness campaign "SE4ALL for Guinea Bissau" and the registration of the project as a NAMA is facilitated
3	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 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	3.1.1 A national capacity building program is developed and under implementation 3.1.2 A handbook on renewable energy project development based on the lessons learned of the implemented investment projects is adapted 3.1.3 The capacities of the Directorate General of Energy/PMO on renewable energy issues are strengthened 3.1.4 The capacities of local training institutions are strengthened through the implementation of three train-the-trainer workshops in cooperation with ECREEE 3.1.5 At least one hundred (100) experts of different stakeholder groups are trained on various renewable energy aspects in workshops conducted by trained trainers

4	5.1 At least two annual project steering committee meetings 5.2 Yearly reports 5.3 Final evaluation	4.1.1 Project monitoring and evaluation through: (a) the establishment of the Project Steering Committee and the execution of two annual committee meetings (b) Yearly progress reports in accordance with the established monitoring plan (c) Final evaluation

A.1 National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NAPs, NBSAPs, national communications, TNAs, NCSA, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.

The project is fully in line with the energy and climate policy of Guinea Bissau:

- The promotion of renewable energy (RE) has been included as a key activity in the Poverty Reduction Strategy Paper (PRSP) and the National Energy Policy. Guinea Bissau is currently developing the new Energy Master Plan (Plan Directeur Energétique) which includes strong focus on renewable energy.

- 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. This GEF-UNIDO project is fully in line with Guinea-Bissau's National Communication priorities. Within the 1st and 2nd National Communications to the UNFCCC the energy sector is considered a priority sector for GHG emission reductions. The up-scaling of renewable energy and related technology transfer, which this GEF-UNIDO project aims at, is an important climate change mitigation measure. The proposed demonstration projects in the GEF-UNIDO project are fully in line with the GHG mitigation options proposed in the 2nd National Communication. The use of decentralized rural electrification using PV systems and the development of the hydropower project Saltinho HPP and Cussilinta HPP are proposed. In this context the GEF-UNIDO project has included several PV powered mini-grid systems and aims also at the development of Saltinho HPP to feasibility stage. It has to be noted that the bioelectricity sector was not considered in the analysis of the National Communication. The PPG phase revealed that this would be an attractive area to mitigate GHG emissions in a cost-effective way.

- The promotion of renewable energy (RE) plays an important role in several regional energy policies adopted by Guinea Bissau. The 43rd Ordinary Session of the ECOWAS Authority of Heads of State and Government, which was held in Abuja, Nigeria from July 17 – 18, 2013 renewed its commitment to the provision of access to sustainable energy services in West Africa by adopting the ECOWAS Energy Efficiency Policy (EEEP) as well as the ECOWAS Renewable Energy Policy (EREP). The EREP aims to increase the share of renewable energy in the region's overall electricity mix to 10% in 2020 and 19% in 2030 (excluding large hydro power). The policy foresees that all ECOWAS Member States, including Guinea Bissau, will develop National Renewable Energy Action Plans (NREAPs) which respond to the regional targets. In the coming years, the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), an important executing partner of the GEF project, will lead the process of implementing the regional RE&EE policies on national levels.

- Guinea Bissau is also part of the West African Power Pool (WAPP) and the Organization for the Development of the River Gambia (OMVG). Under OMVG and the WAPP Master Plan the countries Gambia, Guinea, Guinea Bissau and Senegal decided to jointly develop the commonly share hydroelectric potential. Several transmission lines and hydro power generation projects are planned or already under construction.

A.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities

The proposed GEF Project in Guinea-Bissau is fully in line with CCM-3 Objectives (Promote investment in renewable energy technologies) of the GEF-5 Results Framework. The following paragraphs provide information on how the CCM objectives are pursued by the project:

Objective CCM-3 *is pursued through (i) strengthening the policy framework and establishing appropriate incentives for energy generation from renewable energy; and (ii) mobilizing direct and indirect investment to actively promote*

investment in renewable energy in the electricity sector. Important GHG mitigation effects are expected compared to the baseline situation.

***Objective CCM-6** is pursued through the development and registration of the project as a NAMA.*

A.3 The GEF Agency's comparative advantage

UNIDO's mandate within the United Nations system is to promote and accelerate inclusive and sustainable industrial development (ISID) 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 energy generation from solar energy, bioenergy and small hydro power. South-south cooperation has also been supported by UNIDO's technology centres. UNIDO is coordinating the Global Network of Regional Sustainable Energy Centres which is comprising of centres in Africa, the Caribbean and the Pacific. UNIDO has been key technical partner in the establishment and operation of the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) as well as in the design of the ECOWAS Renewable Energy facility (EREF). Moreover, UNIDO in partnership with ECREEE is coordinating the energy component of the GEF Strategic Programme for West Africa (SPWA). UNIDO is implementing several similar GEF projects in the region (e.g. Guinea, Sierra Leone, Liberia, Burkina Faso, Cape Verde and Chad). Within UNIDO, potential synergies with relevant other programmes (e.g. Environmental Management, Business, Investment and Technology, Trade Capacity-Building and Agro-Business Development) will be created. UNIDO pays special attention to mainstream gender equality throughout its technical cooperation project portfolio.

A.4. The baseline project and the problem that it seeks to address

The following chapter provides an overview on the baseline project and the problems to be addressed. A comprehensive renewable energy baseline report was developed during the PPG phase in cooperation with ECREEE. The report is included in Annex G.

Summary and strategic approach of the project

The GEF project addresses the existing energy challenges of Guinea Bissau by promoting renewable energy investments in the electricity sector. The combined and integrated interventions in the areas of technology demonstration, policy support and capacity building will create an enabling environment for the scaling-up of renewable energy investments. The project aims to achieve the following results:

- Under the *investment component* a set of RE projects with a total capacity of 2.5 MW will be developed and implemented in two phases (Phase I and Phase II). The projects are highly innovative when considering the baseline in Guinea Bissau. They cover technology areas such as medium-scale PV, mini-grid hybrid systems (between 300 to 500 kW) for rural electrification and productive uses, PV stand-alone systems and bioelectricity systems for industrial facilities in the fishery and cashew processing sectors. Through the implemented RE projects the feasibility and viability of RE technologies will be demonstrated. The lessons learned and results will be beneficial for the planned activities under the capacity building and policy components. In addition, the GEF project will support the development and endorsement of a National Renewable Energy Investment Plan (NREIP). The plan will include key data of potential RE priority investment projects and a special financing window to support the development of such projects. Under the investment plan the GEF project will support the development of the hydro power project Saltinho HPP (19 MW) to bankable feasibility stage. The activity will be co-funded by the African Development Bank (AfDB). Also the International Finance Corporation (IFC) expressed interest to support the project. The hydro power project is a high priority of the Government and could be further supported under GEF-6. A grant financing window under the ECOWAS Renewable Energy Facility (EREF) will be created and support the development of a number of project under the NREIP.

- Under the *policy component* the GEF project will support the development and endorsement of the National Renewable Energy Policy (NREP) and National Renewable Energy Action Plan (NREAP). The activity will be undertaken in close coordination with the ECOWAS Renewable Energy Policy (EREP) implementation process

which is executed by the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE). In addition, the GEF project will support the development of a feasibility study on the establishment of a regulatory agency for the energy sector. To attract potential investors in the RE sector the project components of the GEF project will be registered as a NAMA. Moreover, the GEF project will facilitate the execution of the international awareness campaign "SE4ALL for Guinea Bissau". The campaign will be executed in cooperation with ECREEE and AfDB, which is the hub for SE4ALL in Africa.

- Under the *capacity building* component a national RE capacity building program will be developed and its implementation facilitated. The capacities of local educational institutions will be strengthened by executing train-the-trainer workshops on different aspects of RE. Around 100 key stakeholders will be trained in follow-up workshops conducted by the trained institutions. The implemented trainings will benefit from the practical lessons of the investment component and the achieved results of the policy component. The newly created capacities will contribute to the implementation of the National Renewable Energy Action Plan (NREAP) and the National Renewable Energy Investment Plan (NREIP). The activities will be undertaken in close cooperation with ECREEE and its regional capacity building program. South-south knowledge transfer and exchange from other ECOWAS countries will be promoted through ECREEE.

General energy challenges to be addressed:

The implementation of the GEF projects starts at the background of the successfully held democratic elections in April/May 2014 which mark the end of a period of international isolation and political instability. The new situation gives the project a particular relevance in the context of the UN efforts to further stabilize the democratic and socio-economic change in the country. The unstable political and economic environment in the country has affected the development of several sectors of the economy, including the energy and particularly the power sector.

The country is facing the interrelated challenges of energy access, energy security and climate change mitigation and adaptation simultaneously. The chronic energy crisis hampers the social, economic and industrial development of Guinea Bissau. The need for modern, reliable and affordable energy services (electricity, motive power, modern fuels) is huge at all levels (productive sectors, social sectors, residential). The national final energy consumption is characterized by the predominance of traditional use of biomass with up to 87.8%, followed by 11.7% from petroleum products and only 0.5% from electricity. Fuelwood is the dominant source of fuel (particularly for cooking purposes) with a demand that exceeds 500,000 tons per year, followed by charcoal being the most-used fuel in the urban areas. The unsustainable electricity generation and distribution system represents a high cost for the entire economy of the country, adversely impacting production costs and the population’s standard of living. In terms of electricity generation, the country relies on diesel generators and, as long as the country continues to depend on expensive diesel-based power generation, the situation is not expected to improve.

The years of civil and political unrest have left Guinea Bissau with a poor and declining electricity system and service in urban, peri-urban and rural areas. There is a rapidly growing gap between the urban electricity demand and available generation and distribution capacity. The generation capacity has dropped more than 80% in the past years. The four (out of seven) units operated by the national utility EAGB (7.5 MW) are, in practice, estimated to deliver 2 MW on average due to lack of ability to purchase fuel and maintenance challenges. The (potential) demand for power in the capital Bissau alone has been estimated at 30 MW. The remaining 3 generation units are out of order. Due to bad maintenance and lack of financial sources of the utility the city of Bissau is facing chronic power cuts and load shedding. Due to the failure of the public supply system, large consumers such as embassies, international organizations, hotels and other institutions use private diesel generators with an overall estimated capacity of 20 MW. There is also an estimate of 800-1000 small diesel generators in use by the residential sector.

The power transmission and distribution system of Guinea Bissau remains underdeveloped. The country’s electrical network was once divided into several isolated grids which include the main grid for the capital and independent secondary grids and secondary production centres in peri-urban areas (Bafata, Gabu, Farim, Mansoa, Bissora, Canchungo and Catio). Due to the political instability, economic decline, poor maintenance, theft of wires and high costs of diesel none of the isolated grids and generation facilities are functional. The main grid in Bissau is outdated and

characterized by high technical and commercial losses (exceeding 30%). The grid system of Guinea Bissau is currently not connected to its neighboring countries.

Therefore, only a small proportion of the population has access to reliable electricity services. The national electrification rate was estimated at 11.5% in 2010. There are huge disparities between the capital Bissau (with 29.1% rate of electrification), the other major cities of the country (with an average of only 4.3% electrification rate), and the rural areas with less than 1% electrification rate. The urban and rural poor in Guinea Bissau spend more income for poor quality energy services, than the better-off for clean and modern energy services. 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 for cooking purposes is a serious problem for women and children.

The power generation costs and consumer tariffs are high due to exclusive dependence on diesel generators. High operating costs, high commercial and technical grid losses and a small base of 19,000 clients with a low ability and willingness to pay present a heavy burden to EAGB and the Government. Between 2010 and 2011 the Economic Community of West African States (ECOWAS) and L' Union Economique et Monétaire Ouest Africaine (UEMOA) had to assist the Government with a US$10 million emergency subsidy to enable EAGB to buy diesel fuel. The consumer tariffs paid by clients to EAGB or for independent diesel generation are very high in comparison to the average income in the country or in comparison to many countries in ECOWAS, Europe and US.

The Baseline project:

The GEF project addresses the existing energy challenges of Guinea Bissau by promoting renewable energy investments in the electricity sector. The combined and integrated interventions in the areas of technology demonstration, policy support and capacity building will create an enabling environment for the scaling-up of renewable energy investments. The project will contribute to the transformational change of the electricity sector to a sustainable low-carbon development path. Without the GEF intervention the main trends of the "business as usual" scenario would continue, this is, to continue using diesel fuel (or other fossil fuels) to meet their energy needs. The power generation system of Guinea Bissau would stay dependent on expensive imported diesel or heavy fuel oil.

Renewable energy potentials and opportunities

At the background of the rising costs of diesel generation, the focus of the Government has shifted towards renewable energy resources. The strategy focuses on the development of the local on-grid and off-grid RE potentials on the one hand and the import of hydropower from the neighboring countries on the other hand. The GEF project is supporting the Government in this transformational change.

The baseline report developed during the PPG phase has demonstrated that the country can rely on vast technical and economic feasible renewable energy potentials. The economics and technical feasibility of some renewable energy technologies in the urban as well as rural context look promising in comparison to the diesel or heavy fuel oil (HFO) fired plants or generators. This is particularly true for hydro power, bioelectricity and PV. The economics are even more promising if negative externalities of thermal plants (e.g. local pollution, GHG emissions) are considered. The potential for wind power is considered low and the potential for tidal power needs to be studied further. More information is available in the baseline report in Annex G. However, so far the achievements are very limited. The country still relies completely on diesel generation. There are no grid-connected renewable energy projects currently in operation.

The development of the grid-connected hydro power projects is a high priority for the Government. Medium-scale hydropower projects could provide an important part of the needed base load capacity of the country. During the PPG phase UNIDO was requested to assist in the development of the priority site Saltinho HPP with an estimated capacity of 19 MW. As a second step the downstream dam Cussilinta HPP with an estimated capacity between 14 and 50 MW could be developed. During the PPG phase UNIDO undertook first pre-feasibility works on Saltinho HPP (see pre-feasibility study and technical review paper in the baseline report). The works are based on feasibility studies undertaken in the 80s. The projects were not constructed due to the civil war and the continuing political instability. Saltinho HPP and Cussilinta HPP would be developed as a national project or as part of a regional transmission and generation project promoted by the West African Power Pool (WAPP) and the Organization for the Development of the River Gambia (OMVG). The countries Guinea Bissau, Gambia, Guinea and Senegal decided to jointly develop the

commonly shared hydroelectric potential. This project comprises the construction of two large hydro power stations at Sambangalou (128 MW) and Kaleta (240 MW) and the construction of a 1,677 km/225 kV transmission line which will interconnect the countries. The OMVG line will pass through Guinea Bissau and offers the opportunity to connect Saltinho/Cussilinta HPP. After some delays Kaleta HPP is expected to be commissioned in 2015 and will be the starting point for the construction of the OMVG line. Through the OMVG line Guinea Bissau has the opportunity to import hydropower but also to transport or sell its own hydropower. Based on the preparatory works UNIDO was able to mobilize support from the African Development Bank (AfDB) for the development of Saltinho HPP (see co-funding letter).

In previous years some progress regarding the promotion of decentralized renewable energy solutions for rural electrification has been made. For decentralized RE systems the baseline is around 0.5 MW of installed electric capacity. This installed RE capacity comes mainly from micro-scale PV systems for rural households, health facilities or water pumping. Such projects are currently implemented by CILSS with co-funding of the European Union (EU) under the Programme Régional Solaire (PRS) and UNDP. The small size of the systems hardly allows other productive uses which are crucial for income generation in rural areas. The envisaged PV hybrid mini-grid projects to be implemented under the GEF project will power villages with more than 5,000 inhabitants and allow productive uses. These projects are complementary to the ongoing micro-scale PV projects. UNIDO will cooperate with TESE - Associação para o Desenvolvimento, a Portugese NGO, which is currently developing two PV hybrid mini-grid systems for rural villages.

These two villages are Bambadinca and Bissora. Bambadinca relied on diesel fuel generation systems, located at Bafata, which generated energy and transmitted it to Bambadinca through a 30 kV line. In 2007 and the subsequent years, the copper from the lines was stolen and the diesel systems became out of order. In the case of Bissora village, there are remains of past rural electrification projects, which are the old medium-voltage underground cables installed under the “Elefante” and “Gazela” projects, and two transformation poles of 0.4/6 kV and several low voltage poles. Therefore, as in the case of Bambadinca, Bissora village used to have electricity from a grid, fuelled with diesel.

There are also efforts to make use of the shells of cashew for supplying power to cashew processing plants or villages. However, the projects SICAJU in Bissau (80 kVA), SAFIM in Safim (42 kVA) and LICAJU in Bolama (150 kVA) are either not functional or still not finalized. A programmatic approach to make use of bioelectricity is still lacking.

Renewable energy barriers addressed

So far the country does not make use of its RE potentials due to the existence of various barriers. The GEF project contributes to the mitigation these barriers. These are:

- *Financial barriers*, which are associated to the availability of tailored financing instruments and financing institutions in the country, as well as the high initial capital costs of renewable energy solutions (“affordability”). There are two main issues that constitute a financial barrier for the promotion of RE investments in Guinea Bissau. Firstly, financial institutions tend to lend money only to projects that are considered financially attractive. Due to a lack of information about the “attractiveness” of RE technologies and the ways to evaluate the associated risks in RE projects’ investments, they are usually reluctant to financing RE projects. This reluctance is also encouraged by the general difficult political and economic environment. Although lower operating costs (due to the absence of fuel demand in RE projects) may make renewable energy more cost-competitive on a life-cycle basis, higher initial capital costs can mean that renewable energy provides less installed capacity per dollar invested than conventional generation. Additionally, experiences from West Africa have shown that renewable energy projects tend to be more expensive than in industrialized countries (e.g. transport costs, risk). The creation of tailored financing instruments (grant, lending, guarantees, micro-credits) for grid-connected and off-grid solutions is needed. For development banks most RE projects have an unattractive size and high overhead costs. The GEF project will address these barriers by co-financing the development and implementation of a pipeline of renewable energy projects with an overall electric capacity of 2.5 MW. Moreover, the hydro power project Saltinho with an estimated electric capacity of 19 MW will be developed to feasibility stage. In addition, it is foreseen to develop a national renewable energy investment plan and to establish a special financing window of the ECOWAS Renewable Energy Facility (EREF). To attract potential investors the project will facilitate the launch of the international campaign "SE4ALL for Guinea Bissau".

- *Institutional and regulatory barriers*, which are related to the unstable political and economic environment in the country, the lack of a clear tariff structure, the insufficient policy and regulatory support for RE, and the insufficient institutional capacity. Currently there is no policy and regulatory framework established in the country that exclusively supports the development of RE. However, the National Energy Master Plan is being developed, and it is therefore a very good opportunity to simultaneously strengthen the capabilities of the policy/regulatory making bodies so they can include renewable energy issues in their plans. Although renewable energy issues are indirectly addressed in some regulations and laws it is not enough to promote the deployment of RE initiatives in the country. In addition, there is an absence of standard procedures (e.g. Power Purchase Agreements) to guide the involvement of Independent Power Producers (IPPs) or Public Private Partnerships (PPPs). Moreover, there is no regulatory body on energy issues (except for the DGE), which makes it difficult to think of potential RE grid-connected investments in the country. Currently the only governmental organisation in charge of renewable energy issues is the DGE. This situation needs to be improved in order to create an appropriate institutional framework that promotes the generation of RE investments and projects in the country. The GEF project will address these barriers and will assist the Government in the development of the National Renewable Energy Action Plan (NREAP) and the National Renewable Energy Policy (NREP) in line with the ECOWAS Renewable Energy Policy (EREP). Moreover, the project will assist in the creation of a National Regulatory Agency to regulate and monitor the operations in the energy sector and propose models to open up opportunities and reduce investment risks for IPPs and PPPs in the power sector.

- *Technical barriers* are derived from the current poor energy transmission and distribution grid, and the insufficient technical capacity in the local market to identify, develop and implement renewable energy projects. The potential for the introduction of intermediate grid-connected renewable energy sources is limited due to the weak situation of the grid. Moreover, experiences from other implemented projects in West Africa have shown that there are in some cases transport and construction limitations due to non-existing roads or maritime infrastructure. There are also technology supply limitations for some countries. In Guinea Bissau it is difficult to have access to RE equipment as there is no local production of RE products and the import processes are bureaucratic. There are difficulties in receiving the foreseen exemptions for RE equipment. The GEF project contributes to the mitigation of these barriers through the foreseen policy and capacity building interventions.

- *Capacity, knowledge and awareness barriers* concern all relevant key stakeholders (policy makers, utility, project developers, companies, banks, civil society). There is insufficient renewable energy baseline data. There is limited information about the characteristics of the renewable resources. There have been general studies for all the resources conducted by different organizations in different years. Therefore, there is no reliable information on the exact potential for each of the renewable energy sources, which difficulties the possibility of developing new projects. No detailed measurements of wind or tidal resources were made so far. The systematic collection of hydrological data has stopped in the 80s and no functional gauging network exists. There is a lack of knowledge on the feasibility, economics and benefits of renewable energy on-grid and off-grid technologies. There is a limited technical capacity to design, install, operate, manage and maintain renewable energy systems. The technical capacities of local experts and the utility are weak or focused on conventional solutions (e.g. diesel generators). There is no knowledge on the management of hydropower plants and RE grid integration issues. In rural areas the capacity and knowledge barriers are even more severe. There is poor awareness of renewable energy technologies and the opportunities they can offer beyond PV water pumping systems and other small rural PV household applications. Higher education in the energy sector is weakly developed. Due to the instability, lack of knowledge of the market and the local capacity limitations foreign investors are hesitant to invest in the power sector. During the PPG phase a comprehensive RE baseline report (incl. hydro power study) was prepared. The GEF project will address these capacity and knowledge barriers by implementing a comprehensive capacity development program which applies a train the trainers approach.

A. 5. Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:

GEF financing will provide the necessary catalytic support to create and sustain a market environment conducive to investments and adoption of appropriate grid-connected and off-grid renewable energy technologies that contribute to climate change mitigation and bring other associated environmental benefits (i.e. a more reliable electricity supply for the population of Guinea Bissau, independent from fossil fuels). Without the GEF project the Government would not be able to undertake the envisaged transformational change of the electricity system to a low-carbon path. The proposed project and methodological approach will lay the grounds for a learning, know-how transfer and technological capabilities development, which ultimately will drive the replication of this kind of activities in the future towards one common objective: achieving a clean and low-carbon sustainable development model in Guinea Bissau. Therefore, in order to address the described barriers and to complement the mentioned on-going initiatives, a project for economically, environmentally and socially sustainable renewable energy development is herewith proposed by means of including and adopting a range of sustainable renewable energy technologies in the electricity sector of Guinea Bissau that would lead to the necessary transformational change of the electricity sector and reduction in carbon emissions, all leading to the generation of a sustainable development model.

Therefore, the **development objective** of the project is:

The objective of this project is to promote renewable energy investments in small to medium scale renewable energy technologies

The Project will assist Guinea-Bissau in the transformational change of the electricity sector to a sustainable low-carbon development path. It combines activities in the areas of technology demonstration, policy support as well as capacity building. The project will also facilitate "south-south knowledge transfer"[10] between ECOWAS (particularly Cape Verde) and Guinea Bissau. The objective of the project is pursued through the following four project components (PC):

Project Component 1 (PC1). Investments into small and medium scale renewable energy technologies

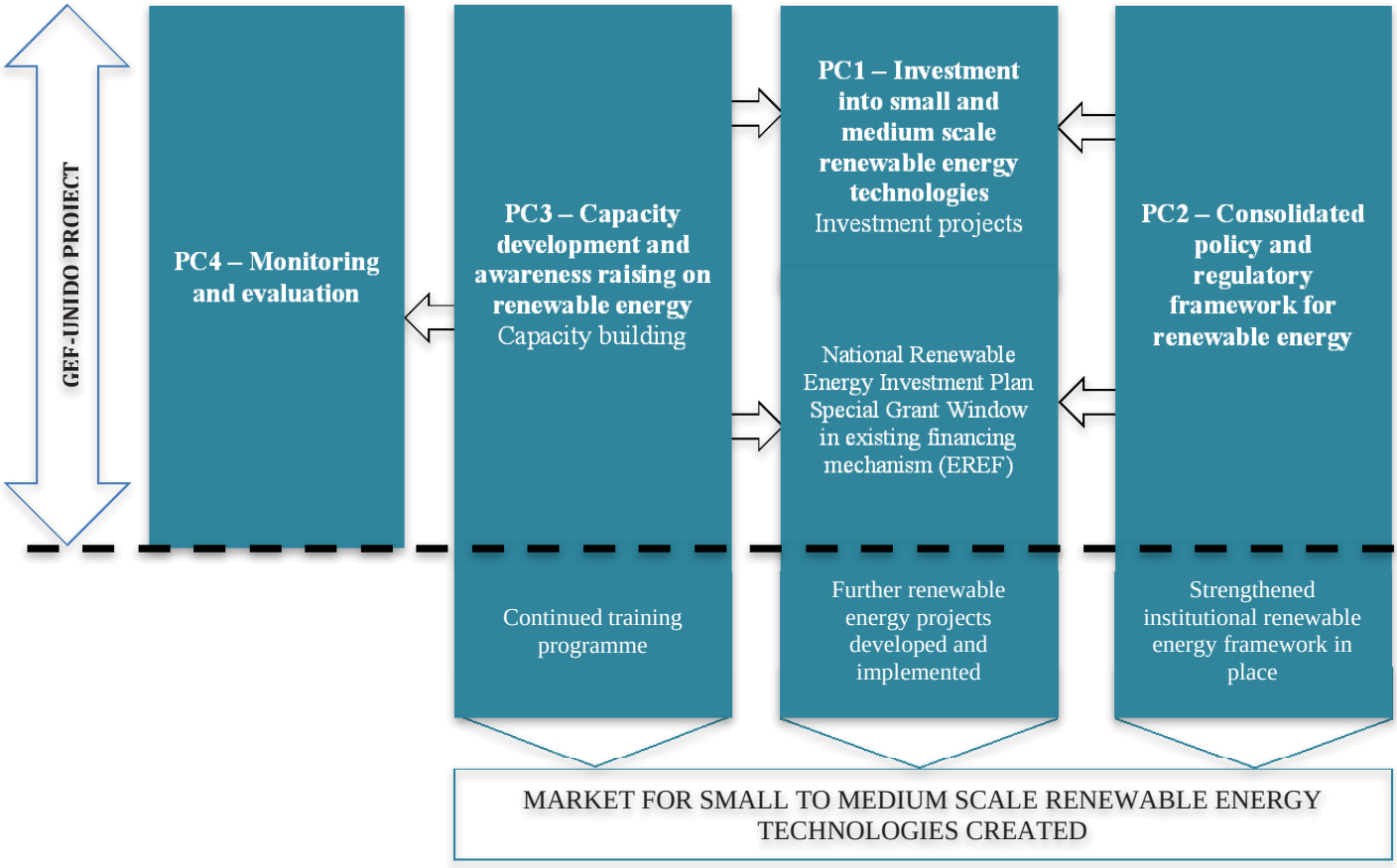
Project Component 2 (PC2). Consolidated policy and regulatory framework for renewable energy

Project Component 3 (PC3). Capacity development and awareness raising on renewable energy

Project Component 4 (PC4). Monitoring and Evaluation

[10] **South–South Cooperation** is a term historically used by policymakers and academics to describe the exchange of resources, technology, and knowledge between developing countries, also known as countries of the global South. The "South-South" cooperation concept is applied in this document to represent the cooperation between Cape Verde and Guinea Bissau. The global South includes nearly 157 of a total of 184 recognized states in the world.

FIGURE 1: PROJECT'S COMPONENTS



***Project Component 1:* Investments into small to medium scale renewable energy technologies**

The objective of this component is to mitigate technical and financial barriers for investments in renewable energy on-grid and off-grid technologies.

Under the component a number of high impact on-grid and off-grid renewable energy demonstration projects with a total electric capacity of 2.5 MW (around 50% of the operating electricity generation capacity of Guinea Bissau in 2012) will be developed and implemented. Currently solar PV systems with an overall capacity of around 0.5 MW are installed in the country. These installed solar PV systems are very small in scale, as they mainly comprise several individual solar home systems for rural households. Such systems usually do not allow productive uses and income generation. Thus the projects supported under the GEF/UNIDO project focus on systems of larger scale. They cover technology areas such as medium-scale PV mini-grid hybrid systems (between 300 to 500 kW) for rural electrification and productive uses, PV stand-alone systems and bioelectricity systems for industrial facilities in the fishery and cashew processing sectors. The projects will take the country to another stage of renewable energy technology deployment (more specific descriptions on the demonstration projects can be found in Outputs 1.1.1 and 1.2.1). The investment projects will generate high social, economic and environmental (incl. GHG emissions) impacts for the final beneficiaries. They will result in a transformational change of the entire electricity sector away from a diesel generation based scenario to a low-carbon renewable energy based system.

Through the implemented RE projects the feasibility and viability of RE technologies will be demonstrated. The lessons learned and results will be beneficial for the planned activities under the capacity building and policy components (see Outputs 3.1.2, 3.1.3, 3.1.4 and 3.1.5). In addition, the GEF project will support the development and endorsement of a

National Renewable Energy Investment Plan (NREIP). The plan will include key data of potential RE priority investment projects and a special financing window to support the development of such projects. Under the investment plan the GEF project will support the development of the hydro power project Saltinho HPP (19 MW) to bankable feasibility stage. The activity will be co-funded by the African Development Bank (AfDB). Also the International Finance Corporation (IFC) expressed interest to support the project. The hydro power project is a high priority for the Government and could be further supported under GEF-6. A grant financing window under the ECOWAS Renewable Energy Facility (EREF) will be created and support the development of a number of project under the NREIP.

Expected Output 1.1.1: High impact on-grid and off-grid renewable energy investment projects with a total capacity of 2.5 MW are developed and implemented

Under the GEF project high impact on-grid and off-grid renewable energy investment projects with a total electric capacity of 2.5 MW will be developed and implemented. The PPG phase included the identification of projects and the development of pre-feasibility studies. The received project ideas were screened according to their relevance, feasibility, cost-effectiveness, impacts and potential for replication. Five priority projects with a total electric capacity of 1.0 MW were selected from the project pipeline for implementation during the first phase of the GEF project (Phase I of the project: year 1 and 2). Further identified projects with a capacity of at least 1.5 MW will be selected by the Steering Committee of the GEF Project for implementation during the second phase (Phase II of the project: year 3 and 4). The potential pipeline of projects is included under Output 1.2.1. All pre-feasibility studies are included in Annex H.

In addition to the 2.5 MW that will be implemented throughout Phase I and Phase II of the project, the project will support/facilitate the development of the necessary studies to develop Saltinho HPP (19 MW) to feasibility stage. The implementation of this project could be interesting for GEF-6. More information on the Saltinho HPP project can be found in Output 1.2.1.

Despite the difficult political situation in the country, sufficient co-financing has been raised for the projects from various sources (see co-funding letters in Annex I). The selected projects cover a range of technologies (solar PV, bioenergy, hydro power, solar thermal), applications (e.g. mini-grids, stand-alone systems) and target groups (urban electricity consumers, rural communities, fishery and cashew industry and public buildings). The generated results will be beneficial for the policy and capacity building activities of the GEF project and will be disseminated widely in the ECOWAS region.

The five projects are expected to have high potential for replication and will generate positive social, economic and environmental impacts (see chapter on global environmental benefits). As mentioned at the beginning of this section, the five projects have a total installed capacity of around 1.0 MW. The following projects were selected (the detailed description can be found in the pre-feasibilities in Annex H):

Category a.) Mini-grid systems for rural electrification:

- **Hybrid PV mini-grid system for Bambadinca Sta Claro (312 kW):** The project aims at the installation and commissioning of a 312 kW PV-diesel hybrid mini-grid in the underdeveloped Bafata region. It will supply the Bambadinca community with reliable and affordable electricity services. The community has currently no access to electricity. The GEF project will be implemented in cooperation with TESE - Associação para o Desenvolvimento and with co-financing of the European Commission. The GEF project will co-fund the implementation of the renewable energy part of the project (PV part) being the rest of the project (diesel part and associated investment and feasibilities) financed by the other identified sources of co-financing. Moreover the GEF project will contribute to the dissemination and replication of project results in Guinea Bissau and in the ECOWAS region. The lessons learned and the business model will be disseminated widely through regional workshops organized in cooperation with ECREEE. During the PPG phase a pre-feasibility study on the replication project for the village Bissorã was developed in cooperation with TESE.
- **Hybrid PV mini-grid system for Bissorã (500 kW)**: The Bambadinca replication project will result in the installation and commissioning of a 500 kW PV-diesel hybrid mini-grid system in the underdeveloped Oio region. It will provide electricity services to the Bissorã village. During the PPG phase a pre-feasibility study was developed in cooperation with TESE. With support of the GEF-Project (being the GEF co-funding only allocated to the renewable part of the project) the feasibility study will be finalized and co-finance for the investment will be provided. The project will be co-funded by ECREEE and other funds raised by TESE. GEF-

co-funding will only be used for the development of the PV part of the project. The Bissora project will be most probably developed as an IPP. The project will be the biggest PV based mini-grid system in the ECOWAS region.

Category b.) Stand-alone systems for public buildings with high visibility:

- **Roof-top PV system for the Ministry of Energy (94.35 kW):** The project aims at the installation and commissioning of a ~95 kW PV system on the roof of the Ministry of Energy, located in the Ministerial Complex, in Bissau. It will improve the energy security and reduce the running costs for the Ministry. Due to the frequent power cuts and the inability to pay the costs of the diesel back-up the productivity of the Ministry is low. The project will act also as a demonstration project for visiting delegations to the Ministerial Complex. It will also increase the effectiveness of the GEF Project Management Unit (PMO) which will be based in the Ministry of Energy. The system will be planned in a way that it can be up-scaled or the other buildings of the complex in a second step. With support of the GEF project and co-funding from the Ministry of Energy the PV system will be procured, installed and commissioned. The system will be planned in a way that it can be up-scaled or the other buildings of the complex in a second step.

Category c.) Stand-alone systems for industrial facilities

- **Roof-top PV system for the fish processing plant Afripêche (99.82 kW):** The project aims at the installation and commissioning of 99.82 kW roof-top PV system for the fish processing facility Afripêche LDA located in the industrial area of Bissau. The PV system will help to reduce the electricity generation costs for the ice production of the facility which is currently fully dependent on four diesel generators and is not connected to the grid. As Afripêche LDA currently did a big investment in cooling equipment, renewable energy efficient cooling technologies were not an option that the facility was open to explore. On the other hand the facility was very keen to develop PV to face part of the fuel demand and in this way reduce in part their ice processing costs. With support of the GEF project and co-funding from the fish processing facility the PV system will be procured, installed and commissioned. During the PPG phase a pre-feasibility study on the PV system was conducted (see in the annex). The project is replicable and the fishery is one of the main sectors of the economy in Guinea Bissau. An energy audit will be undertaken as part of the final feasibility works.
- **Biomass cogeneration plant of the Bula cashew processing facility (34 kW):** The project aims at the installation and commissioning of a 34 kW co-generation system for the Bula cashew processing facility. The system would use agricultural waste (cashew shells) to generate steam for the treatment of the cashew and generation of electricity. The project will be co-funded by the University of Udine through an ongoing biochar project funded by the European Commission.

The following table summarizes key features of the selected investment projects:

Project Name	Project Size	Total capital costs	GEF Grant	Investment Costs/kW	Estimated annual electricity generation	Estimated GHG reduction per year	Capital cost/tonne GHG saved	Annual savings from diesel	IRR (w/ GEF Grant)	Simple Payback period (w/ GEF Grant)
	kW	kUSD	kUSD	USD/kW	MWh	tCO_2/year	USD/tCO_2	kUSD		years
Category a.) Mini-grid systems for rural electrification:										
Hybrid PV mini-grid system for Bissorã	500.00	2,972	293	5,945[i, iii]	791	603	246	341	12.1%	9.1
Hybrid PV mini-grid system for Bambadinca Sta Claro	312.00	2,953	68	9,464[ii, iii]	560	414	357	234	14.1%.	9.1
Category b.) Stand-alone systems for highly visible demonstration projects:										
Roof-top PV system for the Ministry of Energy	94.35	486	146	5,148[iv]	112	77	252	34	19.6%	4.7
Category c.) Stand-alone systems for industrial facilities										
Roof-top PV system for the fish processing plant Afripêche	99.82	437	131	4,376[v]	138	95	184	37	22.7%	4.1
Biomass cogeneration plant of the Bula cashew processing facility	34.00	72	4	2 118	145	117	25	67	17.5%	3.2
Total	**1,040.17**	**6,920**	**641**	**6,653**	**1,746**	**1,306**	**1,064**	**712**	**N/A**	**N/A**

Notes:

[i] *– The Bissora PV project total capital cost and the cost/kW includes the infrastructure costs of the plant and the needed feasibility study costs. This project does not include the costs of grid development, as it will use the existing mini-grid and current lines in the area.*

[ii] *– The Bambadinca project total capital costs and the cost/kW includes the infrastructure costs of the plant plus the costs of the mini-grid system (no mini-grid available to inject the electricity generated)*

[iii] *– The co-finance from GEF for the Bissora hybrid project and the Bambadinca hybrid project are only for the renewable part of the project. The co-finance for the development of the diesel part of the project will come from other co-finance sources*

[iv] *– The PV for the Ministry of Energy Building total capital costs and cost/kW integrated the PV equipment to be installed and the future installation of batteries for backup. These figures are based on NREL's information and costs of already implemented projects in West Africa (information provided by ECREEE) Due to the undeveloped market the costs for PV installations in West Africa is usually higher than in Europe or US.*

[v] *- The Afripêche total capital costs and the cost/kW integrated the PV equipment costs but no batteries as back up, since they will use the existing diesel generators as backup equipment. These figures are based on NREL's information and costs of already implemented projects in West Africa (information provided by ECREEE). Due to the undeveloped market the costs for PV installations in West Africa is usually higher than in Europe or US.*

Most of the projects implemented during the Phase I are focused on PV due to the following reasons:

- Cost-effectiveness is only one factor in the selection of demonstration projects. Also the technical feasibility and needed development and execution time has to be taken into account. Hydropower development takes much longer to be developed and constructed so it will not address the energy issue faced by Guinea-Bissau right away. PV is much faster and easy to deploy in this context. Moreover, there are already local technical capacities in the PV sector available which can be strengthened to ensure the maintenance of the systems. PV is a short-term solution and therefore it was considered as the priority option for the Phase I demonstration projects.
- Hydropower is a mid-term option since the development of Saltinho HPP will still need two to three years. No GHG emission reduction could be demonstrated during the lifetime of the GEF-UNIDO project. Therefore, the GEF-UNIDO project will support the development of the Saltinho HPP to feasibility stage in close cooperation with AfDB and IFC**.** Both committed already to contribute to the development of the project but also the investment phase once the project turns out to be feasible. There is also a lack of hydropower expertise in Guinea Bissau which has to be build up in parallel.
- PV systems are competitive to the usually used distributed diesel or off-grid diesel generation in Guinea Bissau. The generation costs (LCOE) for distributed diesel generation is exceeding 0.30 USD/kWh in some countries in West Africa (e.g. Cape Verde, Guinea Bissau), which is confirmed by data collected by IRENA in Africa (see **Error! Reference source not found.** below) ranging from 0.35 to 0.60 USD/kWh. The costs for small-scale stand-alone generators in remote areas can reach even 2 USD/kWh (IRENA, 2012). This is confirmed by the data collected by TESE for the PV diesel hybrid systems to be developed at Bambadinca and Bissora villages. The LCOE for rural small-scale diesel generation systems was calculated at 2.2 USD/kWh. Due to the non-affordability, many of the rural diesel based grids are not functioning anymore. In the table below it can be seen the renewable energy options to be implemented in Phase I are more attractive than the business as usual scenario (diesel generation):

	Approximate LCOE (USD/kWh)
Project cases	**Renewable Energy Project**
Ministry of Energy (PV) incl. batteries	0.37
Afripeche (PV) excl. batteries	0.22
Bula Cashew plant (bioen)	0.12
	Hybrid Systems
Bissora & Bambadinca (PV-diesel hybrid)	0.34

Note: The Levelized Cost of Energy (LCOE) represents the price of energy at which the NPV is equal to zero (0). It was estimated based on the pre-feasibility studies assumptions on investment and O&M costs for the renewable and non-renewable options.

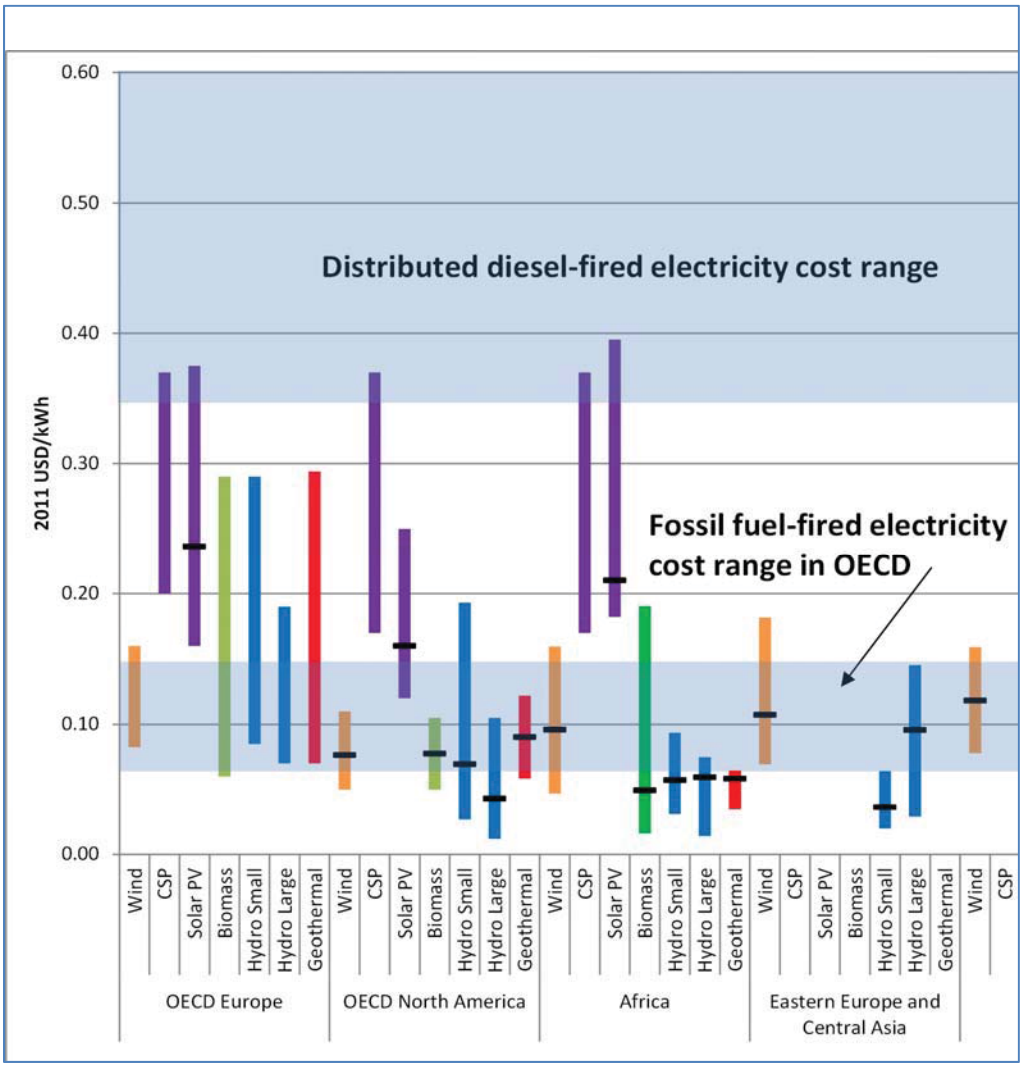


FIGURE 2: LCOE FOR RENEWABLE ENERGY AND DISTRIBUTED DIESEL GENERATION IN AFRICA (IRENA 2012)

- Bioelectricity project development is very complex in the country due to lack of capacity for the identification, deployment and maintenance of this type of systems and the lack of a comprehensive biomass resource assessment. In Guinea-Bissau the most promising opportunity is bioelectricity development in the cashew sector in which one (1) project will be implemented under Phase I (see biomass cogeneration plant of the Bula cashew processing facility). Nevertheless the nature of the sector and the crisis in Guinea Bissau which has led to the closure of local cashew processing plants, has put several constraints on the development and implementation of more bioelectricity projects. A more strategic and programmatic approach is needed. Phase II considers the development of a biomass resource assessment to diversify the type of projects. UNIDO is currently in discussions with the Government to develop the project "Renewable energy for promoting added value chains in the cashew processing industry" under GEF-6. It would have important cross-linkages to biodiversity.

In conclusion, although the focus is initially on PV, this fact is expected to be balanced in Phase II. To fulfill the 2.5MW target of renewable energy investment projects to be developed, in Phase II the UNIDO-GEF project will include the development of other types of small to medium scale renewable energy projects given that the political situation should have improved. In the Phase I the project focus on projects that can be faster implemented.

Implementation of the Component:

The investment projects will be implemented under the supervision of the National Project Manager (NPM) with support of a National RE Expert and an International RE Expert and various specialized subcontractors (e.g. equipment suppliers, hydro consultants). The NPM is located at the Project Management Office (PMO) at the Ministry of Energy. The NPM will receive technical assistance from an ECREEE Senior RE Expert. The ECREEE expert is managing a similar RE GEF project in Cape Verde. The NPM will take care that important cross-cutting issues such as gender, conflict-sensitivity and minority rights of disadvantaged population groups are considered during project implementation. The final GEF contributions to the individual investment projects will be determined in cooperation with the co-financiers and final price offers received during the procurement processes. In case funds are not utilized they would be redirected to projects identified in the National Renewable Investment Plan (see Output 1.2.2).

To achieve this output the following activities will be carried out:

- Finalize the design and procurement documents of the renewable energy investment projects & negotiate the final cost-sharing with co-financiers and promoters (Activities 1.1.1.a) and 1.1.1b))
- Provision of technical assistance for the implementation of the investment projects (Activity 1.1.1.c))
- Monitoring and evaluation of investment projects (Activity 1.1.1.d))
- Preparation of Case Studies (Activity 1.1.1.e))
- Dissemination (Activity 1.1.1.f))

Details of these activities are provided in Annex K.

Expected Output 1.2.1: Development of a pipeline of grid-connected and off-grid renewable energy priority projects

The main objective of this output will be to develop and compile a pipeline of priority grid-connected and off-grid small to medium scale renewable energy projects to be included in the National Renewable Energy Investment Plan (NREIP). Projects with a capacity of at least 1.5 MW identified from the list of potential renewable energy projects identified within this output will be implemented under Output 1.1.1. under Phase II of this GEF/UNIDO project.

During the PPG phase further potential investment projects were identified to be further developed and implemented either in Phase II of the project or in Phase II (after the end of the project). Out of the pipeline, projects with a total capacity of at least 1.5 MW will be selected by the Steering Committee for implementation under Output 1.1.1. The potential pipeline includes the following projects:

- *Saltinho Hydro Power Plant (HPP) with an estimated capacity of 19 MW (see detailed technical study and pre-feasibility study in the Annex H) - high priority project of the Government*
- *Solar Thermal System and PV system for Lybia Hotel (146.64 kW from PV) (pre-feasibility study already done under the PPG phase - see Annex H)*
- *Solar dryers system for ADPP*
- *Gasification systems for the small cashew producers (project proposed by SNV during the 1st Mission)*
- *Project for Electrification and Creation of Points of Water in Regional Hospitals of Guinea-Bissau*
- *Biomass resource assessment*
- *Study on the potential use of innovative financial mechanisms for small to medium scale renewable energy projects*
- *Study on energy efficiency opportunities in Guinea Bissau industry sector*
- *Wind resource assessment: assessment of 5 potential wind sites through full year wind measurements*
- *PV system by ADPP*
- *Rice factories, like Agrogeba (use of biomass)*
- *Solar hybrid Mini-Grid system for Villages up to 5,000 inhabitants (FRES NGO)*
- *PV for the telecommunication company*
- *Additional PV system for the Ministerial Complex (200 kW)*

The identification of the pipeline projects will be carried out throughout the duration of the GEF project (with stronger emphasis on the first two years), by the NPM in cooperation with the National and International RE Experts and ECREEE. For some projects such as Saltinho HPP and the Solar Thermal and PV system for the Lybia Hotel pre-feasibility studies were already developed during the PPG phase (see in Annex H). The Ministry of Energy strongly requested UNIDO and GEF to give priority to the development of the hydropower project Saltinho (19 MW). During the PPG phase a detailed technical review and pre-feasibility study were developed and UNIDO was able to mobilize sufficient co-funding from the African Development Bank (AfDB), IFC and ECREEE (through the ECOWAS Commission) for the full technical development of the hydro project under the umbrella of the GEF project (see co-funding letters in the annex). ECREEE will support through its ECOWAS Small Hydro Power Program which was approved by the Ministers of Energy in 2012. AfDB and IFC expressed strong interest to finance also the hardware investment once the technical development is finalized and the project turns out to be feasibly and viable. Also other financing institutions indicated support for the project (e.g. BOAD). The project is of high priority for Guinea Bissau: the project is financially viable within different scenarios and would lead to a real transformational change in the country and substantial GHG emission reductions.

Saltinho Hydro Power Project (19 MW):

Further information on the project can be found also in the technical hydropower review (see Annex G) and the pre-feasibility study in Annex H. The project aims at the construction and commissioning of the grid-connected hydroelectric run-of-river plant Saltinho HPP with an estimated total installed electric capacity of 19 MW. There is also the possibility to add another downstream dam with a capacity of 14 to 40 MW in a second stage at the site Cussilinta (see technical review document in the annex). Saltinho HPP was already fully developed to bankable feasibility stage in the 80s but led finally not to investment due to the civil war and political instability. Today, there is the need to review the old studies and to undertake the design in accordance with a modern run-of-river scheme and social and environmental standards. It is recommended to develop the project as PPP or IPP. The Government of Guinea Bissau requested UNIDO to support in this regard. The activity will be co-funded by the African Development Bank (AfDB). Also the International Finance Corporation (IFC) expressed interest to support the project.

The project is highly attractive in an economic view by considering different scenarios and would be of high impact for Guinea Bissau. There are different off-takers for the electricity (e.g. EAGB in Guinea Bissau, other OMVG utilities through the regional transmission line or potential mining purposes nearby the hydro site). The project is part of a wider regional transmission and generation expansion plan promoted by the West African Power Pool (WAPP) and the Gambia River Basin Development Organisation (OMVG). There is the Master Plan for the 225 kV OMVG western loop (linking Guinea-Boké with Senegal-Tanaf via the stations Saltinho, Bambadinca and Mansoa in Guinea Bissau; including an antenna to Bissau). This project comprises 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. Kaleta HPP is expected to be commissioned in 2015 and will be the starting point for the construction of the OMVG line for which as feasibility study was undertaken and financing was secured from AfDB (a partner and co-founder of the GEF project) and the European Union. The realization of HPP Saltinho is depending on the construction of the envisage OMVG transmission line or a similar national grid network in Guinea Bissau. The development of Saltinho HPP would be finalized in time when the new transmission line of OMVG is expected to be constructed. The alternative scenarios would be the construction of a 110 kV national line or of a short line to provide power for expected mining purposes nearby.

During the PPG phase, UNIDO and ECREEE contracted a hydro consultant to determine the necessary works to update/renew the old studies of the 80s and to develop the procurement documents for the outstanding works (e.g. hydrology, geology, environmental and social impact assessment). The technical study and the pre-feasibility study are included in the Annexes G and H. A comprehensive documentation of the old studies, maps and hydrology data is available in digital form and can be shared with strategic partners. Under the duration of the GEF project HPP Saltinho will be developed to feasibility stage (update of studies and environmental and social impact studies). Saltinho HPP will be designed in a way that allows to include the downstream dam at the site Cussilinta with an estimated capacity of 14 to 50 MW in a second step.

Project Name	Project Size	Total capital costs	Investment Costs/kW	Estimated annual electricity generation	Estimated GHG reduction per year	Capital cost/tonne GHG saved	Annual savings from diesel
	kW	kUSD	USD	MWh	tCO_2/year	USD/tCO_2	kUSD
Category d.) Grid-connected renewable energy systems							
Saltinho **Hydro Power Project** (HPP)	19 000.0	2 780[i] *(Infrastructure costs = 78 114)*	4 258[ii]	125 000	90 122	30[iii]	37 020

Notes:

[i] *The cost contemplated in the GEF-UNIDO project is the cost for updating the studies. The cost of the infrastructure development is estimated at USD 78 million.*

[ii] *The cost/kW for the Saltinho project took into account the total estimated cost for the project (update of the studies cost plus the infrastructure costs)*

[iii] *the capital cost/tonne of GHG saved for the Saltinho project was calculated using the total costs of the project (update of the studies cost plus the infrastructure costs)*

To achieve this output the following activities will be carried out:

- Identification of potential (grid-connected and off grid) renewable energy projects in the electricity sector of Guinea Bissau (Activity 1.2.1.a))
- Analysis of the technical and economic viability of the identified projects making use of already existing tools like RETScreen, HOMER, etc. (Activity 1.2.1.b))
- Consultation workshop on priority projects and renewable energy investment opportunities and barriers in Guinea Bissau (Activity 1.2.1.c))
- Compilation of the pipeline of grid-connected and off-grid renewable energy priority projects to be promoted by the Government (Activity 1.2.1.d))
- Dissemination of the pipeline of projects (Activity 1.2.1.e))

Details of these activities are provided in Annex K.

Expected Output 1.2.2: The National Renewable Investment Plan is finalized

This output will result in the compilation of the National Renewable Energy Investment Plan (NREIP) for Guinea-Bissau. The plan will include the identified pipeline of renewable energy priority projects, the scale of capital expenditure required and the possible returns on investment available. The plan will be used to attract local and international financiers and donors to invest in the renewable energy sector in Guinea Bissau. The investment plan will focus on grid-connected and off-grid small to medium scale RE projects. The investment plan will be aligned with the targets of the National Renewable Energy Policy (NREP) and National Renewable Energy Action Plan (NREAP). The plan will be promoted by ECREEE through the ECOWREX and the ECOWAS Renewable Energy Investment Initiative which promotes regular investment forums.To achieve this output the following activities will be carried out:

- Detailed cost plan prepared based on the pipeline of projects identified in Output 1.2.1 (Activity 1.2.2.a))
- Identify potential sources of funding (Activity 1.2.2.b))
- Prepare full National Renewable Energy Investment Plan (Activity 1.2.2.c))
- Dissemination of the National Renewable Investment Plan to potential project proponents and investors (Activity 1.2.2.d))

Details of these activities are provided in Annex K.

Expected Output 1.2.3: An existing grant facility will provide support for project development and small investments

This output will result in the establishment of a Special Grant Financing Window, within an existing grant facility, to support the development of renewable energy projects in Guinea Bissau. A special grant financing window to provide support to renewable energy project development and small investments will be established as part of an existing financing facility available for the ECOWAS region - the ECOWAS Renewable Energy facility (EREF) operated by ECREEE. This GEF-UNIDO project intends to use this existing grant facility.

The EREF is managed by ECREEE and has funding commitments by the ECOWAS Commission, the Governments of Austria and Spain (more than 3 million USD). The EREF provides seed funding for pre-investment activities (measurements, feasibilities, financial structuring) and business development (e.g. development of business plans) for small to medium scale renewable energy and energy efficiency projects in the ECOWAS region, which includes Guinea Bissau. Usually, the EREF provides a limited grant amount (between €5,000 and €100,000) per project. The eligible EREF grant is determined on a project-by-project basis. Contributions to the special window for Guinea Bissau are subject to approval by the Executive Board of ECREEE.

As the objectives of EREF are in line with those of this GEF-UNIDO project, part of EREF targeted to Guinea Bissau, will be provided as seed fund co-finance for replicating small to medium scale renewable energy projects within the scope of the GEF-UNIDO project. Under GEF-UNIDO project at least one EREF call for proposals will be undertaken. The financing from the grant facility will be used for the development and implementation of the 1.5 MW of renewable energy projects identified in Output 1.2.1 during the Phase II of the project. The project developers will be responsible for the final designs and the feasibility studies. ECREEE and the National and International RE Experts will assist. ECREEE will also participate and agree in the establishment of the final capital costs for each project (which will result from Output 1.2.2). Any further TA required will be identified at this time. The EREF has sufficient finance for the next years from the Austrian and Spanish Governments, and other donors.

It is important to refer that the funds from this Special Grant Financing window will not be used towards the implementation of the investment projects to be developed under Phase I of the GEF-UNIDO project, as all those projects have already co-funding sources aligned.

The purpose of this Grant Financing Window is of creating a mechanism in which all renewable energy related support funds developed from Phase II (included) onwards would be routed in. It will help government agencies, donors, and private sectors in identifying and selecting the RE projects and its implementation by providing technical assistance as well as routing the funds. Any NGO, local community, government agency may be eligible for getting the support under this. Thus within this, the GEF-UNIDO project will advise project developers on sourcing finance and, where considered appropriate by the project team, some limited seed finance be provided for the projects if required (envisaged to be approximately up to 10% of project costs) through the Special Grant Financing Facility. Technical assistance will be provided during the project development and implementation according to the needs identified during the project selection. The NPM will be responsible for over-seeing each of the new and scale-up projects and for the disbursement of any funds to these projects.

Through the Special Grant Financing window, by providing seed funding for the development of RE projects in Guinea-Bissau, the project aims at reducing financial barriers for RE, and at incentivizing local banks to provide financing to RE investment; moreover, a study on the potential use of innovative financing instruments (e.g. micro-credits) for small scale renewable energy household systems and mini-grids will be undertaken based on the experiences of the EREF financing window and the lessons learned of the implemented PV hybrid mini-grids (see output 1.2.1.). In Phase II the Special Grant Financing Window might provide financial resources directly for banks to implement innovative RE financing schemes.

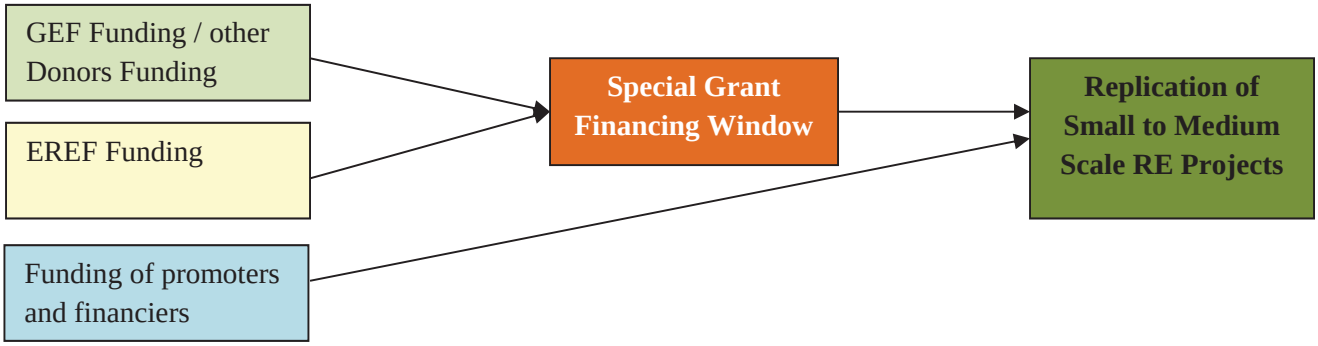


FIGURE 3: RELATION OF THE CO-FINANCE SOURCES FOR THE DEVELOPMENT AND IMPLEMENTATION OF PC1

This Special Grant Financing Window and its grant allocation process need to be further planned with ECREEE and the other donors identified at the PPG stage. During the project implementation detailed discussions will be held with ECREEE, the Udine University and the other stakeholders in the Steering Committee to design the functionality of this special window. It is envisaged that this will be discussed and agreed in the 1st Steering Committee of the project.

It is envisage that this window will be further expanded depending on the necessities through an increase of the ECREEE's contribution and/or investment of other donors.

To achieve this output the following activities will be carried out:

- ECOWAS Renewable Energy Facility (EREF) establishes a special grant financing window to support project development and small investments (Activity 1.2.3.a))
- Monitoring and evaluation of projects after the first year of operation (Activity 1.2.3.b))

Details of these activities are provided in Annex K.

The following table summarises the outputs of PC1.

Project Component 1: Investments into small to medium scale renewable energy technologies. ***Outcome 1.1:*** *The technical feasibility and viability of small to medium-scale on-grid and off-grid renewable energy technologies in the urban and rural context are demonstrated*
The objective of the first outcome of this component is to demonstrate the technical feasibility and financial viability of small to medium-scale on-grid and off-grid renewable energy technologies and business models in the urban and rural context of Guinea Bissau. The component will generate national case studies and best practices with the potential for replication in Guinea Bissau and the ECOWAS region.
Output 1.1.1: *High impact on-grid and off-grid renewable energy investment projects with a total capacity of 2.5 MW are developed and implemented*
Project Component 1: Investments into small and medium scale renewable energy technologies. ***Outcome 1.2.*** *The National Renewable Energy Investment Plan to replicate and up-scale on-grid and off-grid renewable energy projects is developed and endorsed*
The objective of the second outcome of this project component is to develop a National Renewable Energy Investment plan to replicate and scale –up grid-connected and off-grid renewable energy projects in Guinea Bissau and present it to interested developers and investors.
Output 1.2.1: *Development of a pipeline of grid-connected and off-grid renewable energy priority projects*
Output 1.2.2: *The National Renewable Investment Plan is finalized*
Output 1.2.3: *An existing grant facility will provide support for project development and small investments*

Project Component 2: Consolidated policy and regulatory framework for renewable energy

This component is directed at reducing institutional, regulatory and policy barriers for the renewable energy investments and markets in Guinea Bissau. Under the component the National Renewable Energy Policy (NREP) and National Renewable Action Plan (NREAP) for Guinea Bissau will be developed in close coordination with the implementation process of the ECOWAS Renewable Energy Policy (EREP). The activity will be undertake in close partnership with ECREEE which coordinating and monitoring the implementation of the ECOWAS Renewable Energy Policy (EREP) and ECOWAS Energy Efficiency Policy (EEEP) in the fifteen ECOWAS Member States (incl. Guinea Bissua). The GEF project will also facilitate the creation of a National Regulatory Agency to regulate and monitor the operations in the energy sector and propose models to open up opportunities and reduce investment risks for IPPs and PPPs in the power sector. Under this component international support for the renewable energy sector will be raised through the awareness campaign "SE4ALL for Guinea Bissau" and the registration of the GEF project components as a NAMA. The African Development Bank (AfDB) as the official SE4ALL hub for Africa will be a strategic partner in the campaign (as well as the Saltinho HPP project).

Expected Output 2.1.1: An assessment on gaps in the existing legal and regulatory framework for renewable energy is undertaken

Although at the PPG stage an inventory of the policy and regulatory gaps that exist in terms of policy to foster the development of grid connected and off-grid renewable energy systems was already carried out, there will be need for more analysis during the development of the National Renewable Energy Policy (NREP) and National Renewable Energy Action Plan (NREAP). The assessment will also have to be aligned with the gap assessment to be undertaken by ECREEE for the National Energy Efficiency Action Plan (NEEAP) of Guinea Bissau (this activity is not co-funded by the GEF project). This output will result on an expansion of the inventory of the gaps that exist in terms of policy as well as an inventory of the existent barriers carried out at the PPG stage.

To achieve this output the following activities will be carried out:

- Expansion of the gap analysis on the current regulations related to on-grid and off-grid renewable energy projects to include energy efficiency and energy access related issues (Activity 2.1.1.a))
- Expansion of the identification of regulatory barriers for renewable energy and recommendations to overcome those to include the energy efficiency and energy access related issues (Activity 2.1.1.b))
- Validation workshop on gap analysis (Activity 2.1.1.c))

Details of these activities are provided in Annex K.

Expected Output 2.1.2: The National Renewable Energy Policy (NREP) and the National Renewable Energy Action Plan (NREAP) are developed in alignment with the ECOWAS Renewable Energy Policy (EREP)

The aim of this output is to develop a National Energy Policy (NREP) and National Renewable Action Plan (NREAP) for Guinea Bissau aligned with the ECOWAS Renewable Energy Policy (EREP). Within EREP, all fifteen ECOWAS Member states (including Guinea-Bissau) are asked to develop their National Renewable Energy Action Plans (NREAP) and their National Renewable Energy Policies (NREP) with clear targets/measures and incentives for the deployment of renewable energy at the national levels. The NREAPs and NREPs shall include clear targets for renewable energy power generation by 2020 and 2030. The NREAP in Guinea Bissau will include the following main sections:

- Summary of the National Renewable Energy Policies
- Summary of the targets to 2020 and 2030
- Renewable energy targets and trajectories from 2010 to 2020 and 2030 on: (i) grid connected renewable energy (ii) energy access with renewable energy (iii) complementary energy efficiency targets (namely looking into lighting solution); (iv) renewable energy application for domestic uses (domestic cooking energy targets and solar thermal water heating); (v) biofuels and (vi) market development
- Measures for achieving the targets:
    - Measures for achieving those targets: (i) specific measures to fulfil the requirement under the EREP (covering the following: administrative procedures and spatial planning; technical specifications;

buildings; information provision; certification of installers for RE equipment; electricity infrastructure development; electricity network operation; renewable energy applications for domestic uses and biofuels (sustainability criteria and verification of compliance));
- Support schemes to promote the use of energy from renewable resources in electricity (incl. tax exemptions for RE equipment)
- Specific measures for the promotion of efficient cookstoves
- Specific measures for the promotion of efficient charcoal production
- Specific measures for the promotion of modern fuel alternatives for cooling;
- Support schemes to promote the use of biofuels
- Specific measures for the promotion of the sustainable use of energy from biomass.

The template adopted by the ECOWAS Ministries for the development of the NREAP is shown in Annex M.

Thus within this plan all the national policies, plans and programmes that need to be established in Guinea Bissau (a big part of them already identified at the PPG stage and the others that will be identified in Output 2.1.1) will be identified and a plan for its development and adoption put forward. This will include the development of enabling frameworks for IPPs and PPPs, establishment of standard PPA, just to name a few.

The NREP will be the overarching political document that will be compiled and passed through Cabinet for implementation of the NREAP. The NREP will identify the targets, responsible institutions for overseeing the implementation of the NREAP just to name a few.

The NREAP and NREP will be developed locally by the Government of Guinea Bissau and the key sector stakeholders (named by ECREEE as country groups) through a series of national stakeholders meetings where the targets, measures and policies to be developed will be discussed and put forward. A national consultant and international consultants will be made available by ECREEE to support Guinea Bissau Government through this process.

Thus this GEF-UNIDO project implements already activities which will be part of the NREAP. It will support the development and implementation of some RE priority projects. It will facilitate the development of a National Renewable Energy Investment Plan (NREIP). It will support the establishment of a national regulator which is necessary to strengthen IPPs and PPPs in the RE sector. It will contribute to the strengthening of local RE capacities necessary to implement the NREAP

To achieve this output the following activities will be carried out:

- Development of the Guinea-Bissau NREAP (Activity 2.1.2.a))
- Development of the Guinea-Bissau NREP (Activity 2.1.2.b))
- Organization of an ECOWAS meeting on the development and implementation of NREPs and NREAPs (Activity 2.1.2.c))
- Organization of stakeholder workshops on the Guinea-Bissau NREAP and NREP (Activity 2.1.2.d))

Details of these activities are provided in Annex K.

Expected Output 2.1.3: Facilitate the creation of a National Regulatory Agency for the power sector and support the development and implementation of mechanisms for IPPs and PPPs

Through this Output:

- A study on the creation of a National Regulatory Agency for electricity to regulate and supervise the installations and functioning of the electricity sector will be carried out. This study will clearly identify how this regulatory agency should be created, its roles and function as well as it operation. At the moment Guinea Bissau does not have an independent regulatory body in the electricity sector which is essential to regulate the sector in an impartial way as well as to oversee and supervise installation and functioning of all (conventional and renewable) generation systems. This activity was requested by the Ministry of Energy during the PPG phase.
- Mechanisms to promote Independent Power Producers (IPPs) and Public and Private Partnerships (PPPs) in the power sector will be proposed and its development and implementation facilitated. This will include as well the development of standardized Power Purchased Agreements (PPA).

The mechanisms to promote IPP, PPPs and the establishment of PPA will be standardized in line with existing regional and international modalities, as this approach has a greater potential to be replicated. This will be ensured through the South-South cooperation that this project will have with Cape Verde that has already these support mechanisms in place and operational. These mechanisms will be established with special emphasis on the needs of renewable energy projects to ensure that the market is clearly regulated and promotes the adoption of such technologies.

Details on the execution of the activity facilitate the Creation of a National Regulatory Agency/Regulator for the energy sector and support the development and implementation of mechanisms for IPPs and PPPs (Activity 2.1.3a)) with a focus on the renewable energy sector is presented in Annex K.

Expected Output 2.1.4: The awareness campaign "SE4ALL for Guinea Bissau" and the registration of the project as a NAMA is facilitated.

In cooperation with ECREEE and the SE4ALL office the GEF-UNIDO project will support the international awareness campaign "SE4ALL for Guinea Bissau". This campaign aims at raising awareness on the project as well as at raising funding and technical support from international partners for the National Renewable Energy Investment Plan and other activities to be undertaken under the GEF project.

At the Cop 17 in Durban, the Parties recognized “the need for support for enabling activities to assist developing country Parties in the identification and preparation of national appropriate mitigation actions (NAMAs) for submission to the register, and support for their implementation”. In alignment with the Guinea-Bissau 2nd National Communication submitted to the UNFCCC in 2011, this GEF-UNIDO project builds upon this framework to identify and implement small to medium scale renewable energy projects in the Country. These are National Appropriate Mitigation Measures targeting the energy sector, which according to the 2nd National Communication is the 2nd largest emitter of CO_2 in the country. Furthermore, this GEF-UNIDO project seeks to directly contribute to the implementation of several GHG mitigation options outlined in the National Communication for the energy sector:

- Construction of Saltinho and Cussilinta Dams – this GEF-UNIDO projects will contribute to the development of the Saltinho project as referred in Output 1.1.1.
- Decentralised rural electrification using photovoltaic systems – this GEF-UNIDO project will contribute to the implementation of these system as referred in Output 1.1.1.

This GEF-UNIDO project will contribute to reduce 76,267 tCO_2 of direct emissions through the project’s lifetime by implementing Phase I and Phase II projects identified in Outcome 1.1 (details on GHG emissions reductions expected from this project can be found below in the Section Global Environmental Benefits).

Within this output, the Government will be supported in registering the GEF-UNIDO project as a NAMA. For that the project will support the activities of NAMA readiness and registration on the UNFCCC NAMA registry portal and facilitate the creation of the necessary support mechanism for the project to be identified as a NAMA, such as the establishment of national registry and MRV system, and future scale up. NAMA recognition at the international level is very important and for that a project description has to be uploaded in the UNFCCC NAMA registry portal with GEF and other supporting partners validating their support for such recognition.

The activity will be implemented by the PMO in cooperation with the National and International Consultants and ECREEE.

The following table summarises the outputs of PC2.

Project Component 2: Consolidated policy and regulatory framework for renewable energy
Outcome 2.1: *The existing policy and legal support framework for renewable energy is strengthened and regulatory mechanisms are improved*
The component is directed at reducing the institutional, regulatory and policy barriers for the renewable energy investments and markets in Guinea Bissau.
Output 2.1.1: *An assessment on gaps in the existing legal and regulatory framework for renewable energy is undertaken*

Output 2.1.2: *The National Renewable Energy Policy (NREP) and the National Renewable Energy Action Plan (NREAP) are developed and endorsed in alignment with the ECOWAS Renewable Energy Policy (EREP)*
Output 2.1.3: *Facilitate the creation of a National Regulatory Agency for the power sector and support the development and implementation of mechanisms for IPPs and PPPs*
Output 2.1.4: *The awareness campaign "SE4ALL for Guinea Bissau" and the registration of the project as a NAMA is facilitated*

Project Component 3: Capacity development and awareness raising on renewable energy

The component aims at mitigating the existing capacity constraints in the renewable energy sector of Guinea Bissau. The activities are directed to strengthen the capacities of key market enablers (e.g. policy makers, developers, companies, utility, and banks) on different aspects of renewable energy through the implementation of train-the-trainers approaches and establishment of south-south knowledge transfer from the ECOWAS region. During the PPG phase this component was highlighted as high priority by most of the stakeholders.

Expected Output 3.1.1: A national capacity building program is developed and implemented

The main objective of this output will be the development of a national capacity building programme towards:

(a) Directorate General of Energy/PMO
(b) Training institutions;
(c) Key stakeholders in the sector;

The National Capacity Building Programme will incorporate a different component for each of the target audience.

This output will integrate the:

- Evaluation of the institutional capacity, training needs of market enablers and market players (Activity 3.1.1a))
- Development of a National Capacity Building Programme with detailed working plan for its execution (schedule, role, responsibilities, milestones etc) (Activity 3.1.1.b))
- Execution of the training programme (Activity 3.1.1.c))
- Evaluation of the National Capacity Building Programme (Activity 3.1.1.d)).

In the beginning and to design a National Capacity Building Programme to address the needs of the Guinea Bissau renewable energy market players and enablers an analysis of the capacity building needs will be undertaken, targeting separately the Directorate General of Energy and the other stakeholders groups (the other stakeholders group includes local institutions and market players, market enablers and the National Utility (EAGB) and National Regulatory Agency – this last one can be created with the guidance provided through Output 2.1.3). The program will make use of train-the-trainers methodologies and south-south knowledge exchange with other ECOWAS countries. It will create strong synergies to the regional capacity building program of ECREEE.

The division of the programme into the different groups was decided at the PPG state, as during the visit the different stakeholders groups revealed different capacity building needs. Also some of the stakeholders groups, as part of projects being developed in Guinea Bissau, have already been identified as groups for which capacity diagnostics are going to be carried out, and thus co-funding for that has been located

Table 1: Capacity Requirements of Various Stakeholder Groups

Stakeholder group	Capacity needs
Policy makers in the renewable energy and energy efficiency sectors and the energy sector in general.	• Developing and operationalize coherent, comprehensive and evidence based policies, laws and regulations that create a level playing field for RE&EE technologies • Implementing rural energy planning • Negotiating power purchase agreement (PPAs) with independent power producers (IPPs) and setting up Public Private Partnership (PPP) and setting viable financial mechanisms or tools to foster renewable energy development • mainstreaming climate resilience and gender
Policy makers from non-energy sectors like agriculture, health, water, private sector, transport sectors etc.	• Basic design of renewable energy systems • Integrating renewable energy components into other sectors (e.g. health, rural development, cashew processing, fishery)
Entrepreneurs, project developers, equipment manufacturers, consultants and industry support bodies	• Development of vocational and higher education courses adapted to the RE&EE requirements and languages of the region • Certification for conducting energy audits • Identifying, developing and packaging a pipeline of potential RE&EE investment projects • Negotiating viable power purchase agreement with investors • Preparing quality business plans that are consistent with existing financing mechanisms • Identifying and developing potential CDM projects • Mobilizing and structuring investments in RE&EE projects • Mainstreaming climate resilience of energy infrastructure and gender
Utilities	• Ability to tender RE&EE efficiency projects • Negotiate power purchase agreements (PPAs) • Grid stability and the integration of RE • Special training on the operation of hydro power plants (e.g. Saltinho HPP)
Recipients/buyers of energy services and technologies	• Willingness and ability to pay for the services or technologies • Ability to assess the energy implication or cost in daily choices and decisions such as selecting electric equipment

Following the needs assessment results the different components of the National Capacity Building Programme (see Output 3.1.3, 3.1.4 and 3.1.5) will be designed and put together under the umbrella of the National Capacity Building Programme. After its design the Programme will be executed and evaluated.

It is important to highlight that the training of the DGE and financing institutions will include: renewable energy project appraisal, quality control and enforcement system (for installation, operation and maintenance) as these are critical to ensure the success or renewable energy development. The adequate means for quality control and enforcement system will be set up according to the ones used in EREF (EREF has a quality and appraisal framework which aims at ensuring the quality of supported projects throughout the project cycle). The DGE and banks will be trained in applying the framework.

The continuation of the capacity building programme after the end of the GEF-UNIDO project will be ensured through:

- Created train-the-trainers network;
- South-south exchange/cooperation with the University of Cape Verde
- ECREEE, which will continue cooperating and supporting training and capacity building activities in Guinea Bissau and in the ECOWAS region.

Details on the activities to be carried out to achieve this output are provided in Annex K.

Output 3.1.2: A handbook on renewable energy project development based on the lessons learned of the implemented investment projects is developed

Using the investment projects implemented under Output 1.1.1 (Phase I) as case studies, a handbook on renewable energy project development in Guinea Bissau will be compiled. It is envisioned that the handbook will contain technical specification on the design of the project and economics, details on its implementation and operation. Moreover, the handbook will contain lessons learned from the projects developed as well as recommendation on how to replicate these projects. The handbook is also envisioned to be updated following the implementation of the Phase II investment projects.

This handbook will then be disseminated in Guinea Bissau and in the ECOWAS region. This will be carried out at the national level, through the project website and through distribution of paper copies to different stakeholders in Guinea Bissau, and at regional level, through its publication on ECREEE and ECOWREX websites

To achieve this output two activities will be implemented:

- Compilation of the handbook on project development based on lessons learned of the implemented investment projects (Activity 3.1.2.a));
- Dissemination of the handbook (Activity 3.1.2.b))

Further description of the activities contemplated in the output is provided in Annex K.

Output 3.1.3: Strengthen the capacity of the Directorate General of Energy/PMO on renewable energy issues

This output integrated the development, implementation and evaluation of the National Capacity Building Programme component to strengthen the capacity of the Directorate General of Energy /PMO on renewable energy issues. This training will be additional to any technical training on renewable energy which will be provided as part of Outputs 3.1.4 and 3.1.5.

Thus to achieve this output the following activities will be implemented:

- Development of a detailed work plan for the execution of the Training programme for the DGE to be incorporated under the component of National Training Programme (schedule, role and responsibilities, milestones, etc.) (Activity 3.1.3.a));
- Execution of the training programme for the DGE component of the National Training Programme (Activity 3.1.3.b))
- Evaluation of the training programme for the DGE component of the National Training Programme (Activity 3.1.3.c).).

Further description of the activities contemplated in the output is provided in Annex K.

Output 3.1.4: The capacities of local training institutions and instructors are strengthened through the implementation of three train-the-trainer workshops in cooperation with ECREEE

This output aims at strengthening the capacities of local training institutions and trainers to conduct trainings more effectively. A train-the-trainers approach will ensure the sustainability of the GEF interventions beyond the lifetime of the project. This will be particularly reached through the involvement of ECREEE and its regional training activities. Institutions such as Action for Development and the University of Guinea Bissau will be strengthened.

It is envisaged that some of the trainings will be incorporated in the modules of existing courses and as short courses for technicians and engineers. Moreover, the train the trainers programme, as well as the other training programmes, will be carried out with support from other ECOWAS countries (south-south knowledge transfer). The trainings will seek to have at least 30% female participants.

The following table highlights the training programmes, main contents and target groups to which the programmes/modules of the programmes of the training programmes are directed to.

Training Programme / Modules of the Programme		Contents of training programme/ module of the programme	Target Groups
(1) Train the Trainers – Energy Expert Training		• Providing technical assistance to enterprises and coaching on renewable energy implementation • Conducting short (one-half day) awareness raising meetings for managers on the benefits and opportunities of renewable energy and showcasing the support available to participating companies (1/2 day meetings are included in PC3 Activity 3.1.5) • Conducting training sessions for stakeholders interested in developing their own renewable energy projects	DGE, EAGB, University of Guinea Bissau, Action for Development
(2) Renewable Energy Training	Module 1: Training on Identification, Development and Management of Renewable Energy Projects	• Identify what sort of projects each participant could develop at their sites • Identify the technical issues • Carry out a life cycle cost analysis of the project • Use a software for renewable energy potential analysis such as RETScreen and COMFAR • Special hydro power training in conjunction with Saltinho HPP	Management and technical people involved in developing renewable energy projects who are looking to develop a project, possibly with support from the GEF project
	Module 2: Design and Development of Renewable Energy Projects	• Understand all the issues related to the design and development of renewable energy projects from assessing the site specific resource available, to sizing and designing a system, to either writing or commissioning someone to write a specification, planning and permitting and providing links to additional information resources. • Incorporate specific issues of small to medium scale RE development in tendering • Oversee the project installation • Mainstreaming of gender in RE projects	Technical persons responsible for developing renewable energy projects and is designed as a follow-on from the Identification, Development and Management of Renewable Energy Projects Training (Module 1)
	Module 3: Financing instruments for RE projects	• Analyse existent financing instruments, including carbon financing, available for small to medium scale renewable energy projects • Analyse the financial viability of these types of projects.	Project developers and financial institutions that want to develop and/or provide financing for renewable energy projects and who wish to better understand the issues better, as well as technicians who want to expand their services to small to medium scale renewable energy.
	Module 4.	Guidance on operational and management issues of	Project developers looking

Training Programme / Modules of the Programme		Contents of training programme/ module of the programme	Target Groups
	Operation and Management of Renewable Energy Projects	renewable energy projects including monitoring and quality control	to develop a RE project who wish to better understand the issues better, as well as technicians who want to expand their services to renewable energy
	Module 5: Technical grid connection issues for renewable energy	• Distribution, stability, power grid quality concepts; • Effects of renewable energy injection into the grid and how to minimise disruptions	EAGB, National Regulatory Agency and the renewable energy project developers
(3) Development of Modules for the University		The Renewable Energy Training contents will be edited to become modules for insertion in technicians training courses and electrical engineering courses at the University of Guinea Bissau.	University of Guinea Bissau and previously qualified technicians or engineers
(4) Development of Modules for the Action for Development		The Renewable Energy Training contents outlined above will be edited so that they become modules for insertion in technicians training courses and electrical engineering courses at the Action for Development	Action for Development and previously qualified technicians or engineers

Thus to achieve this output the following activities will be implemented:

- Development of the detailed work plan for the execution of the Train the Trainers component of National Training Programme (schedule, role and responsibilities, milestones, etc.) (Activity 3.1.4a)
- Execution of the Training components of the National Training Programme (Activity 3.1.4.b))
- Evaluation of the Train the Trainers component of the National Training Programme (Activity 3.1.4.c));

Details of the activities and the different courses highlighted in the table above can be found in Annex K.

Output 3.1.5: At least one hundred (100) experts of different stakeholder groups are trained on various renewable energy aspects in workshops conducted by trained trainers.

This output will result in a series of awareness raising workshops on renewable energy targeted to market enablers and players. It is estimated that 10-12 half day awareness raising workshops on renewable energy will be carried out through the project duration targeting around 100 market enablers (organisations). These workshops will be mainly delivered by the National Experts trained by the GEF UNIDO project under Output 3.1.4.

To achieve this output the following activities will be implemented:

- Development of a detailed work plan for the execution of a series of awareness raising workshops on renewable energy opportunities (schedule, venues, trainers, etc.) (Activity 3.1.5.a)
- Execution of the 10-12 half-day Awareness Raising Workshops on Renewable Energy - component of the National Training Programme: Execution of a series of 10-12 half-day awareness raising workshops on Renewable Energy (Activity 3.1.5.b));
- Evaluation of the 10-12 half-day Training Workshops on Renewable Energy component of the National Training Programme (Activity 3.1.5.c)).

Details of the activities can be found in Annex K.

The following table summarises the outputs of PC3.

Project Component 3:* Capacity development and awareness raising on renewable energy** ***Outcome 3.1: *The capacities of key stakeholders on renewable energy are strengthened*
This component aims to build and strengthen the capacities of market enablers (institutional, market and enterprises level) on the different aspects of renewable energy through a train-the-trainers approach and direct training and establish South-South knowledge transfer from the ECOWAS region.
Output 3.1.1: *A national capacity building program is developed and under implementation*
Output 3.1.2: *A handbook on renewable energy project development based on the lessons learned of the implemented investment projects is developed*
Output 3.1.3: *Strengthen the capacity of the Directorate General of Energy/PMO*
Output 3.1.4: *The capacities of local training institutions are strengthened through the implementation of three train-the-trainer workshops in cooperation with ECREEE*
Output 3.1.5: *At least one hundred (100) market enablers are trained on various renewable energy aspects in workshops conducted by trained trainers.*

Project Component 4: Monitoring and Evaluation

The objectives of this component are to:

- establish a project management office, conduct adequate and systematic monitoring of all project indicators (based on a monitoring plan) together with regular and comprehensive assessment of an on-going and /or completed initiatives to ensure successful project implementation;
- establish a dedicated website for the project in cooperation with ECREEE;
- ensure that the dissemination programme is implemented and project milestones/reports etc., are regularly posted on the website.

Expected Output 4.1.1: Project Monitoring

At the beginning of project implementation a Project Management Office (PMO) will be established and a detailed work plan for the entire duration of the project will be developed by UNIDO in collaboration with the PMO, ECREEE and the DGE. The work plan will clearly define roles and responsibilities for the execution of project activities, including monitoring and evaluation; it will set milestones for deliverables and outputs. The work plan will be used as management and monitoring tool by PMO and UNIDO and reviewed and updated as appropriate on a biannual basis.

The PMO will be responsible for:

- day-to-day management, monitoring and evaluation of project activities as in the agreed project work plan. The PMO will coordinate all project activities being carried out by project national experts and partners. It will also be in charge of the organization of awareness raising and the seminars and training to be carried out under Project Component 3. The PMO will be supported by ECREEE.
- The design and maintenance of a website for the GEF project. The project website will be a sub-site of the existing ECREEE website (http://www.ecreee.org). There is a special section for projects implemented under the GEF Strategic Programme for West Africa (GEF-SPWA). This will be the main communication and dissemination means used through the implementation of the project. The website will be designed and developed by UNIDO, ECREEE, the International Expert and the PMO. Day to day maintenance of the site as well as site up-dates will be of the responsibility of the PMO. The PMO will work closely with the ECREEE senior renewable energy expert responsible for the implementation of a similar GEF project in Cape Verde.
- The communication and dissemination of the opportunities and results from this project which is important for the sustainable development of the renewable energy market in Guinea Bissau. The dissemination programme will be designed to raise awareness of the investment projects. This feeds directly into the awareness raising of Project Component 3 and should be planned together. Further promotional material on renewable energy should also be compiled to feed into the dissemination and sensitisation programme. A programme of sensitisation of

stakeholders will be designed and implemented to ensure the project has lasting results. These stakeholders will include regional governments, manufacturers, hotel associations, and local business. The PMO will be assisted by ECREEE and make use of the ECOWAS Observatory for Renewable Energy and Energy Efficiency (http://www.ecowrex.org).

To achieve this output the following activities will be implemented:

- Establishment of project steering committee and the execution of two annual committee meetings (Activity 4.1.1a)
- Yearly Regular reporting (Activity 4.1.1.b))
- Final evaluation of the project (Activity 4.1.1.c))

Details on these activities can be found in Annex K.

The following table summarises the outputs to be achieved under PC4.

Project Component 4:* Monitoring and Evaluation** ***Outcome 4.1: *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*
The objectives of this component are to: • establish a project management office, conduct 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; • establish a dedicated website for the project; • ensure that the dissemination programme is implemented and project milestones/reports etc., are regularly posted on the website.
Output 4.1.1: *Monitoring and Evaluation*

Global Environmental Benefits:

Calculation of environmental benefits in terms of GHG emissions:

With the implementation of this project several renewable energy generation projects will be demonstrated. Global environmental benefits in the form of direct and indirect GHG emissions reductions are expected from the implementation and replication of these projects. The estimate of emissions reductions was done following the GEF methodology and the *CO_2 Spreadsheet* provided by GEF, RETSCREEN modelling, and during the conduction of the pre-feasibility studies, which are based on CDM/UNFCCC sources (methodologies and guidelines). The spreadsheet for each case was prepared, with the exception of the general case where several renewable energy projects adding up 1.5 MW are.

Direct Emissions Reduction:

The direct greenhouse gas emission reductions are, on a case by case scenario, the following:

TABLE 2: ANNUAL AND DIRECT GHG EMISSIONS REDUCTIONS

Project Case	Annual GHG emissions avoided (tCO_2e/year)	Source of information	Project lifetime (years)	Direct GHG emission reductions (tCO_2) over the lifetime of the project
Phase I of Investment Projects				
Afripeche ice factory building– PV system (~100 kW)	95	Estimated with RETSCREEN	25	2,363

Ministry of Energy building – PV system (~95 kW)	77	Estimated with RETSCREEN	25	1,918
Bula cashew processing plant – Biomass use (~35 kW)	117	Estimated in pre-feasibility study	25	2,926
Bissora (mini-grid system, with electrical grid and a hybrid solar PV-diesel) (312 kW)	603	Estimated with RETSCREEN (by TESE)	20	12,051
Bambadinca (minigrid system, with electrical grid and a hybrid solar PV-diesel) (500 kW)	414	Estimated in feasibility study (by TESE)	20	8,280
Phase II of Investment Projects				
Other renewable energy projects to be selected from the pipeline (1.5 MW)	2,436	Energy Baseline Report, pre-feasibility studies.	20	48,729
Total (2.5 MW)	**3,742**			**76,267**

Assumptions for the calculation of direct emissions reductions

In all these cases, power generation with fossil fuel sources (diesel oil) is displaced by cleaner forms of energy. The use of fossil fuels (diesel in these cases) constitutes the baseline scenario, which means that if no RE was used, the business-as-usual trend would be to continue using diesel oil for supplying energy needs.

Other data used to estimate the emissions reductions (refer to Annex N that includes the excel spreadsheets):

- Diesel oil emission factor: 0.074 tCO_2/GJ (2006 IPCC Guidelines for GHG inventories, vol. 2 Energy)
- Standard conversion factor of 3.6 GJ/MWh
- Efficiency of diesel generator: between 33% and 39%, depending on the size of the system considered (TOOL07 Methodological tool: Tool to calculate the emission factor for an electricity system Version 04.0 - Table 2 "off-grid power plants")
- In the case of the hybrid PV-Diesel systems, only the energy generated by the PV part was considered for the estimate of emissions reductions, because the diesel generated energy does not generate reductions.

The figure showing the total direct emissions reduction over a period of one year (tCO_2/year) in Table 2 would occur only if all the projects are implemented and operating simultaneously, i.e. they are all reducing emissions at the same time. If they are implemented in different moments, then the total yearly emissions reduction of the overall project may vary.

The emissions reduction derived from the “Other renewable energy projects to be selected from the pipeline” (Phase II) were estimated based on the combination of potential renewable energy projects that may be implemented. The pipeline includes several PV systems and projects (as independent applications), solar-hybrid mini-grids for other villages, several biomass projects (cashew, rice and other biomass assessments), wind and the Saltinho HPP. Bearing in mind the conclusions from the Energy Baseline Report (see Annex G), which state that solar energy and biomass energy are the most promising renewable sources in terms of potential for exploitation in Guinea Bissau (in addition to the Saltinho HPP), as well as the interest of potential projects developers (e.g. Hotel Lybia and expansion of MoE PV system), an estimate of potential capacity additions was done, which adds up 1.5 MW. Then, added to the already identified Phase I

investment projects, reaches the 2.5 MW proposed to be achieved during the execution of the GEF Project. As in Phase I, the business-as-usual scenario would be to consume diesel fuel to supply energy needs.

The estimate of potential projects to be executed in Phase II that will bring emissions reductions are:

- Ministry of Energy additional capacity (200 kW)
- Other public buildings (e.g. in the Ministerial Complex) that may replicate the MoE initiative (~100 kW)
- Solar hybrid mini-grid system/s for villages (e.g. such as the identified by FRES) (~650 kW)
- Lybia Hotel PV/solar thermal systems (~150 kW)
- PV systems installed by several organisations, similar to the case of Afripeche (e.g. PV for telecommunications companies, PV water pumping systems, PV systems promoted by ADPP, etc.) (~200 kW)
- Initiatives for energy generation with biomass sources, e.g. rice, cashew, etc. identified as part of a detailed national biomass resource assessment (~200 kW)

Although Saltinho HPP has been included in the pipeline of Phase II Investment Projects mentioned in Output 1.2.1, its emissions reductions were not included in the estimate of Table 2. The reason is that Saltinho is included under the GEF Project with the objective of updating the old feasibility studies (e.g. hydrology, social and environmental impact study), which will leave the project ready to start the bidding process and future construction. Since the emissions reduction will only occur once the plant enters into operation, they are not likely to occur during the execution of this GEF Project. However, due to the relevance of this particular project for the country, the emissions reductions were estimated and these are:

- Annual: 90,122 tCO_2/year
- Direct: 2,703,649 tCO2 (over 30 years)

Indirect Emissions Reduction:

There are two different approaches for estimating indirect effects: the "bottom-up approach" and the "top-down approach". The indirect emissions reduction may occur if the project cases are replicated.

TABLE 3: INDIRECT BOTTOM-UP GHG EMISSIONS REDUCTION

Projects to be replicated	Replication Factor	Indirect bottom-up GHG emissions reduction (tCO2e)
Phase I - Investment Projects		
Afripeche ice factory building – PV systems for other fishery facilities	2	4,726
Ministry of Energy building – PV systems for other public buildings	2	3,836
Bula cashew processing facilities – Biomass co-generation systems for other cashew processing facilities	3	5,852
Bissora (minigrid system, with electrical grid and a hybrid solar PV-diesel) - mini-grids for further villages	2	24,101
Bambadinca (minigrid system, with electrical grid and a hybrid solar PV-diesel) - mini-grids for further villages	2	16,560
Phase II - Investment Projects		
Other renewable energy projects to be selected from the pipeline	2	152,534
Total		**207,609**

Phase I projects: For the estimate of the indirect bottom-up emissions reduction, a replication factor of 2 was used for the projects involving PV systems (Afripeche, Ministry of Energy, Bissora and Bambadinca), following the GEF

spreadsheets suggestion. For the biomass Bula plant where cashew shells are used as energy source, a replication factor of 3 was applied since the technology used in this type of initiative is aligned with the technology used in the industrial processes associated to the production of cashew. In addition, cashew production is one of the biggest activities carried out in Guinea Bissau, and thus this type of project has a larger potential for replication.

Phase II projects: A replication factor of 2 was used for the other 1.5MW renewable energy projects to be selected from the pipeline. As explained before, Saltinho's emissions reductions were not included in Table 2 and therefore are not included in Table 3 either. However, due to the relevance of this project for the country, the indirect emission reductions were estimated and are:

- Indirect: 4,325,838 tCO_2 (replication factor: 1.6)

Diesel savings derived from all these projects are relevant because of the positive impact they will have in terms of "money" that will not be spent for purchasing fuel and generating energy. The following table summarizes the volume of diesel saved by each type of resource:

TABLE 4: VOLUME OF DIESEL SAVED THROUGH INVESTMENT PROJECTS

	Volume of diesel saved (m^3/year)	**Volume saved over projects' lifetime (m^3)**
Afripeche PV (25 years)	36	894
Ministry of Energy PV (25 years)	29	725
Bissora PV (20 years)	228	4,557
Bambadinca PV (20 years)	157	3,131
Intanha Bula cashew plant (25 years)	44	1,106
Other renewable energy projects to be selected from the pipeline (20 years)	900	18,006
Total	***1,394***	***28,418***

The savings presented in the previous table expressed in terms of money, are as follows:

TABLE 5: TOTAL DIESEL FUEL SAVINGS THROUGHOUT THE LIFE-TIME OF INVESTMENT PROJECTS

	Cost of diesel (USD/litre)	**Total savings throughout project lifetime (kUSD)**
Afripeche PV (25 years)	1.03	$921
Ministry of Energy PV (25 years)	1.17	$851
Bissora PV (20 years)	1.50	$6,816
Bambadinca PV (20 years)	1.50	$4,683
Intanha Bula cashew plant (25 years)	1.50	$1,664
Other renewable energy projects to be selected from the pipeline (20 years)	1.34*	$ 24,128
Total	$ ***39,063***	

**An average value was taken since some of the projects do not have a definitive location and the price may vary depending on this.*

The estimate of the total savings was done using the current price of diesel, which implies that the actual value for each coming year might be different due to the variation in the price of diesel that may occur. The diesel prices vary depending on the consumer, therefore the price will be different for public buildings' users, end-consumers, commercial and industrial activities and utilities selling to the grid. Saltinho HPP's diesel savings would be as follows:

- Volume of diesel saved over lifetime: 1,022,317 m^3
- Costs saved from diesel purchases: USD 1,110,610,317

In general, the following positive impacts can be expected with regard to the achievement of the Millennium Development Goals (MDGs) in Guinea Bissau:

MDG	Renewable Energy Contributes by
1 Cutting Extreme Poverty and Hunger	• Reducing share of household income spent on cooking, lighting, and space heating by eliminating the purchase of kerosene through wider use of renewable options such as biogas. • Improving ability to cook staple foods. • Reducing post-harvest losses through use of solar dryers as opposed to diesel run generators for better preservation. • Use of treadle and ram pumps, and electricity from renewable energy sources for irrigation to increase food production and access to nutrition. • Enabling enterprise development, utilizing locally available resources such as agricultural residues, biogas etc and creating jobs. • Use of renewables-based lighting to allow permit income generating activities during the night. •
2 Universal Primary Education	• Renewables based lighting for reading or studying beyond daylight. • Creating a more child-friendly environment (access to clean water, sanitation, lighting, and space heating/cooling, less time needed for firewood collection, school feeding), which can improve attendance in school and reduce dropout rates. • Provision of renewables based electricity to rural schools can assist in retaining teachers. • Electricity from renewables can power equipment enabling access to media and communications that increase educational opportunities.
3 Gender Equality and Women's Empowerment	• Freeing women's time from survival activities, allowing opportunities for income generation. • Clean energy options such improved biomass cookstoves and biogas units can reduce exposure to indoor air pollution which adversely affects women in Africa and improve health (through use of improved stoves). • Lighting streets using electricity from renewables can improve women's safety. • Providing lighting for home study and the possibility of holding evening classes for women.
4, 5, 6. Health	• Reducing exposure to indoor air pollution thus reducing respiratory and eye diseases, less burns, and improving health through improved and more efficient biofuel cookstoves. • Providing access to better medical facilities for maternal care through PV-powered clinics and medical equipment. • Allowing for medicine refrigeration, equipment sterilization, and safe disposal by incineration. • Facilitating development, testing, and distribution of drugs through PV-powered rural clinics. • Enabling access to the latest medicines/expertise through renewable-energy based telemedicine systems. • Providing access to health education media.
7 Environmental Sustainability	• Boosting agricultural productivity, increasing quality instead of quantity of cultivated land. • Reducing deforestation for traditional fuels, reducing erosion and desertification. • Reducing greenhouse gas emissions. • Restoring ecosystem integrity through land management.

Source: REN21 Renewable Energy Policy Network, 2005

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks:

TABLE 6: RISKS AND MITIGATION ACTIONS

Risks	Impact on the Project	Likelihood	Risk Description and Mitigation Actions
1. Political instability may drive the project off track	Moderate	Moderate	The implementation of the GEF projects starts at the background of the successfully held democratic elections in April/May 2014 which mark the end of a period of international isolation and political instability. The new situation gives the project a particular relevance. Still, there is some risk that political instability may drive the project off-track although most of the activities will not be affected in case of remaining instability. Larger investment projects like Saltinho HPP might be affected due to the needed trust of investors.

Risks	Impact on the Project	Likelihood	Risk Description and Mitigation Actions
			Probability: moderate *Mitigation Measures:* • High-level access to the local authorities through the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) and ECOWAS will help to resolve possible challenges; • Possible delays are considered in the project duration and implementation schedule; • Saltinho HPP will be developed in close coordination with the OMVG/WAPP regional project and IFIs such as the IFC, AfdB, BOAD and IBRD.
2. Poor infrastructure and performance as well as low interest of EAGB in renewable energies may be an obstacle to inject energy into the main grid. (Medium)	Moderate	Moderate	Some of the proposed investment projects rely on the grid management capacity of EAGB and its will to buy electricity. So far there is no legislation in place which obliges the utility to buy electricity generated from IPPs. If EAGB does not accept the injection of electricity into the grid then specific grid-connected projects may fail. Moreover, the management of hydro power projects or other renewable energy projects requires specific capacities of the utility, which need to be built. *Probability*: Due to the financial situation of EAGB at the moment, this risk is considered medium. Nevertheless EAGB has been involved during the development of this PPG and will be actively involved in some of the investment projects. In addition they are keen on adding additional generation capacity and keen to also off-set some of their fossil fuel generation. They have expressed interest in signing PPAs with potential generators. The MEINR/DGE is fully committed to the project and will also ensure that the projects are connected to the grids. *Mitigation Measures*: • Possible Independent Power Producer (IPP) and Public Private Partnership (PPP) models will ensure the sustainability of the projects; HPP Saltinho will be developed either as PPP or IPP; IFC supports the PPP model. • Strengthening of capacities of utility experts on renewable energy integration and grid stability through the capacity building component;
3. Delay in commissioning of investment and replication projects and availability of results	Moderate	Low	There is a technical risk associated with the investment projects due to limited experience in the country with the proposed technology and similar projects. There are no noteworthy technical risks associated with the policy measures and capacity building activities proposed by the UNIDO-GEF project. All of them are well proven interventions, tested by national experiences and in many other

Risks	Impact on the Project	Likelihood	Risk Description and Mitigation Actions
			countries. *Probability*: low. *Mitigation Measures*: • Execution of activities to be implemented under PC1 will be carried out with the support of international experts/companies with demonstrated and successful past experience. • Only mature and proven small to medium scale renewable energy technologies are being proposed to be installed as investment projects. • Capacity building and enabling activities will pay special attention to further defining the existing baseline in order to develop effective tailored and well-targeted training programmes and curricula. • For the identification of replication projects, ECREEE will provide assistance to the project. • The status of projects will be regularly reviewed and any necessary corrective steps will be promptly taken.
4. Sector stakeholders do not participate/ engage actively in the project	Low	Very Low	Due to the lack of information and awareness in small to medium scale renewable energy initiatives, there is a risk that there is not active participation from stakeholders. However the project aims at addressing this barrier. In addition, the very high cost of traditional energy (fossil fuel based) in the country means that organizations are looking for and considering new alternatives such as renewable energy. The level of interest and collaboration shown by enterprises during the PPG phase leads to legitimately expect strong participation. *Probability*: very low. During the PPG phase members of the ECREEE, Hotels, MEINR/DGE, Public and Private Organisations and Financing Institutions in Guinea Bissau were all approached. The general response was of strong support and interest to participate in the project. *Mitigation Measures:* • A well-structured national dissemination campaign demonstrating the viability of the investment projects and outlining the opportunities during project implementation combined with an active dialogue and involvement of associations at the national and local level during the whole project duration will ensure the desired stakeholder response to the project
5. Financial and credit constraints prevent enterprises from investing in RE	Moderate	Low - Moderate	The ability of companies to invest in small to medium scale renewable energy projects will impact the replication of the investment projects and the long term market for small to medium scale renewable energy. Access to finance in Guinea Bissau is possible but at very high interest rates. Also there is no experience in Guinea Bissau on the involvement of the

Risks	Impact on the Project	Likelihood	Risk Description and Mitigation Actions
			local finance sector in providing financing for this type of projects. *Probability:* Low to moderate. *Mitigation Measures:* • Early dialogue with grant providers will be initiated • Links to the ECOWAS Renewable Energy Facility will be created • One of the key advantages to invest in small to medium scale renewable energy is the offset of either grid electricity or diesel fuel – both of which are very expensive/unavailable within Guinea Bissau. As part of the training in PC3 life cycle analysis will be taught to show the lifetime benefits of renewable energy projects, particularly in a volatile fossil fuel market. Demonstrating these benefits is expected to lead to further investment in small to medium scale renewable energy projects. • For the scale-up investment projects additional technical assistance will be provided to help the projects take off the ground. • Training will also be provided to local financial institutions so that they fully understand the risks and benefits of small to medium scale renewable energy projects and provide appropriate financial mechanisms.
6. Implementation risk	Moderate	Very low	UNIDO has long-standing direct experience in the development and implementation of renewable energy projects and it has a strong knowledge of the key variables that determine the success and the failure of project implementation *Probability:* Low to moderate. *Mitigation Measures:* • Detailed development of activities plans in close cooperation with in-country project partners, stakeholders and developers. • Agreed and transparent modus operandi will be defined before the start of the project implementation. • The UNIDO project manager has worked in the renewable energy sector of ECOWAS for years, is aware of critical issues, has strong links to the country and ECREEE and speaks Portuguese • ECREEE will support the project implementation and the centre employs a specialised team of local and international experts which will contribute to the success for the UNIDO-GEF project. Moreover, ECREEE has access to other donor funding (e.g.

Risks	Impact on the Project	Likelihood	Risk Description and Mitigation Actions
			European Commission, Spain, USAID) which can co-fund some of the activities or ensure follow-up and sustainability. • All other project partners have experience in the development of renewable energy projects in Guinea Bissau
7. Sustainability	Moderate	Low	The sustainability of the activities to be implemented under all components of the project are a key issue which has to be addressed. The environmental and social sustainability of the investment projects has to be considered. *Probability:* Low to moderate. *Mitigation Measures:* • The involvement of ECREEE will ensure that project results will be maintained also after the closing of the GEF project. • All investment projects include also capacity development activities for the project owners/promoters. For Saltinho HPP a detailed environmental and social impact assessment will be undertaken. Saltinho HPP will be developed as run-of-river scheme which has usually very moderate impacts on the environment.
8. Climate change impacts on the region may affect project development	Low	Very Low	The execution of the Investment projects can suffer delays in terms of timeline for execution due to climate change effects in Guinea Bissau. For example a change in the frequency of storms or draughts may affect the availability of biomass for biomass-related projects, or unusual cloud cover and more-than-usual frequent rains may reduce the energy generated by PV systems. It affects also hydro power planning. *Probability*: the likelihood of this risk has been assessed as Very low in terms of the Project's lifetime (4 years). Climate change would take more time to cause a significant impact on the environment and thus on the execution of the project. *Mitigation measures*: • An organised schedule and project monitoring will assist in the identification of delays and reprogramming of activities execution.

A.7. Coordination with other relevant GEF financed initiatives

The GEF project will coordinate closely with already ongoing programs and projects in Guinea Bissau. Synergies and the potential for replication and up-scaling through the GEF project were already identified during the PPG phase. The GEF project will contribute to a better coordination and strategic orientation of the currently fragmentized off-grid activities in the sector. Synergies that will be explored during the project:

- 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 show to be promising. Indeed, one of the investment projects identified to be deployed, as part of PC1, is a similar project to the referred one.
- With ongoing off-grid PV projects of the Programme Régional Solaire (PRS) of CILS/EU, UNDP and different NGOs. During the PPG stage different cooperation opportunities were discussed and some of them have been already established for the development/participation in the development of some of the project components;
- 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 was carried out during the PPG stage and for the projects that yield positive results those were integrated into the pipeline of investment projects: 19 MW small scale Saltinho hydro power project and the Bambadinca Sta Claro 312 kW PV project.

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 (EREP) 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. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1 Describe how the stakeholders will be engaged in project implementation:

The GEF Implementing Agency for the Project will be UNIDO. UNIDO will oversee the implementation of the project. It will be represented by the UNIDO Project Manager in the Steering Committee. All procurements will be undertaken in line with the UNIDO procurement rules. The project manager is coordinating the UNIDO Global Network of Regional Sustainable Energy Centres (which includes ECREEE) and the regional knowledge program of the GEF Strategic Programme for West Africa (GEF-SPWA). The project will be implemented in cooperation with the following main executing partners:

- **DGE at MEINR:** DGE is the main local counterpart. DGE will host the PMO and will be responsible for the execution of some of the activities. It will be responsible for keeping the project up to schedule and to develop specific initiatives in accordance to the project objectives. Moreover, office space, technical and human resources will also be made available by DNE.

- **ECREEE:** ECREEE will be an important executing partner for the envisaged policy and capacity development activities. ECREEE is leading the implementation of the ECOWAS Renewable Energy Policy (EREP) on national levels in the fifteen ECOWAS countries. Moreover, ECREEE is operating several train-the-trainers networks and is managing the ECOWAS Renewable Energy Facility (EREF), ECREEE will also ensure the political buy-in of ECOWAS and create strong synergies to its regional activities and promote south-south cooperation between Cape Verde and Guinea Bissau. Cape Verde and Guinea Bissau share a common language (Portuguese) and history. The centre will create strong synergies to its ongoing programs such as the ECOWAS Renewable Energy Facility (EREF), the ECOWAS Renewable Energy Policy (EREP) Implementation Process, the ECOWAS Renewable Energy Investment Initiative and the ECOWAS Program on Gender Mainstreaming in Energy Access (ECOWGEN). An ECREEE senior renewable energy expert, which implements a similar RE project with UNIDO in Cape Verde, will support the NPM. ECREEE will assist particularly in the implementation of some of the investment projects, as well as policy, knowledge and capacity development activities.

- **African Development Bank (AfDB):** The AfDB will be an important partner and co-financier for the development of the project Saltinho HPP (19 MW). The early involvement of AfDB will ensure access to loan

finance once the project is developed to bankable feasibility stage. AfDB has a long-standing track-record and experience in the development and financing of hydropower projects in Sub Sahara Africa.

- **TESE - Associação para o Desenvolvimento:** will be an important executing partner of several activities of the project, by providing technical and human resources as well as co-finance particularly for the envisaged PV powered mini-grids and some of the capacity development and policy activities**.** TESE is very experienced with regard to mini-grids and related policy issues in Guinea Bissau. It implements several EU funded projects.

Other Executing Partners:
Several organisations will be engaged at different stages of project execution in order to provide and/or share specific experiences and knowledge and to participate in the project's activities.

- Local associations, institutions and NGOs such as EAGB, 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 Assembleia de Cooperação Pela Paz (ACPP), FRES (Foundation for Renewable Energy Sources), International Finance Corporation (IFC), University of Mindelo in Cape Verde, Udine University can and some of them have already agreed and demonstrated their intent to 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.
- The ENERGIA International network on 'Gender and Sustainable Energy' will be a strategic partner with regard to energy issues of the project. ENERGIA is a strategic partner of the ECOWAS Program on Gender Mainstreaming in Energy Access (ECOWGEN). ENERGIA to promote awareness of gender issues and build capacity on mainstreaming gender into the existing and planned national RE&EE policies. As a first key activity to improve the data situation regarding the gender-energy nexus ENERGIA will undertake a baseline assessment.
- The Austrian Energy Agency (AEA) will be a partner with regard to the review and quality assurance of the National Renewable Energy Action Plan of Guinea Bissau. AEA is already engaged in that process through ECREEE.

Bilateral donor partners, local and development banks as well as project developers and investors are important stakeholder when it comes to the implementation of investment projects. Moreover, UNIDO will involve its network of Investment and Technology Promotion Office ITPOs during project implementation.

Project Management Set-up

Main Activities to be conducted	**Responsibility of / stakeholders involved**
0) Ensure the implementation of the project	UNIDO
1) Convene the Steering Committee (SC) responsible for project coordination and execution	MEINR, ECREEE, TESE, EAGB, Chamber of Commerce, Industry, Agriculture and Services, Ministry of Finance, UNIDO, ENERGIA, AfDB
2) Selection of the National Project Manager (NPM)	Steering Committee
3) Establishment of a Project Management Office (PMO) and selection of members	Steering Committee
4) Day to day coordination, management and monitoring of all project activities	PMO – National Project Manager in cooperation with ECREEE
5) Engagement of Strategic Partners when necessary	PMO – National Project Manager
6) Evaluations	Mid-Term evaluations are the responsibility of the UNIDO project manager and independent

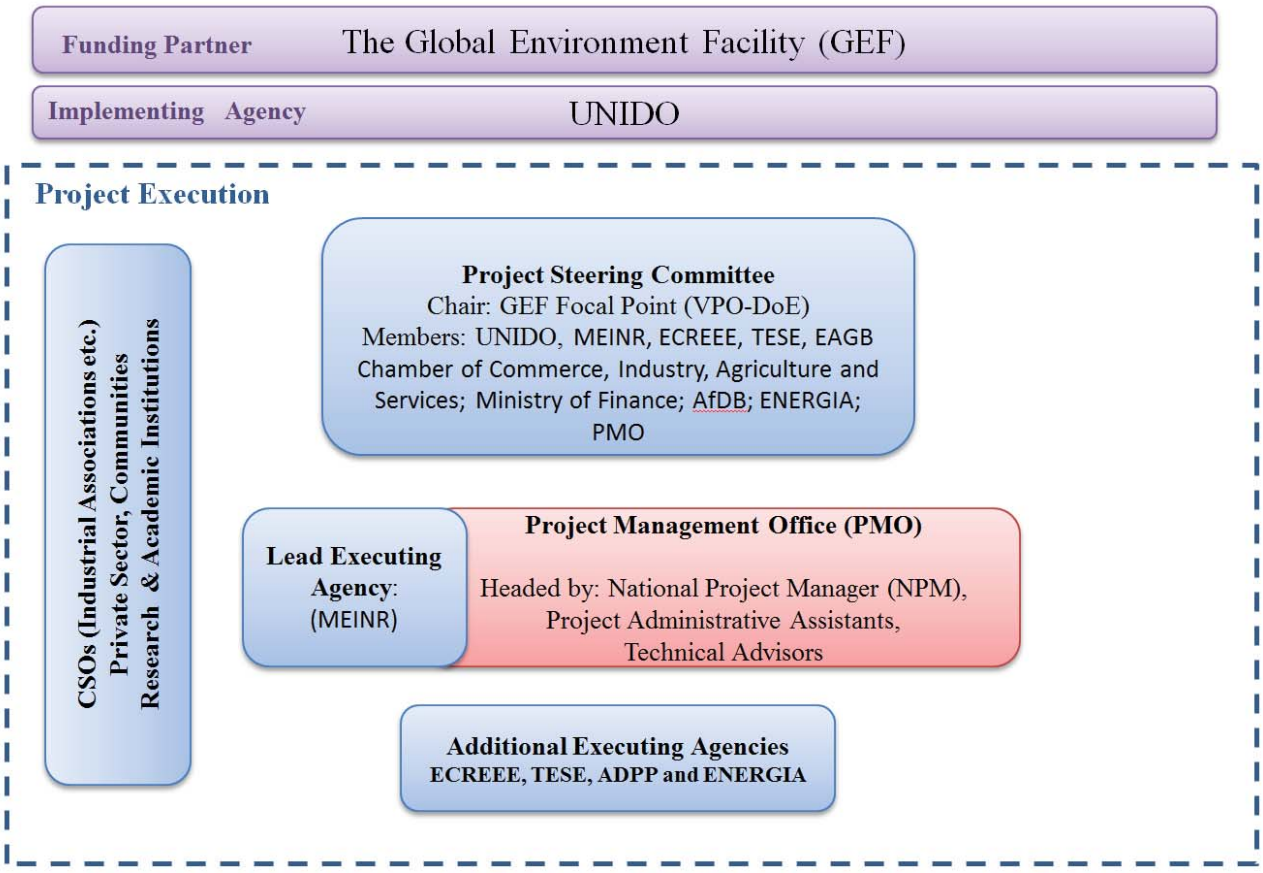
	evaluations of the UNIDO ODG/EVA

The project will be managed at two different levels:

- Institutional level
- Project level

Each level implies the involvement of different stakeholders who are engaged in the execution of the project and have different responsibilities and/or share several activities. At institutional level, the most important responsible party of the project will be Director of the General Directorate for Energy at MEINR, who also plays the role of the Project Steering Committee's chairman. He/she will be responsible for coordinating the efforts of each government body (ministries, directorates, etc. – "project executing counterparts") with a view to achieving the objective of the project at national level. The PMO (Project Management Office) will coordinate the specific activities at project level and will monitor the fulfilment of each individual milestone. The following figure shows schematically how the stakeholders relate with each other in the two levels:

FIGURE 4: INSTITUTIONAL ARRANGEMENT FOR THIS PROJECT



Project Steering Committee:

The **Steering Committee** is composed of the three Ministerial directorates (DGE at MEINR, Ministry of Finance, Chamber of Commerce, Industry, Agriculture and Services), the EAGB, ECREEE, AfDB, TESE, ENERGIA and UNIDO. The Ministry for Finance will be part of the SC and will be responsible to oversee the disbursements referent to the co-finance provided to the project by the Government of Guinea Bissau. The Chamber of Commerce, Industry, Agriculture and Services will be part of the **S**C and will help in providing input and guidance into some of the activities developed through the project duration.

Therefore, the Secretariat of the Steering Committee will be located at Bissau, capital city of Guinea Bissau. AfDB expressed strong interest in co-funding the development of Saltinho HPP. Moreover, AfdB is the Africa hub for SE4ALL and is a strategic partner for the envisaged "SE4ALL for Guinea Bissau" campaign. AfDB is currently developing a country strategy for Guinea Bissau where renewable energy plays an important role. To ensure gender-mainstreaming the ENERGIA International network on 'Gender and Sustainable Energy' will be invited to participate in the meetings. ENERGIA is a strategic partner in the implementation of the ECOWAS Program on Gender Mainstreaming in Energy Access (ECOWGEN). The DGE will act as focal point and will be responsible for the overall daily project management, monitoring of activities and planning, making sure that everything flows as scheduled.

The Steering Committee will be chaired by the Director of DGE and will meet on a biannual basis. The responsibilities of the Steering Committee include:

1. Revision and approval of annual work plans;
2. Revision and approval of annual GEF reporting (PIRs);
3. Revision and approval of annual budgets;
4. Monitoring of Project progress;
5. Providing guidance on strategic issues and activities;
6. Appointing the National Project Manager;
7. Select the members of the Project Management Office (PMO);
8. Development of a Procurement Plan
9. Development of a and gender mainstreaming plan
10. Supervise the PMO

Any changes/revisions/approvals proposed by the Steering Committee will be done in accordance with UNIDO and GEF rules and regulations. As already mentioned, the SC will establish a Project Management Office (PMO) and will select its members. The UNIDO procurement rules will be applied. The PMO will be responsible for the project at local level and will be the main point of contact for government institutions and organisations. The PMO will also be responsible for elaborating a Work Plan (POA). All PMO members will be either national consultants (Guinea Bissau) or seconded from the national counterparts (ministries' staff), unless otherwise agreed, and will be based in Bissau, and shall satisfy the selection criteria described in the Terms of Reference (TOR) and be hired using the Project's GEF and co-financing resources. PMO members shall have the capabilities to coordinate, evaluate and monitor project-related activities as well as background on renewable energies, knowledge of the local language and/or English, management capacities, etc. The specific capabilities, experience and level of knowledge of each mentioned item will be defined by the SC at the time of selecting the staff needed for a certain position to be filled within the PMO or activity to be carried out. The PMO will be responsible for coordinating the communication and dissemination of the project results, lessons learned and success stories that are important for the sustainable and future development of the involved market sectors in Guinea Bissau.

B.2 Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF):

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). The following table summarizes some of the socio-economic benefits yield by the project:

TABLE 7: SOCIO-ECONOMIC BENEFITS OF PROJECT

Benefits	Summary description
Investment leverage	The total amount that the GEF would provide for this project is approximately USD 1.7 million, which leverages a total co-financing amount of approximately USD 10 million from other sources. The investment leverage will be further increased to around USD 80 million once the Saltinho HPP project is brought to financial closure.
Jobs created	Provided the local interest in working in the renewable energy field grows and that the political and economic scenario improves in order to promote and increase the deployment of RE in Guinea Bissau, there could be potential for the generation of the following type of jobs: • Local workers for the construction and operation of Saltinho HPP • Teachers/trainers providing courses on RE technologies in local educational institutions (e.g. universities) and/or organisations, such as local NGOs that may provide capacity building. • Local or foreign RE technology providers (such as distributors of imported goods, e.g. PV panels) that can employ local technicians or engineers on RE technologies to do the installation, operation and maintenance of the RE systems. • Local consultancy service providers that work on RE systems design and feasibility • Foreign companies that may open local offices due to the growth of the RE market may employ local workforce for their operations and this could include specialised RE staff as well as non- RE specialized staff (e.g. administrative staff)
Positive impacts on environment and health	The deployment of the considered investment projects as well as the deployment of further projects (e.g. projects identified to be developed in National Renewable Energy Investment Plan) will have several positive impacts on the local and global environment: • Reduction of GHG emissions and other associated air pollutants derived from fossil fuel combustion (CO, NOx, SO_2, particulate matter) since it is replaced by renewable energy sources. • Potential reduction in emissions and wastes from fossil fuel production (upstream and downstream), distribution and transport to the site of consumption. Although there will be emissions associated to the production, transportation, installation and maintenance of RE technologies, these are expected to be very low during the lifetime of the RE system in comparison to the emissions from a fossil fuel-based plant during its operation and maintenance. • Particularly in the case of the use of cashew shells (biomass) there is a reduction of the cashew shells disposed of as waste, which are left to naturally decay in the nearby plantations or facility's surroundings. • With an increased access to reliable electricity, the families will reduce the use of other sources of energy for lighting than pollute the indoor air and compromises their health, such as candles, fossil fuel burners, etc. • The use of RE as a source of energy for lighting and communication (radio) can in some cases reduce the use of batteries, which are considered an environmental pollutant if they are not disposed correctly after use. • Avoidance of potential fuel leaks that could occur if storage tanks or containers are not properly handled. Fossil fuel leaks can pollute the soil and water sources.

Benefits	Summary description
Positive impacts for urban and rural companies and households, as well as the Government and the utility	• Increased energy security in the capital Bissau through access to cost-effective base load hydro power through Saltinho HPP or imports from Guinea through the OMVG transmission line. Saltinho HPP has the potential to cover up to 63% of the estimated 30 MW peak power demand in the capital (depending on the seasonal fluctuations of the river flow). Alternatively the power can be sold through the OMVG line to countries such as Gambia or Senegal. • Through the integration of cost-effective hydropower sources it is expected that the generation costs for the utility EAGB will go down considerably. It can be expected that this will result into a reduction of the high consumer tariffs for households, companies and industry. The Government and ECOWAS (which has provided diesel fuel subsidies for Guinea Bissau in the past) will benefit from a reduction of these spending and the import of diesel. The reduction of the tariffs will lead to a higher productivity, competitiveness and income of companies and households. Public institutions will be able to deliver their services more effectively. • The reduction of power cuts and load shedding through hydropower will reduce the widespread use of independent diesel back-up systems in the capital. Private companies/industries that install RE in their facilities will be able to have their independent energy supply system without having to rely on fossil fuels only. • Rural households, like in the case of Bissora and Bambadinca, will have an independent mini-grid to supply energy for them, reducing the use of diesel generators in the village. • By adding RE sources to the electricity grid, the state will also be able to reduce the grid's carbon emission factor and thus have a lower national carbon footprint. • State-owned buildings, e.g. ministry of energy, could have their independent electricity supply (off-grid) without having to incur in the purchase of expensive fossil fuels for energy generation, which they currently cannot afford.
Competitiveness of RE to diesel generation	Although it is well known that RE projects need a higher upfront investment in comparison to diesel-based systems, the potential reduction in operation and maintenance cost that would be generated throughout their lifetime, which are mainly associated to the purchase of diesel fuel to operate, makes RE technologies more attractive. Moreover, the exploitation of indigenous resources (solar, biomass, hydro, etc.), reduces the country's dependency on external sources of energy, i.e. imported fossil fuels. In addition, the implementation of renewable energy projects generates positive environmental impacts, in comparison to diesel-based generation systems, since RE reduces GHG emissions and other air pollutants.
Access to affordable and reliable electricity services	The deployment of the considered investment projects, especially the Bambadinca and Bissora projects, will provide 24 hours electricity access to more than 16,000 rural inhabitants through RE. This type of projects, which are the firsts of its kind in Africa, can be very effective for the provision of electricity access to similar villages not only in Guinea Bissau, but also in Africa in general.
Addressing gender issues	This project will monitor gender-related indicators in order to follow up the percentage of women involvement in renewable energy initiatives. Women will be encouraged to participate in the capacity building activities and their participation will be tracked. In addition, there are benefits in terms of improvement of household air quality due to diminishing the use of fossil fuels for lighting, which will impact directly on women and children, who are the ones that more frequently stay at home.

B.3. Explain how cost-effectiveness is reflected in the project design:

The project takes a comprehensive approach to address many of the barriers that are preventing renewable energy projects being taken up widely, in particular those related to awareness and capacity as well as a supportive regulatory framework. The strategy for the project to achieve good cost-effectiveness is based on a number of principles: 1) build on and maximize leverage of national public and private resources; 2) training-the-trainers approach for institutional and industry-wide awareness raising of and capacity building in renewable energy project identification, analysis and development; 3) select renewable energy investment projects primarily on the basis of their replication potential (and therefore direct and indirect avoided GHG emissions); and 4) searching and maximizing synergies with institutions for investment in renewable energy. Given its focus on addressing policy and technical capacity barriers, the GEF-UNIDO project will generate the biggest share of GHG emission savings after the project implementation period, when the new legislation, capacity built and the training programmes established will deploy their full impact in terms of new renewable energy projects. Bearing in mind that the GEF allocation of resources for this project are USD 1.7 million USD, the cost-effectiveness of this initiative is estimated at 62 US$/ton CO_2eq, considering only the direct GHG benefits over the initiative's lifetime for Phase I –Investment projects (27,538 tCO_2eq). If also Phase II – Investment projects are considered, then the figure drops to 22 US$/t$CO_2$eq (for a total reduction of 76,267 tCO_2eq). If the indirect GHG benefits (total 207,609 tCO_2eq, bottom-up approach) are included for both Phase I and Phase II investment projects, the cost-effectiveness drops to approximately 8 US$/t$CO_2$eq.

C. DESCRIBE THE BUDGETED M &E PLAN:

Project monitoring and evaluation (M&E) will be conducted in accordance with established UNIDO and GEF procedures. The concrete M&E activities are defined by Project component #4. The overall objective of the monitoring and evaluation process is to ensure successful and quality implementation of the project by: i) tracking and reviewing project activities execution and actual accomplishments; ii) providing visibility into progress as the project proceeds so that the implementation team can take early corrective action if performance deviates significantly from original plans; and iii) adjust and update project strategy and implementation plan to reflect possible changes on the ground, results achieved and corrective actions taken. A detailed monitoring plan for tracking and reporting on project time-bound milestones and accomplishments will be prepared by UNIDO in collaboration with the Project Management Office (PMO) and project partners at the beginning of project implementation and then periodically updated. By making reference to the impact and performance indicators defined in the Project Results Framework, the monitoring plan will track, report on and review project activities and accomplishments in relation to:

a) Renewable energy generation and GHGs emission reductions directly generated by the UNIDO GEF project. These will include the type and the number of small to medium scale renewable energy projects developed and implemented.
b) Renewable energy generation and GHGs emission reductions in-directly generated by the UNIDO GEF project. These will include type and the number of small to medium scale renewable energy projects developed and implemented due to the increased capacity and conducive environment for the projects.
c) Renewable energy investment generated by the UNIDO GEF project, directly and indirectly.
d) Development of policy, legislative and regulatory frameworks in favour of renewable energy
e) Level of awareness and technical capacity for small to medium scale renewable energy within relevant institutions, in the market and within enterprises.
f) Private sector contribution to the implementation of the project.
g) Overall socio-economic impacts of the project to include increase in productive capacities, gender balance etc.

Monitoring and Evaluation of direct and indirect GHG emission reductions will make use of the GEF Tracking Tool, which will be submitted to the GEF Secretariat three times during the duration of the project: at CEO Endorsement, at mid-term, and at project closure. The National Project Manager will be responsible for continuous monitoring of project activities execution, performance and track progress towards milestones. However, monitoring and evaluation of the investment projects with respect to energy generation, technical performance, commercial viability and GHGs emission reduction, and related information, will be integral part of the evaluation component of Project Component#1. The UNIDO project manager will be responsible for tracking overall project milestones and progress towards the attainment

of the set project outputs. The UNIDO project manager will be responsible for narrative reporting to the GEF. The final project evaluation will be carried out 6 months after operational completion of the project. The following table provides the tentative budget for the evaluation.

M&E Activity Categories	Time Frame	GEF Grant Budget ($US)	Co-financing Budget ($US)	Responsible Parties
Measurement GEF Tracking Tool specific indicators	At project mid-term and completion	6,400	75,000	• Independent M&E expert to provide feedback to PMU • PMO will submit inputs for consolidation and approval by PSC • PSC submits final inputs / reports to UNIDO PM UNIDO PM
Monitoring of project impact indicators (as per Log Frame)	TBD by UNIDO PM (recommended semi-annually)			
Periodic Progress Reports	TBD by UNIDO PM (recommended semi-annually)			
Midterm review/evaluation	At project mid-term	40,000	15,000	Independent evaluator in cooperation with UNIDO PM
Independent terminal evaluation	Project completion (at least one month prior to the end of the project and no later than six months after project completion)			Independent M&E expert in cooperation with UNIDO ODG/EVA
Total		46,400	90,000	

UNIDO as the Implementing Agency will involve the GEF Operational Focal Point and project stakeholders at all stages of project monitoring and evaluation activities in order to ensure the use of the evaluation results for further planning and implementation. According to the Monitoring and Evaluation policy of the GEF and UNIDO, follow-up studies like Country Portfolio Evaluations and Thematic Evaluations can be initiated and conducted. All project partners and contractors are obliged to (i) make available studies, reports and other documentation related to the project and (ii) facilitate interviews with staff involved in the project activities.

D. LEGAL CONTEXT:

The Government of the Republic of Guinea-Bissau agrees to apply to the present project, mutatis mutandis, the provisions of the Standard Basic Assistance Agreement between the United Nations Development Programme and the Government, signed on 23 June 1975 and entered into force on 12 November 1975.

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 form. 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

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date *(Month, day, year)*	Project Contact Person	Telephone	Email Address
Philippe Scholtès, Managing Director, Programme Development and Technical Cooperation Division (PTC) UNIDO GEF Focal Point		*08/08/2014*	Martin Lugmayr, Project Manager, Rural Renewable Energy Unit, Energy and Climate Change Branch	+43(1)26026 3595	m.lugmayr@unido.org

ANNEX A: PROJECT RESULTS FRAMEWORK

Results	Indicators	Baseline and Targets	Means of Verification	Assumptions and Risks
Objective				
Investments in small to medium scale renewable energy technologies in the electricity sector are promoted	1. Volume of investment in RE technology projects mobilized and implemented (in USD) 2. Energy generated from RE (in MWh and as a % of total) 3. Incremental avoided CO2eq emissions (tonnes of CO2eq)	**Baseline**: 1. No major investments in RE technologies so far 2. Only 0.5 MW of RE capacity currently operating 3. High CO2eq emissions due to the dependence on diesel power generation 4. No RE policy and incentives in place **Targets**: 1. At least 8 million USD of investment for RE demonstration projects are mobilized and implemented 2. Installed demonstration projects with a capacity of 2.5 MW produce at least 4,977 MWh per year 3. Cumulative reduction of GHG of around 76,267 tCO_2 over the lifetime of the implemented demonstration projects (20 or 25 years depending on the projects)	1. Reports on the demonstration projects installed 2. Regular project reporting on generation capacity 3. Reports on policy and action in place	A: The Government of Guinea Bissau remains committed in the medium and long-term to renewable energy. A: Data is available to calculate CO2eq emission reductions R: Economic, financial or political crisis threaten the sustainability of the project
PC#1: Investments into small to medium scale renewable energy technologies				
Outcome 1.1: The technical feasibility and viability of small to medium-scale on-grid and off-grid renewable energy technologies in the urban and rural context are demonstrated	1. RE generation capacity installed and operating (in MW) 2. % of implemented demonstration projects generate sufficient revenues to meet the operating expenses and financial obligations	**Baseline:** No grid-connected renewable energy projects installed and decentralized systems with a capacity of 0.5 MW are deployed in Guinea-Bissau **Target:** 1. On- and off-grid RE projects with a total capacity of 2.5MW are fully developed and implemented 2. At least 75% of the implemented demonstration projects generate sufficient revenues to meet the operating expenses and	1. Evaluation reports 2. Project reports 3. Project website	A: Fossil fuel prices remain high in the medium and long term A: Co-finance is available for each project and there is technical capacity to install the projects.

			financial obligations		
Outputs:					
Output 1.1.1	High impact on-grid and off-grid renewable energy investment projects with a total capacity of 2.5MW are developed and implemented.	1. Number of RE projects developed and implementation facilitated 2. Installed renewable energy capacity (kW)	**Baseline**: No grid-connected renewable energy projects installed and decentralized systems with a capacity of 0.5 MW are deployed in Guinea-Bissau **Target**: 1. The RE projects developed under the PPG phase with a capacity of 1 MW and the projects to be fully developed under Output 1.2.1. with a capacity of 1.5 MW are implemented	1. Procurement documents and final offers of subcontractors 2. Commissioning and project progress reports 3. Project website	A: Fossil fuel prices remain high in the medium and long term A: Co-finance is available for each project and there is technical capacity to install the projects.
Outcome 1.2: The National Renewable Energy Investment Plan (NREIP) to replicate and up-scale on-grid and off-grid renewable energy technology projects is developed and endorsed		1. Volume of RE investments identified and to be promoted by the NREIP (in USD)	**Baseline**: No national investment strategy and financial support schemes linked to renewable energy targets are in place **Targets**: 1. Finalized National Renewable Energy Investment Plan (NREIP) promotes a project pipeline with an investment volume of at least 30 million USD	1. (Pre-)feasibility studies and project evaluation 2. Investment plan document 3. Project reports 4. Workshop proceedings	A: Sustained Government Support to agreed project activities A: Fossil fuel prices remain high in the medium and long-term A: The Grant financing window ring fenced to the ECOWAS Renewable Energy Facility (EREF) managed by ECREEE is fully operational
Outputs					
Output 1.2.1	Development of a pipeline of grid-connected and off-grid renewable energy priority projects	1. Number of (pre-feasibility) studies developed and incorporated in the National RE Investment Plan	**Baseline**: No grid-connected renewable energy projects installed and decentralized systems with a capacity of 0.5 MW are deployed in Guinea-Bissau **Targets**: 1. At least 9 (pre-)feasibility studies for RE projects are developed and included in the National RE Investment Plan	1.Feasibility studies and project evaluation 2. Project reports	A: Sustained Government Support to agree project activities A: Sustained Government Support to agree project activities

			2. Saltinho HPP (19 MW) is developed to feasibility stage and included in the National RE Investment Plan		A: Fossil fuel prices remain high in the medium and long-term A: private investors interested in developing Renewable energy projects
Output 1.2.2	The National Renewable Investment Plan is finalized	1. Validated National Renewable Energy Investment Plan (NREIP)	**Baseline**: 1. No national investment strategy for renewable energy **Target:** 1. National Renewable Investment Plan including the project pipeline is finalized and validated by key stakeholders in a workshop	1.Project evaluation 2. Project reports 3. Workshop proceedings 4. Project website	A: Sustained Government Support to agree project activities A: Sustained Government Support to agree project activities A: Fossil fuel prices remain high in the medium and long-term A: private investors interested in developing Renewable energy projects
Output 1.2.3	An existing grant facility will provide support for project development and small investments	1. Number of projects of the National Renewable Energy Investment Plan (NREIP) supported by the ECOWAS Renewable Energy Facility (EREF)	**Baseline**: 1. No financing instruments of special financial schemes for renewable energy project development or investments are in place in Guinea Bissau **Target**: 1. At least 3 projects of the National Renewable Energy Investment Plan (NREIP) receive support by the ECOWAS Renewable Energy Facility (EREF)	1. Application guidelines for EREF call for proposal(s) 1. Evaluation results of submitted projects in Guinea Bissau 2. Project documents and reports	A: Sustained Government support to agreed project activities A: Fossil fuel prices remain high in the medium and long-term A: Sustained support of ECREEE to implement the

					ECOWAS Renewable Energy Facility (EREF)
PC#2: Consolidated policy and regulatory framework for renewable energy					
Outcome 2.1: The existing policy and legal support framework for renewable energy is strengthened and regulatory mechanisms are improved		1. Endorsed renewable energy targets, policy and action plan 2. Concept for a National Regulatory Agency and support mechanisms for IPPs and PPPs are proposed	**Baseline**: No renewable energy targets, policy or action plans are in place in Guinea Bissau **Target**: 1. The National Renewable Energy Policy (NREP) and the National Renewable Energy Action Plan (NREAP) are developed and endorsed by the Government 2. The concept for a National Regulatory Agency and support mechanisms for IPPs and PPPs is proposed	1. RE policy and action plan documents 2. Studies 3. Project Reports	A: Sustained government support to agreed activities A: Sustained support of ECREEE through the NREAP process
Outputs					
Output 2.1.1	An assessment on gaps in the existing legal and regulatory framework for renewable energy is undertaken	1. Available gap assessment including recommendations for improvement	**Baseline**: No renewable energy targets, policy or action plan are in place in Guinea Bissau **Target**: Available gap assessment including recommendations for improvement	1. Review document 2. Recommendations	A: Gov. Guinea Bissau / EAGB acceptance of the new legislation supporting RE development
Output 2.1.2	The National Renewable Energy Policy (NREP) and the National Renewable Energy Action Plan (NREAP) are developed and endorsed in alignment with the ECOWAS Renewable	1. Renewable energy targets, policy and action plan are endorsed	**Baseline**: No renewable energy targets, policy or action plan are in place in Guinea Bissau **Target**: 1. The National Renewable Energy Policy (NREP) and the National Renewable Energy Action Plan (NREAP) are developed and endorsed by the Government	1. NREAP and NREP documents 2. Project reports	A: Gov. Guinea Bissau / Ministry of Energy accept the new legislation supporting the development of RE energy A: Sustained support of ECREEE through the NREAP process

	Energy Policy (EREP)				
Output 2.1.3	Facilitate the creation of a National Regulatory Agency for the power sector and support the development and implementation of mechanisms for IPPs and PPPs	1. Facilitate the creation of a National Regulatory Agency for the power sector 2. Support the development and implementation of mechanisms for IPPs and PPPs	**Baseline**: 1. No National Regulatory Agency exists 2. There are no support mechanisms for IPPs and PPPs **Target**: 1. Study with indication and recommendation on how to set up a National Regulatory Authority 2. Support mechanisms for IPPs and PPPs are finalized and its implementation facilitated	Project Reports	A: Gov. Guinea Bissau / Ministry of Energy /EAGB cooperate in the study on the creation of a National Regulatory Agency for the power sector and support mechanisms for IPPs and PPPs
Output 2.1.4.	The awareness campaign "SE4ALL for Guinea Bissau" and the registration of the project as a NAMA is facilitated	1. SE4ALL Campaign 2. Registration of the GEF-UNIDO project as a NAMA	**Baseline**: 1. There is no NAMA targeting the development of renewable energy in the electricity sector in Guinea Bissau and there is low international awareness on the renewable energy investment opportunities **Target**: SE4ALL campaign implemented GEF-UNIDO project components as NAMA registered National registry and MRV system implemented	1. SE4ALL campaign documents 2. NAMA registration	A: Continued interest of the Government to register the GEF-UNIDO project as a NAMA
PC#3: Capacity development and awareness raising on renewable energy					
Outcome 3.1: The capacities of key stakeholders on renewable energy are strengthened		1. Number of experts trained in follow-up workshops conducted by trained trainers 2. % of the trained experts apply the obtained skills in the national energy sector	**Baseline**: Wide spread lack of knowledge of key stakeholders (e.g. developers, policy makers, utility, banks, educational institutions) and non-existence of major training programs for the planning, installation and operation of renewable energy systems.	1. Attendance lists of trained participants and institutions 2. Meeting minutes and filled evaluation sheets of trainings 3. Mid-term review on	A: The Government of Guinea Bissau remains committee in medium and long-term to renewable energy A: ECREEE cooperates in the train

			Target: 1. The trained trainers under the capacity building program conduct follow-up trainings for at least 100 experts of different stakeholder groups (at least 30% female) 2. At least 50% of the trained experts apply their received renewable energy skills in the national energy sector of the country	capacity building program	the trainers workshop programme
Outputs					
Output 3.1.1	A national capacity building program is developed and implemented	1. National capacity building program 2. Implementation progress of national capacity building programme in % of total	**Baseline**: No strategy for the development of capacities in the renewable energy sector is in place **Target**: 1. At least 30% of the activities of the national capacity building programme are implemented by end of the GEF project	1. Capacity building program document 2. Mid-term review on program implementation	A: Sustained Government support to agreed project activities
Output 3.1.2	A handbook on renewable energy project development based on the lessons learned of the implemented investment projects is adapted	1. Handbook on renewable energy project development 2. Number of handbooks sent out to stakeholders and number of downloads from the project website	**Baseline**: No training material on project development tailored for Guinea Bissau and its local language available **Target**: 1. Handbook on renewable energy project development available 2. Fifty (50) handbooks sent to key stakeholders and over 150 downloads from the project website	1. Handbook on renewable energy project development is adapted based on the lessons learnt from the implementation of the investment projects 2. Website activity reports	A: Handbook show successful implementation of the investment projects and good lessons
Output 3.1.3	Strengthen the capacity of the Directorate General of Energy/PMO on renewable energy issues	1. % of DGE staff apply obtained skills in the Ministry	**Baseline**: Weak renewable energy capacities of policy makers in the Ministry of Energy **Target**: 1. At least 70% of the trained DGE expert apply the obtained skills in the Ministry	1. Attendance lists of trained participants and institutions 2. Filled questionnaires by trained experts	A: Sustained Government support to agreed project activities
Output 3.1.4	The capacities of local training institutions are strengthened	1. Number of train-the-trainers workshops carried out 2. Number of trainers	**Baseline**: No major training programs for the planning, installation and operation of renewable energy systems in place.	1. Attendance lists of trained participants and institutions 2. Results of workshop	A: ECREEE remains engaged in cooperating in the implementation of the Train-the-Trainers

	through the implementation of three train-the-trainer workshops in cooperation with ECREEE	certified	**Target**: 1. Three (3) Train-the-Trainers workshops carried out 2. Twenty (20) experts certified as trainers	exams and certificates	programme A: Sustained Government support to agreed project activities A: Stakeholders interested in becoming trainers in RE
Output 3.1.5	At least one hundred (100) experts of different stakeholder groups are trained on various renewable energy aspects in workshops conducted by trained trainers.	1. Number of experts trained in follow-up workshops conducted by trained trainers	**Baseline**: Wide spread lack of knowledge of key stakeholders (e.g. developers, policy makers, utility, banks, educational institutions) and non-existence of major training programs for the planning, installation and operation of renewable energy systems . **Target**: 1. The trained trainers conduct follow-up trainings for at least 100 experts of different stakeholder groups (at least 30% female)	1. Attendance lists of trained participants and institutions 2. Evaluation sheets on quality of training filled by participants of courses	A: ECREEE remains engaged in cooperating in the implementation of the Train-the-Trainers programme A: Sustained Government support to agreed project activities A: Stakeholders interested in becoming trainers in RE

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

STAP comment raised during PIF review		**Answer to the comment**
1	***Rationale**:* ANW, March 25, 2013: Please provide an estimate of CO2 emission reduction potential from the project at the PIF stage. At the time of CEO approval, more detailed calculations are expected	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_2 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_2 eq/MWh). Using the GEF bottom-up methodology, indirect emission reductions attributable to the project are 197,100 tonnes of CO_2 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_2 emission reductions can be expected in comparison to the diesel alternative (e.g. capacity factor, life-time).

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS[11]

A. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES FINANCING STATUS IN THE TABLE BELOW:

PPG Grant Approved at PIF: **USD 91,324.00**			
Project Preparation Activities Implemented	***GEF/LDCF/SCCF/NPIF Amount ($)***		
	Budgeted Amount	***Amount Spent To date***	***Amount Committed***
Development of renewable energy baseline report	25,000	24,583	417
Development of pre-feasibility studies on renewable energy investment projects	40,700	40,700	
Stakeholder Consultations	16,624	11,366	5,258
Preparation and finalization of project document	9,000	9,000	
Total	**91,324**	**85,649**	**5,675**

[11] If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities.

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used**)**

Provide a calendar of expected reflows to the GEF/LDCF/SCCF/NPIF Trust Fund or to your Agency (and/or revolving fund that will be set up)

N/A

ANNEX E: BUDGET ALLOCATION

Project component	Indicate whether Inv. Or TA	Expected Outcomes	Expected Outputs	UNIDO Budget Lines		GEF Financing	Co-Financing	Total ($000)
				Code	Description	$000	$000	c=a+b
						a	b	
Project Component 1 (PC 1): Investments into small to medium scale renewable energy technologies	INV	1.1. The technical feasibility and viability of small to medium-scale on-grid and off-grid renewable energy technologies in the urban and rural context are demonstrated.	1.1.1: High impact on-grid and off-grid renewable energy investment projects with a total capacity of 2.5MW are developed and implemented	11	Int'l consultant	30.00	-	30.00
				17	Nat consultant	8.40	-	8.40
				21	Sub-contract	641.06	6,278.68	6,919.73
			Sub-total			**679.46**	**6,278.68**	**6,958.13**
		1.2. The National Renewable Energy Investment Plan to replicate and up-scale on-grid and off-grid renewable energy technology projects is developed and endorsed	1.2.1. Development of a pipeline of grid-connected and off-grid renewable energy priority projects	11	Int'l consultant	37.50	37.50	75.00
				17	Nat consultant	16.80	16.80	33.60
				30	Workshops	2.00	-	2.00
				21	Sub-contract	546.00	2,234.00	2,780.00
			Sub-total			**602.30**	**2,288.30**	**2,890.60**
			1.2.2. The National Renewable Investment Plan is finalized	11	Int'l consultant	15.00	30.00	45.00
				17	Nat consultant	8.40	5.60	14.00
				30	Workshops		2.00	2.00

			Sub-total			**23.40**	**37.60**	**61.00**
			1.2.3. An existing grant facility will provide support for project development and small investments	17	Nat consultant	-	11.20	11.20
				21	Subcontract		1,081.32	1,081.32
			Sub-total			**-**	**1,092.52**	**1,092.52**
			Sub-total - PC1			**1,305.16**	**9,697.09**	**11,002.25**
						75.22%	94.53%	91.74%
Project Component 2 (PC2): Consolidated policy and regulatory framework for renewable energy	TA	2.1. The existing policy and legal support framework for renewable energy is strengthened and regulatory mechanisms are improved	2.1.1. An assessment on gaps in the existing legal and regulatory framework for renewable energy is undertaken	11	Int'l consultant	-	30.00	30.00
				17	Nat consultant	-	8.40	8.40
				30	Workshops	5.00	-	5.00
			Sub-total			**5.00**	**38.40**	**43.40**
			2.1.2 The National Renewable Energy Policy (NREP) and the National Renewable Energy Action Plan (NREAP) are developed and endorsed in alignment with the ECOWAS Renewable Energy Policy (EREP)	11	Int'l consultant	-	16.80	16.80
				30	Workshops	-	15.00	15.00
				21	Subcontract	-	5.62	5.62
			Sub-total			**-**	**37.42**	**37.42**
			2.1.3 Facilitate the creation of a National Regulatory Agency for	11	Int'l consultant	45.00	-	45.00

			the power sector and support the development and implementation of mechanisms for IPPs and PPPs	17	Nat consultant	8.40	-	8.40
			Sub-total			**53.40**	**-**	**53.40**
			2.1.4. The awareness campaign "SE4ALL for Guinea Bissau" and the registration of the project as a NAMA is facilitated	11	Int'l consultant	30.00	-	30.00
				17	Nat consultant	5.60	-	5.60
			Sub-total			**35.60**	**-**	**35.60**
			Sub-total - PC2			**94.00**	**75.82**	**169.82**
						5.42%	0.74%	1.42%
Project Component 3 (PC3): Capacity development and awareness raising on renewable energy	TA	3.1. The capacities of key stakeholders on renewable energy are strengthened	3.1.1. A national capacity building program is developed and implemented	11	Int'l consultant	-	15.00	15.00
				17	Nat consultant	5.60	-	5.60
			Sub-total			**5.60**	**15.00**	**20.60**
			3.1.2 A handbook on renewable energy project development based on the lessons learned of the implemented investment projects is adapted	17	Nat consultant	-	8.40	8.40
			Sub-total			**-**	**8.40**	**8.40**
			3.1.3 Strengthen the capacity of the Directorate General of Energy/PMO on renewable energy issues	11	Int'l consultant	33.00	27.00	60.00
				17	Nat consultant	-	8.40	8.40

				30	Workshops/ targeted training	19.84	19.84	39.68
			Sub-total			**52.84**	**55.24**	**108.08**
			3.1.4 The capacities of local training institutions are strengthened through the implementation of three train-the-trainer workshops in cooperation with ECREEE	11	Int'l consultant	7.50	37.50	45.00
				17	Nat consultant	2.80	19.60	22.40
				30	Workshops/Train-the-Trainers	50.00	20.00	70.00
			Sub-total			**60.30**	**77.10**	**137.40**
			3.1.5 At least one hundred (100) market enablers are trained on various renewable energy aspects in workshops conducted by trained trainers.	11	Int'l consultant	30.00	-	30.00
				17	Nat consultant	16.80	39.20	56.00
				30	Workshops/Capacity Build Market Enablers	20.00	10.00	30.00
			Sub-total			**66.80**	**49.20**	**116.00**
			Sub-total PC3			**185.54**	**204.94**	**390.48**
						10.69%	2.00%	3.26%

Project Component 4 (PC4): Monitoring and Evaluation	TA	4.1. 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	4.1.1. Project monitoring and evaluation through: (a) the establishment of the Project Steering Committee and the execution of two annual committee meetings (b) Yearly progress reports in accordance with the established monitoring plan (c) Mid-term/Final evaluation	17	Nat consultant	6.40	-	6.40
				11	Int'l consultant	40.00	5.00	45.00
				16	Travel	-	40.00	40.00
				51	Sundries	-	45.00	45.00
			Sub-total			**46.40**	**90.00**	**136.40**
			Sub-total PC4			**46.40**	**90.00**	**136.40**
						2.67%	0.88%	1.14%
			Sub-total			1,631.10	10,067.85	11,698.95
			PMC			104.06	190.34	294.40
Total project Costs						**1,735.16**	**10,258.19**	**11,993.35**

SUMMARY KEY BUDGET LINES (COMPONENT 1-4)*		
UNIDO Allotment line	**Funding Source**	
	GEF	**COF**
international experts (11-00)	268,000	**198,800**
national experts (17-00)	79,200	**117,600**
subcontracts (21-00)	1,187,056	**9,599,613**

*All figures exempt of rounding errors.

ANNEX F: ANNUAL BUDGET

					GEF Disbursements (USD)			
Project Components	**Expected Outputs**	**GEF (USD)**	**Co-Finance (USD)**	**Total (USD)**	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Project Component 1 (PC 1): Investments into small to medium scale renewable energy technologies	1.1.1: High impact on-grid and off-grid renewable energy investment projects with a total capacity of 2.5MW are developed and implemented	679,456	6,278,678	6,958,133	339,728	339,728		
	1.2.1. Development of a pipeline of grid-connected and off-grid renewable energy priority projects	602,300	2,288,300	2,890,600	28,150	28,150	273,000	273,000
	1.2.2. The National Renewable Investment Plan is finalized	23,400	37,600	61,000	11,700	11,700	-	-
	1.2.3. An existing grant facility will provide support for project development and small investment	-	1,092,516	1,092,516	-	-	-	-
Sub-total - PC1		1,305,156	9,697,093	11,002,249	379,578	379,578	273,000	273,000
Project Component 2 (PC2): Consolidated policy and regulatory framework for renewable energy	2.1.1. An assessment on gaps in the existing legal and regulatory framework for renewable energy is undertaken	5,000	38,400	43,400	5,000	-	-	-
	2.1.2 The National Renewable Energy Policy (NREP) and the National Renewable Energy Action Plan (NREAP) are developed and endorsed in alignment with the ECOWAS Renewable Energy Policy (EREP)	-	37,420	37,420	-	-	-	-
	2.1.3 Facilitate the creation of a National Regulatory Agency for the power sector and support the development and implementation of mechanisms for IPPs and PPPs.	53,400	-	53,400	26,700	13,350	13,350	
	2.1.4. The awareness campaign "SE4ALL for Guinea Bissau" and the registration of the project as a NAMA is facilitated	35,600	-	35,600		17,800	17,800	
Sub-total - PC2		94,000	75,820	169,820	31,700	31,150	31,150	-

					GEF Disbursements (USD)			
Project Components	**Expected Outputs**	**GEF (USD)**	**Co-Finance (USD)**	**Total (USD)**	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Project Component 3 (PC3): Capacity development and awareness raising on renewable energy	3.1.1. A national capacity building program is developed and implemented	5,600	15,000	20,600	2,800	933	933	933
	3.1.2 A handbook on renewable energy project development based on the lessons learned of the implemented investment projects is adapted	-	8,400	8,400	-	-	-	-
	3.1.3 Strengthen the capacity of the Directorate General of Energy/PMO on renewable energy issues	52,840	55,240	108,080	26,420	8,807	8,807	8,807
	3.1.4 The capacities of local training institutions are strengthened through the implementation of three train-the-trainer workshops in cooperation with ECREEE	60,300	77,100	137,400		30,150	30,150	
	3.1.5 At least one hundred (100) market enablers are trained on various renewable energy aspects in workshops conducted by trained trainers.	66,800	49,200	116,000		22,267	22,267	22,267
Sub-total - PC3		185,540	204,940	390,480	29,220	62,157	62,157	32,007
Project Component 4 (PC4): Monitoring and Evaluation	4.1.1. Monitoring and evaluation (GEF funding directed at International Project Evaluator and the realization of the Steering Committee Meetings)	46,400	90,000	136,400	1,600	21,600	1,600	21,600
Sub-total - PC4		46,400	90,000	136,400	1,600	21,600	1,600	21,600
PMC		**104,064**	**190,336**	**294,400**	**26,016**	**26,016**	**26,016**	**26,016**
Total Project Costs		**1,735,160**	**10,258,189**	**11,993,349**	**468,114**	**520,501**	**393,923**	**352,623**

ANNEX G: DRAFT BASELINE REPORT

Separate file with file name “Annex G_Baseline_Report”

ANNEX H: PRE-FEASIBILITY AND FEASIBILITY STUDIES FOR THE INVESTMENT PROJECTS

Separate file with file name “Annex H_Pre-Feasibility & Feasibility Studies.pdf”

ANNEX I: CO-FINANCE LETTERS

Separate file with file name “Annex I_Co-finance Letters.pdf”

ANNEX J: TRACKING TOOL FOR CLIMATE CHANGE MITIGATION PROJECTS

Separate file with file name “Annex J_GEF CC Mitigation Tracking Tool.xls”

ANNEX K: DETAILED ACTIVITIES’ DESCRIPTION & WORKPLAN

Separate file with file name “Annex Detailed Activities description and workplan.pdf”

ANNEX L: DESCRIPTION OF UNIDO IN-KIND CONTRIBUTION

Separate file with file name “Annex_L_UNIDO_In-Kind_Contribution”

ANNEX M: NREAP TEMPLATE

Separate file with file name “Annex_M_NREAP Template.pdf”

ANNEX N: GHG Emissions Reductions from Investment Projects

Separate compressed file with file name “Annex N_GHG Emission Reductions from Investment Projects.zip”