



## REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: MEDIUM-SIZED PROJECT

TYPE OF TRUST FUND: GEF TRUST FUND

For more information about GEF, visit [TheGEF.org](http://TheGEF.org)

### PART I: PROJECT INFORMATION

<b>Project Title:</b> Greening the productive sectors in Gambia: Promoting the use and integration of small to medium-scale renewable energy systems in the productive sectors.			
Country(ies):	The Gambia	GEF Project ID:	5609
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	130110
Other Executing Partner(s):	Ministry of Energy (GREC), National Environment Agency (NEA); ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE).	Submission Date:	12/12/2014
GEF Focal Area (s):	Climate Change	Project Duration(Months)	30 Months
Name of Parent Program (if applicable):		Project Agency Fee (\$):	125,365

### A. FOCAL AREA STRATEGY FRAMEWORK<sup>1</sup>

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount (\$)	Co-financing (\$)
CCM -3 Promote investments in renewable energy technologies	- Favourable regulatory environment created for renewable energy investments	RE regulation in place	GEF TF	82,750	230,000
	- Investments in renewable energy increased. - GHG emissions avoided	- 1.2 MW new RE investment installed - Over 44ktCO <sub>2</sub> eq GHG emission reduced	GEF TF	1,236,885	2,945,388
<b>Total project costs</b>				1,319,635	3,175,388

<sup>1</sup> Refer to the [Focal Area Results Framework and LDCF/SCCF Framework](#) when completing Table A.

## B. PROJECT FRAMEWORK

<b>Project Objective: Promoting market based use and integration of small to medium scale renewable energy systems in the productive sectors.</b>						
<b>Project Component</b>	<b>Grant Type</b>	<b>Expected Outcomes</b>	<b>Expected Outputs</b>	<b>Trust Fund</b>	<b>Grant Amount (\$)</b>	<b>Confirmed Cofinancing (\$)</b>
1. Develop strategy and regulation on the integration of small to medium-scale RE systems	TA	Conducive regulatory environment for small to medium-scale renewable energy systems for the productive sectors established	1.1. National strategy, targets and regulation on the use and integration of small to medium-scale renewable energy systems in productive sectors developed 1.2. Performance standards, permitting procedures and regulation on grid-connected renewable energy systems developed	GEF TF	82,750	230,000
2. Demonstrate technical feasibility and promoting investments in small to medium scale RE systems	INV	Feasibility of small to medium-scale RE systems demonstrated	2.1 Six (6) demonstration projects with total capacity of 1.2MW installed	GEF TF	800,000	2,250,703
	INV	Women and youth invest in small to medium-scale RE projects	2.2 Youth and women entrepreneurs are supported to invest in small to medium-scale renewable energy businesses	GEF TF	100,000	24,685
	TA	Investment in small to medium scale renewable energy systems promoted	2.3 Portfolio of viable small to medium-scale investment projects developed and promoted	GEF TF	0	100,000
3. Renewable energy projects entrepreneurship skills development	TA	Entrepreneurship skills of the youth and women in small to medium-scale renewable energy projects increased	3.1. Renewable energy projects based entrepreneurship training modules for the youth and women developed and training conducted 3.2. Training on small to medium scale RE systems integrated into curriculum of youth and women training organizations	GEF TF	152,918	300,000
4. Monitoring and Evaluation	TA	Project effectively implemented	4.1 Annual monitoring reports and project terminal evaluation report	GEF TF	64,000	70,000
Subtotal					1,199,668	2,975,388
Project management Cost (PMC)					119,967	200,000
<b>Total project costs</b>					<b>1,319,635</b>	<b>3,175,388</b>

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

Sources of Co-financing	Name of Co-financier (source)	Type of Co-financing	Co-financing Amount (\$)
National Government	Ministry of Energy (pledged by Ministry of Finance)	In-kind	400,000
National Government	Ministry of Energy (pledged by Ministry of Finance)	Cash	200,000
Private Sector	Gambian Chamber of Commerce and Industry (GCCI)	Cash	300,000
Private Sector	Gambian Chamber of Commerce and Industry (GCCI)	In-kind	36,000
Private Sector	Mbolo Women's Empowerment/vocational training centre and small-scale industry <sup>2</sup>	Cash	90,703
Private Sector	Mbolo Women's Empowerment/vocational training centre and small-scale industry <sup>3</sup>	In-Kind	18,000
Private Sector	Mohan Energy - Bansang community Mini-grid	Cash	650,000
Private Sector	Sulayman Junkung Hospital/ Power Up Gambia	Cash	246,000
Private Sector	GreenTech company/hotels and restaurant	Cash	330,000
Private Sector	NAWEC - Farafenni community mini-grid	Cash	580,000
Private Sector	Gambia Technical Training Institute (GTTI)	In-kind	24,685
Multilateral Agency	ECREEE	In-kind	100,000
GEF Agency	UNIDO	Cash	60,000
GEF Agency	UNIDO	In-kind	140,000
<b>Total Co-financing</b>			<b>3,175,388</b>

### D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY

GEF Agency	Type of Trust Fund	Focal Area	Country Name/ Global	(in \$)		
				Grant Amount (a)	Agency Fee (b) <sup>2</sup>	Total c=a+b
UNIDO	GEFTF	Climate Change	The Gambia	1,319,635	125,365	1,445,000
<b>Total Grant Resources</b>				<b>1,319,635</b>	<b>125,365</b>	<b>1,445,000</b>

### E. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS

Component	Grant Amount (\$)	Co-financing (\$)	Project Total (\$)
International Consultants	90,000	70,000	160,000
National/Local Consultants	104,500	10,000	114,500

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

<sup>2+3</sup> This is equivalent to 78,000.44€ as indicated in the endorsement letter (exchange rate applied 1€ = 1,39362 US\$)/May 2014

## **PART II: PROJECT JUSTIFICATION**

### **A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF**

The project design remains largely similar to what was presented in the original PIF. However a few changes have occurred based on findings from the PPG phase and inputs received at the project validation workshop<sup>4</sup>. These are detailed in the relevant sections of this document.

#### ***1. Involvement of financial institutions***

As part of the project preparatory process, the local banks and insurance companies were consulted to explore options to have them engaged as co-financiers in the project, but to also set up revolving funds to support investments in small to medium-scale renewable energy projects in Gambia. From these consultations, it became apparently clear that there is huge interest, on the part of the financial institutions, to engage in renewable energy sector in general, particularly as a result of the achievements of the UNIDO/GEF 4 project, "Promoting Renewable Energy Based Mini-grids for productive uses in rural areas in The Gambia". However, the lack of know-how to assess and value risks associated with investing in renewable energy projects remains a critical barrier. Therefore, the banks and insurance companies requested assistance with capacity building for them to have requisite skills to engage fully in this sector. This project will, therefore, work in liaison with the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), since it has existing capacity building programmes targeting the financial services sector, to train bankers on assessing renewable energy proposals and estimating their investment worthiness. The project, through such trainings, will equip the financial sectors with the capacity to finance renewable energy projects in general, which will support more investments beyond the life of this project. As part of the development of a portfolio of investment project under this project, focus will be on projects where there is an RE component in sectors that the banks are currently supporting such as agriculture etc. This will increase confidence in lending to RE by banks who are currently sceptical of RE investment opportunities.

#### ***2. Involvement of women and youth in RE sector.***

The Government of The Gambia expressed its wish and commitment to seeing more women and youth entrepreneurs take up renewable energy. This was brought up in view of the fact that women and youth constitute the majority of the population and hence the promotion of RE technologies in these sections of the population will have high replication potential and also bring about transformational socio-economic benefits. Accordingly, this project will have specific activities targeted at increasing the participation of women and youth in the RE sector. To begin with and as part of the RE Fund, a grant will be provided to women and youth led projects that are funded by the RE Fund. The grant funding will be gradually decreased as more women and youth invest in RE projects. In addition, RE entrepreneurship training will be provided to youth and women and integrated into curriculum of vocational training institutions that train women and youth.

---

<sup>4</sup> Summary of workshop available on : [http://www.grts.gm/index.php?option=com\\_content&view=article&id=1175:grts-radio-news-july-07-2014&catid=39:news&Itemid=75](http://www.grts.gm/index.php?option=com_content&view=article&id=1175:grts-radio-news-july-07-2014&catid=39:news&Itemid=75)

### ***3. Selection of pilot project to be funded under the project***

The selection of pilot projects to be supported under this project was conducted through an open competitive process. To begin with TORs, including the selection criteria, were developed as in Annex M and were posted on ECREEE website<sup>5</sup> ([www.ecreee.org](http://www.ecreee.org)) for a period of 2 months. In addition, adverts were posted in local newspapers for a 2 months period. An evaluation team consisting of GEF Operational Focal point, Ministry of Energy, UNIDO, PURA- the regulator and a representative from the private sector was composed to review the received proposals. Out of the 9 proposals received, 6 were selected to receive support from the project. Based on lessons learnt from GEF 4 project, once the project is approved, UNIDO will initiate a formal procurement process where each of the pilot projects will be required to submit a more detailed proposal for contracting purposes. In addition, UNIDO will also inform the beneficiaries that the support is an allocation and should the owners of the project fail to have the co-finance available to start the project within 3 months, the allocation will be duly forfeited and an open competitive process will be initiated to invite new project developers to submit proposals. As a measure to ensure that the pledged co-finance actually materialises, part of the conditions of the contract between UNIDO and the owners of the pilot project would be such that payment of the grant component will only be released for pre-agreed costs after the work is completed.

#### ***A.1 National strategies and plans or reports and assessments under relevant conventions, if applicable (i.e. NAPAS, NAPs, NBSAPs, national communications, TNAs, NIPs, PRSPs, NPFE, etc.):***

The project reflects the Government of The Gambia's priorities to promote renewable energy and sustainable development, as shown by the Renewable Energy Law of 2013<sup>6</sup>, which sets out the legal, economic and institutional basis to promote the use of renewable energy resources, and the Programme for Accelerated Growth and Employment (PAGE)<sup>7</sup>, which identifies the supply of adequate, affordable, reliable and environmentally friendly and sustainable energy services, as a key pillar to ending poverty in The Gambia and promoting investment for economic growth.

Gambia's National Energy Policy (NEP) sets out specific objectives to promote: the utilisation of renewable forms of energy such as solar, wind and biomass; the use and to develop, to the extent possible, a domestic production capacity for renewable energy fuels and technologies; ensure the sustainable supply of renewable energy fuels, device, technologies at competitive prices through private sector participation.

Furthermore, the project is also consistent with the second National Communication of The Gambia to United Nations Framework Convention on Climate Change (UNFCCC)<sup>8</sup> with its focus on up-scaling clean energy technologies to implement the GHG mitigation scenario in the energy sector. Also, the National Appropriate Mitigation Action plan identifies energy production from renewable sources (solar & wind) as an energy sector strategy to reduce emissions<sup>9</sup>.

---

<sup>5</sup> Call for proposal was posted on ECREEE website – with the following link : <http://www.ecreee.org/news/call-project-proposal-unido-gef-5-project-promoting-use-small-medium-scale-renewable-energy>

<sup>6</sup> Renewable Energy Act (2013) at: <http://faolex.fao.org/docs/pdf/gam134879.pdf>

<sup>7</sup> Programme for Accelerated Growth and Employment (PAGE) at: [http://ec.europa.eu/delegations/gambia/documents/about\\_us/page\\_2012\\_2015\\_en.pdf](http://ec.europa.eu/delegations/gambia/documents/about_us/page_2012_2015_en.pdf)

<sup>8</sup> 2<sup>nd</sup> National Communication of The Gambia to United Nations Framework convention on Climate Change (UNFCCC) at: <http://unfccc.int/resource/docs/natc/gamnc2.pdf>

<sup>9</sup> NAMA for The Gambia at: [http://unfccc.int/files/focus/application/pdf/nama\\_foc\\_prop\\_gambia.pdf](http://unfccc.int/files/focus/application/pdf/nama_foc_prop_gambia.pdf)

The draft medium term development framework Vision 2020<sup>10</sup> notes that reducing GHG emissions and associated impacts of climate change is one of the major environmental challenges facing The Gambia. In 2003, electricity generation accounted for 30% of CO<sub>2</sub> emissions, which is about 72,426 tonnes of the 181,064 tonnes of CO<sub>2</sub> emitted by the energy sector. Although at the global level, The Gambia's contribution to GHG emissions is very low, as a coastal country, The Gambia is highly susceptible to impacts of climate change. Coastal erosion is already becoming a major issue in the country, with significant resources being directed towards adaptation.

Under the ongoing GEF 4 project, a Renewable Act was adopted by parliament and endorsed by the President of Gambia in November 2013. This project will therefore focus on the development of a strategy and regulations to operationalise this act, which was not included in the GEF 4 project.

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

The project will contribute to the GEF Climate Change Strategic Objective 3: Promote investment in renewable energy technologies, through developing a favourable market and investment climate for the increased deployment of renewable energy technologies in The Gambia. This GEF 5 project will catalyse the adoption of small to medium-scale renewable energy technologies so as to increase energy access rates in the country and income generation from productive ventures by making available reliable and cost-effective energy services through the demonstrations projects and investments that will follow. Setting up the market environment that allows and promotes the use and replication of such technologies will lead to significant GHG emission reductions and help The Gambia in its transformation towards low carbon development. In addition, the project will result in the development of a national strategy, and put in place the necessary regulatory frameworks, to drive the continuous and market-based deployment of small-to-medium scale renewable energy technologies long after this project ends. Moreover, with the entrepreneurship skill training for the youth and women will ensure that the manpower to sustain this development in the long-term is made available and will promote the involvement of women and youth at the local level in such an important sector. This is also in line with GEF's policy on Gender Mainstreaming.

#### ***A.3 The GEF Agency's comparative advantage:***

UNIDO, being a specialized agency of the UN system having as its mandate to promote and support sustainable industrial development, through (a) promoting the cleaner and more efficient use of resources and energy by industry; and (b) facilitating productive activities (particularly in rural areas) through the provision of modern energy supplies based on renewable energy, has a comparative advantage in enabling the Gambia address these issues. UNIDO is one of the Global Environment Facility (GEF) implementing agencies and is the only GEF agency which focuses on an industry integrated approach for sustainability through (i) promoting industrial development through the use of renewable energy technologies for productive uses, while (ii) enhancing the competitiveness in industries by reducing dependence on high cost fossil fuels and (iii) climate change inducing effects of carbon emissions from industries.

Moreover, UNIDO has implemented renewable energy demonstrations projects, provided technical support in development of RE and EE policies, and conducted capacity-building activities through local training and workshops in a number of developing countries, including countries in West Africa. Through the GEF Strategic Programme for West Africa (SPWA) – Energy Component UNIDO has worked extensively in The Gambia to

---

<sup>10</sup> Draft Medium term development framework Vision 2020 at:

[https://www.google.cv/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CCEQFjAB&url=http%3A%2F%2Fwww.ciam.gm%2F\\_library%2F2012%2F6%2Fnational\\_environmental\\_summary\\_of\\_the\\_gambia.doc&ei=EtohVJeNOorXyQO83ID4DA&usg=AFQjCNFfbC7H2TwKVPZw2NTUyvjV-PKexA&bvm=bv.75775273,d.bGQ](https://www.google.cv/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CCEQFjAB&url=http%3A%2F%2Fwww.ciam.gm%2F_library%2F2012%2F6%2Fnational_environmental_summary_of_the_gambia.doc&ei=EtohVJeNOorXyQO83ID4DA&usg=AFQjCNFfbC7H2TwKVPZw2NTUyvjV-PKexA&bvm=bv.75775273,d.bGQ)

achieve the main objectives of the regional programme under the project “Promoting renewable energy based mini-grids for productive uses in rural areas in The Gambia”. Through the project, activities were developed and executed to demonstrate the techno-economic viability of renewable energy projects in rural areas of The Gambia; (2a) a Renewable Energy Law was developed and enacted, (2b) Strengthening the legal and regulatory framework for the renewable energy; (3) Strengthening institutional capacity through focused capacity building. Having established relationships and networks with the relevant decision making bodies, this experience places UNIDO at an advantageous position to partner with the country to implement similar projects in the future.

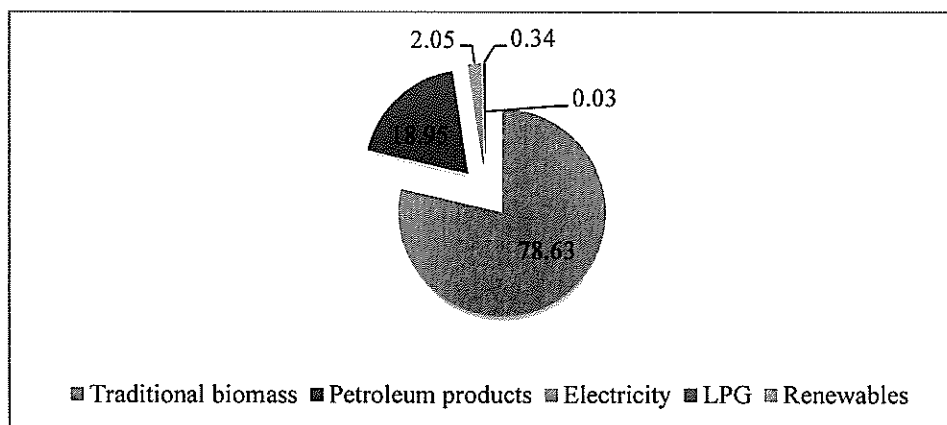
Since 2010, UNIDO has worked with the Government of The Gambia in a partnership to transform the country into a middle income country by 2020. This partnership is being implemented through the UNIDO Country Programme (CP) for The Gambia. UNIDO’s renewed mandate focuses on Inclusive and Sustainable Industrial Development (ISID). Accordingly, UNIDO seeks to promote industrial development that is sustainable on one hand, but also inclusive implying paying more attention to the involvement of vulnerable sections of the population such as women and youth in the industrialization process. In this particular project and in agreement with Government of Gambia, particular attention will be paid to promote the involvement of youth and women in the renewable energy based productive activities.

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

##### ***a) Baseline Situation***

##### ***A.4.1 Energy situation in the Gambia***

In 2010, Total Energy Supply (TES) in The Gambia was 407,926 toe<sup>11</sup>. The energy consumption per capita in The Gambia in 2009 was 88 kg of oil equivalent (kgoe)<sup>12</sup>. According to available data, the supply mix consists of traditional biomass (charcoal and firewood) which accounts for the vast majority at about 79% of the country’s energy supply, followed by petroleum products accounting for 19%, electricity at 2.05%, LPG at 0.34% and renewables at 0.03%.



**Figure 1: The Gambia Energy Supply mix (Source: MoE, as at 2008)**

Petroleum products play a vital role in the country’s energy supply since it is the main source of fuel for transport and electricity generation. Fuel imports cause major problems for Gambian policy makers as they use up a significant part of the small foreign exchange the country generates. In 2009, the country spent USD 47 million on petroleum imports. This amounts to a share of about 15.5% of total imports. Moreover the energy intensity of

<sup>11</sup> RRA report for The Gambia at: [http://www.irena.org/DocumentDownloads/Publications/RRA\\_Gambia.pdf](http://www.irena.org/DocumentDownloads/Publications/RRA_Gambia.pdf)

<sup>12</sup> World Statistics Pocketbook 2013 at: <http://unstats.un.org/unsd/pocketbook/>

Gambia is high at 0.45toe/GDP thousand USD in 2010<sup>13</sup>, compared to many developed countries where energy access is not an issue. The power generation system heavily relies on obsolete and inefficient systems and there are high transmission and distribution losses. Electricity is a key challenge in terms of reliability, quality, access and cost. Voltage fluctuation, spikes, blackouts, brownouts and other disruptions create concern for industrial, commercial and residential customers. Nevertheless, the electricity situation in the country has improved markedly in recent years and is set to witness more improvements as the government continues to push forward its goal to close the energy demand-supply gap in the country by harnessing its abundant renewable energy resources. The Gambia is one of the few countries in West Africa to have a national renewable energy law enacted in 2013 with support under the GEF 4 project.

#### *A.4.1.1 Institutional framework and Actors in the Electricity sector*

The National Energy Policy (NEP) provides the framework for the provision of efficient, reliable and affordable energy supply to effectively support the socio-economic development of the country. The NEP contains specific development objectives for energy sub-sectors, including electricity and renewable energy sub-sector. For the electricity sector the specific objectives are to:

- Improve and expand generating, transmission and distribution capacity to improve the reliability and quality of electricity services and cater for load growth;
- Reduce the cost of electricity;
- Encourage investment in rural power supply;
- Encourage the use of alternative and efficient technologies and fuels for electricity.

For the renewable energy sub-sector, the specific objectives of the NEP are to promote the utilization of renewable forms of energy such as solar, wind and biomass; promote use and develop, to the extent possible, a domestic production capacity for renewable energy fuels and technologies; and ensure the sustainable supply of renewable energy fuels/device/technologies at competitive prices through private sector participation. In addition the Electricity Act, 2005 and the Renewable Energy Act, 2013 set out the roles and responsibilities of all parties within these sectors.

The main actors in the energy sector are the Ministry of Energy, the National Water and Electricity Company, The Gambia Renewable Energy Centre, Gambia Public Utilities Regulation Authority, the National Environment Agency and a number of independent power producers. The role of each of these institutions is provided in the Table 1 below and further details are provided in Annex G.

**Table 1: Institutions active in the energy sector and their roles**

Actor	Role
<b>Ministry of Energy (MoE)</b>	Responsible for establishing and overseeing the implementation of government's policies and strategies on energy including policies for restructuring and privatization in the electricity market and to promote an environment attractive for investments. Under the Renewable Energy Act of 2013, MoE is responsible for setting national targets for the use of renewable energy; collaborating with other ministries and authorities to implement an effective permitting process for installation of renewable energy facilities; promoting capacity building activities with the renewable energy sector; enabling the development of technical standards and requirements and certification of renewable energy installations.

<sup>13</sup> In 2010 the GDP of the country was 963 million current US \$ <https://data.un.org/CountryProfile.aspx?crName=Gambia>



<b>The Gambia Renewable Energy Centre (GREC)</b>	The technical arm of the Ministry of Energy with responsibility for research, development and utilization of renewable energy. GREC's objective is to promote renewable energy market development through demonstration and capacity building activities.
<b>National Water and Electricity Company (NAWEC)</b>	A state-owned company under the purview of the MoE and is the main electricity generator in The Gambia, operating and managing over 50% of the electricity generation capacity. Through a PPP, NAWEC is implementing a 60kW solar PV system <sup>14</sup> and has allocated certain areas in the country for renewable energy installations.
<b>Gambia Public Utilities Regulatory Authority (PURA)</b>	Regulation of all public grid-connected systems and responsible for establishing electricity tariffs. Under the Renewable Energy Act of 2013, PURA is also responsible for the following: <ul style="list-style-type: none"> <li>• managing the country's Renewable Energy Fund;</li> <li>• formulating Feed In Tariff (FiT) Rules;</li> <li>• acting as arbitrator on matters provided for under the Act between the network utility and renewable energy electricity generators;</li> <li>• maintaining a register of appropriately qualified installers of systems using renewable energy resources; and</li> <li>• requiring importers of systems using renewable energy resources to provide details of compliance with internationally recognised performance and safety standards.</li> </ul>
<b>National Environment Agency (NEA)<sup>15</sup></b>	Body responsible for regulating environmental aspects of development in the country, particularly as it concerns electricity generation and consumption. The goal is to ensure that electricity supply and expansion meets global environmental standards for a sustainable social and economic development in The Gambia.
<b>Independent Power Producers (IPPs)</b>	The main IPP operating in the Gambia is the Global Electrical Group (GEG) comprising of three organizations/companies namely: Global Electrical Company (GEC), Global Trading Company (GTC), and Global Management Company (GMC). GEG has installed a total capacity of 38.6MW HFO plants in Brikama.

#### *A.4.1.2 Electricity generation and consumption*

The Gambia relies almost entirely on imported fossil fuel for electricity generation, operated mainly by NAWEC, the state-owned utility, and GEG. NAWEC operates a thermal power station using heavy fuel oil at Kotu supplying electricity to the Greater Banjul Area (GBA) plus 7 isolated power stations using light fuel oil feeding mini-grids in the provincial areas. GEG operates two power stations at Brikama also supplying the GBA. In addition to the thermal power stations are two small-scale wind power plants. The Batokunku 120kW wind project is a result of a community development initiative led by the people of Batokunku. The electricity is used by the community and any excess power generated is sold to NAWEC. Two 450 kW wind turbines are also installed at Tanji operated by Gamwind. Further details are provided in Annex G.

According to the NAWEC's status report, total installed capacity in the country is estimated at 85 MW, with the annual power production estimated at 246 GWh. Electricity is transmitted and distributed through two 33 kV transmission lines having a total length of 125 km, conveying electricity from Brikama and Kotu to 33 kV / 11 kV substations. Approximately 44% of the electricity produced is consumed by households. Small-scale industries, hotels and larger industries use approximately 39% and commercial entities about 8%. The remaining 9% is consumed by government establishments and NAWEC.

<sup>14</sup> The project is being implemented partly with GEF grant through the framework of UNIDO/GEF 4

<sup>15</sup> NEA website <http://www.nea.gm/about-us/>

National electricity access is estimated at 35%, mostly concentrated in GBA where access is about 93%. The low electrification rates are attributed to under-capitalization, a rigid tariff system, escalating fuel prices, double digit transmission and distribution losses (25%) and non-settlement of electricity bills. As a result, NAWEC does not have the resources to replace obsolete equipment and invest in new electricity generation capacities. On the other hand, annum electricity demand growth rate is over 8%.

Recognizing the high level of suppressed demand and a weakness in the transmission and distribution network, NAWEC projects that 75MW of additional capacity will have to come online in the next three years for the country to close its huge electricity deficit. It also estimates a need for additional capacity of 135MW between 2014 and 2020 (Government of The Gambia, 2012). To achieve this about USD 112.5 million will be required between 2013 and 2015 and similarly, over US\$ 182 million will be required between 2016 and 2020.

#### *A.4.1.3 Renewable Energy in The Gambia: Markets and prospects*

Grid connected renewable energy systems, particularly wind energy technologies, have proven to be a cost-effective option for providing clean energy services in communities in The Gambia. The country presently has a grid-tied wind system of 120kW capacity that has been in operation since 2009, and two 450kW wind systems that were installed in Tanji in 2012, as a UNIDO GEF 4 demonstration project. The electricity provided from these projects has contributed towards improving the economic activities in these communities, and by extension, the welfare of the local people.

Both grid-connected and stand-alone renewable energy based systems have good potential for addressing the energy gap in the country and to help expand electrification in remote areas. Based on the country's solar and wind resources, and suitable land areas, solar photovoltaic and wind technologies have the potential of generating 647 TWh/year of electricity<sup>16</sup>. The table 2 below shows the technical potential for these technologies based on the factors aforementioned.

**Table 2: Technical potential of solar PV and wind turbines in The Gambia**

<i>Technical potential of selected renewable energy technologies</i>		
Technologies	PV	Wind <sup>17</sup>
Potential (TWh/year)	474	173

*Source: IRENA (2014)<sup>18</sup>*

The abundant renewable energy resource potential, particularly wind and solar, the high cost of electricity generated by NAWEC, as well as the fact that the prices of renewable energy technologies continue to fall presents a good opportunity for The Gambia to cost-effectively increase the share of renewables in the country's energy mix.

<sup>16</sup> IRENA (2014) Estimating the renewable energy potential in Africa: A GIS Approach. Available at: [http://www.irena.org/DocumentDownloads/Publications/IRENA\\_Africa\\_Resource\\_Potential\\_Aug2014.pdf](http://www.irena.org/DocumentDownloads/Publications/IRENA_Africa_Resource_Potential_Aug2014.pdf)

<sup>17</sup> All areas with wind turbine capacity factor greater than 20%.

<sup>18</sup> Supra, see note 14

### *Renewable energy market trends in the productive sectors*

The market for renewable energy systems in The Gambia is presently small, but rapidly growing. However interest in new power generation capacity has come mainly from private sector entities that are willing to invest in large-scale fossil-fuel based systems, normally above 10MW. This trend is, however, seen to be changing as the government (MoE) has reported to have received significant numbers of investment proposals for renewable energy projects; according to NAWEC proposals ranging from 1.5 to 30 MW have been brought forward. Moreover the government is putting in place a number of structures to support its rapidly growing renewable energy market. For instance the MoE is moving quickly to rehabilitate GREC; two energy officers have been recruited and two technicians are in the process of being recruited.

There is a clear opportunity for the utility. With the increasing cost of importing and transporting fuel oil for running its generators, NAWEC now recognizes the role of renewables in cost-effectively increasing its supply and meeting the demands of its customers, particularly those in the rural areas, and is working towards increasing the share of renewables in its energy mix.

Besides renewables for electricity generation, demand for modern biomass (e.g. briquettes) for cooking is also growing in the tourism sector. The driver for switching from the use of traditional wood fuel to briquettes produced from agricultural waste (groundnut shells) is both environmental and economic. So far the private sector has been the main actor here however the state-owned groundnut company (Gambian Groundnut Company - GGC) has made plans to enter the market of supplying briquettes; an evidence of the lucrative nature of this sub-sector in the renewable energy market.

In the manufacturing sector, due to the higher electricity consumption, demand for renewables is likely to be with medium to large scale renewable energy technologies. Also, like the tourism sector, industrial units are interested in replacing certain energy consuming activities with electricity or heat from renewables. Another similarity between the manufacturing and tourism sector is that they both find attractive options that allow a cluster of establishments to produce and use their own green electricity. This is however constrained by lack of regulations to govern such systems.

Furthermore, there is a market for renewable energy in the health care, and the educational sector, particularly technical institutions of high learning. In the health care sector there is not much use of renewable energy presently, however NGOs have identified this sector as one where the high-impact of renewable energy may be demonstrated. Until these demonstration projects are able to show the economic viability of renewables in this sector and, thus, result in buy-in by private investors, the market for renewables in the health sector might remain small with NGOs and humanitarian groups being the main actors here. The educational sector, on the other hand, requires renewable energy technologies for training and demonstration purposes.

With the establishment of GREC in the 1980's, The Gambia may have been one of the fore-runner countries of renewable energy development in West Africa. Unfortunately, the centre has lacked the resources, man-power and infrastructure, to carry out its mandate of championing renewable energy development in The Gambia. The uptake of renewable energy technologies has been slow, evident in the negligible contribution of renewables in the country's energy supply mix.

### *Socio-economic benefits of renewable energy*

The main driver for renewable energy is the very high tariff rate for electricity. Electricity tariff in The Gambia is among the highest in the continent; consumers pay about US\$ 0.27/kWh compared to the continent's average of US\$ 0.14kWh<sup>19</sup>. In 2011, NAWEC using the economic model approved by PURA reviewed the tariff resulting in a 26% increase in tariff applied to domestic consumers; 13% increase for commercial consumers; 16% increase for hotels/industries; 14% increase for agricultural establishments and 11% for government entities. Even then, tariffs are not reflective of costs, and the utility has been experiencing major financial difficulties. Resources allocated to cover operation and maintenance costs are inadequate. NAWEC, therefore, is forced to close the financing gap through expensive commercial loans, which in turn continues to drive up the tariff rate.

The lack of accessible and affordable electricity from the grid and dependence on high-cost diesel back-up systems is driving up the cost of production, discouraging investment and hampering growth in the productive sectors. In the manufacturing sector, large industrial units spend an average of \$140,143.86 on kWh of electricity in a year, and in medium sized units the average rate is 15,192.73\$/kWh and for small units 2,019.38\$/kWh<sup>20</sup> per annum.

Moreover, the dependence on fossil fuels and its associated GHG emissions impacts negatively the country's sustainable development ambitions. The deployment of renewable energy systems could play a major role in reducing the nation's dependency on imported fossil fuel, diversifying the electricity mix, increasing access to energy services and reducing emissions. Moreover, private sector participation as producers of green electricity will reduce the cost spent on purchasing electricity and may even provide an alternative source for revenue generation when the excess electricity produced is sold to the grid.

### *Renewable Energy Resource potential*

The Gambia could benefit from its abundant renewable energy resources, particularly wind and solar. For biomass, the country, being an agrarian economy, has good potential for agricultural waste-to-energy gasification technologies. Presently less than one-half of the arable land in the country is cultivated.

#### *Wind energy resource potential*

The mean wind speed in The Gambia is estimated at 3.92m/s. However, in certain locations mean wind speed is as high as 5.0m/s. A map of the wind resource is shown in Annex G. In the areas surrounding Banjul, Western region and some parts of North Bank, where wind speed is comparatively high, wind turbines, particularly of utility scale could be installed. Smaller wind technologies for water pumping for irrigation or livestock rearing and wind mills for grain grinding may be used in inland areas to support agricultural production.

Small-scale wind energy technology for water pumping is not new but sustainability has been an issue. In the 1990s, the Department of Water Resources (DWR) actively promoted the use of wind pumps along coastal villages with support from the EU. The pilot systems were installed in three villages, but their operation has been

---

<sup>19</sup> AfDB at <http://www.afdb.org/en/blogs/afdb-championing-inclusive-growth-across-africa/post/the-high-cost-of-electricity-generation-in-africa-11496/>

<sup>20</sup> This is based on a survey conducted as part of the PPG involving 10 manufacturing companies (comprising of 3 large sized unities, 5 medium sized and 2 small sized establishments). It is the average of electricity bought from the grid and amount spent on back-up systems. For back-up systems calculations were based on cost of electricity from the grid, cost of a litre of fuel (averaged at \$1.4 per litre) and a capacity factor of 0.85

discontinued due to lack of proper maintenance, and pumping systems inappropriate for the local conditions; thus, underscoring the need for capacity building interventions<sup>21</sup>.

Although there is potential for large-scale wind turbines, the lack of adequate infrastructure for transporting and installing such technologies could prove to be a barrier in the optimal utilization of the wind resources in the country. Some of these issues were encountered in the implementation of the UNIDO GEF 4 wind energy project in Tanji.

#### *Solar energy potential*

The solar energy potential in the country ranges from 6.1 to 5.8kWh/m<sup>2</sup>/d, with 5.97kWh/m<sup>2</sup>/d being the average global horizontal irradiance (GHI). This is shown in Annex G. Solar energy applications currently in use in The Gambia include: PV for off-grid applications and solar water heating for homes, hotels and community applications. Numerous PV systems are in use across The Gambia for rural off-grid electrification and water pumping purposes in places unlikely to be reached by the grid. The government and donors have funded most of The Gambia's PV investments as part of rural energy service projects for health clinics, schools, households and street lighting. With funding from the EU and the Japanese government, local private company GamSolar has installed solar pumping systems in about 80 villages. This provides clean potable water to more than 200,000 people. Moreover, through the UNIDO GEF 4 project 4 solar energy (and hybrid) projects were installed with total capacity of 160.7kW, including NAWEC's 60kW grid-connected solar PV.

#### *Biomass energy potential*

The Gambia has a rich variety of woodland ecosystems, including forests, closed and open woodland, tree and shrub savannah, mangrove, riparian and fringing savannah. The Gambia's forest cover has declined from 60% in the 1960s to 43% of the land area today<sup>22</sup>. Its forest and woodland ecosystems supply about 85% of domestic energy requirements. Fuel wood accounts for more than 90% of household energy consumption and is often used in inefficient stoves. According to the REMP study the standing stock of wood fuel would not be enough to meet future demand. In 2005 the technical potential for sustainable wood fuel production was about 209, 000 tons/year for an aggregated demand of 734 400 tons/ year resulting in a huge gap of about 535, 000 tons/year. This has led to overexploitation and degradation of native forest, as well as fuel imports from Senegal largely in the form of charcoal.

Thus, although millet and maize have the highest energy potential, estimated at 3000 terajoules (TJ) per year and 1200 TJ/year respectively, the residues for these crops are widely used for animal fodder and for various household uses. Hence, the only real potential may lie in the use of groundnut residue through centralized groundnut processing facilities across the country. Currently only one centralized plant is operating at Denton Bridge and groundnut production has decreased over recent years due to a decrease in international demand.

---

<sup>21</sup>Gambia RRA report

<sup>22</sup>Jarju, 2008, cited in RRA report

## b) Baseline Project

The baseline project consists of the following: 1) RE Law is in place but it needs to be operationalized and there is need to develop appropriate regulation to promote investments in small to medium-scale renewable energy systems; 2) The RE Fund is not be able to provide funding to women and youth led projects at scale and rate that will result in these sectors of the population adopting RE technologies in their enterprises.

### A.4.1.4 The problem the project seeks to address

Despite the clear benefits that may result from the increased use of renewable energy systems in the productive sectors in terms of cost effective energy supply and security of supply. A number of barriers to the deployment of small to medium-scale renewable energy based systems for the productive sectors by the private sector are responsible for the status quo. These barriers are presented in the table below:

**Table 3: Barriers and project mitigation actions**

Barriers	Outputs in the project that addresses the barriers
<p><b>1. Institutional and regulatory barriers</b></p> <ul style="list-style-type: none"> <li>- The procedure for obtaining permits to implement energy projects is rather complex. This means that although the Electricity Act allows for IPPs' participation in the electricity market many a times the high administrative and transaction cost involved have discouraged private players from entering the market.</li> <li>- According to the FiT rules and standard PPA developed as part of the RE Law, all eligible renewable plants shall have priority connection to the network, whenever it is possible within the requirements of system security, and the electricity generated shall be dispatched first, subject to system security limitations. However these elements of the FiT and PPA are still yet to be made operational owing to the absence of adequate information on the absorption capacity of the grid for the integration of renewable energy systems. In addition to this, specific standards and regulation on quality, design, safety, operation and maintenance of renewable energy technologies are lacking, as well as a grid code, without which the development and operation of an efficient, safe and economic power system, with renewables integrated, will be unattainable.</li> <li>- An agreed mechanism for pricing electricity generated from renewables under FiT regimes and not eligible for FiT is yet to be developed.</li> </ul>	<p>1.1 National strategies, targets and regulation on the use and integration of renewable small to medium scale energy systems in productive sectors developed.</p> <p>1.2 Performance standards, permitting procedures and regulation on grid connected renewable energy systems developed.</p>
<p><b>2. Capacity related barriers</b></p> <ul style="list-style-type: none"> <li>- Although there is some capacity for small to medium scale renewable energy systems in REAGAM, this is concentrated among a few and not sufficient for the much needed transformation of the electricity sector. NAWEC, on the other hand, does have the technical and engineering base to develop electricity generation projects, but expertise here is mainly in conventional energy systems.</li> <li>- Adequate capacity for assessing renewable energy projects is lacking in the financial sectors. The lack of technical capacity for appraising renewable energy project proposals is partly to be blamed for the high cost of borrowing as such projects are perceived to be high-risk investment ventures by lending institutions.</li> </ul>	<p>3.1 Renewable energy project based entrepreneurship training modules for the youth developed and training conducted and linked to financial services sector.</p> <p>3.2 Training on small to medium scale RE systems integrated into curriculum of youth organizations.</p> <p>1.1 National strategies, targets and regulation on the use and integration of renewable small to medium scale energy systems in productive sectors developed.</p> <p>2.1 Portfolio of viable and replicable small-to-medium scale demonstration projects developed and managed</p>

<p><b>3. Information related barriers</b></p> <p>- During the PPG consultation meetings it was clear that many of the stakeholders were not fully aware of the fiscal incentives available for renewable energy components and systems, as contained in the Renewable Energy Law, and, hence, were not fully aware of the techno-economic feasibility of generating electricity from renewable energy systems.</p>	<p>1.1 National strategies, targets and regulation on the use and integration of renewable small to medium scale energy systems in productive sectors developed.</p>
<p><b>4. Financial barriers</b></p> <p>- The lack of adequate capital on the part of the private sector and the high interest rate of borrowing from banks present the renewable energy market as a highly risky and unattractive venture for the average investor.</p>	<p>2.1 Portfolio of viable and replicable small-to-medium scale demonstration projects developed and managed</p> <p>2.2 Six (6) demonstration projects with a minimum capacity of 1.2MW installed</p> <p>1.1 National strategies, targets and regulation on the use and integration of renewable small to medium scale energy systems in productive sectors developed.</p> <p>3.3 Young entrepreneurs and women are supported to start-up renewable energy technologies based businesses</p>

***A.5 Incremental /Additional cost reasoning: description of the incremental (GEF Trust Fund) or activities requested for GEF financing and the associated global environmental benefits (GEF Trust Fund):***

This project seeks to address the aforementioned barriers that contribute towards accelerated adoption of small to medium-scale renewable energy projects for the productive sector in the Gambia. The project will establish regulations that will operationalize a conducive environment for private sector participation in the sector and will lead to the development and implementation of a time-bound roadmap for the sustainable and high-impact transformation of the energy sector through the increased use of small to medium-scale renewable energy technologies for productive uses. This will be achieved through an integrated and holistic approach that combines demonstration projects that have high replication potential with targeted capacity building activities conditions for the development of a self-sustaining renewable energy market in the productive sectors in The Gambia. In particular, GEF resources will be used to acquire international expertise in renewable energy entrepreneurship training and setting a grant fund that will be linked to the RE fund to provide a capital incentive for women and youth to develop high impact renewable energy projects focusing on the productive sectors.

***A.5.1 Description of outputs, objectives, and activities***

Based on its objective of promoting market-based use and integration of small to medium-scale renewable energy systems in the productive sectors, the project is divided into three technical components, monitoring and evaluation, and a project management component. These are as follows:

**Project Component 1 (PC1):** Development of strategy and regulation on the integration of small-to-medium scale RE systems

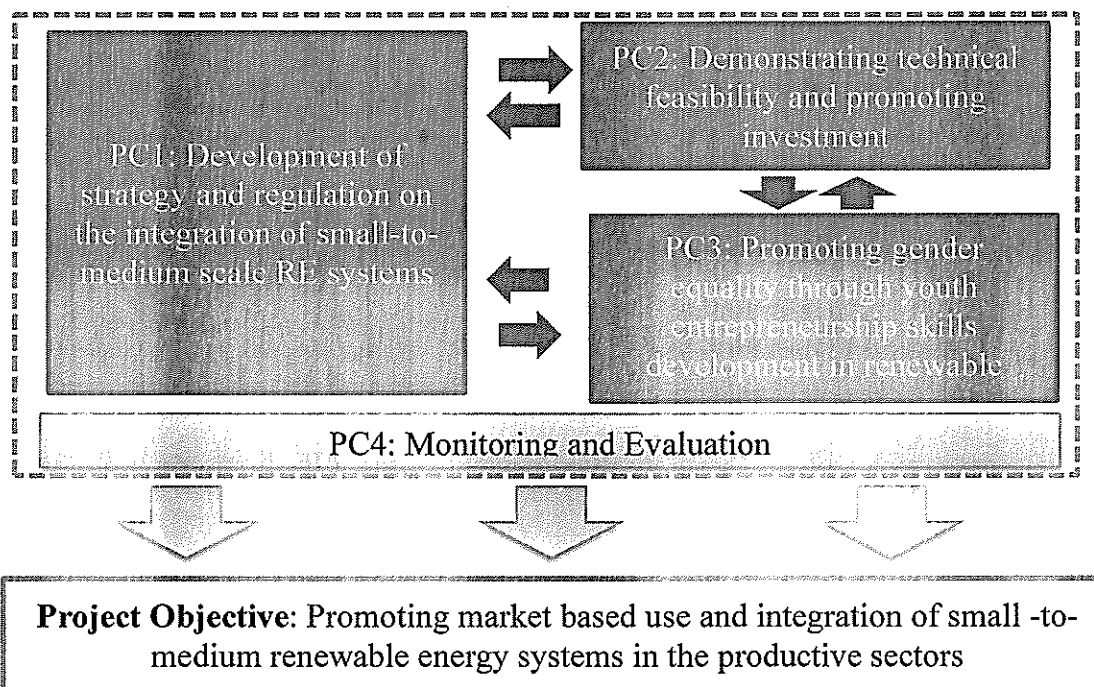
**Project Component 2 (PC2):** Demonstrating technical feasibility and promoting investments

**Project Component 3(PC3):** Renewable energy projects entrepreneurship skills development.

**Project Component 4 (PC4):** Monitoring and Evaluation

Figure 2 below shows the interactions among project components and indicators for achieving the associated outcomes are detailed in the Logical Framework Matrix in Annex A.

**Figure 2: Interaction among project components**



### **Component 1 - Develop strategy and regulation on the integration of small to medium-scale RE systems**

Component 1 has four main activities namely: developing a long-term national strategy for the integration of renewable energy systems; regulations for private wire networks; regulations for purchasing and selling power to IPPs eligible and not eligible for FiT; and development of a national grid code. These activities are designed to lead to the establishment of key regulatory frameworks which will guide, and drive into the long-term, development of the market for small to medium-scale renewable energy technologies for productive sectors in The Gambia. The national strategy, which will be implemented by the MoE in partnership with PURA, NAWEC and other relevant stakeholders, will serve as a guidebook for the execution of activities that will facilitate replications of renewable energy projects similar to the projects that will be demonstrated through this project. In addition to this, the regulations will ensure that the private sector play a key role in developing the renewable energy sector by creating a level playing field for all actors, and will, therefore, complement the national strategy and ensure the effective execution of the RE law.

The regulations planned under this project have both the support of the private and public sector. During the PPG, the private sector, specifically manufacturing sectors, expressed the need to establish a framework which supported the 'Private Wire Network' system in The Gambia; and from the utility, regulations which will enable them to effectively govern such systems. Thus, it is expected that these regulations, when in place, will eliminate regulatory barriers and encourage private sector investment in small to medium-scale renewable energy systems for the productive sectors



<b>Output 1.1</b> National strategy and regulation on the use and integration of renewable small-to-medium scale energy systems in productive sectors developed.
<b>Objective 1.1</b> Develop national strategy for RE market development and establish a regulatory framework to govern the operation of Private Wire Networks (max.200kW) by Small power producers (SPP) and Small Power Distributors (SPD) with the aim to encourage the development of mini-distribution networks through which locally produced electricity can be sold directly to consumers, in order to promote efficient use of renewable energy and reduce dependency on electricity generation using fossil fuels, which will, in turn, help decrease expenditure on fuel import and reduce environmental impacts.
<b>Activities</b>
1.1.1 Development of strategy and action plan document for the integration of renewable energy systems 1.1.1.1 Organize introductory stakeholders meeting 1.1.1.2 Draft strategic actions from the National Renewable Energy Action Plans (NREAPs) 1.1.1.3 Disseminate for peer-review 1.1.1.4 Organize validation workshop
1.1.2 Development of regulations for the operation of Private Wire Networks by Small power producers (SPP) and Small Power Distributors (SPD) 1.1.2.1 Organize introductory stakeholders consultative workshop 1.1.2.2 Prepare draft regulation and tariff methodology 1.1.2.3 Organize validation workshop
<b>Output 1.2</b> Performance standards, permitting procedures and regulation on grid connected small to medium-scale renewable energy systems developed and adopted.
<b>Objectives 1.2</b> To establish rules, guidelines and standards to be followed by various persons and participants in the system to plan, develop, maintain and operate the RE systems, in the most secure, reliable, economic and efficient manner, while facilitating healthy competition in the generation and supply of electricity.
<b>Activities</b>
1.2.1 Development of Regulations for the Purchase of Power from Small Power Producers (SPP) eligible and not eligible for Feed-in tariff 1.2.1.1 Organization of introductory stakeholders workshop 1.2.1.2 Prepare draft regulation and tariff methodology 1.2.1.3 Organize validation workshop
1.2.2 Development of a national grid code 1.2.2.1 Conduct a study on renewable energy absorption capacity in grid in the Gambia 1.2.2.2 Define the technical interconnection requirements for renewable energy systems and operational control system needs 1.2.2.3 Organize validation workshop

### **Activity 1.1.1 Development of Strategy and Action Plan Document for the Integration of Renewable Energy Systems in the Productive Sectors**

In order to develop a comprehensive long term strategy for the integration of small to medium-scale renewable energy systems, the project will consult, at different stages, with the rest of the international and local experts, and relevant stakeholders that will be contracted under this project to develop strategic actions as mentioned in 1.1.2.2.

#### Activity 1.1.1.1 Organize introductory stakeholders meeting

The technical consultant, in collaboration with the national technical expert will organize an introductory stakeholders meeting with the objective to identify and examine conditions necessary for the development and integration of small to medium-scale renewable energy systems in the economic sectors of the country in the medium to long-term – i.e. 2020 to 2030, consistent with the NREAPs.

#### Activity 1.1.1.2 Draft strategic actions from the National Renewable Energy Action Plan (NREAP)

In line with the NREAP, an expert will assist in developing strategic actions that will lead to an increase in the use of renewable energy in the productive sector, and contribute towards meeting the targets set in the NREAP of The Gambia. Specifically, strategic actions on: financial support mechanisms that will enable the country fulfil its targets for the productive sectors (including developing credit lines for the RE fund); effective and streamlined administrative procedures in authorisation/certification/licensing, information on technical specification and support schemes, training qualifications; market integration through appropriate market signals; research and development and regional and international cooperation; gender mainstreaming; sustainability, etc.

#### Activity 1.1.1.3 and 1.1.1.4 Disseminate for peer-review and Organize validation workshop

Once in place, the document will be widely circulated to all stakeholders in the country to receive feedback. The draft will be disseminated to the relevant stakeholders for review. A validation workshop will be organized where the revised document will be validated and adopted by the MoE.

#### Activity 1.1.2 Development of Regulations for the operation of Private Wire Networks by Small Power Producers (SPP) and Small Power Distributors (SPD)

The RE law states that electricity generation from renewable energy resources or hybrid systems in off-grid areas (“Private Wire Network”) will be allowed to charge electricity tariffs to end consumers up to the current national retail tariff rates (“Approved Electricity Tariffs”), provided the capacity of the generating facility is not greater than 200 kilowatts and, those greater than 200 kilowatts wishing to charge more may be permitted with acceptable justification. Thus, the aim of this task is to develop regulations which will enable the regulator govern operators under this system.

#### Activity 1.1.2.1 Organize introductory stakeholder's workshop

The project will organize a stakeholder’s workshop, comprised of the electricity regulator, the Ministry of Energy, the National Water and Electricity Company (NAWEC), the Gambian Renewable Energy Centre (GREC), Project developer and others, to discuss the principles of regulating the operations for generating and distributing electricity through private wire networks. Also examples of best-practices from other countries that have in place such regulations will be presented and discussed. Further to this, the workshop will help to define the outline of the regulation and the tariff system that will be adopted.

#### Activity 1.1.2.2 Prepare draft regulation and tariff methodology

The project will review operational, legal, and administrative implications arising from the implementation of a Private Wire Network system in The Gambia. Based on this knowledge and the guidance received from the government and the regulator during the consultation workshop, the consultant shall develop a draft regulation. The document will describe in simple and easy to understand language, the tariff and the rights and obligations of

both the government and private wire network operators, including electrical system standards for SPP and SPD; procedures and criteria for serving as an operator of a private wire network; cost ownership; principle of the tariff determination; settlement conditions; dispute settlements, etc.

#### Activity 1.1.2.3 Organize validation and adoption workshop

Following review by the pertinent government agencies and UNIDO, and revision to include comments provided by all stakeholders, a validation workshop will be organized to validate and adopt the regulatory document.

#### **Activity 1.2.1 Development of Regulations for the Purchase of Power from Small Power Producers (SPP) Eligible and not Eligible for Feed-In Tariff**

The RE law makes provisions for both on-grid renewable electricity (FiT) for electricity produced from eligible RE Resources and for on-grid renewable electricity not qualifying for FiT. For systems not eligible for FiT, the law stipulates that the tariff to be paid for the electricity generated may be purchased at a negotiated rate no higher than the alternative cost of electricity generation, provided that the network utility (NAWEC) ensures the safety and technical capability of the grid to integrate the project. Thus the task of the regulatory specialist is to develop regulations containing performance standards for renewable energy systems so as to enable NAWEC determine the safety of such systems. Also the consultant would develop a methodology for the purchase or sell of electricity from SPPs.

#### Activity 1.2.1.1 Organization of introductory stakeholders' workshop

The project will organize a stakeholder's workshop, comprised of PURA, the Ministry of Energy, the National Water and Electricity Company (NAWEC), the Gambian Renewable Energy Centre (GREC), Project developers and others, to discuss the principles of regulating the purchase of electricity from SPP by the distribution utility. Also examples of best-practices from other countries that have in place such regulations will be presented and discussed. Further to this, the workshop will help to define the outline of the regulation and the tariff calculation methodology.

#### Activity 1.2.1.2 Prepare draft regulation and tariff methodology

The project will review operational, legal, and administrative implications arising from the grid connection of privately owned power plants. Based on this knowledge and the guidance received from the Government and the utility during the training workshop, the consultant shall develop a draft regulation. The document describes in simple and easy to understand language, the power purchase tariff and the rights and obligations of both the government and the SPP, including electrical system standards for SPP; procedures and criteria for consideration of power purchase from SPP and conditions for purchasing power from SPPs; power purchasing point and connection point; cost ownership; principle of the tariff determination for selling and purchasing power to/from SPPs; settlement conditions; and mechanism for dealing with Problems Arising from Compliance with the Regulations and Power Purchase Agreements.

#### Activity 1.2.1.3 Organize validation and adoption workshop

Following review by the pertinent government agencies and UNIDO, and revision to include comments provided by all stakeholders, a validation workshop will be organized to validate and adopt the regulatory document. The regulatory specialist will be responsible for explaining the provisions stipulated in the regulation and the initial position taken on the commercial and technical elements during the validation workshop.

### **Activity 1.2.2 Development of a National Grid Code**

The current levels of unplanned outages and damages caused to electrical appliances indicate the existence of a serious problem in power quality. Thus, renewable generation will create additional challenges in operating plants, by introducing the need to ramp to balance increases or decreases in generation. There are not currently sufficient controls to respond rapidly to ramp requests.

The Gambia does not have a grid code, and there is no provision for this in the 2005 Electricity Act. This would be a requirement for interconnection with a wider West Africa Power Pool (WAPP). It is also important in ensuring a stable and reliable grid system, with all participants behaving appropriately. New conventional generation is likely to be required, along with renewable generation, to adequately meet existing as well as suppressed demand. New conventional IPPs should be able to respond to the requirements of the system, with obligations placed on them through appropriate PPAs, grid code and license conditions. The current network is not able to take significant additional power capacity, as evidenced by a requirement on new IPPs to build transmission upgrades. New transmission development would be required to connect additional generation. The needs are therefore necessary for more robust system control as a long term strategy for the sector.

#### **Activity 1.2.2.1 Conduct a study on renewable energy absorption Capacity in The Gambia**

The project will assess and advise on the amount of renewable generation that the network system can safely absorb (at system-wide, substation, and feeder levels) in relation to projected demand (to be provided by NAWEC) without jeopardizing the safety and reliability of the grid.

Taking into account the renewable energy potential in The Gambia evaluated, the consultant will assume a realistic energy mix including PV (including both, utility scale and distributed rooftop PV connected to the grid), wind (both, small and large turbines), (agricultural) waste to energy and the current diesel generation, and will analyze the potential impact on the electricity system and provide recommendations in order to achieve the RE penetration targets determined by the MoE.

Also, the project would determine the immediate needs with regard to systems control and operations that NAWEC would need to implement to ensure stable integration of renewable energy in the medium and long term by undertaking a study of grid requirements and potential costs to strengthen distribution grids to accommodate a high penetration of distributed renewable energy connection to the grid and recommend cost-recovery schemes to compensate grid companies for these additional costs.

#### **Activity 1.2.2.2 Define the technical interconnection requirements for renewable energy systems and operational control system needs**

This grid code will describe the technical criteria and requirements for inter-connection of Small and Medium Scale Distributed Generation (SSDG, and MSDG) in consultation with NAWEC including voltages and frequency range of operation and requirements to integrate such sources into system operations (e.g. power output and ramp control);

The code will cover , but not limited to, the following viable renewable energy technologies: wind, solar PV, and hybrid systems connected to the Low and Medium Voltage grid, including the relevant differentiations depending on the capacity of the system, technology, application and licensing requirements (as per the Energy Bill of The Gambia. The consultant will also evaluate if any special provision will be required with regard to the integration of biomass system.

### Activity 1.2.2.3 Organize validation workshop

Stakeholder consultation workshop shall be held targeting key stakeholders to reach consensus on the national technical standards and study result. After the meeting, comments would be assembled and responses shall again be incorporated into the finalized documents.

### **Component 2 - Demonstrate technical feasibility and promoting investments in small to medium scale RE systems**

This component focuses on developing six viable and replicable small to medium-scale renewable energy projects for productive uses. A few changes have been made to this component as a result of a lot of interest in small to medium scale RE projects and comments received from the stakeholders during the PPG and at the project validation workshop<sup>23</sup>. The success of the GEF 4 project and the consultation exercise with stakeholders during the PPG for the GEF 5 project created awareness of the benefits of such systems and their technical feasibility for the private sector market. Thus, a larger number, than what was initially expected, of high quality proposals, with co-financing, were received. This showed that although technical assistance for the development of bankable feasibility studies remains valid, the support required by the stakeholders was more in the area of investment - GEF grants to support development of renewable energy projects. Thus, rather than having three demonstration projects and a number of investments projects, as stated in the PIF, it was decided to provide investment grants to support, as demonstration projects, the six projects selected. By supporting more demonstration projects, the project would have higher replication potential in the different sectors. Table B and C were modified to reflect the changes.

Furthermore, this project will demonstrate the feasibility of sustainable biomass projects, in addition to solar projects, which are more popular. This is additional to the GEF 4 project, where wind and solar technologies were demonstrated, and goes further than what was projected in the PIF. This shows that renewable energy technologies which were formally seen not to be practical are beginning to be viewed as attractive for investment. Thus, the GEF 5 project would build on the success of the GEF 4, going further than installing demonstration projects, by organizing RE investment promotion activities to attract investors into The Gambia RE market and also to showcase the development that have occurred in the Gambia vis-a-vis RE development. This activity was recommended by The Gambia Chamber of Commerce and Industry (GCCCI) for inclusion under GEF 5 and, thus, would be linked with the annual exhibition done by GCCCI. In addition, capacity building workshops, addressing the capacity gaps of project developers and financiers, would be organized. These training will close the gap that current exists between project developers and financiers and will lead to the uptake of investments in small to medium-scale RE project for productive uses beyond the life of this project.

---

<sup>23</sup> See news item on : [http://www.grts.gm/index.php?option=com\\_content&view=article&id=1175:grts-radio-news-july-07-2014&catid=39:news&Itemid=75](http://www.grts.gm/index.php?option=com_content&view=article&id=1175:grts-radio-news-july-07-2014&catid=39:news&Itemid=75)

<b>Output 2.1</b> Six (6) demonstration projects with a minimum capacity of 1.2MW installed
<b>Objectives:</b> Install and commission renewable energy projects that reduce electricity demand on the grid while, simultaneously, increasing the overall electricity available for distribution.
<b>Activities</b>
2.1.1 Select 6 eligible demonstration projects from the investment portfolio for co-financing
2.1.2 Installation and commissioning of demonstration projects
2.1.3 Performance monitoring of installed projects and documentation of results in form of case-study reports
<b>Output 2.2</b> Women and youth entrepreneurs are supported to start-up renewable energy businesses
<b>Objective:</b> Increase the number of renewable energy projects installed in The Gambia by supporting the creation of businesses and job opportunities for youths.
<b>Activities</b>
2.2.1 Establishment and implementation of a Women and Youth Renewable Energy Entrepreneurship Fund within the Renewable Energy Fund
2.2.2 Launch call for proposals for young entrepreneurs in the RE sector
2.2.3 Selection of best proposals to access the grant
<b>Output 2.3</b> Portfolio of viable and replicable small-to-medium scale projects developed and managed
<b>Objective:</b> Compile, for investment, a range of small-to-medium renewable energy projects that demonstrate effectively the technical and economic feasibility, as well as the greenhouse gas (GHG) emission reduction potential, of renewable energy technologies in the productive sectors
2.3.1 Establish criteria for viable investment small-to-medium scale projects and selection of portfolio projects
2.3.2 Organize capacity building workshops for project developers and financiers
2.3.3 Organize national RE investment promotion workshops

*Activity 2.1.1 Select 6 eligible demonstration projects from the investment portfolio for co-financing*

In selecting the demonstration projects a call for proposal, outlining the eligibility criteria developed, was published on the ECREEE website and local newspapers in Gambia and in the local newspapers – see Annex M being copies of adverts in local newspapers and the TORS. A total of 9 proposals were received from both the private and public sectors; with the proposed technologies varying from solar PV, Wind, Biogas and biomass briquette. A team comprising of GEF Focal Point, representative of Ministry of Energy, UNIDO Project Manager and a representative of the private sector and the regulator – PURA was established to evaluate the project received as per given criteria in the TORs. To assist the evaluation process, UNIDO reviewed the technical viability of each of the project by conducting pre-feasibility studies of each of the projects, see Annex L.

After detailed review of the projects received, 6 grid-connected demonstration projects having the highest ratings on the technical, financial and sustainability/replicability requirements, as set out in the eligibility criteria, were selected. The total capacity of the projects selected for demonstration and investment promotion is about 1.3MW, with co-financing amounting to \$2,354,199 and GEF grant amounting to \$800,000. A summary of the projects is provided in the table below and further details are provided in the following text.

**Table 4: Summary table of demonstration projects**

N o	Project Name	Proposed technology	Proje ct size (kW)	Total capital costs (‘000U S\$)	GEF Grant (‘000 USD )	Estimated annual electricity generation (MWh)	Estimated GHG reduction per annum (tCO <sub>2</sub> )	Cumulative tCO <sub>2</sub> saved over the life of the project	Annual net savings/in come (USD)	Equity payback (yrs)
1	Bansang, Mini-grid	Solar PV	500	847.9	200	876	777.4	19,435	175,200	3.3
2	FARAFENNI Mini-Grid (NAWEC)	Solar PV	500	850	270	876	777.4	19,435	175,200	2.9
3	Business incubation Center	Solar PV	100	439.6	100	176	155	4,055	41,172	7.0
4	Mbolo Women's Empowerment	Solar PV	20.7	158.7	50	36.3	32.2	805	17,520	9.8
5	SJGH Solar PV	Solar PV	110	308	62	193.2	182.7	4,568	46,253	4.3
6	Biomass generator for fuel briquette	Biomass generator	60	550	118	226	292	5,840	129,642	2.55
	<b>TOTAL</b>		<b>1290.7</b>	<b>3,050.7</b>	<b>800</b>	<b>2383.5</b>	<b>2216.7</b>	<b>44,334</b>		

With the GEF grant most of the project promoters will recover their investment cost in less than 5 years. Moreover, with interest rate being as high as 25% in commercial banks, most of the project promoters, excluding GCCI which is able to raise its co-financing contributions internally, are financing their projects through alternative avenues such as from friends or business associates who partly own the business, like the Perpetuum Mobile-biomass generator for fuel briquette project, and in other cases, through donor partners who contribute to the project as a way of promoting socioeconomic development in local communities, examples include the SJHG solar PV and Mbolo Women's Empowerment project.

For the NAWEC 500kW solar PV project it is expected that the project will be supported through the ECOWAS Emergency Regional Programme for Improved Electricity Supply Facility (EERPIEF) grant. The grant size is \$108 million and will support three countries, namely The Gambia, Mali and Sierra Leone to increase electricity production in their respective countries<sup>24</sup>.

#### *Bansang community Mini-grid*

The Mohan Energy Corporation Ltd, New Delhi India is proposing to install a 500kWp grid-connected project, near the existing power plant, in Bansang under a Build, Own and Operate (B-O-O) arrangement with the state-owned utility – the National Water and Electricity Company (NAWEC). The electricity produced would be entirely evacuated into the local grid and would benefit, directly, business owners in the community, especially women engaged in small-scale industries. About 876MWh of electricity will be generated annually and 777.4tCO<sub>2</sub>/yr of emissions reduced. The promoters will invest \$650,000, in addition to GEF grant of \$200,000. The project was selected on this basis that, in addition to supplying electricity for productive activities in the community, the project will enable NAWEC meet the electricity demand of a large number of customers without

<sup>24</sup> See <http://www.africanreview.com/energy-a-power/power-generation/gambia-sierra-leone-and-mali-receive-us-108-million-grant-from-ecowas>

any additional cost being incurred directly by NAWEC. Moreover, the project, and the B-O-O framework, will be a good demonstration of how private investors could enter into the renewable energy IPP market and a PPA with NAWEC. In addition to this, during the construction, commissioning and maintenance phases of the project young women and men will be engaged throughout the process with the aim to build the local capacity.

#### *NAWEC Farafenni 500kW Solar PV*

The 500kW Solar PV being planned by the National Water and Electricity Company (NAWEC) in Farafenni aims to reduce greenhouse gas (GHG) emissions from diesel powered from private generators; help alleviate poverty in the rural area and create savings for the company; support the small to medium-scale manufacturing and service industries to participate in the development of renewable energy in the Gambia. The target beneficiaries are the rural people, particularly women and children.

The project will lead to a net annual GHG emission reduction of 777.4 tCO<sub>2</sub> and 876MWh of electricity produced for the Farafenni community. GEF grants will be used in supporting the project with \$270,000, whereas NAWEC invest \$580,000 in the project.

NAWEC's increased addition of renewable energy into its generation capacity will build confidence among prospective investors in the market and, thus, will demonstrate the techno-economic viability of such scales of renewable energy systems and lead to a replication of renewable systems of similar scales.

#### *GCCI Trade Fair Center/Business Incubation Center*

GCCI intends to install a 100kW solar PV system to power its trade fair grounds and incubation centre. Also GCCI envisages that at least 50% of the electricity used to meet the internal load will be dedicated to agro-processing activities. To run its incubation centers, host trade fair activities, GCCI estimates that it would require approximately 88 MWh per annum. The excess electricity produced will be sold to NAWEC. The total annual savings, and income, from this project will amount to \$41,172. Moreover, the project will lead to a net GHG emission reduction of 155 tCO<sub>2</sub> per annum.

In addition to the \$100,000 from GEF grant, GCCI will invest \$336,000 into the project. Small-to medium scale renewable energy systems in a trade fair and incubation centre is a good way of demonstrating the benefits of, and promoting, renewable energy. The use of renewable energy in the incubation centre is innovative as it goes directly for productive uses. Moreover, this will off-set any grid electricity that would have been applied. This has the potential of being replicated in business establishments in The Gambia and in trade centers in other ECOWAS countries. Moreover, the project, during its installation and commissioning phases will train local men and women who will maintain the system in the long-run.

#### *Mbolo Women's Empowerment/vocational training centre and small-scale industry*

Mbolo Association works towards the empowerment and improvement of the welfare of women by strengthening their productive capacities and abilities through training in entrepreneurship and access to a revolving fund. Mbolo plans to install a grid-tied solar PV system of 20.7kWp to demonstrate the potential of generating employment opportunities and increasing the participation of women in decision-making processes, while protecting the Gambian environment, through the integration of renewable energy systems in vocational training centers. Through this project 36.3MWh of electricity will be exported to the grid. The revenue, \$17,520 will enable the association provide subsidized services for the following:



- hands-on trainings on renewable energy
- Mainstreaming gender in the renewable energy sector by equipping women with the skills to install and maintain renewable energy systems
- Promoting new income generating activities based on renewable energy for women entrepreneurs
- Running activities for improving skills in sewing, tie-dye, cookery, bakery, catering, arts and craft, basic education, ICT, health, ice making, cosmetic products, etc.

\$50,000 of GEF funds will be used in funding the project while Mbolo will contribute \$108,703 to the project. The Mbolo project was one of the demonstration projects selected under the UNIDO GEF 4 project. With its 8.3kW hybrid installation, the project has inspired other projects in The Gambia, like the ongoing renewable energy projects in Lemon Creek (60kW) and Bijilo Clinic. Similar to the UNIDO GEF 4 project, this project has an excellent demonstration potential and can easily be replicated by other community-based organizations in The Gambia and other ECOWAS countries.

#### *Sulayman Junkung General Hospital/ Power Up Gambia*

The Sulayman Junkung General Hospital (SJGH) is a non-profit primary level referral health facility and a teaching hospital built by the Government of the Gambia. With budget becoming a constraint, the unstable supply of electricity from the grid and the high cost of running the hospital through diesel-powered generators have rendered SJGH ineffective in meeting its objective of providing high-quality services to its patients. SJGH plans to install a 110kWp solar PV system to meet its internal load (92MWh) and to sell the rest of the electricity produced to NAWEC to generate revenue. The project will export 101MWh of electricity to the grid. The project will result in savings equal to \$46,253 (avoided fuel cost and electricity export income). In addition to this, the project will bring about an annual reduction of 182.7tCO<sub>2</sub>/yr. The promoters will invest \$246,000 towards the project plus \$62,000 from GEF funds.

The success of this project could be a turning point for SJGH, allowing the hospital to be commercially viable and self-sustaining. As a high social impact project, there is a good opportunity for replication; the success of this project could serve as model for other hospitals or clinics in the country and in the ECOWAS region as a whole.

#### *GreenTech company/hotel and restaurant*

GreenTech Company is converting waste groundnut shells into high quality fuel briquettes, which can be used instead of fuelwood for heating, firing and cooking, as in households, canteens, restaurants, bakeries and fish smokeries. The industrial press can produce 500kg/h. Electricity is a major input in the production and contributes significantly to the end user price. The erratic supply of electricity and high cost of relying on a stand by diesel generator during power outages have led to a higher market price for briquettes.

GreenTech, therefore, plans to install a 60kW biomass generator which will run for 12hrs a day to compensate for power cuts and to replace the diesel generator being used now.

The generator will produce about 226MWh of electricity annually which will result in savings of approximately 97,339 litres of fuel and, in monetary terms, \$136,275. Moreover, the heat recovered from the system could be used in heating water. The project will lead to an annual emission reduction of 292tCO<sub>2</sub>/yr and, throughout the life the plant, a total of 8,761 tCO<sub>2</sub>. GreenTech will contribute \$330,000 in co-finance with GEF fund supporting with \$118,000.

The GreenTech project is a technically feasible project with a size that can be easily replicated in other restaurant or hotel establishments. Moreover, as the technology does not depend solely on one feedstock (groundnut shells), but could use other agricultural waste as well, the risk of feedstock availability becoming an issue with the addition of such projects in the future is minimal.

#### Activity 2.1.2 Installation and commissioning of demonstration projects

Under this task PMO will identify the technical assistance (TA) required for each project, if any, to support with the installation process. This TA expertise is expected to be minimal and to be supplied from the national and international RE experts. The PMO, reporting regularly to UNIDO and other relevant stakeholders, will supervise the installation of the projects to ensure that it is done timely and in accordance with the agreed design and requirements set up by NAWEC.

#### Activity 2.1.3 Performance monitoring of installed projects and documentation of results in form of case study reports

The PMO will be responsible for reporting the progress made. This will be reported in the project implementation review (PIR), quarterly progress reports and periodic thematic reports, as at when requested by UNIDO. The progress report will include system outputs which will be tracked and monitored online through data monitoring hardware and software applications installed with the renewable energy systems. As part of the contracts with each project, the owner will be requested to include an online data monitoring system to collect systems performance data.

Results for preparation of case-study reports will be culled from the project terminal report. The PMO will liaise with UNIDO to come-up with a dissemination strategy of the case-study reports.

#### Activity 2.2 Establishment and implementation of a Youth and Women Renewable Energy Entrepreneurship Fund within the Renewable Energy Fund

A few changes have been made to this component following feedback from the stakeholders during the PPG. During the scoping mission, it was discovered that there was a need to establish a framework to incentivise youths, particularly young women, to engage as entrepreneurs in the renewable energy sector. Thus, combined with the knowledge and skills that will be impacted through the trainings that will be conducted it was agreed to establish a renewable energy entrepreneurship fund for the youths. This fund will provide grants on a competitive basis as part of loans that the youth will access from within the Gambian Renewable Energy Fund. The adopted RE Law, which was developed under the UNIDO/GEF 4 project with the support of the EU Energy Initiative Partnership Dialogue Facility (PDF), requires that a Renewable Energy Fund be established to support RE investment project on a rolling basis. According to the law, the fund will be managed by The Gambia Public Utilities Regulatory Authority (PURA). Like the RE fund, the RE Entrepreneurship fund for youths will be managed by PURA.

The government has expressed interest in supporting this initiative during and after the completion of the project. With more pilots and co-financing having received under Component 1, part of GEF funds (\$100,000) from this component will be used to capitalise the RE youth entrepreneurship fund. The project will work with the MoE and PURA to set-up, within the Renewable energy fund, a component for youth and women enterprise development. According to the recently established RE law, one of the functions of the RE fund is to support “the production or fabrication of equipment for the development and utilization of equipment for the development and utilization of renewable energy in the country”. Thus, in line with this, the youth and enterprise fund will promote

deployments of renewable energy equipment by providing the necessary financial support to stimulate the production of such equipment by Gambian youths and women.

In the national strategy to be developed under component 1, the medium and long term plan for this fund, in regards to the sort of support that will be provided through the fund will be developed in detail. So as to ensure that the objective of the funds remains in line with the development needs of the renewable energy sector. The RE Fund does provide concessionary loans to RE project. In order to promote youth and women entrepreneurs to access these loans, the GEF grant will be used to provide a grant components for projects targeted at youth and women. It is envisaged that the grant will initially be about 20% of project cost for the first 5 projects. The grant components will be reduced to 10% for the following 5 project, and then to 5% to the next 5 projects. The exact amounts to be disbursed will depend on the submitted project, but it is envisaged that these 15 projects will create critical mass of appreciation of the role of RE in various businesses and encourage other women and youth entrepreneurs to develop projects to be funded under the RE fund and other financial services providers.

#### Activity 2.2.2 Launch call for proposals for young entrepreneurs and women in the RE sector

To operationalize the fund, the consultant will assist in launching and coordinating a call for proposals for renewable energy projects. It is envisaged that this will take place in the first quarter of the second year of the project's implementation. The consultant will also assist in establishing the eligibility criteria for project proposals and in the evaluation of the received proposals.

#### Activity 2.2.3 Selection of best proposals to access grant funding

After the evaluation process, the project will recommend to the MoE at least three (3) project proposals for grant support. To ensure that both men and women are supported to start-up renewable energy businesses through the fund, at 50% the projects selected for grant would be owned by a woman. This is necessary because there are presently more male students in science and engineering fields. In 2011/2012, 76% of Gambian students that attained science and engineering degrees were male students<sup>25</sup>. While it is expected that this project will lead to an increased number of female students' enrollment in the sciences or technical fields, the present situation, without preferential measures, places women at a disadvantaged position in such a technical related competition.

#### Activity 2.3.1 Establish criteria for viable small-to-medium scale investments projects and selection of portfolio

Demonstrating the viability of renewable systems for income generating activities requires that a set of clear and comprehensive eligibility criteria based on established technical, financial and sustainability requirements is developed for small-to-medium scale renewable energy projects that may be used in the productive sectors, with the objective that projects invested in achieve profitable returns for the investor. To this end, during the PPG, a scoping mission was conducted with the primary objective to consult with the stakeholders in the country and to develop selection criteria tailored to the Gambian environment. As a result of this process, 22 selection criteria were set and disseminated to the relevant stakeholders. The selection criteria were designed to lead to the implementation of projects that have the highest potential of improving electricity access, increasing economic output while enhancing the welfare of women.

The purpose of these eligibility criteria is to serve as the minimum requirement for prospective private and public investors interested in such scales of renewable energy systems. In the national strategy that will be developed eligibility criteria will be modified according to the medium and long-terms targets for the productive sector.

---

<sup>25</sup> Based on a survey conducted by ECREEE on the status of Gender Mainstreaming in Energy Access in the ECOWAS Region. Data was provided by the Ministry of Energy.

### Activity 2.3.2 Organize capacity building workshops for project developers and financiers

During the PPG, stakeholders from both the private and public sectors expressed the need to strengthen capacities in the development of renewable energy project proposals. A short-term strategy for developing the renewable energy sector, capacity building workshops on developing bankable renewable energy project proposals will be organized within the framework of the ECOWAS Renewable Energy Investment Initiative (EREI).

EREI was initiated by ECREEE, with the support of financial institutions and the private sector, with the objective of mitigating financial barriers to investments in medium and large-scale renewable energy projects and businesses in the ECOWAS region. It assists member countries to make use of their individual renewable energy potentials by providing support to develop technically and economically feasible pipeline projects to attract the interest of investors and financiers.

To accomplish this for The Gambian renewable energy sector, training workshops targeting the capacity gaps identified during the scoping mission will be organized once within the first year of the project's implementation. The trainees selected from financial services providers in Gambia will be trained on managing RE investment projects. Similar to activities under Component 3, the training workshops will be organized in collaboration with GTTI who will own the training modules and continue to provide the training once the project is completed. The medium to long term goal of this is to build up a critical mass of experts in the development and assessments of renewable energy projects, comprising both project developers and financiers. GTTI will continue to provide the training at a fee once the project is completed. In this case, ECREEE will be engaged as a service provider in terms of adapting already existing training modules.

### Activity 2.3.3 Organize national RE investment promotion workshops

With The Gambia Chamber of Commerce and Industry (GCCCI) leading the process, UNIDO will liaise with the relevant Government Ministries, Department and Agencies (MDAs), private sectors and civil society organizations (CSO) to organize a national renewable energy forum/exhibition. The aim of this will be to create awareness on the potential and market for renewable energy technologies and to attract investors into this lucrative sector, and, to equip the national actors, particularly GCCCI, with the capacity to incorporate renewable energy exhibitions in the country's annual trade fair exercises.

The national RE investment promotion workshop will be organized to provide the much needed link to the financial sector. Once there is a critical mass of appreciation, trainings are conducted and a portfolio of viable investment project is developed, the workshop will be used to ensure that the different components will help convince the integration of RE into the portfolio of the financial services providers. Through this approach, the demonstration project, and other components will directly lead to market-based replication of investments. In particular, the portfolio of the project to be developed will be such that RE components will be integrated into sectors that financial service providers are already funding like agro-processing etc. This will increase confidence in RE project and will eventually translate to funding of standalone RE projects.

## **Component 3 – Youth and Women renewable energy projects entrepreneurship skills development**

Activities under this component will, in the short and long term, create a critical mass of renewable energy entrepreneurship skills among youth and women that will drive and sustain the integration of renewable energy technologies into the business ventures by women and youth. During the PPG, the academic institutions consulted, the Gambia Technical Training institute (GTTI) and University of The Gambia (UTG), both expressed their interest to integrate renewable energy modules into their course programs. According to GTTI, numerous

requests have been received from enrolled and prospective students for renewable energy related trainings in general. In addition, youth and women groups have requested for formal training on renewable energy entrepreneurship and how they can make use of RE technologies in their business ventures. Based on this GTTI is working on a strategy to integrate fully renewable energy modules in its programs and also provide formal vocational training to youth and women. The GEF 5 project will play a central role in this strategy as the project will lead to the development of RE curriculum and training modules which will be delivered by GTTI, as co-financer in this activity. The cooperative framework between GTTI and UTG, involving knowledge exchange, etc., will lead to replication of similar trainings in UTG.

In addition, trainings for unemployed youths (or for young people in primary and secondary schools) will be conducted through youth organizations/vocational training institutions like the Mbolo women association. This will ensure that these youths are equipped with the skills to be self-employed or to gain employment in the renewable energy sector. With the demand for installers and maintainers of renewable energy systems being in high demand, this activity will complement component 1 and 2 of this project and contribute towards the success of the RE law.

<b>Output 3.1 Renewable energy project based entrepreneurship training modules for the youth and women developed and training conducted</b>
<b>Objectives:</b> Equip training institutions in The Gambia with the capacity to produce highly skilled men and women workers for the renewable energy sector in the short and long term.
<b>Activities</b>
3.1.1 Establishment of expert panel on renewable energy curriculum development
3.1.2 Development of curriculum for groups in primary, secondary schools and vocational training institutions
3.1.3 Development of training materials on renewable energy projects entrepreneurship skills development for basic, secondary school pupils and post-secondary students
3.1.4 Selection of pilot institutions
3.1.5 Conduct a training workshops
3.1.6 Awareness raising and sensitization activities
<b>Output 3.2 Training on small to medium scale RE systems integrated into curriculum of youth and women vocational training organizations.</b>
<b>Objective:</b> Enhance a culture of entrepreneurship among young women and men in The Gambia and, through valuable training programs, increase in the number of youths engaged in industrial and commercial activities of renewable energy development.
<b>Activities</b>
3.2.1 Development of curriculum for advanced students (higher education students)
3.2.2 Development of training materials on renewable energy projects entrepreneurship skills development for higher education students
3.2.3 Establishment of Renewable Energy Enterprise program in higher academic institutions
3.2.4 Conduct 2 training of trainers workshops

#### Activity 3.1.1 Establishment of expert panel on renewable energy curriculum development

In order to increase knowledge on renewable technologies and the understanding of business models applicable to small-to-medium scale renewable energy projects, a specific curriculum needs to be developed for young entrepreneurs to enhance their understanding of the subject-matter. Thus, an expert panel whose main task will be to develop, and endorse, a curriculum on renewable energy, having technical and management components will be established.

The expert panel will comprise of the MoE, NAWEC, PURA, National Training Authority (NTA), Ministry of Basic and Secondary Education (DoSBSE), Ministry of Higher Education, GTTI, UTG, GCCI, and other relevant institutions. Based on the skill gaps identified by the panel, the project panel will develop standards in line with the required skill set and competency levels in renewable energy for the different target groups.

Activity 3.1.2 Development of curriculum for groups in primary, secondary schools and vocational training institutions

The standards will inform the development of the curriculums. For primary school pupils and junior secondary level students, the curriculum will be designed to impact the students with a basic knowledge of energy, renewable energy technologies and its benefits such as generating clean energy for productive services and its role in environmental sustainability. The curriculum will emphasize on demonstration and hands-on learning activities that enable students understand the fundamentals of renewable energy resources and their technologies.

For senior secondary level youths and youths that may have completed basic education (post-secondary) but are unemployed, the curriculum will focus on the technical aspects of renewable energy, as well as the practical aspects. Young women and men, through the curriculum that will be developed, will learn about the technical principles guiding the operation of renewable energy technologies. The students will learn how to design, manufacture, install, operate and maintain solar, biomass and wind technologies. The objective is that student having completed the training will be impacted with the skills to be self-employed through starting up their own renewable energy businesses or gain employment in relevant establishments.

Activity 3.1.3 Development of training materials on renewable energy projects entrepreneurship skills development for basic, secondary school pupils and post-secondary students

In line with the adopted curriculum, the consultant will develop training manuals and materials which will be introduced into primary and secondary schools as well as youth organizations or vocational training centers. For primary school pupils and junior secondary school students, the training materials and manuals include the following areas:

- Energy: conventional and alternative energy
- Energy production, consumption and climate change
- Renewable energy resources and their technologies
- Hands-on training (building simple renewable energy technologies with simple materials)

The manual and training materials for senior secondary school and post-secondary school youths will include aspects on:

- technical terminology of RE technologies
- the basic engineering principles of generating power through RE technologies
- Manufacturing/assembling of simple RE technologies (e.g. solar cookers and dryers, solar water heaters, wind turbines)
- the marketing strategies
- installation and testing training of RE technologies

#### Activity 3.1.4 Selection of pilot institutions

The developed curriculum and training materials and manuals will first be introduced in pilot academic institutions comprising of two (2) primary schools, one (1) secondary school and two (2) youth vocational training centers. Evaluations will be conducted and documented at the end of every term, in the first year of the project's implementation or at agreed intervals for the youth vocational training centers. The reports from the evaluation and lessons learned during this process will inform the sustainability strategy which will be consolidated before the end of the project to ensure that this activity is replicated in all the primary and secondary schools and relevant youth vocational training centers.

#### Activity 3.1.5 Conduct training workshops

In rolling out the training activity, the project will develop a work plan to conduct train-the-trainers workshops to equip the teachers of the pilot institutions with the knowledge and skills to deliver the training materials. It is envisaged that, in general, four (4) training-of-trainers workshops will take place, after which the trained teachers will begin delivering the training materials to the students; for the first two classes conducted, this will take place under the supervision of the consultant and subsequently without any supervision.

#### Activity 3.1.6 Awareness raising and sensitization activities

Awareness and sensitization activities will be conducted throughout the project's duration to sensitize the public on the importance of the training for the economic empowerment of young women and men. The sensitization activities will focus mainly on educating the public on the added-value of the girls and women population in the development and growth of Gambian renewable energy industries as well as in sustaining the renewable energy sector. The sensitization activities that will be implemented will also aim at dispelling the perception that renewable energy is technically rigorous for women, and, therefore, should be or remain a male-dominated field.

In addition, to encourage the participation of young girls and women, the accomplishments of female students that perform well in assessments will be publicized in the local newspapers and the project's website. This will be implemented in collaboration with the Ministry of Women Affairs.

#### Activity 3.2.1 Development of curriculum for advanced students (higher education students)

The curriculum for advanced students will be developed and adopted by the expert panel described in 3.1.1. The curriculum will be designed to provide an in-depth level of understanding about renewable energy technologies and business development and management, with an emphasis on demonstration and hands-on activities. Thus, the aim of this is to equip students with the competency to undertake supervisory roles in establishments such as PURA or NAWEC, as well as the knowledge and skills to set-up their own renewable energy businesses.

#### Activity 3.2.2 Development of training materials on renewable energy projects entrepreneurship skills development for higher education students

The training materials and manuals that will be developed for this target group will include topics on:

- Theoretical and Practical aspects of RE technologies
- Development of business plan for RE projects
- Starting up and managing RE businesses (market analysis, business strategy, risk management, etc.)

### Activity 3.2.3 Establishment of Renewable Energy Enterprise program in higher academic institutions

The project will work with GTTI, as the pilot institution, to establish and integrate a short-term certification awarding program on renewable energy enterprise development. In line with the aforementioned topics in 3.2.2, the program will target students registered in technical-related courses, so as to ensure that those enrolled have the background knowledge to successfully complete the course.

Evaluations will be conducted and documented at the end of every semester, in the first year of the project's implementation. The reports from the evaluation and lessons learned during this process will inform the sustainability strategy to ensure that the program is replicated in other higher education institutions in the country.

### Activity 3.2.4 Conduct 2 training of trainers workshops

The project will conduct a series of train-the-trainers (ToT) workshops to equip GTTI lecturers, GREC staff and others, with the knowledge and skills to deliver the training materials. Two trainings ToT workshops will be conducted, after which it is expected that the lecturers will begin the implementation of the program by conducting training sessions, starting first with the supervision of the consultant and then, based on evaluation results, without supervision.

### **A.5.2 Value added through incremental reasoning**

Sector analysis, review of existing barriers, meetings with various stakeholder groups and discussions with other agencies regarding renewable energy - all carried out during the project preparation phase - have shown the strong relevance of this project. The project focusses on additional, incremental and cost effective interventions that are carefully selected so that they are complementary to ongoing and planned national and international programmes to promote and support increased renewable energy in The Gambia.

GEF funding is being requested to provide the incremental policy, technical and financial inputs required to support and effectively leverage local efforts in setting up and maintaining an infrastructure capable to support development and implementation of small to medium-scale renewable energy systems in the productive sector. GEF funding will leverage investments from the private sector to realise 6 highly replicable demonstration projects; the development of the enabling market environment through supporting the development of appropriate regulations and through the support and training of youth and women entrepreneurs. In addition, GEF funding will be used to set up a special window under the RE Fund where support will focus on projects owned by youth and women.

#### *A.5.2.1 Business-as-usual (BAU) scenario*

The Gambian economy relies almost entirely on fossil-fuel for productive activities, either in form of commercial electricity or private back-up generators. The negative effect these have had on the economy and sustainability of the country has been described in the above sections. With the UNIDO GEF 4 project, however, some progress has been made towards promoting the use of renewable energy – a renewable energy law, FiT and PPA was developed; renewable energy systems were demonstrated; and capacity building activities have been conducted. These have created the necessary awareness of the potentials of renewable energy and have stimulated the development of a renewable energy market to an extent. However, this progress, if not consolidated, will not result in the transformations necessary for a well-developed renewable energy market in The Gambia.

Thus, in a BAU scenario, a larger population of commercial establishments may continue to rely on high cost diesel back-up generators for power. Also, the lack of know-how on assessing renewable energy projects among



the financial institutions may continue to discourage the banking sector from investing in renewable energy projects, which may mean that capital for replication of renewable energy projects will not be easily available.

Secondly, without the necessary regulations to operationalize the RE law developed under the GEF 4 project the full potential of this legislative instrument may not be realized. This may hamper private sector investment in the renewable energy sector even if capital was no not an issue. Without a grid code, the utility may not be willing to integrate renewable energy systems nor will the regulators be willing or able to govern a Private Wire Network system, a system that the private sector has shown much interest in participating in.

Thirdly, there may be no strategy to direct the long-term development of the renewable energy market. Without a long-term strategy, there may be no incentive for the MoE to identify capacity gaps that may hinder the development of the sector and put in place frameworks to address these gaps or other existing barriers that may affect the goal of increasing the share of renewable energy in the country's energy mix.

Lastly, the steady availability of a workforce skilled in renewable energy development may be unattainable. Although, the academic and vocational training institutions will like to have renewable energy introduced into their programs, the lack of resources – human resources and financial resources – is a barrier to the integration of this new and important academic field. Without support to develop the appropriate curriculum and capacity building to deliver the training modules it is unlikely that the young men and women in the country, and prospective workforce, would be equipped with the necessary knowledge and skills to steer and lead the development of the renewable energy sector.

The Government is well aware of its resource and capability constraints and for this reason is seeking international support from both multilateral and bilateral donors. This GEF 5 project would, therefore, the Government and other institutions to implement activities which will lead to an alternative scenario which will contribute towards the sustainable development goals of the country.

#### *A.5.2.2 GEF Project Alternative scenario*

**At the technology level:** The project, through GEF grant, will support the implementation of 6 demonstration projects in the productive sector. The GEF grant will be supporting about 20 – 32% of project cost, without which, given the very high interest rate of commercial banks (i.e. 25%), it would have been impossible for these projects to be executed. The projects will result in the addition of about 1.3MW of power generation capacity to the existing 85MW, and an annual electricity generation of about 2GWh. In addition, the project will work to demonstrate the viability of biomass technology in The Gambia, thus increasing the scope of technologies for potential replication after the project ends. In general, on the side of the Government, the project will show the potential contribution of renewable energy technologies in closing the energy deficit in the country and the role of the private sector in achieving this goal. On the side of the private sector, the project will show the potential savings (income and fuel) from the use of renewable energy systems in income generating activities, and their investment worthiness for the banking sector.

**At the institutional level** the project will strengthen local expertise, knowledge and capacity in developing, implementing and maintaining effective renewable energy projects and programmes. Particularly, policy and regulatory institutions like MOE/GREC, PURA, and NAWEC, as well as academic institutions like GTTI, UTG, etc., will benefit from the capacity building activities that will be executed through the project. This will allow them to lead the process of the continued development of the renewable energy market.

**At the sector level** the project would target all players. To financiers, entrepreneurs, academia, the project would provide the knowledge to fully understand the economic and environmental benefits of renewable projects; and the technical capacity and tools to develop and implement. Moreover, GCCI will be in a position to ensure the replication of the projects with their members.

**At the policy level** the project will support the development of regulatory instruments to enable the country's regulators operationalize the RE law, specifically to govern the private network market system effectively, as well as a national strategy for the MoE to facilitate the further expansion of the renewable energy market.

#### **A.5.3 Global environment benefits**

The investments as part of the technology demonstration (6 demonstration projects) are estimated to result in 44,334 tCO<sub>2</sub>eq emission reduction over a 20 year lifecycle duration of the systems.

After the completion of this project, investments are expected to be increased due to the long term outcomes of the project activities; the policy component will strengthen the policy and institutional framework to enhance penetration and scaling up of the use of renewable energy by SMEs; awareness raising and capacity building activities will contribute to significant indirect CO<sub>2</sub> emissions reduction.

Considering the characteristics of the productive sector in The Gambia, a replication factor of 3 can be used on the demonstration projects, which will result in deployment of additional renewable energy projects with the cumulative amount of emission reductions achieved at 133,000 tCO<sub>2</sub>eq over the project and post-project duration (using the bottom-up approach). Using the GEF top-down methodology, indirect emission reductions attributable to the project are estimated at 152,000 tCO<sub>2</sub>eq. The range of indirect CO<sub>2</sub> emission reductions is therefore 133,000 – 152,000 tCO<sub>2</sub>eq. More information on how the emissions reductions were estimated is provided in Annex I.

#### **A.5.4 Innovativeness, sustainability and potential for scale-up**

##### **Component 1: Develop strategy and regulation on the integration of small to medium-scale RE systems**

The Private Wire Network, and regulations for purchasing and selling power from renewable energy SPPs, when operationalized in The Gambia, will be the first of its kind in the ECOWAS region and will serve as a demonstration for the rest of the Member States on the application of a similar system for supporting renewable energy market development in their respective countries. Thus, this GEF project will not only catalyse renewable energy market expansion, driven by the private sector, but is expected to have the same effect on other countries in the ECOWAS indirectly. The same goes for the national grid code which some countries in the ECOWAS still do not have.

The regulations and national strategy that will be developed through this project will be used by the relevant institutions namely: MOE, PURA, and NAWEC. The implementation of these documents will, through learning-by-doing and using, strengthen the institutional capacities of these organizations to make the necessary modifications, in the policy and regulatory environment, to suit the changes in the renewable energy market and, thus, ensure that the interventions are self-sustaining.

### **Component 2: Demonstrate technical feasibility and promoting investments in small to medium scale RE systems**

The demonstration projects are novel in their approaches and characteristics. For instance, the Bansang mini-grid with the B-O-O framework (at such scale) and the GCCI project to electrify its exhibition centre with renewable energy, are new in the renewable energy market in the West African region and could serve as good demonstrations which may lead to replications of similar project, of varying scales, in The Gambia and other ECOWAS Member States. These demonstration projects help create business models to support broader replication in The Gambia and the ECOWAS region. By linking the activities under this project with the knowledge management mandate of ECREEE, the project will ensure that the experience from this project will be translated to best practices and policy messages for the whole region.

To ensure that only commercially viable renewable energy technologies are replicated the project will lead to the development of minimum eligibility criteria for The Gambia, adjustable as the market dynamics changes, to support prospective investors make informed decisions concerning investments in renewable energy systems. As stated above, these minimum eligibility criteria will be part of the national strategy which will be developed under component 1. Furthermore, through the investment promotion activities, which will be mainstreamed into the annual exhibition exercise conducted by GCCI, renewable energy technologies will be showcased regularly. With awareness being created and maintained, replications of similar projects can be expected. This will effectively link existing project opportunities to financial services sectors for greater replication.

### **Component 3: Renewable energy project entrepreneurship skills development**

The curriculum, training modules and materials that will be developed could be used in facilitating training (or training-of-trainers) workshops, in the country and other countries in the region (through knowledge exchange collaborations). This will facilitate the replications of similar training activities in and outside the country.

The project, through its approach of ensuring that both women and men benefit from the skills development activities implemented by the project, will lead to women contributing actively in the renewable energy sector, early on, and may guide other countries in the ECOWAS region on how to mainstream gender in the energy sector.

The interventions under this project were carefully selected to catalyse continued interventions by market players and enablers, beyond the life of the project. In terms of regulatory interventions, this project will work with Ministry of Energy to establish regulations that they will lead their implementation beyond the life of the project. By building capacity of financial services providers to appraise RE projects, the project ensures that this sector will continue to have skills to invest in the sector in other projects during and after the life of this project. In terms of training, GTTI and UTG have already expressed interest to take over the training modules and integrate them in their programmes after the project with the support of the government.

**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:**

<b>Risk</b>	<b>Rating</b>	<b>Management and mitigation</b>
<b>Institutional risk 1: Low government commitment to the enactment of regulations for the operationalization of the law.</b> The MoE, PURA and NAWEC, and other relevant government institutions, have expressed the need to develop regulations. However there is a possibility that achieving a consensus, from the stakeholders, on the provisions of the regulation may involve some level of difficulty.	Low	Through the stakeholders' consultation workshop that will lead to the preparation of the regulations, the interest and needs of all relevant stakeholders will be identified and issues will be clarified.
<b>Institutional risk 2: Lack of adequate human capacity in GREC.</b> The MoE is currently equipping the center with staff. There is, however, a risk that the staff may not have the required skills to execute the responsibilities of GREC under this project	Moderate	Under the UNIDO- GEF 4 project UNIDO is working with the MoE to build the capacity of MoE and GREC staff. Through this intervention it is expected the staff will have the skills and knowledge required for the work. Moreover, ECREEE, as one of the executing agencies of this project, will provide back-stopping to GREC and in the project activities
<b>Institutional risk 3: NAWEC does not accept renewable energy Electricity into its grids:</b> The purpose of the demonstration projects is to show the revenue enhancing potential of renewable energy through the selling of electricity to grid. If NAWEC refuses to connect the projects to the grid the purpose of the project will be defeated.	Low	NAWEC have been fully consulted in the demonstration projects and will be actively involved in some of them. In addition they are keen for additional generation capacity and keen to also offset some of their fossil fuel generation. They have expressed interest in signing PPAs with potential generators. The MoE is fully committed to the project and will also ensure that the projects are connected to the grids.
<b>Technical risk: Underperformance of renewable energy technologies.</b> Due to the lack of performance standards on renewable energy technologies in The Gambia there is a probability that systems of sub-standard qualities may be use. The effect of this may impact negatively on the objective of demonstrating renewable energy technologies as cost-effective alternative options.	Moderate	The activity will be executed with component 1 of the project, which will lead to the development of performance standards for renewable energy. Moreover, with proper communication programmes that will be executed with the MoE, PURA and NAWEC, project developers will have access to information on baseline conditions for renewable energy technologies.
<b>Market risk: Gambian youths do not participate in the renewable energy training.</b> There is a risk that the training on renewable energy entrepreneurship development is not received well by the target group or there is a lack of interest in the program.	Low	During the PPG, several academic institutions were consulted and it is clear that there is a demand for training in renewable energy entrepreneurship development. Moreover many of these institutions have introduced courses on renewable energy to respond to the growing demand in this field of study. The international consultant that will be employed to develop the program on renewable energy entrepreneurship will liaise with the relevant institutions to ensure that training modules are functional and tailored to the needs and interest of the youths.

<b>Economic and Financial risk: Financial and credit constraints prevent enterprises from investing in RE.</b> The ability of companies to invest in renewable energy projects will impact the replication of the demonstration projects and the long-term market for renewable energy. Access to finance in The Gambia is possible but at prohibitively high interest rates.	Moderate	The project will link up with ECREEE initiative: ECOWAS Renewable Energy Investment Forum, to promote renewable energy portfolio projects at the regional level with the aim to attract investors into the renewable energy market in The Gambia. Moreover, through capacity building efforts under component 2, financial institutions will be equipped with the skills to properly assess renewable energy projects and, thus, reduce the perception of them being high-risk investment ventures.
<b>Execution/governance risk:</b> Although UNIDO has long-standing direct experience in the development and implementation of RE projects and it has a strong knowledge of the key variables that determine the success and the failure of project implementation, the project may face challenges at the national level related to governance.	Moderate	UNIDO will mitigate this risk through 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. In addition, UNIDO will closely monitor project progress and take immediate action in case of governance issues.
<b>Sustainability risk:</b> Although care has been taken to ensure that the projects selected for demonstration all contribute towards the sustainability of the country by including requirements for this in the selection criteria there is still a risk that the proposed project sites may be situated in environmentally unstable areas.	Low	The National Environment Agency was consulted during the PPG and throughout the process leading to the final selection of the demonstration projects. Moreover, during the implementation of the demonstration projects the activities will be closely monitored to ensure that national and international environmental rules and regulations are respected.
<b>Climate Change risk:</b> None of the demonstration projects are situated in coastal regions, which are susceptible to coastal erosion. One of the projects, however, depends on groundnut waste for fuel. The risk is that through extended drought periods, as a result of climate change, groundnut production may be affected	Low	The technology does not depend on solely on groundnut. There is a vast alternative of fuel source.
<b>Social risk:</b> Women, due to socio-cultural factors, shy away from participating in technical aspects of renewable energy capacity building.	Moderate	With a combination of special awareness and sensitization activities and incentives, targeting women, the project will ensure equal participation of women and men in trainings.

#### ***A.7. Coordination with other relevant GEF financed initiatives***

This project directly builds on the success of the GEF 4 project that is currently ongoing. Under the ongoing project, a RE Law was passed and under this new project, new regulations to operationalize this RE law will be developed. Similarly, the success of the demonstration projects under the GEF 4 project have led to the overwhelming response by private sector for support in implementing demonstration projects under this project. Therefore, the very design of this project is premised on the success and lessons from the GEF 4 project. Project governance bodies like PSC, PMC etc, of GEF 4 project will be extended to the GEF 5 project. This will ensure continuity, but also utilize the capacity that the GEF 4 project has built.

## **B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:**

### ***B.1 Stakeholders engagement***

In the implementation of component1 the main stakeholders that will be engaged throughout the process will include GREC, NAWEC, PURA, and ECREEE. As part of the process of building local institutional capacities, UNIDO will sub-contract specific institutions for the execution of specific project activities. UNIDO as the implementing agency will be responsible for overall monitoring and oversight. The engagement and roles will be as follows:

The **Gambian Renewable Energy Centre (GREC)** as the technical arm of the Ministry of Energy will provide the local technical expertise in the development of the national strategy and action plans and will assist in facilitating the capacity building workshops that will be implemented under component. Through GREC's advisory role the activities implemented will be in line with the long-term targets of the ministry.

The **National Water and Electricity Company (NAWEC)** and the **Public Utilities Regulatory Commission (PURA)** will provide support in the development of the regulations by providing directions on the needs and gaps so as to ensure that the work done by the project is properly tailored to the local conditions.

In component 2, GREC and the **ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)** will together execute activities to promote the deployment of renewable energy technologies by conducting a series of capacity building activities targeting prospective project developers as well as banking institutions, and promotion activities to attract both international and national investors into the Gambian renewable energy market.

This component will be implemented closely with the **Gambia Chamber of Commerce and Industry (GCCI)**, a non-political, self-governed private sector organization representing Trade and Commerce, Agriculture, Industry, Transport, Telecommunication services, Tourism, Banking and Finance. The role of GCCI will be to disseminate to SME's important information of the project's activities and to ensure the active participation of its members. In addition, GCCI will facilitate and coordinate the planned exhibitions and trade fairs aimed at promoting renewable energy systems in The Gambia.

In component 3, together with GREC, ECREEE and GCCI, the **Gambia Technical Training Institute (GTTI)** will support in facilitating trainings aimed at building renewable energy entrepreneurship skills among Gambian youths. GTTI will house the demonstration laboratory and will provide the local trainers that will conduct the trainings (including training of trainers) in GTTI as well as coordinate trainings that will be conducted in other institutions.

The activities that will be executed by these institutions will accrue direct benefits to the following recipients:

- Government ministries, agencies etc.(specifically, NAWEC, GREC and PURA)
- technical organizations, universities (GTTI and the University of The Gambia), research institutes and private sector organizations (GCCI)
- Project developers
- The National Environment Agency (NEA) and non-governmental organizations concerned with environmental management and conservation of natural resources.

The target beneficiaries will be: the local population, and especially women, who will benefit from sustainable income and livelihoods, and enhanced business condition of and opportunities for women; business people who will benefit from having clean and reliable electricity to allow them cost-effectively engage in productive

activities; and young entrepreneurs who will be imparted with the knowledge and skills to be gainfully (self) employed in the renewable energy sector.

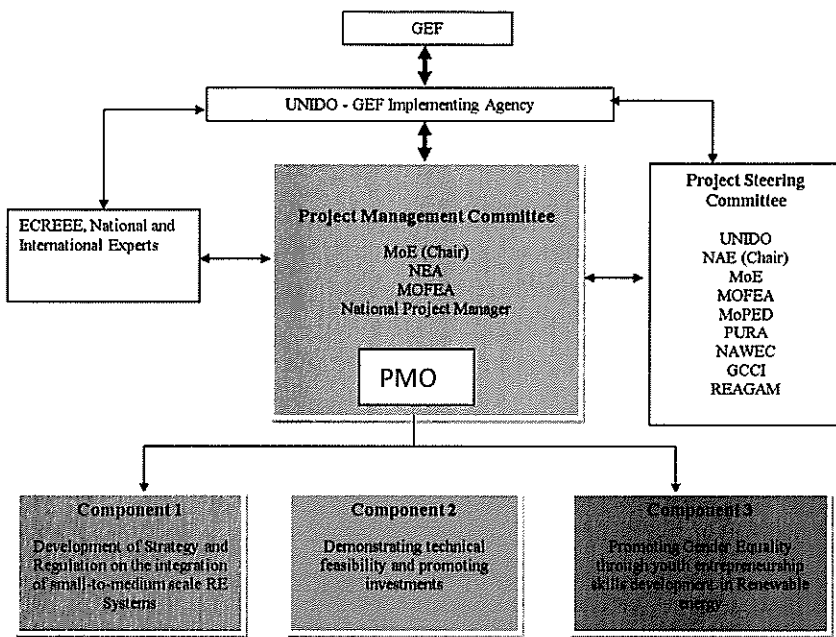
Any amendments to the project will be done in accordance to the GEF Policy C.39.09 and UNIDO rules and regulations.

### ***B.2 Project Implementation structure of the project***

The implementation structure for project management is such that UNIDO holds the ultimate responsibility for the implementation of the project, the delivery of the planned outputs and the achievement of the expected outcomes. The project will be directly implemented by UNIDO in collaboration with the Ministry of Energy (MoE) and the National Environment Agency (NEA). UNIDO will be responsible for the general management and monitoring of the project, and reporting on the project performance to the GEF. UNIDO will be in charge of procuring the international expertise, technologies, services etc. needed to deliver the outputs planned under the three project components plus monitoring and evaluation. It will manage, supervise and monitor the work of the international teams and ensure that deliverables are technically sound and consistent with the requirements of the project.

A *Project Management Office (PMO)* will be hosted by the GREC— a part of MoE. The PMO will consist of the National Project Manager (NPM) and a Project Assistant (PA). Operating as an entity, the PMO will be responsible for the day-to-day management, monitoring of project activities as in the agreed project work plan and submit monitoring reports to UNIDO. 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, sensitization and the seminars and training to be carried out under Project Component 4. The PMO will be part-funded by the GEF budget plus in-kind funding and co-finance from the Government of the Gambia. During the whole implementation period of the project UNIDO will provide the PMO with the necessary management and monitoring support. Adequate numbers of technical experts in different disciplines and project management experts/consultants with expertise in project, finance, energy, legal matters, etc. will be associated on a longer-term or short-term basis depending upon the work load. Requirement of additional support staff for fieldwork will be assessed and experts will be engaged on contract/assignment basis as per requirement. MOE will make available staff member as Technical Representatives for the PMO.

**Figure 3: Project Implementation structure**



A *Project Management Committee (PMC)* will be established to guide the management of the project. This Project Management Committee will be chaired by the Ministry of Energy (MoE) and will include a representative from the National Environment Agency (NEA) and the Ministry of Finance (MOFEA) as well as the National Project Manager and the Project Assistant. The committee will meet monthly to discuss technical, financial and management issues with the day-to-day coordination of the project. The NEA includes a GEF Council member and have prior experience with coordination GEF projects, they will therefore be able to offer valuable guidance on the management of this project.

A *Project Steering Committee (PSC)* will be established at the inception of the project to monitor the project's progress, to guide its execution and to support the project in achieving its listed outputs and outcomes. The PSC will be made up of representatives of all agencies which are involved in execution directly or which have a legal or regulatory stake in project outcomes or execution. The PSC will be chaired by the GEF OFP and Director of the National Environment Agency (NEA). The Project Steering Committee will periodically review and monitor project implementation progress, facilitate co-ordination between project partners, provide transparency and guidance, and ensuring ownership, support and sustainability of the project results. The PSC will have a balanced representation from key ministries, public institutions, private sector, NGOs, UNIDO and other international organizations partnering in the project or having relevant ongoing programmes. The final composition of the Steering Committee will be defined during the project implementation start-up phase but will be chaired by the NEA as a minimum will include representation from the Ministry of Energy, Ministry of Economic Planning and Industrial Development (MoPED), UNIDO, the Ministry of Finance and GCCI, representing the interest of the private sector. The Steering Committee is envisaged to meet quarterly. The final list of PSC members will be finalized at the outset of project operations and presented in the Inception Report. Other members can be invited by the decision of the PSC on an as-needed basis, however, by taking care that the PSC remains operational by its size. As part of the requirements of implementing this project, UNIDO will provide overall management guidance to the project, compile and present progress reports and ensure quality of the different activities.

At the beginning of project implementation a detailed work plan for the entire duration of the project will be developed by UNIDO in collaboration with the PMO, the Ministry of Energy and NEA. The working 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 the day-to-day management of project activities as in the agreed project work plan. With ECREEE playing a supporting role, 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, sensitization and the seminars and training to be carried out under Project Component 3.

The PMO will also be responsible for 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 The Gambia. The dissemination programme will be designed to raise awareness of the demonstration projects.

**Table 5: Project management Budget/cost**

<b>Cost Items</b>	<b>Total Estimated person months</b>	<b>GEF (\$)</b>	<b>Other sources (\$)</b>	<b>Project total (\$)</b>
Local consultants	29	30,000	95,000	125,000
International consultants				
Office facilities, equipment, vehicles and communications		89,967	90,000	179,967
Travel			15,000	15,000
Miscellaneous - Subcontracts - websites/videos				
<b>Total</b>	<b>29</b>	<b>119,967</b>	<b>200,000</b>	<b>319,967</b>

***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)***

The aim of the project is to increase the use of renewable energy, and reduce the high dependence on expensive diesel back-up generators, in the productive sector. By contributing towards the reliable, and much more affordable, supply of electricity the project will enhance productivity in income generating ventures and contribute towards poverty reduction in The Gambia. The successful implementation of the project would result in direct benefits in terms of improvement in the country's investment climate and growth in the productive sectors, livelihoods and general quality of life of the local communities, as well as in the overall energy situation in The Gambia.

In the short-term, government's ministries and agencies, regulatory bodies, electricity generators and distributors, educational and financial institutions, renewable energy investors, women and men entrepreneurs will benefit from the regulatory framework that will be established, capacity building activities that will be conducted and sustainable industries that will come as a result of this project. Some of the observable indicators will include an improvement in the grid stability and operation; increased number of renewable energy IPPs in the electricity market and a reduction of GHG emissions in the electricity sector; an increased level of electricity generation and consumption and reduction in importation of fossil fuels for power generation; increased number of youth employment and number of businesses dedicated to renewable energy and/or powered by renewable energy; and equal participation of women and men in the renewable energy market.

Furthermore, with women being a focal target group, the project will lead to an increase in the number of women technicians and entrepreneurs in the renewable energy sector by leveling the playing field for both men and women actors in the sector. This will be achieved through a mixture of awareness raising activities and preferential instruments that will encourage female participants in training activities, access to funding and for long-term results the national strategy and action plan document for the integration of renewable energy systems in the productive sectors will include gender-specific and gender-responsive targets and goals. The project activities are in line with UNIDO and GEF Mainstreaming policies. In particular, by targeting the greater involvement of women in RE entrepreneurship programmes, the project will ensure that women have the means to improve the productivity of their enterprises thereby increasing incomes and achieve associated socio-economic benefits. The project will create direct employment for women and youth who will work on the 10 targeted enterprises. Furthermore, the project will also create more employment for value chains linked to these enterprises.

The socioeconomic benefits that will be realized through this project will contribute towards the greater ECOWAS development goals and the ECOWAS White Paper on Access to Energy Services in Peri-Urban and Rural Areas. Moreover, the environmental benefits that will accrue through this project will contribute towards a reduction in the global GHG emission rate.

***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 the application of renewable energy in income generation activities, 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) awareness raising of and capacity building in renewable energy to include 'train the trainers'; 3) select pilot projects primarily on the basis of their replication potential (and therefore direct and indirect avoided GHG emissions).

Given its focus on addressing policy and technical capacity barriers, this project will generate the biggest share of

GHG emission savings after the project implementation period, when the regulations would be in place, capacity built and the training programmes established that will, among other impacts, lead to additional renewable energy projects in The Gambia.

This project will result in:

- Direct emission reductions of 44,334 tCO<sub>2</sub>eq through its demonstration projects
- Annual electricity generation from demonstration projects totalling 2383.5MWh
- Post-project indirect emission reductions of between 133,000 tCO<sub>2</sub>eq and 152,000 tCO<sub>2</sub>eq due to increased awareness and capacity to develop and finance renewable energy projects

Calculating the cost per tonne of direct reduction of emissions for GEF, the cost per tonne of abatement would then be 29.7 USD/tCO<sub>2</sub>eq. This figure is based on the total GEF grant for this project although many of the activities supported by this grant will support the long term effects rather than only the direct emissions. If the grant associated only with these projects is used then the cost per tonne of abatement would be 18 USD/ tCO<sub>2</sub>eq. Incorporating the post-project indirect reduction of emissions, the cost per tonne of abatement would reduce to as low as 5 USD/tCO<sub>2</sub>eq.

The GHG emission reduction calculation was based on the latest GEF methodology.

### **C. DESCRIBE THE BUDGETED M&E PLAN:**

Project monitoring and evaluation (M&E) are conducted in accordance with established UNIDO and GEF procedures. The M&E activities are defined by Project component 4 and the concrete activities for M&E that are specified and budgeted in the M&E plan. Monitoring will be based on indicators defined in the strategic results framework (which details the means of verification), and the annual work plans. Monitoring and Evaluation will make use of the GEF Tracking Tool, which will be submitted to the GEF Secretariat two times during the duration of the project: at CEO Endorsement, at mid-term review, and at project closure.

UNIDO as the Implementing Agency will involve the GEF Operational Focal Point and project stakeholders at all stages of the 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, provide reports or other documentation related to the project and (ii) facilitate interviews with staff involved in the project activities.

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 project progress so that the implementation team can take early corrective action if performance deviates significantly from original plans; iii) adjust and update project strategy and implementation plan to reflect possible changes on the ground, results achieved and corrective actions taken; iv) keep GEF secretariat updated on all project activities.

A detailed M&E plan will be prepared by UNIDO in collaboration with the Project Management Committee (PMC) and project partners at the beginning of project implementation and then periodically updated. Implementation of the M&E Plan will be undertaken by the Project Management Committee (PMC), UNIDO Project Manager. In particular, the impact and performance indicators as in Annex A will track, report and review project activities and accomplishments in relation to:

- Renewable energy electricity generated and used for productive uses and/or sold to the grid and GHGs emission reductions directly generated by the UNIDO GEF project. These will include the type and the number of projects developed and implemented.
- Renewable energy electricity generated and GHGs emission reductions in-directly generated by the UNIDO GEF project. These will include type and the number of projects developed and implemented due to the increased capacity and conducive environment for the renewable energy projects.
- Renewable energy investment generated by the UNIDO GEF project, directly and indirectly.
- Development of strategy, legislative and regulatory frameworks aimed to promote and support the integration of small-to-medium scale renewable energy in SMEs.
- Overall socio-economic impacts of the project to include increase in productive capacities, access to modern energy services, cost-effectiveness and gender equality.

The National Project Manager will be responsible for day-to-day management of project activities and track progress towards milestones, coordination of monitoring and evaluation of the specific project activities with respect to energy generation, technical performance, commercial viability, GHGs emission reduction and other related information.

The UNIDO project manager will be responsible for oversight and 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 UNIDO project manager will be responsible for the preparation of Annual Project Implementation Reviews (PIR) and mid-term review as established in the M&E Plan.

A final external evaluation will take place at least two months before the completion of the project. UNIDO will make arrangements for the independent terminal evaluation of the project. The UNIDO project manager will inform UNIDO Evaluation Group at least 6 months before project completion about the expected timing for the Terminal Evaluation (TE). UNIDO Evaluation Group will then manage the TE in close consultation with the project manager. The following table provides the tentative budget for the evaluation.

**Table 6: M&E tentative budget**

M&E Activity Categories	Feeds Into	Time Frame	GEF Budget (USD)	UNIDO (USD) co-financing	Responsible Parties
Measurement GEF Tracking Tool specific indicators	Project management	Continuous	19,100	40,000	PMU
Monitoring of project impact indicators (as per Log frame)	Project management	Continuous			
Periodic Progress Reports and dissemination.	Project management; PSC Meeting; Annual PIF	Semi-annually			
Independent terminal evaluation	Terminal Evaluation Review (TER) conducted by UNIDO EVA and/or GEF EO	Project completion  (at least one month prior to the end of the project and no later than six months after project completion)	44,900	20,000	Independent evaluator, PMU, UNIDO PM, and UNIDO Evaluation Group
<b>TOTAL</b>			<b>64,000</b>	<b>60,000</b>	

UNIDO as the Implementing Agency will involve the GEF Operational Focal Point and project stakeholders throughout project duration in order to ensure the use of the evaluation results for further planning and implementation.

#### **Legal Context.**

The Standard Basic Cooperation Agreement concluded between UNIDO and the Government of the Republic of Gambia on 27 January 1994 applies.

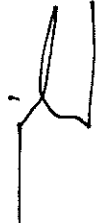
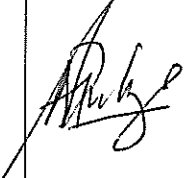
**PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)**

**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)
Ndey S. Bakurin	GEF Focal Point , The Gambia, and Executive Director	NATIONAL ENVIRONMENT AGENCY (NEA)	08/30/2013

**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 R. Scholtès, Managing Director, Programme Development and Technical Cooperation Division (PTC) UNIDO GEF Focal Point		12/12/2014	Alois Posekufa Mhlanga, Industrial Development Officer, ECC/RRE	Tel: +43 1- 260265196	<a href="mailto:a.mhlanga@unido.org">a.mhlanga@unido.org</a> 

## Endorsement Letter



### NATIONAL ENVIRONMENT AGENCY

Jimpey Road, Kanifing PMB 48, Banjul, THE

GAMBIA

Tel: (220) 4399422, 4399423

Fax: (220) 4399430

Email: [nea@gamtel.gm](mailto:nea@gamtel.gm)

Website: [www.nea.gm](http://www.nea.gm)



NEA/ADM130/01/Part XXXIV (18)

30<sup>th</sup> August 2013

**Philippe Scholtès**  
**Officer-in-Charge**  
**Programme Development and**  
**Technical Cooperation Division (PTC)**  
**UNIDO GEF Focal Point**  
**Vienna International Centre**  
**Wagramerstr. 5, P.O. Box 300**  
**A-1400 Vienna, Austria**

**Subject: Endorsement for the Greening the productive sectors in Gambia:  
Promoting the use and integration of small to medium scale renewable  
energy systems for productive uses**

In my capacity as GEF Operational Focal Point for The Gambia, I confirm that the above-mentioned project proposal is in accordance with my government's national priorities and our commitment to the relevant global environmental conventions. It was discussed with relevant stakeholders, including the global environment convention focal points, in accordance with GEF's policy on public involvement.

I hereby endorse the preparation of the above-mentioned project proposal with the support of the UNIDO. If approved, the proposal will be prepared and implemented by the Gambia Renewable Energy Centre, Ministry of Energy, in close collaboration with National Environment Agency and other competent national authorities. I further request UNIDO to provide a copy of the project document before it is submitted to the GEF Secretariat for CEO endorsement.

I understand that the total GEF financing being requested for this project is US\$1,505,000 from Gambia's Climate Change STAR Allocation under GEF-5, which includes project preparation grant (PPG), agency fees to UNIDO related to project cycle management services associated with this project. The financing requested for Gambia is detailed in table below

Source Funds	of GEF Agency	Focal Area	Amount in USD			
			Project Preparation	Project	Agency Fee (9.5%)	Total
GEF TF	UNIDO	Climate Change	60,000	1,319,635	125,365	1,505,000

I consent to the utilization of Gambia's allocation in GEF-5 as defined in the System for Transparent Allocation of Resources.

  
Ndey Sireng Bakurin

Ag. Executive Director & GEF Focal Point for The Gambia

Cc:

Honourable Secretary General, Office of The President, State House, Banjul  
Permanent Secretary, Ministry of Environment, Parks and Wildlife, Kairaba Avenue,  
Kanifing

The Director, Department of Water Resources, UNECCC Focal Point, Banjul

The Director, Department of Forestry, UNCCD Convention Focal Point, Banjul

The Director, Department of Parks & Wildlife Management, UNCBD Convention Focal  
Point, Abuko

GEF Secretariat, Washington DC, USA

UNIDO Office in Dakar, Senegal

## **LIST OF ANNEXES**

- ANNEX A – PROJECT RESULTS FRAMEWORK**
- ANNEX B – RESPONSES TO PROJECT REVIEWS**
- ANNEX C – STATUS OF IMPLEMENTATION OF PROJECT PREPARATION  
ACTIVITIES AND THE USE OF FUNDS**
- ANNEX D – BUDGET SHEET (GEF FUNDING)**
- ANNEX E – BUDGET SHEET – CO-FINANCING**
- ANNEX F – PROJECT WORK PLAN**
- ANNEX G – OVERVIEW OF THE GAMBIA'S ENERGY SECTOR**
- ANNEX H – DEMONSTRATION PROJECTS**
- ANNEX I – ESTIMATE OF ENERGY SAVINGS AND GHG EMISSION  
REDUCTIONS**
- ANNEX J – TERMS OF REFERENCE FOR KEY STAFF**
- ANNEX K – CO-FINANCING COMMITMENT LETTERS**
- ANNEX L – FEASIBILITY STUDIES OF PILOT PROJECTS (see separate file)**
- ANNEX M – CRITERIA FOR SELECTING DEMONSTRATION PROJECTS**



## ANNEX A: PROJECT RESULTS FRAMEWORK

Project Strategy		Objectively verifiable indicators				Risk and Assumptions	
		Indicator (quantified and time-bound)	Baseline	Targets	Source of Verification		
Objective of the project	Promoting market based use and integration of small to medium scale renewable energy systems in the productive sectors.	1.Installed capacity of renewable energy (kW) 2.Energy generated from renewable energy (kWh) 3.Adoptiton of regulatory frameworks supporting private sector involvement in small to medium-scale renewable energy systems for the productive sector.	1. 1020kW (on-grid Wind) and 567kW (off-grid solar electricity and water heater) 2. 904,440kWh generated from renewable energy 3. No regulatory framework	1.1. Additional 1.2 MW installed 2. 2,000MWh of electricity produced annually 3. Renewable energy regulations developed and adopted 4. Additional 2,216 tCO2 saved annually	1.Demonstration projects evaluation 2.Regular project reporting 3. Final evaluation	The Government of The Gambia remains committed to developing the renewable energy sector 2. Life cycle energy costs reduction becomes a priority for consumers.	
Project Component 1: Development of strategy and regulation on the integration of small-to-medium scale RE systems.							
Outcome 1	Conducive regulatory environment for small to medium-scale renewable energy systems is established in the Gambia	1.Adoption of Regulation and tariff system for private wire networks 2. Adoption of Regulation for the operation of SPP 3.Adoption of Grid Code for the integration of renewable energy	1. RE law and FiT rules exist 2. Regulations for operationalization of the law and grid code do not exist	1. Regulations for governing the operations of private wire networks and SPP are developed and adopted. 2. Recommendations from the study on the grid capacity are being implemented, and the grid code as well.	1. Government policy 2. Project report	Government remains supportive of project activities	

Output 1.1	National strategies, targets and regulation on the use and integration of renewable small to medium scale renewable energy systems in – productive sectors developed.	1. Regulations developed and adopted for the operation of private wire networks	1. No RE regulations in place	1. Regulations on small to medium-scale RE systems developed and adopted. 2. Grid code developed and adopted	1. Government records. 2. Project report	Government supportive of project activities remains
Output 1.2	Performance standards, Permitting procedures and regulation on grid connected renewable energy systems developed	1. Regulations developed and adopted for the operation of SPP 2. Grid code and performance standards developed and adopted	1. No RE regulations in place 2. Absence of study on grid absorption capacity and grid code.	1. Regulations developed and adopted. 2. Grid code developed and adopted	1. Government records. 2. Project report	Government supportive of project activities remains
<b>Project Component 2: Demonstrating technical feasibility and promoting investments</b>						
Outcome 2.1	Feasibility of small to medium scale renewable energy projects for the productive sector demonstrated	Increased deployment of renewable energy systems in servicing a wide range of productive activities	Productive use of renewable energy focused mainly in the tourism sector and, in terms of service, water heating	At least, a 50% increase in the use of renewable energy for alternative purposes.	1. M&E report 2. Progress report	Financial-related barriers do not hinder RE investment in the productive sectors
Outcome 2.2	Investments in small to medium scale renewable energy systems promoted.	Enhanced private sector participation in the development of the renewable energy market.	Low private sector participation in the renewable energy market	At least 50% increase in the number of IPPs in the renewable energy market	1. M&E report 2. Progress report	Conducive regulatory frameworks are put in place to encourage private sector participants
Output 2.1	Investments projects realized with total capacity of 1.2 MW	Total installed capacity of portfolio projects	UNIDO –GEF 4 demonstration project 2X450kVa and one 150kVA wind	1.2 MW installed by 2017	1. M&E reports 2. Progress report	Conducive regulatory frameworks are put in place to encourage private sector participants

Output 2.2	Young entrepreneurs and women are supported to start-up renewable energy businesses	1. Number of renewable energy businesses established by youths and women 2. Number of young women and men employed (or self employed) in renewable energy sector ( at least 50% are women)	None	1. At least 10 new businesses established with 5 of them headed by women.	1.M&E report 2. Progress report	
Output 2.3	Portfolio of viable small to medium scale investment projects	Number of pipeline projects in the portfolio	None	At least 10 viable projects are identified	1.M&E report 2. Progress report	Awareness and investment promotion activities are effective
<b>Project Component 3: Renewable energy projects entrepreneurship skills development</b>						
Outcome 3	Small to medium scale renewable energy projects entrepreneurship skills of youth increased	The number of young people engaged in renewable energy businesses	None	At least 10 young people are engaged in renewable energy businesses	1.M&E report 2. Progress report	The trainings are effective and enabling frameworks to promote youth employment in the renewable energy sector are put in place.
Output 3.1	Renewable energy based entrepreneurship training modules for the youth developed and training conducted	1.Number of trainings conducted.	None	1. At least 5 train-of-trainers sessions conducted and 60 trainings conducted for youths ( with over 50% women)	1.M&E report 2. Progress report	Awareness raising efforts are effective.
Output 3.2	Training on small to medium scale RE systems integrated into curriculum of youth organizations.	1 .Number of enrollments on the Renewable Energy Enterprise Program. 2. Number of young men and women trained.	None	1.At least 30 new enrollments 2.At least 15 young men and 15 women trained	1.M&E report 2. Progress report	Awareness raising efforts are effective.

**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).

GEF SEC Comments	UNIDO responses
<p>Recommendation at PIF stage: During the project design phase, we expect a complete study of mechanisms that can maximize local bank financing.</p>	<p>During the PPG phase, the project organized a joint meeting of all financial service providers to consult on the state of the sector and potential mechanisms that could be established. From this consultative meeting, it became apparently clear that the sector had very low capacity to appraise RE project in general. Accordingly, this project shifted focus to include intensive training for financial services providers on RE projects. It was envisaged that once there is critical mass of RE project appraisal capacity within this sector, the study on financial mechanism will be conducted. In fact, the project plans to use one of the last training sessions to introduce the issue of financial mechanisms and this will lead to the report. The training will equally target development finance institutions so that they can also provide know-how on how concessionary funding could be accessed and how local banks can make use of these funding windows to develop projects/mechanisms to finance renewable energy projects.</p>

**ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS<sup>26</sup>**

PPG Grant Approved at PIF: 54,800		GEF/LDCF/SCCF/NPIF Amount (\$)		
<i>Project Preparation Activities Implemented</i>	<i>Budgeted Amount</i>	<i>Amount To date</i>	<i>Spent</i>	<i>Amount Committed</i>
Regional Subcontractor	54,800	54,800		
Work package 1: Proposal on developing a strategy for the integration of small to medium scale renewable energy systems in The Gambia.				
Work package 2: Stakeholder consultation report.				
Work package 3: Feasibility study plans for demonstration project.				
Work package 4: Full sized project document/Request for CEO Endorsements				
<b>Total</b>	<b>54,800</b>	<b>54,800</b>		

<sup>26</sup> 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: BUDGET SHEET (GEF FUNDING)**

Project components	\$	GEF DISBURSEMENT			
	GEF Financing	Co-Financing(\$)	YEAR 1 (\$)	YEAR 2 (\$)	YEAR 3 (\$)
Component 1: Development of strategy and regulations on the integration of small-to-medium RE systems					
Output 1.1 National strategy, targets and regulation on the use and integration of renewable small to medium scale energy systems in productive sectors developed.	38,750	112,500	38,750	-	-
Output 1.2 Performance standards, permitting procedures and regulation on grid connected renewable energy systems developed	44,000	117,500	44,000	-	-
Sub-total – Component 1	82,750	230,000	82,750	-	-
Component 2: Demonstrating technical feasibility and promoting investments					
Output 2.1 Portfolio of viable and replicable small-to-medium scale demonstration projects developed	0	100,000	0	0	0
Output 2.2 Six (6) demonstration projects with a minimum capacity of 1.2MW installed	800,000	2,250,703	540,000	260,000	
Output 3.3 Young entrepreneurs are supported to start-up renewable energy businesses	100,000	24,685	35,000	50,000	15,000
Sub-total – Component 2	900,000	2,375,388	575,000	310,000	15,000
Component 3: Promoting gender equality through youth renewable energy entrepreneurship skills development					
Output 3.1 Renewable energy project based entrepreneurship training modules for the youth developed and training conducted	52,918	150,000	52,918		
Output 3.2 Training on small to medium scale RE systems integrated into curriculum of youth organizations.	100,000	150,000	100,000	-	-
Sub-total – Component 3	152,918	300,000	152,918	-	-
Component 4: Monitoring and Evaluation					
Output 4.1 Mid-term and end of project evaluation report	64,000	70,000	-	21,000	43,000
Sub-total – Component 4	64,000	70,000	-	21,000	43,000
Total	1,199,668	2,975,388	810,668	331,000	58,000
Project Management Cost	119,967	200,000	40,000	40,000	39,967
Total Project Costs	1,319,635	3,175,388	850,668	371,000	97,967

ANNEX E: BUDGET SHEET – CO-FINANCING

PROPOSED CO-FINANCING BUDGET*					
CO-FINANCING BUDGET COMPONENT 1					
<i>Component 1: Development of strategy and regulations on the integration of small-to-medium RE systems</i>	GOG (\$)	PROJECT PROMOTERS (\$)	UNIDO (\$)	OTHERS (ECREEE/GTTL, GCCCI) (\$)	OUTCOME TOTAL (\$)
Outcome 1: Regulatory environment established	230,000				230,000
CO-FINANCING BUDGET COMPONENT 2					
<i>Component 2: Demonstrating technical feasibility and promoting investments</i>	GOG	PROJECT PROMOTERS	UNIDO	OTHERS (ECREEE/GTTL, GCCCI)	OUTCOME TOTAL
Outcome 2.1 Investments in small to medium scale renewable energy systems promoted	24,685	2,250,703		100,000	2,375,388
Outcome 2.2 Feasibility of small to medium scale projects from the productive sector demonstrated.					
CO-FINANCING BUDGET COMPONENT 3					
<i>Component 3: Promoting gender equality through youth renewable energy entrepreneurship skills development</i>	GOG	PROJECT PROMOTERS	UNIDO	OTHERS (ECREEE/GTTL, GCCCI)	OUTCOME TOTAL
Outcome 3.1 Small to medium scale renewable energy projects entrepreneurship skills of youth increased	224,301			75,699	300,000
CO-FINANCING BUDGET COMPONENT 4					
<i>Component 4: Monitoring and evaluation</i>	GOG	PROJECT PROMOTERS	UNIDO	OTHERS (ECREEE/GTTL, GCCCI)	OUTCOME TOTAL
Outcome 4.1 Project monitored and evaluated	20,000		50,000		70,000
CO-FINANCING BUDGET: PROJECT MANAGEMENT					
<i>Project Management</i>	GOG	PROJECT PROMOTERS	UNIDO	OTHERS (ECREEE/GTTL, GCCCI)	OUTCOME TOTAL
	50,000		150,000		200,000
<b>TOTAL:</b>					<b>3,175,388</b>

\* COFINANCING MAY VARY PER COMPONENT AND PER SOURCE DURING PROJECT IMPLEMENTATION

# ANNEX F: WORK PLAN

		Year 1												Year 2												Year 3					
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Project set up and management	Finalise institutional set-up and relationships																														
	Set out roles and responsibilities																														
	Establish a Project Management Unit/Office																														
	Recruit project manager																														
	Establish a Project Steering Committee																														
Project management	Prepare Terms of Reference for key experts																														
	Prepare detailed work plan																														
	Day-to-day coordination, management and monitoring of all project activities																														
Component 1																															
1.1 National strategy, targets and regulation on the use and integration of renewable small to medium scale energy systems in productive	<i>Development of strategy and action plan document for the integration of</i>																														
	Organize introductory stakeholders meeting																														
	Draft strategic actions from the NREAPs																														
	Disseminate for peer-review																														
	Organize validation workshop																														
	<i>Development of regulations for the operation of Private Wire Networks by Small power producers (SPP) and Small</i>																														
	Organization of stakeholders' workshop to introduce the activity																														
	Preparation of draft regulation and tariff methodology																														
	Organization of stakeholders' workshop to validate and adopt the final document																														









## ANNEX G: OVERVIEW OF THE GAMBIA'S ENERGY SECTOR

### *Institutional framework and Actors in the Electricity sector*

The NEP<sup>27</sup> provides the framework for the provision of efficient, reliable and affordable energy supply to effectively support the socio-economic development of the country. The NEP contains specific development objectives for energy sub-sectors, including electricity and renewable energy sub-sector.

For the electricity sector these specific objective are to:

- Improve and expand generating, transmission and distribution capacity to improve the reliability and quality of electricity services and cater for load growth;
- Reduce the cost of electricity;
- Encourage investment in rural power supply;
- Encourage the use of alternative and efficient technologies and fuels for electricity.

And for the renewable energy sub-sector the specific objectives are to promote the utilisation of renewable forms of energy such as solar, wind and bio-mass; promote use and develop, to the extent possible, a domestic production capacity for renewable energy fuels and technologies; ensure the sustainable supply of renewable energy fuels/device/technologies at competitive prices through private sector participation.

Established in 2007, *the Ministry of Energy (MoE)* is responsible for overseeing the implementation of government's policies and strategies on energy. Under the framework of the Electricity Act of 2005<sup>28</sup>, the MoE functions include to:

- establish policies that promote an environment conducive to attracting investments in the electricity sub-sector in the short, medium and long term;
- promote a policy of restructuring and privatization of state enterprises in the electricity sub-sector and establish competition in the electricity market;
- support scientific research and education in the electric sector; promote efficiency in the production, transmission and distribution of electricity and in the use of electricity by consumers, and create a comprehensive electricity conservation programme for The Gambia;
- monitor and recommend policies regarding the effect on the environment of all energy activities, and incorporate national environmental protection goals in the formulation and implementation of the electricity subsector policies;
- establish policies to promote the establishment of relationships between licensees and electric sector entities in foreign countries, and promote the establishment of transit and import and export relationships in the electric sector.

To promote the utilization of the country's renewable energy resources, the MoE, under the Renewable Energy Act of 2013, is responsible for setting national targets for the use of renewable energy; collaborating with other ministries and authorities to implement an effective permitting process for installation of renewable energy facilities; promoting capacity building activities with the renewable energy sector; enabling the development of technical standards and requirements and certification of renewable energy installations.

---

<sup>27</sup> NEP at:

<sup>28</sup> Electricity Act 2005: <http://faolex.fao.org/docs/pdf/gam134882.pdf>

*The Gambia Renewable Energy Centre (GREC)* is the technical arm of the Ministry of Energy with responsibility for research, development and utilisation of renewable energy. GREC was established in 1984 with the objective to promote renewable energy market development through demonstration and capacity building activities.

*The National Water and Electricity Company (NAWEC)* is a state-owned para-statal company established under the Companies Act in 1996. NAWEC is under the purview of the MoE and is the main electricity generator in The Gambia, operating and managing over 50% of the electricity generation capacity. NAWEC has as its mission “To ensure the safe, effective provision of affordable nationwide electricity, water and sewage services to satisfy consumer requirements, generate reasonable rates of return on investments and contribute to the socio-economic development of The Gambia”. Through a PPP, NAWEC is implementing a 60kW solar PV system<sup>29</sup> and has allocated certain areas in the country for renewable energy installation.

The main Independent Power Producers (*IPP*) operating in the Gambia is the Global Electrical Group (GEG) comprising of three organizations/companies namely: Global Electrical Company (GEC), Global Trading Company (GTC), and Global Management Company (GMC). GEG has installed a total capacity of 38.6MW HFO plants in Brikama.

All public grid-connected systems are regulated by the **Gambia Public Utilities Regulatory Authority (PURA)**. Established in 2001, PURA, under The Gambia Public Utilities Regulatory Authority Act 2001, is responsible for establishing electricity tariffs.

Moreover, PURA, under the Renewable Energy Act of 2013, is responsible for the following:

- managing the country’s Renewable Energy Fund;
- formulating Feed In Tariff (FiT) Rules;
- acting as arbitrator on matters provided for under the Act between the network utility and renewable energy electricity generators;
- maintaining a register of appropriately qualified installers of systems using renewable energy resources; and
- requiring importers of systems using renewable energy resources to provide details of compliance with internationally recognised performance and safety standards.

*National Environment Agency (NEA)*<sup>30</sup> is the body responsible for regulating key aspects of development in the country, particularly as it concerns electricity generation and consumption. The goal is to ensure that electricity supply and expansion meets global environmental standards for a sustainable social and economic development in The Gambia.

NEA’s mandate is enshrined in The Gambia Environmental Action Plan, which are as follows:

- to ensure the health and well-being of all those living in The Gambia.
- to provide reliable and relevant information for sound environmental management.
- to conserve and promote the sound and rational use of natural resources.
- to develop and maintain a National Environmental Planning Framework for The Gambia.
- to educate about the environment, increasing environmental awareness and empower communities to take action to identify and solve environmental problems.

---

<sup>29</sup> The project is being implemented partly with GEF grant through the framework of UNIDO/GEF 4

<sup>30</sup> NEA <http://www.nea.gm/about-us/>

## *Electricity generation and consumption*

The Gambia relies entirely on imported fossil fuel for electricity generation, operated mainly by NAWEC, the state-owned company, and GEG. NAWEC operates thermal power stations that run mainly on heavy fuel oil (HFO), supplying electricity to the Greater Banjul Area (GBA); these are the Kotu power station, and Brikama Power station (I) (Independent power producer) and Brikama Power station (II)<sup>31</sup>. In addition to the thermal power stations is a small-scale wind power plant, and 7 isolated power stations in the provincial areas of The Gambia.

### ***Kotu Power Station***

The Kotu power station comprises of Kotu A, B and D, running on 8 engines, predominately HFO type engines with a total installed capacity of 41.1MW, of which 27.2 MW is the capacity available. Due to improved management practices electricity production increased from 100GWh in 2011 to 102GWh in 2012.

### ***Brikama Power Station (I and II)***

Commissioned in 2006, the Brikama I power station is operated by the IPP GEG. The station has a total installed capacity of 25.6 MW, running entirely on HFO. Currently, the station operates at about 50% capacity, with electricity production decreasing by 29% from 119 GWh in 2011 to 83 GWh in 2012.

Through an EPC contract signed between the Social Security and Housing Finance Corporation (SSHFC) and Global Trading Group (GTG)/GEG, under the coordination of MoE and supervision of NAWEC, two 6.5MW engines were installed at the Brikama II plant. The 13MW power plant is owned by SSHFC, operated by GTG/GEG and the electricity is sold to NAWEC.

***Table1 Conventional power plants: Installed and available capacity in The Gambia***

<b>Kotu</b>				
	Installed capacity (MW)	Available capacity (MW)	Fuel	Year of commission
<b>Location unit</b>				
KPS-G1	3	2.6	LFO	1981
KPS-G2	3	0	LFO	1981
KPS-G3	3.4	2.6	HFO	1997
KPS-G4	6.4	5.5	HFO	2001
KPS-G6	6.4	5.5	HFO	1990
KPS-G7	6.4	5.5	HFO	2001
KPS-G8	6.4	0	HFO	2001
KPS-G9	6.4	5.5	HFO	2009
TOTAL	<b>41.4</b>	<b>27.2</b>		
<b>Brikama</b>				
BRK-G1	6.4	0	HFO	2006
BRK-G2	6.4	5.5	HFO	2006
BRK-G3	6.4	5.5	HFO	2007
BRK-G4	6.4	5.5	HFO	2007
BRK-G5	6.5	6.5	HFO	2013
BRK-G6	6.5	6.5	HFO	2013
TOTAL	<b>38.9</b>	<b>29.5</b>		

Source: NAWEC

Annual Status Report, 2012<sup>32</sup>

<sup>31</sup> NAWEC Annual status report 2013

<sup>32</sup> Report on the new plants commissioned in Brikama in 2013 was based on consultations with NAWEC. The annual report for 2013 is still being developed.

### ***Batokunku small-scale wind power plant***

The Batokunku 150kW wind project is a result of a community development initiative led by the people of Batokunku. The objective of the project is to generate electricity from renewable energy to contribute towards the community's economic development. The excess power generated is sold to NAWEC.

According to the utility's status report, total installed capacity in the country is estimated at 85 MW, with the annual power production estimated at 246 GWh. Electricity is transmitted and distributed through two 33 kV transmission lines having a total length of 125 km, conveying electricity from Brikama and Kotu to 33 kV / 11 kV substations.

Approximately 44% of the electricity produced is consumed by households, small-scale industries, hotels and larger industries use approximately 39% and commercial entities about 8%. The remaining 9% is consumed by government establishments and NAWEC<sup>33</sup>.

National electricity access is estimated at 35% , mostly concentrated in GBA where access is about 93%. The factors responsible for the low electrification rate include under-capitalization, a rigid tariff system, escalating fuel prices, double digit transmission and distribution losses (25%) and non-settlement of electricity bills. As a result, replacing obsolete equipment and investing in new electricity generation capacities remains a struggle for NAWEC, in the midst of an 8% per annum electricity demand growth rate.

Recognizing the high level of suppressed demand and a weakness in the transmission and distribution network, NAWEC has projects that 75MW of additional capacity will have to come online in the next three years for the country to close its huge electricity deficit. It also estimates a need for additional capacity of 135MW in 2014 -2020 (government of The Gambia, 2012)<sup>34</sup>, about USD 112.5million will be required between 2013 and 2015 and in 2016-2020 USD 182million to achieve this.

### ***Renewable Energy in The Gambia: Markets and prospects***

Grid connected renewable energy systems, particularly wind technologies, have proven in The Gambia to be a cost-effective option for providing clean energy services in communities. The country presently has a grid-tied wind system of 120kW capacity that has been in operation since 2009, and two 450kW wind systems that were installed in Tanji in 2012, as a UNIDO GEF 4 demonstration project<sup>35</sup>. The electricity provided through these projects has contributed towards improving the economic activities in these communities, and by extension, the welfare of the local people.

Both grid-connected and stand-alone renewable energy based systems have good potential for addressing the energy deficient in the country and to help expand electrification in areas that are yet to be electrified. Based on the country's solar and wind resources, and suitable land areas, solar photovoltaic and wind technologies have the potential of generating 647 TWh/year of electricity<sup>36</sup>, this is equivalent to 0.1% of the electricity that will be generated from the additional 75MW capacity needed in the next three (3) years as stated by NAWEC.

---

<sup>33</sup> RRA report for The Gambia

<sup>34</sup> Cited in Gambia RRA Report

<sup>35</sup> Gambia RRA Report

<sup>36</sup> IRENA (2014) Estimating the renewable energy potential in Africa: A GIS Approach. Available at: [http://www.irena.org/DocumentDownloads/Publications/IRENA\\_Africa\\_Resource\\_Potential\\_Aug2014.pdf](http://www.irena.org/DocumentDownloads/Publications/IRENA_Africa_Resource_Potential_Aug2014.pdf)

The table below shows the technical potential for these technologies based on the factors aforementioned.

**Table 2: Technical potential of solar PV and wind turbines in The Gambia**

<i>Technical potential of selected renewable energy technologies</i>		
Technologies	PV	Wind <sup>37</sup>
Potential (TWh/year)	474	173

*Source: IRENA (2014)<sup>38</sup>*

The abundant renewable energy resource potential, particularly wind and solar, the high cost of electricity generated by NAWEC, as well as the fact that the prices of renewable energy technologies have fallen, and continues to, presents a good opportunity for The Gambia to cost-effectively increase the share of renewables in the country's energy mix.

### ***Renewable Energy Resource potential***

The Gambia could benefit from its abundant renewable energy resources, particularly wind and solar. For biomass, the country, being an agrarian economy, has good potential for agricultural waste-to-energy gasification technologies. Presently less than one-half of the arable land in the country is cultivated.

### ***Wind energy resource potential***

The mean wind speed in The Gambia is estimated at 3.92m/s. However, in certain locations wind speed as high as 5.0m/s and as low as 3.5m/s can be found, as shown in figure 2. In the areas surrounding Banjul, Western region and some parts of North Bank, where wind speed is comparatively high, wind turbines, particularly of utility scale may be installed. Smaller wind technologies for water pumping for irrigation or livestock rearing and wind mills for grain grinding may be used in inland areas to support agricultural production.

Small-scale wind energy technology for water pumping is not new but sustainability has been more of the issue. In the 1990s, the Department of Water Resources (DWR) actively promoted the use of wind pumps along coastal villages with support from the EU. The pilot systems were installed in three villages, but their operation has been discontinued due to lack of proper maintenance, and pumping systems inappropriate for the local conditions; thus, underscoring the need for capacity building interventions<sup>39</sup>.

Also, although, the energy resource for large scale wind is there, the lack of adequate infrastructure for transporting and installing such technologies could prove to be a barrier in the optimal utilization of the wind resources in the country. Some of these issues were encountered in the implementation of the UNIDO GEF 4 wind energy project in Tanji. Nevertheless, it is expected that the renewable energy law, and GEF's activities to demonstrate the technical feasibility and commercial viability of renewable energy technologies, will create the desired market signal for the development of this value chain.

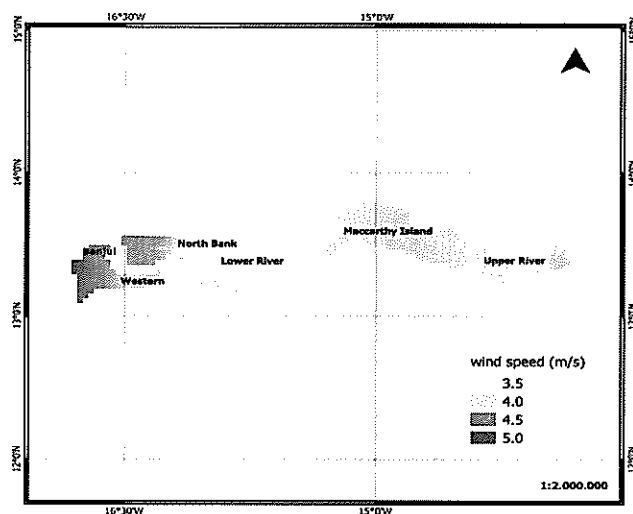
<sup>37</sup> All areas with wind turbine capacity factor greater than 20%.

<sup>38</sup> Supra, see note 19

<sup>39</sup> Gambia RRA report



Figure 1: Wind resources map



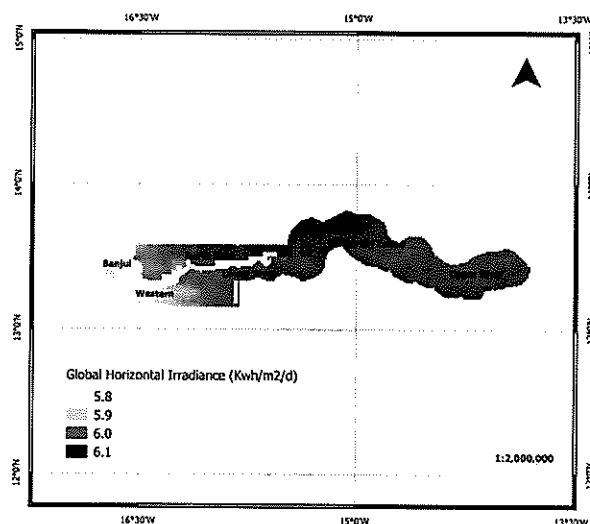
Source: ECOWREX ([www.ecowrex.org](http://www.ecowrex.org))

### *Solar energy potential*

The solar energy potential in the country ranges from 6.1 to 5.8kWh/m<sup>2</sup>/d, with 5.97kWh/m<sup>2</sup>/d being the average global horizontal irradiance (GHI). Although with this average the entire country is suitable for solar energy technologies, the MaCarthy Island and some parts of the North Bank have the highest resource potential, with approximately 6kWh/m<sup>2</sup>/d GHI.

Solar energy applications currently in use in The Gambia include: PV for off-grid applications and solar water heating for homes, hotels and community applications. Numerous PV systems are in use across The Gambia for rural off-grid electrification and water pumping purposes in places unlikely to be reached by the grid. The government and donors have funded most of The Gambia's PV investments as part of rural energy service projects for health clinics, schools, households and street lighting. With funding from the EU and the Japanese government, local private company GamSolar has installed solar pumping systems in about 80 villages. This provides clean potable water to more than 200,000 people. Moreover, through the UNIDO GEF 4 project 4 solar energy (and hybrid) projects were installed with total capacity of 160.7kW, including NAWEC's 60kW grid-connected solar PV.

**Figure 2: Solar energy resource map**



Source: ECOWREX ([www.ecowrex.org](http://www.ecowrex.org))

### *Biomass energy potential*

The Gambia has a rich variety of woodland ecosystems, including forests, closed and open woodland, tree and shrub savannah, mangrove, riparian and fringing savannah. The Gambia's forest cover has declined from 60% in the 1960s to 43% of the land area today<sup>40</sup>. Its forest and woodland ecosystems supply about 85% of domestic energy requirements. Fuelwood accounts for more than 90% of household energy consumption and is often used in inefficient stoves. According to the REMP study conducted the standing stock of woodfuel would not be enough to meet future demand. In 2005 the technical potential for sustainable woodfuel production was about 209, 000 tonnes/year for an aggregated demand of 734 400 tonnes/ year resulting in a huge gap of about 535, 000 tonnes/year<sup>41</sup>. This has led to overexploitation and degradation of native forest, as well as fuel imports from Senegal largely in the form of charcoal.

Given the favourable soil and climate as well as underground water conditions in The Gambia, there is ample opportunity to establish highly productive and intensively managed wood lots. These could replace wood imports and ease the pressure on natural forests. Moreover, The Gambia produces a significant amount of agricultural residues that have the potential to make a meaningful contribution to energy needs. Most crops in The Gambia are subsistence crops (rice, millet, maize and sorghum) with groundnuts as the only cash crop, accounting for over 60% of cash crops produced for exports<sup>42</sup>.

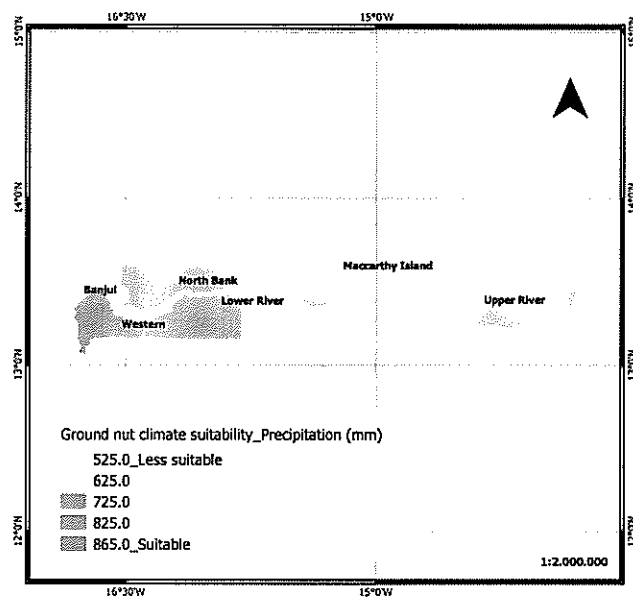
Thus, although millet and maize have the highest energy potential, estimated at 3000 terajoules (TJ) per year and 1200 TJ/year respectively, the residues for these crops are widely used for animal fodder and for various household uses. Hence, the only real potential may lie in the use of groundnut residue through centralized groundnut processing facilities across the country. This would produce heat and electricity to meet local energy needs. Surplus would be sold to the grid. Such centralized large-scale processing facilities could be developed in areas highly suitable for ground-nut cultivation, as shown in figure 3.

<sup>40</sup> Jarju, 2008, cited in RRA report

<sup>41</sup> Ibid

<sup>42</sup> WTO report on The Gambia

**Figure 3: Groundnut climate suitability zones based on precipitation**



Source: ECOWREX ([www.ecowrex.org](http://www.ecowrex.org))

**ANNEX H: SUMMARY OF PRE-FEASIBILITY STUDIES OF SELECTED DEMONSTRATION PROJECTS**  
**TABLE OF INPUT DATA**

Base Data and assumptions	Value	Comments
Consumer's Tariff rate	0.27\$/kWh	<i>The retail tariff rate in the Gambia according to the latest NAWEC annual status report.</i>
Electricity Export rate	0.20\$/kWh	<i>According to NAWEC discussions are ongoing, with PURA, to set the tariff rate at 0.20\$/kWh for systems less than 1.MW.</i>
Fuel type	Oil	
Fuel GHG emission factor	0.723 tCO <sub>2</sub> /MWh	<i>Based on data from RETScreen.</i>
Price of fuel	\$1.4 per litre	<i>Based on information given by NAWEC</i>
T & D losses	25%	<i>Based on information given by NAWEC</i>
Grid emission factor	0.96523 tCO <sub>2</sub> /MWh	<i>Based on data from RETScreen</i>
T & D losses for demonstration projects	8%	<i>Assumption based on past studies on similar cases</i>
Inflation	6%	<i><a href="http://www.indexmundi.com/the_gambia/inflation_rate_consumer_prices.html">http://www.indexmundi.com/the_gambia/inflation_rate_consumer_prices.html</a></i>

**Case 1: Bansang 500kWp Mini-grid**

The Mohan Energy Corporation Ltd, New Delhi India is proposing to install a 500kWp grid-connected project, near the existing power plant, in Bansang under a Build, Own and Operate (B-O-O) arrangement with the state-owned utility – the National Water and Electricity Company (NAWEC). The electricity produced would be entirely evacuated into the local grid and would benefit, directly, business owners in the community, especially women engaged in small-scale industries.

### Summary of prefeasibility study analysis:

<b>Data</b>			<b>Comments</b>
<b>Size</b>		500kW	
<b>Lifetime</b>		20yrs	
<b>Capacity factor</b>		20%	
<b>Electricity exported to grid</b>		876MWh	
<b>Electricity export rate</b>		200\$/MWh	
<b>Investment</b>			
Investment from MEC		650,000 USD	
GEF grant		200,000 USD	
	<b>Total</b>	850,000 USD	
<b>Costs</b>			
<i>Annual O&amp;M cost</i>		800 USD/yr	
<b>Indicators</b>			
Electricity export income		175,200 USD	
IRR		36.8%	
Simple Payback period		3.7 yrs	
Equity Payback period		3.2 yrs	
Emission reduction		777.4 tCO <sub>2</sub> /yr	
Cumulative		15,548tCO <sub>2</sub>	

The electricity from the solar power plant will be available during the day (say from 09:00AM to 05:00PM). And in the evening, demand will be met from the existing diesel generators. Aside from the benefits in terms of increasing the electricity available for productive uses in the community, the project will lead to an improvement in the capacity of the youths in the community as they would be trained throughout the construction, commissioning and maintenance phases. Moreover the project, and the B-O-O framework, will be good as a demonstrator of how private investors could participate in the electricity market as IPPs.

## **Case 2: NAWEC Farafenni 500kW Solar PV**

The 500kW Solar PV being planned by the National Water and Electricity Company (NAWEC) in Farafenni aims to reduce greenhouse gas (GHG) emissions from diesel powered from private generators; help alleviate poverty in the rural area and create savings for the company; support the small to medium-scale manufacturing and service industries to participate in the development of renewable energy in the Gambia. The target beneficiaries are the rural people, particularly women and children.

The project will lead to a net annual GHG emission reduction of 777.4 tCO<sub>2</sub>, which is equivalent to 334,029 litres of petrol avoided.

NAWEC as the promoter will provide this land. NAWEC will also provide storage for the project materials and equipments and allocate manpower during project implementation and operation & maintenance. As the promoter NAWEC will also facilitate licensing, permitting, certifications etc for the project.

### **Summary of prefeasibility study analysis:**

<b>Data</b>			<b>Comments:</b>
<b>Size</b>		500kW	
<b>Lifetime</b>		20 yrs	
<b>Capacity factor</b>		20%	
<b>Electricity exported to grid</b>		876 MWh	
<b>Electricity export rate</b>		200 \$MWh	
<b>Investment</b>			
Investment from NAWEC		580,000 USD	
GEF grant		270,000 USD	
	<i>Total</i>	850,000 USD	
<b>Costs</b>			
<i>Annual O&amp;M cost</i>		800 USD/yr	
<b>Indicators</b>			
Electricity export income		175,200 USD	
IRR		40 %	
Simple Payback period		3.3 yrs	
Equity Payback period		2.9 yrs	
Emission reduction		777.4 tCO <sub>2</sub> /yr	
Cumulative		15,548 tCO <sub>2</sub>	

### Case 3: GCCI Trade Fair Center/Business Incubation Center

Gambia Chamber of Commerce and Industry (GCCI) intend to install a 100kW solar PV system in its trade fair grounds and incubation centre being constructed at the Brusubi Institutional Area, West Coast Region. In the past GCCI has encountered several challenges in its goal to organize, cost-effectively, trade fairs and operate incubation centres. These challenges are associated with the high cost of electricity tariff and frequent power outages, plus the high cost operating private generators.

The installation of a 100 kW electrical capacity at the Trade Fair Centre will mitigate the challenges aforementioned and by doing so supply electricity to promote new small businesses, particularly agriculture related small-scale enterprises where women play a major role in. GCCI envisages that at least 50% of the electricity used to meet the internal load will be dedicated to agro-processing activities.

To run its incubation centres, host trade fair activities, GCCI estimates that it would approximately 88 MWh per annum. In a base case scenario, GCCI will pay close to \$24,000 for electricity, at a tariff rate of 0.27 \$/kWh. With the planned 100kW solar PV system, 100% of the internal load will be met with an additional 88MWh available for export to the grid, at an export rate of 0.20 \$/kWh. The total annual savings, and income, from this will amount to \$41, 172. Moreover, the project will lead to a net GHG emission reduction of 155 tCO<sub>2</sub> per annum; equivalent to saving 69,710 litres of petrol.

#### Summary of prefeasibility study analysis:

Data			Comments:
Size		100 kW	
Lifetime		20 yrs	
Capacity factor		20%	
Electricity delivered to load		88 MWh	GCCI plans to use 50% of the electricity produced internally to run its business incubation centers.
Electricity exported to grid		88 MWh	
Electricity rate -base case		270 \$MWh	
Electricity export rate		200 \$MWh	
Investment			
Investment from GCCI		336,000 USD	
GEF grant		100,000 USD	
	<b>Total</b>	<b>436,000 USD</b>	
Costs			
Annual O&M cost		400 USD/yr	
Fuel cost- proposed case		0	
Annual savings and income			
Fuel cost - base case		23,652 USD	
Electricity export income		17,520 USD	
	<b>Total</b>	<b>41,172 USD</b>	
IRR		20.0%	

Simple Payback period	8.3 yrs	
Equity Payback period	6.2 yrs	
Emission reduction	155 tCO <sub>2</sub> /yr	
Cumulative	3100 tCO <sub>2</sub>	

#### **Case 4: Mbolu Women's Empowerment/vocational training centre and small-scale industry**

Mbolu Association works towards the empowerment and improvement of the welfare of women (from 18 to 65 years who may not have received formal education and/or want to acquire skills to start-up a SME) by strengthening their productive capacities and abilities through training in entrepreneurship and access to the revolving fund.

Mbolu plans to install a grid-tied solar PV system of 20.7kWp to demonstrate the potential of generating employment opportunities and increasing the participation of women in decision-making processes, while protecting the Gambian environment, through the integration of renewable energy systems in vocational training centres.

This project, through revenues that will be generated from selling electricity to the grid, will enable the association provide subsidized services for the following:

- hands-on trainings on renewable energy
- Mainstreaming gender in the renewable energy sector by equipping women with the skills to install and maintain renewable energy systems
- Promoting new activities based on renewable energy for women entrepreneurs
- Running activities for improving skills in sewing, tie-dye, cookery, bakery, catering, arts and craft, basic education, ICT, health, ice making, cosmetic products, etc.

The 20.7kWp solar PV project will lead an emission reduction of 32.2 tCO<sub>2</sub> per annum; the equivalent of saving 13,829 litres of petrol. From selling its electricity, Mbolu would receive an income of \$7,253.

#### **Summary of prefeasibility study analysis:**

Data			Comments:
Size		20.7 kW	
Lifetime		25 yrs	
Capacity factor		20%	
Electricity exported to grid		36.3 MWh	<i>Mbolu plans to evacuate 100% of the electricity produced to NAWEC</i>
Electricity export rate		200 \$/MWh	
Investment			
Investment from Mbolu		108,703 USD	
GEF grant		50,000 USD	
	Total	158,703 USD	
Costs			
Annual O&M cost		150 USD/yr	



<b>Annual savings and income</b>			
<b>Electricity export income</b>		17,520 USD	
	<b>Total</b>		
<b>IRR</b>		12.5%	
<b>Simple Payback period</b>		15.3 yrs	
<b>Equity Payback period</b>		9.8 yrs	
<b>Emission reduction</b>		32.2 tCO <sub>2</sub> /yr	
<b>Cumulative</b>		644 tCO <sub>2</sub>	

#### **Case 5: Sulayman Junkung Hospital/ Power Up Gambia 110kWp Solar PV**

Sulayman Junkung General Hospital (SJGH) is a primary Level referral health facility and a teaching hospital built by the Government of the Gambia. As a Government hospital, SJGH has always been a not-for-profit government institution thriving on inadequate monthly subventions and complementary self-supportive initiatives and drives. The “Bamako Initiative” of cost recovery and patient fee system remains the basis for accessing care. The vast majority of funding for the hospital operations comes from direct government subsidies. And these in turn rely on significant grant funding and governmental loans from external international funding agencies. While these funds cover the very basic of health care needs, the constant budgetary constraints have prevented the hospital from upgrading its operations to meet the expanding number of patients coming to the facility. With budget becoming a constraint, the unstable supply of electricity from the grid and the high cost of running the hospital through diesel-powered generators have rendered SJGH ineffective in meeting its objective of providing high-quality services to its patients.

SJGH and its partner, Power Up Gambia, envisage that by selling to NAWEC 50% of electricity generated through the 110kW solar PV demonstration project it would be able to raise funds to significantly improve health care services while funding the expansion of solar power electrical generation to more rural clinics and hospitals through a health care powering facilities endowment fund. It is expected that the 100,000 people living in the Foni Districts served by SJGH will benefit from both improved health care and improved access to affordable electricity.

To meet its electricity needs, SJGH requires about 92 MWh annually. With the 110kWp solar PV system SJGH will be able to meet this demand (internal load at night time will be met through the existing diesel plant) and sell 101.2 MWh to NAWEC. Annually, the avoided cost of the electricity rate in the base case, where 96MWh would have been met mostly through NAWEC, and the electricity export income would yield \$46, 253 for the hospital. Also, with a net annual GHG emission reduction of 182.7 tCO<sub>2</sub>, emissions will be reduced to a level comparable to 78,519 litres of petrol not used.

### Summary of prefeasibility study analysis:

Data			Comments:
Size		110 kW	
Lifetime		20yrs	
Capacity factor		20%	
Electricity delivered to load		92MWh	50% of electricity used to meet internal load
Electricity exported to grid		101.2MWh	
Electricity rate -base case		270\$/MWh	
Electricity export rate		200\$/MWh	
<b>Investment</b>			
Investment from SJGH		246,000 USD	
GEF grant		62,000USD	
	<b>Total</b>	308,000USD	
<b>Costs</b>			
Annual O&M cost		300 USD/yr	
<b>Indicators</b>			
Fuel cost - base case		26,017 USD	
Electricity export income		20,236 USD	
	<b>Total</b>	46,253 USD	
IRR		27.9%	
Simple Payback period		5.3 yrs	
Equity Payback period		4.3 yrs	
Emission reduction		182.7 tCO <sub>2</sub> /yr	
Cumulative		3,654 tCO <sub>2</sub>	

### Case 6: GreenTech company/hotel and restaurant

GreenTech Company is converting waste groundnut shells into high quality fuel briquettes, which can be used instead of fuelwood for heating, firing and cooking, as in households, canteens, restaurants, bakeries and fish smokeries. The industrial press can produce 500kg/h. Electricity is a major input in the production and contributes significantly to the end user price. The erratic supply of electricity and high cost of relying on a stand by diesel generator during power outages have led to a higher market price for briquettes. Currently the cost of using briquettes is equal to using firewood. If the price of electricity used for production could be lowered, briquettes could compete much better with fuelwood, as only a clear financial advantage could change the consumer behaviour to turn to more sustainable fuels. GreenTech, therefore, plans to install a 60kW biomass generator which will run for 12 hrs a day to compensate for power cuts and to replace the diesel generator being use now.

The generator will produce about 226MWh of electricity annually which will result in savings of approximately 97,339 litres of fuel and, in monetary terms, \$136,275. Moreover, the heat recovered from the system could be used in heating

water. The project will lead to an annual emission reduction of 292tCO<sub>2</sub>/yr and, throughout the life the plant, a total of 8,761 tCO<sub>2</sub>.

**Summary of prefeasibility study analysis:**

Data			Comments:
Size		60kW	
Lifetime		20 yrs	
Net output		5.24kWe	Minus auxiliary load 0.76kWe
Operating hours		4320 hrs/yr	
Electricity production		226 MWh-e/yr	
Power production efficiency		23%	
Heat recovery (CO-gen)		50%	
Fuel needs		3,543 GJ	
Biomass residues		186 ton/yr	
Investment			
Equipment and construction		400,000	
Develop and advisory		40,000	
Testing			
Other cost		8,000	
		-118,000	GEF grant
	Total	330,000 USD	
Costs			
Capital cost (annualised)		57,633 USD/yr	
Annual cost (C )			
Fuel cost		0	Groundnut shells are considered as waste and gotten free of charge. This may continue to be so in the foreseeable future.
Fixed O&M		3,579	0.0138 USD/kW
Variable O&M		3,054	0.0135 USD/kWh
	Subtotal	6,633 USD	
	Lifetime costs	64,267 USD/yr	
Cost of self-generation		0.284 USD/kWh	
Benefits			

<b>Alternative: power and heat with fuel oil</b>			
Avoided fuel oil consumption		97,339 litres	
Avoided fuel costs (B)		136,275 USD	
<b>Indicators</b>			
Net benefits (B-C )		129,642 USD	
Payback period		2.55 yrs	
Emission reduction		292 tCO <sub>2</sub> /yr	
Cumulative		5,840 tCO <sub>2</sub>	

## ANNEX I: ESTIMATE OF ENERGY SAVINGS AND GHG EMISSION REDUCTIONS

### Direct emission reductions

Direct emission reductions within this project result from the investment in six demonstration projects. These projects will be installed and commissioned during the project's 2.5 year implementation phase resulting in direct GHG emission reductions. For each of these projects an economic lifetime of 20 years is assumed. For the 6 demonstration projects this results in total direct emission reductions of 44, 000 tonnes of CO<sub>2</sub> equivalent (tCO<sub>2</sub>eq) over the lifetime of the investments. In the non-GEF base case these energy needs would be satisfied by HFO produced electricity of emission factor of 0.723tCO<sub>2</sub>/MWh (excluding emissions from T&D) or back-up diesel generators with an emission factor of 2.66 kg CO<sub>2</sub>/litre.

No	Project Name	Proposed technology	Project size (kW)	Estimated reduction per annum (tCO <sub>2</sub> )	Cumulative tCO <sub>2</sub> saved over the life of the project
1	Bansang, Mini-grid	Solar PV	500	777.4	15,548
2	FARAFENNI Mini-Grid (NAWEC)	Solar PV	500	777.4	15,548
3	GCCI Trade fair/Business incubation Center	Solar PV	100	155	3,100
4	Mbolo Women's Empowerment	Solar PV	20.7	32.2	644
5	SJGH Solar PV	Solar PV	110	182.7	3,654
6	Perpetuum Mobile-biomass generator for fuel briquette	Biomass generator	60	292	5,840
<b>TOTAL</b>			<b>1290.7</b>	<b>2216.7</b>	<b>44,334</b>

### Direct post-project emission reductions

Although the project will facilitate the financing of new renewable energy projects beyond the implementation phase, this is not expected to use GEF funding which would be used during the project implementation phase only. Therefore as a conservative assumption, no direct post-project greenhouse gas emission reductions are claimed.

### Indirect emissions reductions

The project is expected to catalyse significant further investment in renewable energy due to its policy, technical and capacity building activities that are designed to address the current barriers to investment, resulting in indirect emissions reductions. Using the GEF bottom-up methodology, indirect emission reductions attributable to the project are expected to be 133,000 tCO<sub>2</sub>eq. This figure assumes a conservative replication factor of 3 (GEF uses 3 for a market transformation initiative and 4 where a credit guarantee is introduced). Using the GEF top-down methodology, indirect emission reductions attributable to the project are estimated at a further 152,000 tCO<sub>2</sub>eq. This figure assumes that total technological and economic potential for GHG emission reductions in this area over the post-project 10 years is 252,050 tCO<sub>2</sub>eq, with a project causality factor of 60 %, which takes into account the influence of the related existing government initiatives<sup>43</sup>.

The range of indirect CO<sub>2</sub> emission reductions is 133,000 – 152,000 tCO<sub>2</sub>eq.

## ANNEX J: TERMS OF REFERENCE FOR KEY STAFF

<b>Project Manager</b>
Under the direct supervision of UNIDO the Project Manager is responsible for the day-to-day management and implementation of the UNIDO-GEF 5 project, including all project administrative matters. All work of the Manager will be carried out in line with the Country Programme Action Plan and in full compliance with the UNIDO Rules and Regulations. The management and coordination process will be pursued through undertaking appropriate actions in programme formulation, implementation and evaluation. Strong emphasis will be made on ensuring cohesion with other UNIDO activities in the country.
<b>Job content</b>
<ul style="list-style-type: none"> <li>i. Manage the project implementation in accordance with objectives, schedule and planned budget;</li> <li>ii. Manage all project activity, staff, consultants and etc., for timely implementation of requirements on Monitoring and Evaluation;</li> <li>iii. Coordinate awareness creation on all project activities;</li> <li>iv. Coordinate the project activities with relevant activity and initiative of the Government;</li> <li>v. Ensure cooperation between the participating institutions of the project;</li> <li>vi. Ensure timely preparation of annual project reports, working plans and other relevant project documents.</li> </ul>
<b>Qualifications</b>
<ul style="list-style-type: none"> <li>o At least 10 years work experience in project management. Previous work in international project management is an advantage</li> <li>o University education in Engineering, Energy, Physics, Business Management or relevant field. A post-graduate degree (MSc, MPhil, PhD etc) is an advantage</li> <li>o Strong interpersonal and communication skills</li> <li>o Ability to take decisions</li> <li>o Strong computer skills (Microsoft Office)</li> </ul>

<b>Project Assistant</b>
The Project Assistant will work under the direct supervision of the Project Manager and provide assistance to the project implementation in the mobilization of inputs, the organization of training activities and financial management and reporting.
<b>Job content</b>
<ul style="list-style-type: none"> <li>(i) Prepare all payment requests, financial record-keeping and preparation of financial reports.</li> <li>(ii) Assist in the recruitment and procurement processes, checking the conformity with UNIDO and the Government rules and procedures</li> <li>(iii) Assist in the organization of in-country training activities, ensuring logistical arrangements</li> <li>(iv) Prepare internal and external travel arrangements for project personnel</li> <li>(v) Maintain equipment ledgers and other data base for the project</li> <li>(vi) Take record of projects meetings and draft correspondence as required</li> <li>(vii) Maintain project filing</li> <li>(viii) Other duties which may be required</li> </ul>
<b>Qualifications</b>
<ul style="list-style-type: none"> <li>o At least five years administrative experience,</li> <li>o University degree in Business Administration (Finance or Accounting)</li> <li>o Good organizational skills</li> <li>o Good computer skills, including spread-sheets and database</li> </ul>



REPUBLIC OF THE GAMBIA  
MINISTRY OF FINANCE AND ECONOMIC AFFAIRS  
THE QUADRANGLE, BANJUL, THE GAMBIA.

LDM 53/01 Part 4 (20)

27th August, 2014

Director General  
UNIDO  
Vienna, Austria

Attn: Mr. Philippe Scholtes, Managing Director,  
Programme Development and Technical Cooperation Division

**UNIDO-GEF 5 Project The Gambia: Commitment letter of Co-financing**

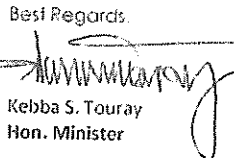
The Government of the Gambia expresses its appreciation to the Director General of UNIDO for the invaluable support and cooperation in the implementation of GEF activities in the Gambia, including the development of the GEF 5 Project.

As you may already have noticed through your various studies and interventions, the Gambia continues to face challenges of providing sustainable energy access to its populations. As the country continues to depend heavily on fossil fuels and traditional biomass with its negative consequences, it reminds us of the need to diversify the energy resource base and explore renewable energy and energy efficiency options. In this regard, the Government commends your efforts to promote the use and integration of small and medium scale renewable energy systems in the productive sectors through the GEF 5 project cycle.

In this regard, the Gambia Government hereby commits a contribution of at least **US\$ 400,000.00 in-kind** and **US\$ 200,000.00 in cash** towards the implementation of the GEF 5 project in the Gambia.

While thanking you for your continued support, please accept, Director General, the assurances of my highest consideration and esteem.

Best Regards,

  
Kebba S. Touray  
Hon. Minister

Cc: Permanent Secretary (MOE)  
Managing Director (NAWEC)  
Director of Treasury  
Aud. Gen.  
Files



July 29, 2014

2014/CEO /2907i

Mr. Philippe Scholtes,  
Managing Director,  
Programme Development and Technical Cooperation Division,  
UNIDO.

Dear Mr Scholtes

**Subject: Co-financing support to the UNIDO – GEF project on Greening the productive sectors in the Gambia, commitment from *Gambia Chamber of Commerce and Industry (GCCCI)* on the GEF Demonstration Project**

We wish to inform the UNIDO-GEF Managing Director that GCCCI would be committing a co-funding of about USD \$336,000 (in cash and kind) towards the UNIDO-GEF initiated project titled 'Greening the productive sectors in the Gambia: Promoting the use and integration of small to medium scale renewable energy systems in the productive uses.

This is to complement the resources already approved by GEF and other development partners for the successful implementation of the project in partnership with the Government of The Gambia and other development partners.

We appreciate the opportunity and thank you for your support.

Yours sincerely

Alieu Secka  
Chief Executive Officer



29<sup>th</sup> July 2014

To:  
Mr. Philippe Scholtes,  
Managing Director,  
Programme Development and Technical Cooperation Division,  
UNIDO

**Subject: Co-financing support to the UNIDO – GEF project on Greening the productive sectors in the Gambia, commitment from *Mbolo Association* on the GEF Demonstration Project**

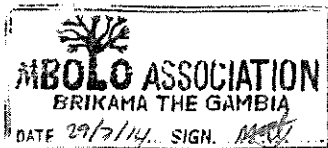
We wish to inform the UNIDO-GEF Managing Director that *Mbolo Association* would be committing a co-funding of € 78,000.44 (in cash and kind) towards the UNIDO-GEF initiated project titled 'Greening the productive sectors in the Gambia: Promoting the use and integration of small to medium scale renewable energy systems in the productive uses'.

This is to complement the resources already approved by GEF to the project proposal 'Women Empowerment Sustainability through Grid-tie Back-up PV System at Fandema Project site (Tujereng, The Gambia)' in the framework of GEF 5 and other development partners for the successful implementation of the project in partnership with the Government of The Gambia and other development partners.

Yours sincerely

Malang Sambou Manneh

  
Chairman  
Mbolo Association



Brikama Town  
The Gambia  
T: (00220) 7533085  
msang@m-bolo.org  
www.m-bolo.org



MOHAN ENERGY CORPORATION PVT. LTD.

Mohan House, Community Centre,  
8 - 9 Zamrudpur, Kailash Colony Extn.  
New Delhi - 110048, INDIA

Phone: +91-11-45003500, 45003501  
Fax: +91-11-29240191  
Email: mec@mohanenergy.com

MEC/RE/152/2014/04  
30<sup>th</sup> July 2014

To:  
Mr. Philippe Scholtes,  
Managing Director,  
Programme Development and Technical Cooperation Division,  
UNIDO.

**Subject: Co-financing support to the UNIDO – GEF project on Greening the productive sectors in the Gambia, commitment from (Mohan Energy Corporation Pvt. Ltd.) on the GEF Demonstration Project.**

Dear Sir,

We thank you for considering and selecting our proposal for a 500KW Solar Project in Bansang, The Gambia. UNIDO-GEF initiated project titled 'Greening the productive sectors in the Gambia: Promoting the use and integration of small to medium scale renewable energy systems in the productive uses.


We also thank you for confirming the grant amount of USD200,000.00 for this project. We would like to inform you that we are keen to implement this project and hereby confirm our commitment to fund the balance cost of the project i.e. USD650,000.00 (US Dollars Six Hundred Fifty Thousand Only) through our own funds including borrowing.

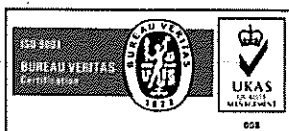
This is to complement the resources already approved by GEF and other development partners for the successful implementation of the project in partnership with the Government of The Gambia and other Development Partners.

Besides funding the project we shall also design, construct, install, commission the project and supply the energy produced to the consumer under agreement with NAWEC.

Thanking you,

Yours sincerely,  
For Mohan Energy Corporation Pvt. Ltd.

  
**Amitabh Agrawal**  
(Director)



[www.mohanenergy.com](http://www.mohanenergy.com)

CIN : U74991DL2006PTC148755

July 30, 2014

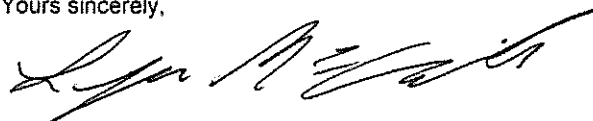
To:  
Mr. Philippe Scholtes,  
Managing Director,  
Programme Development and Technical Cooperation Division,  
UNIDO.

**Subject: Co-financing support to the UNIDO – GEF project on Greening the productive sectors in the Gambia, commitment from Power Up Gambia on the GEF Demonstration Project**

We wish to inform the UNIDO-GEF Managing Director that Power Up Gambia is currently actively engaged in obtaining all the necessary co-funding of USD \$246,000 needed to implement our proposed project under the UNIDO-GEF initiated project titled 'Greening the productive sectors in the Gambia: Promoting the use and integration of small to medium scale renewable energy systems in the productive uses'.

This is to complement the resources already approved by GEF and other development partners for the successful implementation of the project in partnership with the Government of The Gambia and other development partners.

Yours sincerely,



Lynn McConville  
Executive Director  
Power Up Gambia  
email [lmcconville@powerupgambia.org](mailto:lmcconville@powerupgambia.org)  
phone: 267-456-3753

**Power Up Gambia** - Providing reliable electricity and water to healthcare facilities in The Gambia through solar energy. For more information visit our website at [www.powerupgambia.org](http://www.powerupgambia.org)

**Power Up Gambia** - Providing reliable electricity and water to healthcare facilities in The Gambia through solar energy.  
Power Up Gambia is USA-based registered 501(c)3 public charity.  
For more information visit our website at [www.powerupgambia.org](http://www.powerupgambia.org) or contact us at [info@powerupgambia.org](mailto:info@powerupgambia.org).



30<sup>th</sup> of July 2014

To:

Mr. Philippe Scholtes,  
Managing Director,  
Programme Development and Technical Cooperation Division,  
UNIDO.

**Subject: Co-financing support to the UNIDO – GEF project on Greening the productive sectors in the  
Gambia, commitment from *GreenTech Company Ltd* on the GEF Demonstration Project**

Dear Sir,

We wish to inform the UNIDO-GEF Managing Director that *GreenTech Company Ltd*, located in *Kololi/Senegambia, The Gambia*, would be committing a co-funding of USD 330.000,00 in form of equity, land, labour and expertise towards the UNIDO-GEF initiated project titled 'Greening the productive sectors in the Gambia: Promoting the use and integration of small to medium scale renewable energy systems in the productive uses.

This is to complement the resources already approved by GEF and other development partners for the successful implementation of the project in partnership with the Government of The Gambia and other development partners.

We thank you for your kind support.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Anthony Tabbal", is written over a horizontal line.

*Anthony Tabbal, Managing Director*



**NATIONAL WATER AND ELECTRICITY COMPANY LTD.**

Mamady Maniyang Highway, Kanifing - PO Box 609, Banjul, The Gambia  
Tel: (+220) 4376606 / 4376607 – Fax: (+220) 4375990  
E-mail: nawecmd@qanet.gm

Ref: NAWEC/CSD/TPD/VOL XL (41)

Date: 31<sup>st</sup> July, 2014

Mr. Philippe Scholtes,  
Managing Director,  
Programme Development and Technical Cooperation Division,  
UNIDO.

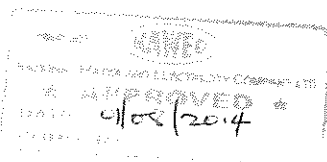
**Subject: Co-financing support to the UNIDO – GEF project on Greening the productive sectors in the Gambia, commitment from (project promoter) on the GEF Demonstration Project**

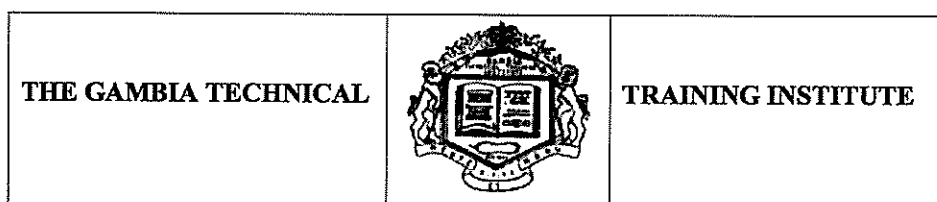
We wish to inform the UNIDO-GEF Managing Director that NAWEC would be committing a co-funding of USD580, 000.00 (in cash) towards the UNIDO-GEF initiated project titled 'Greening the productive sectors in the Gambia. Promoting the use and integration of small to medium scale renewable energy systems in the productive uses

This is to complement the resources already approved by GEF and other development partners for the successful implementation of the project in partnership with the Government of The Gambia and other development partners

Yours sincerely

  
Nani Juwara  
Deputy Managing Director





08/09/ 2014

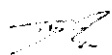
Mr. Philippe Scholtes,  
Managing Director,  
Programme Development and Technical Cooperation Division,  
UNIDO.

**Subject: Co-financing support to the UNIDO – GEF project on Greening the productive sectors in the Gambia, commitment from GTTI on the GEF Demonstration Project**

We wish to inform the UNIDO-GEF Managing Director that *the Gambia Technical Training Institute (GTTI)* would be committing a co-funding of USD 24,685.00 (in-kind) towards the UNIDO-GEF initiated project titled 'Greening the productive sectors in the Gambia: Promoting the use and integration of small to medium scale renewable energy systems in the productive uses.

This is to complement the resources already approved by GEF and other development partners for the successful implementation of the project in partnership with the Government of The Gambia and other development partners.

Yours sincerely



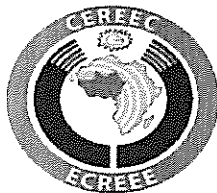
Jahou S Faal  
Director General

---

**THE GAMBIA TECHNICAL TRAINING INSTITUTE**  
P. O. Box 989 Kanifing Industrial Estate Banjul, The Gambia  
Phone: (220) 439-2841, 437-4527, 437-4524 / Fax: (220) 439-2781 / E-mail: gtti@qanet.gm

# ECREEE

Address: Achada Santo António,  
Electra Building, 2nd Floor C.P  
288, Praia, Cape Verde



# CEREEC

Tel.: 260 4630 Fax: 262 4614  
e-mail: [info@ecreee.org](mailto:info@ecreee.org)  
[www.ecreee.org](http://www.ecreee.org)

Ref.No. ECR/REL/GEF5/03-09/MK/2014

Praia, 03 September 2014

Mr. Philippe Scholtes,  
Managing Director,  
Programme Development and Technical Cooperation Division,  
UNIDO

**Subject: Co-financing support to the UNIDO – GEF project on Greening the productive sectors in the Gambia, commitment from the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) on the GEF Project**

We wish to inform the Managing Director that ECREEE would be committing a co-funding of 100,000 USD *in-kind* towards the UNIDO-GEF initiated project entitled 'Greening the productive sectors in the Gambia: Promoting the use and integration of small to medium scale renewable energy systems in the productive uses.

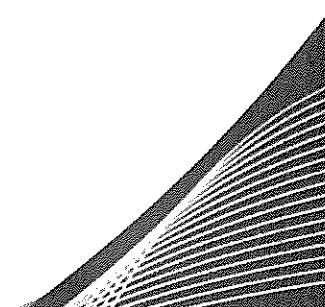
This is to complement the resources already approved by GEF and other development partners for the successful implementation of the project in partnership with the Government of The Gambia and other development partners.

Yours sincerely,

**Mahama Kappiah**  
**Executive Director**



ECOWAS CENTRE FOR RENEWABLE ENERGY AND ENERGY EFFICIENCY  
CENTRO PARA AS ENERGIAS RENOVÁVEIS E EFICIÊNCIA ENERGÉTICA DA CEDEAD  
CENTRE POUR LES ENERGIES RENOUVELABLES ET L'EFFICACITÉ ÉNERGÉTIQUE DE LA CEDEAD



## **ANNEX – M CRITERIA FOR SELECTING DEMONSTRATION PROJECTS**

### **UNIDO GEF 5 Project in the Gambia**

#### **Outline for Project Proposals on**

**“Greening the productive sectors in Gambia: Promoting the use and integration of small and medium scale renewable energy systems in the productive sectors”**

**(Five pages Maximum)**

#### **Section A: Summary Page**

- a. Project title:
- b. Name of implementing agent(s):
- c. Project Size:
- d. Project location:
- e. Proposed starting date:
- f. Project duration:
- g. Total Capital cost:
- h. Amount requested from GEF:
- i. Estimated annual energy generation/offset imports (kWh):

#### **Section B**

##### **1. Background and Justification (objectives, beneficiaries, expected results of the projects)**

This section should provide a brief introduction to the current social and economic situation related to the geographic region and beneficiaries of the project. The background should also describe:

- a. The problem or critical issue which the proposal seeks to resolve
- b. How the proposal relates to other relevant national development strategies and policies
- c. How the need for the project was determined
- d. The beneficiaries and how they were involved in project identification and planning
- e. What kind of resources the project promoter will provide.

##### **2. Project Description:**

This section should describe the productive sector/income generating activity; technology; key elements of the design; the renewable energy resource that will be harnessed; the expected power/heat output; implementation and management structure; operation and maintenance.

##### **3. Replicability and demonstration**

This section should describe plans on how this project will be used to demonstrate the techno-economic feasibility of small to medium scale renewable energy systems in the productive sector and the potential for replicating /up scaling similar projects in the productive sectors of the Gambia.



#### 4. Cost and economics

Under this section describe funding arrangements (please describe in detail, with attachments of proofs, how the promoter will finance the project) economic evaluation of the project as well as the environmental impacts, social impacts that the project will have.

##### Selection Criteria

The United Nations Industrial Development Organization (UNIDO) is implementing, for the 5<sup>th</sup> Global Environment Facility (GEF) cycle, a project titled “Greening the productively sectors in Gambia: Promoting the use and integration of small and medium scale renewable energy systems in the productive sectors”. The project will be executed by the ECOWAS Center for Renewable Energy and Energy Efficiency (ECREEE) with the support of the Ministry of Energy of the Gambia.

The UNIDO GEF 5 project has three components which will be delivered simultaneously throughout a period of 30 months. These core components are as follows:

- Component 1: Development of strategy and regulation on the integration of small-to-medium scale RE systems;
- Component 2: Demonstration of technical feasibility of small to medium scale renewable energy systems and promoting investments;
- j. Component 3: Renewable energy project entrepreneurship skills development.

For component 2, project promoters with proposals that meet the criteria below are encouraged to send in their proposals to [unidogef5@ecreee.org](mailto:unidogef5@ecreee.org)

- Demonstration projects must be implemented in the Gambia.
- Renewable energy projects which either generate electricity or off-set electricity demand on the grid are eligible. In areas not yet connected to the grid, the project must show that when the locality becomes electrified the GEF project has the potential to off-set the demand on the grid.
  - Projects should be between 20 kW and 500 kW (or the equivalent thermal capacity).
  - Demonstration projects should demonstrate a replicable approach to renewable energy.
- A significant proportion of the electricity or heat (more than 50%) must be dedicated for productive uses or sold to the grid.
  - Productive uses encompass any income generating enterprise or industry.
  - Demonstration projects must be able to show that they are commercially viable.
  - Projects should demonstrate a strong incorporation of women as target beneficiaries.
    - Private enterprises should be encouraged to participate in the project.
    - Economic pay back for the projects should be within 5 years.
- The project beneficiary must be able to demonstrate availability of co-finance of between 60% to 80% of total costs, depending on the GEF grant available.
- Eligible co-finance includes equity, debt, cash, land, equipment and personnel. Co-finance is only eligible if clearly identified with the project and spent at the time of the project implementation.
- The plant design and the quality of equipment and the operation (maintenance) must ensure a plant life time of at

least 15 years.

- The project beneficiaries should apply for the project on a voluntary basis
- The organizations should be able to provide the complete set of legally required documentation for any project permitting or licensing by the Government
  - The beneficiaries should have the management and technical capability to run the project.
- The beneficiaries should have a good economic basis, the capacity to repay loans, provide the required security and the required contribution. Total assets must be larger than the total liabilities.
- The project should be able to be viewed and visited by others so that it acts as a true demonstration project.
- All proposed projects must show environmental benefits as compared to using alternate conventional energy sources.
  - The project should have no secondary pollution
  - Beneficiaries should not infringe on nature reserves.
- Any project emissions have to be controlled according to local environmental legislation.